**Invitation for Bids**
**DACA03-98-R-0002**

**U.S. Army Corps of Engineers**
**Little Rock District**

# Job Order Contracting

**Military and Civil Projects Within the Southwestern Division Boundaries including the States of Arkansas, Missouri, Louisiana, Oklahoma, Texas and New Mexico**

## Construction Solicitation and Specifications

**Multiple Award - 8(a) Competitive and Unrestricted**

**ORAL PRESENTATIONS WILL BE USED IN EVALUATION AND SELECTION OF CONTRACTORS**

**Rewrite of the Federal Acquisition Regulations Part 15--Negotiated Source Selection--applies to this procurement**

**December 1997**

**(Facsimile Bid, Bid Bond, Modification or Withdrawal of Bid will not be accepted.)**

# Preproposal Conference

A preproposal conference is scheduled for January 12, 1998, at 10:00 a.m. The conference will be held at the Little Rock District, U.S. Army Corps of Engineers Conference th

## CAUTION TO OFFERORS

All information required by the terms of the solicitation must be furnished. MISTAKES OR OMISSIONS CAN BE COSTLY. Important items for you to check are included in but not limited to those listed below. This checklist is furnished only to assist you in submitting a proper offer. Check as you read.

( ) Have you acknowledged all amendments?

( ) Have you included your Contractor ID (DUNS) number in the block below your name and address?

( ) Is your offer properly signed?

( ) Are all erasures or corrections initialed by the person signing this offer?

( ) Have you not restricted your technical proposal by altering the provisions of the solicitation?

( ) Have you included the original plus five copies of your technical proposal? **No prices or information pertaining to prices should be included in your technical proposal.**

( ) Have you submitted your price proposal in a separate envelope? See Section 00100 for instructions on submission of technical and price proposals.

( ) Are the envelopes/packages containing your offer properly identified that it is a sealed offer and does it contain the correct solicitation number and date/time for receipt of offers?

## R E M I N D E R

**Offers should submit proposals that are acceptable without any additional explanation or information. The Government may make a final determination regarding a proposal's acceptability solely on the basis of the proposal as submitted.**

MAIN TABLE OF CONTENTS


| Section | Title | Page Nos. |
|---|---|---|
| 00010 | Solicitation, Officer, and Award, SF-1442, Bidding Schedule | 1 thru 5 |
| 00100* | Instructions, Conditions, and Notices to Bidders | 1 thru 23 |
| 00600* | Representations, Certifications, and Other Offerors | 1 thru 12 |
| 00700 | Contract Clauses | 1 thru 84 |
| 00800 | Special Contract Requirements | 1 thru 32 |
| 00900 | Attachments | 1 |


*NOTE: Sections 00100 and 00600 to this solicitation will be a part of any resultant contract; however, they will not be physically attached to the contract.

Section 00010 – Table of Contents

and

TITLE _____

Solicitation, Officer & Award (SF 1442)

Bidding Schedule

OMB APPROVAL NO.

| SOLICITATION, OFFER, AND AWARD (Construction, Alteration, or Repair) J | 1. SOLICITATION NO. DACA03-98-R-0002 | 2. TYPE OF SOLICITATION ☐ SEALED BID (IFB) ☒ NEGOTIATED (RFP) | 3. DATE ISSUED 15 DEC 97 | PAGE OF PAGES 1 5 |
|---|---|---|---|---|

**IMPORTANT - The "offer" section on the reverse must be fully completed by offeror.**

| 4. CONTRACT NO. | 5. REQUISITION/PURCHASE REQUEST NO. W41XDE72880827 | 6. PROJECT NO. |
|---|---|---|

| 7. ISSUED BY CODE | 8. ADDRESS OFFER TO |
|---|---|
| Little Rock District, Corps of Engineers<br>P.O. Box 867 / 700 West Capitol Ave.<br>Little Rock, Arkansas 72203-0867 | Little Rock District, Corps of Engineers<br>P.O. Box 867 / 700 West Capitol Ave.<br>Little Rock, Arkansas 72203-0867 |

| 9. FOR INFORMATION CALL: | A. NAME: Janet Holmes<br>E-Mail: jholmes@lrd02.swl.usace.army.mil | B. TELEPHONE NO. *(Include area code)* ***(NO COLLECT CALLS)***<br>501-324-6078 |
|---|---|---|

## SOLICITATION

NOTE: In sealed bid solicitations "offer" and "offeror" mean "bid" and "bidder."

10. THE GOVERNMENT REQUIRES PERFORMANCE OF THE WORK DESCRIBED IN THESE DOCUMENTS *(Title, identifying no., date):*

JOB ORDER CONTRACTS, MILITARY AND CIVIL PROJECTS,
SOUTHWESTERN DIVISION INCLUDING THE STATES OF
ARKANSAS, MISSOURI, LOUISIANA, OKLAHOMA, TEXAS AND NEW MEXICO

This is an indefinite delivery, indefinite quantity type contract used to acquire real property repair, maintenance, and minor construction for the military and civil projects within the Southwestern Division including the states of Arkansas, Missouri, Louisiana, Oklahoma, Texas and New Mexico. Task orders will be on an "as needed" basis. The base contract will be from date of award to 31 May 99, with four one year renewal options. Total maximum contract amount for the basic period plus the four option years is $15 million. The guaranteed minimum quantity of work is $60,000 for the basic contract period and $30,000 for each option year.

Two contracts will be awarded from this solicitation. One contract award will be restricted to 8(a) firms operating with the boundaries of Arkansas. The remaining contract will be awarded from all offers received on an unrestricted basis. All firms submitting proposals for the 8(a) competitive award will be considered for the remaining award. Firms submitting unrestricted award.proposals shall not be considered for both awards either indiv. or as a JV or other business combination.

11. The Contractor shall begin performance within (See Sec 00800) calendar days and complete it within (See Sec 00800) calendar days after receiving ☒ award, ☐ notice to proceed. This performance period is ☒ mandatory, ☐ negotiable. (See Sec. 00800.)

| 12A. THE CONTRACTOR MUST FURNISH ANY REQUIRED PERFORMANCE AND PAYMENT BONDS? *(If "YES," indicate within how many calendar days after award in Item 12B.)* ☒ YES ☐ NO | 12B. CALENDAR DAYS 10 |
|---|---|

13. ADDITIONAL SOLICITATION REQUIREMENTS:

A. Sealed offers in original and five copies of the technical proposal and one original of the cost proposal to perform the work required are due at the place specified in Item 8 by 4:00 p.m. *(hour)* local time 29 Jan 98 *(date)*. ~~If this is a sealed bid solicitation, offers must be publicly opened at that time~~. Sealed envelopes containing offers shall be marked to show the offeror's name and address, the solicitation number, and the date and time offers are due.

B. An offer guarantee ☒ is, ☐ is not required. See Section 00100 for offer guarantee amount.

C. All offers are subject to the (1) work requirements, and (2) other provisions and clauses incorporated in the solicitation in full text or by reference.

D. Offers providing less than 90 calendar days for Government acceptance after the date offers are due will not be considered and will be rejected.

## OFFER *(Must be fully completed by offeror)*

| 14. NAME AND ADDRESS OF OFFEROR *(Include ZIP Code)* | 15. TELEPHONE NO. *(Include area code)* / FAX NO. *(Include area code)* |
|---|---|
| | 16. REMITTANCE ADDRESS *(Include only if different than Item 14)* |
| CONTRACTOR I.D. | |

17. The offeror agrees to perform the work at the prices specified below in strict accordance with the terms of this solicitation, if this offer is accepted by the Government within _____ calendar days after the date offers are due. *(Insert any number equal to or greater than the minimum requirement stated in Item 13D. Failure to insert any number means the offeror accepts the minimum in Item 13D.*

AMOUNTS ▶ See Bidding Schedule

18. The offeror agrees to furnish any required performance and payment bonds.

19. ACKNOWLEDGMENT OF AMENDMENTS

*The offeror acknowledges receipt of amendments to the solicitation -- give number and date of each*

| AMENDMENT NO. | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| DATE | | | | | | | | | | |

| 20A. NAME AND TITLE OF PERSON AUTHORIZED TO SIGN OFFER *(Type or print)* | 20B. SIGNATURE | 20C. OFFER DATE |
|---|---|---|

## AWARD *(To be completed by Government)*

21. ITEMS ACCEPTED:

| 22. AMOUNT | 23. ACCOUNTING AND APPROPRIATION DATA |
|---|---|

| 24. SUBMIT INVOICES TO ADDRESS SHOWN IN *(4 copies unless otherwise specified)* ▶ | ITEM 26 | 25. OTHER THAN FULL AND OPEN COMPETITION PURSUANT TO ☐ 10 U.S.C. 2304(c)( ) ☐ 41 U.S.C. 253(c)( ) |
|---|---|---|
| 26. ADMINISTERED BY CODE | | 27. PAYMENT WILL BE MADE BY |
| Contracting Division | Phone: 501-324-5721 | DISBURSING OFFICER, USAED Little Rock (See Section 00800, |
| Little Rock District, Corps of Engineers | FAX: 501-324-5196 | C/o USACE Finance Center (ATTN: CEFC-AO) No. 12) |
| P.O. Box 867, Little Rock, AR 72203-0867 | | 7800 Third Ave., Millington, TN 38054-5005 |

**CONTRACTING OFFICER WILL COMPLETE ITEM 28 OR 29 AS APPLICABLE**

| ☐ 28. NEGOTIATED AGREEMENT *(Contractor is required to sign this document and return ____ copies to issuing office.)* Contractor agrees to furnish and deliver all items or perform all work, requisitions identified on this form and any continuation sheets for the consideration slated in this contract. The rights and obligations of the parties to this contract shall be governed by (a) this contract award, (b) the solicitation, and (c) the clauses, representations, certifications, and specifications or incorporated by reference in or attached to this | ☐ 29. AWARD *(Contractor is not required to sign this document.)* Your offer on this solicitation is hereby accepted as to the items listed. This award consummates the contract, which consists of (a) the Government solicitation and your offer, and (b) this contract award. No further contractual document is necessary. |
|---|---|
| 30A. NAME AND TITLE OF CONTRACTOR OR PERSON AUTHORIZED TO SIGN *(Type or print)* | 31A. NAME OF CONTRACTING OFFICER *(Type or print)* |

| 30B. SIGNATURE | 30C. DATE | 31B. UNITED STATES OF AMERICA<br>BY | 31C. AWARD DATE |
|---|---|---|---|

SECTION 00010 - SUPPLIES OR SERVICES AND PRICES/COSTS
Base Year Coefficient Factors and NPP Percentage Factor
(Date of award through 31 May 99)

| | | |
|---|---|---|
| **0001** | **Arkansas** | |
| 0001AA | Normal Working Hours | _____ |
| 0001AB | Other Than Normal Working Hours | _____ |
| 0001AC | Non-prepriced Percentage Factor | _____ |
| **0002** | **Louisiana** | |
| 0002AA | Normal Working Hours | _____ |
| 0002AB | Other Than Normal Working Hours | _____ |
| 0002AC | Non-prepriced Percentage Factor | _____ |
| **0003** | **Missouri** | |
| 0003AA | Normal Working Hours | _____ |
| 0003AB | Other Than Normal Working Hours | _____ |
| 0003AC | Non-prepriced Percentage Factor | _____ |
| **0004** | **New Mexico** | |
| 0004AA | Normal Working Hours | _____ |
| 0004AB | Other Than Normal Working Hours | _____ |
| 0004AC | Non-prepriced Percentage Factor | _____ |
| **0005** | **Oklahoma** | |
| 0005AA | Normal Working Hours | _____ |
| 0005AB | Other Than Normal Working Hours | _____ |
| 0005AC | Non-prepriced Percentage Factor | _____ |
| **0006** | **Texas** | |
| 0006AA | Normal Working Hours | _____ |
| 0006AB | Other Than Normal Working Hours | _____ |
| 0006AC | Non-prepriced Percentage Factor | _____ |

**OFFERS:**

**1. THE UNIT PRICE BOOK IN THIS SOLICITATION WAS DEVELOPED USING LITTLE ROCK, ARKANSAS AS THE PROJECT LOCATION. OFFERORS MUST TAKE INTO CONSIDERATION THAT COEFFICIENTS WILL APPLY TO LOCATIONS OTHER THAN THE LITTLE ROCK AREA WHEN SUBMITTING AN OFFER.**

2. Each offeror must submit two coefficient factors and a NPP percentage factor for each state. The first coefficient factor for each state will be applied to prepriced work anticipated to be accomplished during normal working hours. The second coefficient factor for each state will be applied to prepriced work anticipated to be accomplished during other than normal working hours. The NPP percentage factor will be applied to non-prepriced work.

3. The offer shall be “net”, (e.g., 1.0) or a percentage “decrease from” (e.g. .95) or “increase to “(e.g. 1.2) the unit price book. Offerors submitting separate coefficients or percentage factors for line items in the unit price book will be considered unacceptable and the offer will be rejected.

4. The offerors coefficient factor is a numerical factor that represents costs (generally indirect costs) not considered to be included in the Unit Price Book. The coefficient factor must include, but is not limited to, the items listed below, and all contingencies in connection therewith, as no allowance will be made later for any other cost than prepriced or non-prepriced item unit prices.

- field and home office overhead for prime and subcontractors
- profit for prime and subcontractors
- taxes and workman's compensation
- insurance costs
- all costs associated with bonding and alternative payment protection, including the bond premiums
- employee payroll taxes, insurance and fringe benefits
- adjustments for labor, material and equipment for areas outside Pulaski County, AR
- protective clothing
- equipment rental
- mobilization and close out for the total contract and each task order
- compliance with environmental laws (overhead {indirect} costs associated with performing work in compliance with EPA/OSHA regulations, including obtaining any necessary licenses and permits, reporting requirements, etc.)
- compliance with protection and safety laws (i.e., safety rails, face and clothing protection, etc.)
- project signs, traffic and work site signs and barriers
- daily and final clean up
- daily quality control and reports
- operation and maintenance manuals (4 copies required on major equipment)
- moving furniture
- barricades for work site
- electricity, water, and restroom facilities not readily available at the project site
- all waste and excess material
- CAD and as-built drawings
- project management and supervision
- protection of and/or moving of government property
- quality control
- office management and equipment
- depreciation of mobile office(s)
- interest associated with funding of equipment and payroll
- submittal preparation
- permits, licenses, and fees
- other risks of doing business (i.e., risk of a lower than expected contract dollar value; risk of poor subcontractor performance and reperformance)

Contingent costs, such as labor rate changes and inflation for option years, should not be included in the coefficients since option years will be increased by the Economic Price Adjustment. Coefficients proposed by offerors are multiplied times the Government established unit prices in the Unit Price Book to price a job or project on individual orders. The coefficients proposed by the offeror and accepted by the Government will be incorporated in this contract.

5. The non-prepriced profit and overhead percentage will be applied to the bare labor, equipment and material costs of negotiated non-prepriced work. This factor will be used in lieu of the coefficient factor for the non-prepriced item only. Negotiated non-prepriced items, excluding the profit and overhead percentage, may be added to the unit price book for use on future task orders.

**NOTES:**

1. See Section 00800, Evaluation Factors for Award, for a description of price evaluation.

2. Coefficient/percentage factors shall not be carried out further than two decimal points. Submission of a coefficient/percentage factor which extends beyond two decimal points will be rounded to the nearest two decimal points.

3. FAR 52.225-5, Buy American Act—Construction Materials, located in Section 00700, applies to all task orders issued under JOC contracts. Offerors are required to notify the Contracting Officer in advance of performance of any delivery order, if they (or any subcontractor or supplier) plan to use any foreign construction materials, as defined in the clause, in the performance of the delivery order.

4. Coefficients/percentage factors are defined by state lines. Coefficients must be submitted for normal working hours, other than normal working hours, and a percentage for non-prepriced line item profit and overhead. **Failure to provide an offer for each bid item may result in your bid not being considered for award.**

5. Coeffients for renewal options will be calculated in accordance with AFARS Clause 52.217-9000, ADJUSTMENTS TO CONTRACTOR'S COEFFICIENT FOR OPTION YEARS (JOB ORDER CONTRACTS). Non-prepriced percentage factors shall not be increased from the base year. See Section 00800 of the solicitation.

TABLE OF CONTENTS
SECTION 00100
INSTRUCTIONS, CONDITIONS, AND NOTICES TO BIDDERS


| | | |
|---|---|---|
| ~~1~~ | ~~52.252-1~~ | ~~SOLICITATION PROVISIONS INCORPORATED BY REFERENCE (JUN 1988)~~ |
| ~~2~~ | ~~52.225-14~~ | ~~INCONSISTENCY BETWEEN ENGLISH VERSION AND TRANSLATION OF CONTRACT (AUG 1989)~~ |
| 3 | 52.204-6 | CONTRACTOR IDENTIFICATION NUMBER--DATA UNIVERSAL NUMBERING SYSTEM (DUNS)NUMBER (DEC 1996) |
| 4 | 52.211-1 | AVAILABILITY OF SPECIFICATIONS LISTED IN THE GSA INDEX OF FEDERAL SPECIFICATIONS, STANDARDS AND COMMERCIAL ITEM DESCRIPTIONS (JUN 1997) |
| 5 | 52.211-2 | AVAILABILITY OF SPECIFICATIONS LISTED IN THE DOD INDEX OF SPECIFICATIONS AND STANDARDS (DODISS) (JUN 1997) |
| 6 | 52.211-14 | NOTICE OF PRIORITY RATING FOR NATIONAL DEFENSE USE (SEP 1990) |
| 7 | 52.216-1 | TYPE OF CONTRACT (APR 1984) |
| 8 | 52.217-5 | EVALUATION OF OPTIONS (JUL 1990) |
| 9 | 52.222-23 | NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY (APR 1984) |
| 10 | 52.225-12 | NOTICE OF BUY AMERICAN ACT REQUIREMENT-CONSTRUCTION MATERIALS (MAY 1997) |
| 11 | 52.225-13 | NOTICE OF BUY AMERICAN ACT REQUIREMENT--CONSTRUCTION MATERIALS UNDER TRADE AGREEMENTS ACT AND NORTH AMERICAN FREE TRADE AGREEMENT (MAY 1997) |
| 12 | 52.228-1 | BID GUARANTEE (SEP 1996) |
| 13 | 52.228-11 | PLEDGES OF ASSETS (FEB 1992) |
| 14 | 52.252-5 | AUTHORIZED DEVIATIONS IN PROVISIONS (APR 1984) |
| 15 | 52.204-7001 | COMMERCIAL AND GOVERNMENT ENTITY (CAGE) CODE REPORTING (DEC 1991) |
| 16 | 52.2-4066 | OFFERS (LRD)(NOV 1997) |
| 17 | 52.2-4067 | COEFFICIENT FACTORS (NOV)(JAN 1997) |
| 18 | 52.2-4068 | PROPOSAL FORMAT AND CONTENT (LRD)(NOV 1997) |
| 19 | 52.2-4071 | PERFORMANCE AND PAYMENT BONDS (LRD)(NOV 1997) |
| 20 | 52.2-4073 | PRE-PROPROPOSAL CONFERENCE (LRD) (NOV 1997) |
| 21 | 52.5-4077 | PARTNERING |
| 22 | 52.211-4004 A | AVAILABILITY FOR EXAMINATION OF SPECIFICATIONS NOT LISTED IN THE GSA INDEX OF FEDERAL SPECIFICATIONS, STANDARDS AND COMMERCIAL ITEM DESCRIPTIONS (JUN 1988) (FAR 52.0211-0004) |
| 23 | 52.215-4001 A | INSTRUCTIONS TO OFFERORS--COMPETITIVE ACQUISITION (OCT 1997) |
| 24 | 52.233-4002 | SERVICE OF PROTEST (AUG 1996) (FAR 52.233-2) |
| 25 | 52.236-4028 A | PREPARATION OF PROPOSALS--CONSTRUCTION (OCT 1997) |
| 26 | 52.1000-4000 | CONTRACT CLAUSE AND SOLICITATION PROVISION NUMBERING (LRD) |
| 27 | 52.1000-4229 I | DRAWINGS AND SPECIFICATIONS (APR 1984) (LRD) |
| 28 | 52.1000-4232 | OFFEROR'S QUALIFICATIONS (APR 1984) (LRD) |
| 29 | 52.7211-4002 A | AVAILABILITY FOR EXAMINATION OF SPECIFICATIONS, STANDARDS, PLANS, DRAWINGS, DATA ITEM DESCRIPTIONS, AND OTHER PERTINENT DOCUMENTS (DEC 1991)(DFARS 52.210-7002) |
| 30 | 52.9999-4998 II | ENCLOSURES |
| 31 | | ORAL PRESENTATIONS (DEC 1997) (LRD) |
| 32 | | EVALUATION FACTORS FOR AWARD (DEC 1997) (LRD) |
| 33 | | CONTENTS OF TECHNICAL PROPOSALS (DEC 1997) (LRD) |
| 34 | | COEFFICIENT EVALUATION |
| 35 | | PROPOSAL SUBMITTAL PROCEDURES |

SECTION 00100

INSTRUCTIONS, CONDITIONS, AND NOTICES TO BIDDERS

~~1 52.252-1 SOLICITATION PROVISIONS INCORPORATED BY REFERENCE (JUN 1988)~~

~~This solicitation incorporates one or more solicitation provisions by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available.~~
~~(End of provision)~~

~~2 52.225-14 INCONSISTENCY BETWEEN ENGLISH VERSION AND TRANSLATION OF CONTRACT (AUG 1989)~~
~~(Reference 25.902)~~

3 52.204-6 CONTRACTOR IDENTIFICATION NUMBER--DATA UNIVERSAL NUMBERING SYSTEM (DUNS) NUMBER (DEC 1996)

(a) Contractor Identification Number, as used in this provision, means "Data Universal Numbering System (DUNS) number," which is a nine-digit number assigned by Dun and Bradstreet Information Services.
(b) Contractor identification is essential for complying with statutory contract reporting requirements. Therefore, the offeror is requested to enter, in the block with its name and address on the Standard Form 33 or similar document, the annotation "DUNS" followed by the DUNS number which identifies the offeror's name and address exactly as stated in the offer.
(c) If the offeror does not have a DUNS number, it should contact Dun and Bradstreet directly to obtain one. A DUNS number will be provided immediately by telephone at no charge to the offeror. For information on obtaining a DUNS number, the offeror should call Dun and Bradstreet at 1-800-333-0505. The offeror should be prepared to provide the following information:
(1) Company name.
(2) Company address.
(3) Company telephone number.
(4) Line of business.
(5) Chief executive officer/key manager.
(6) Date the company was started.
(7) Number of people employed by the company.
(8) Company affiliation.
(d) Offerors located outside the United States may obtain the location and phone number of the local Dun and Bradstreet Information Services office from the Internet Home Page at http://www.dbisna.com/dbis/customer/custlist.htm. If an offeror is unable to locate a local service center, it may send an e-mail to Dun and Bradstreet at globalinfo@dbisma.com.
(End of provision)

4 52.211-1 AVAILABILITY OF SPECIFICATIONS LISTED IN THE GSA INDEX OF FEDERAL SPECIFICATIONS, STANDARDS AND COMMERCIAL ITEM DESCRIPTIONS (JUN 1997)

(a) A single copy of each specification cited in this solicitation is available without charge from the GSA Federal Supply Service Bureau Specifications Section (3FBP-W), 470 East L'Enfant Plaza, SW., Suite 8100, Washington, DC 20407 (Tel. 202-619-8925). Additional copies may be purchased from the GSA Specifications Section in Washington, DC.
(b) The GSA Index of Federal Specifications, Standards and Commercial Item Descriptions may be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.
(End of provision)

5 52.211-2 AVAILABILITY OF SPECIFICATIONS LISTED IN THE DOD INDEX OF SPECIFICATIONS AND STANDARDS (DODISS) (JUN 1997)

Single copies of specifications cited in this solicitation may be obtained by submitting a written request to the supply point listed below. The request must contain the title of the specification, its number, date, applicable amendment(s), and the solicitation or contract number. A telephone order entry system is available with the use of a touch tone telephone. A Customer Number is required to use this system and may be

obtained by written request to the address listed below or by telephone (215-697-2179). In case of urgency, telegraphic requests are acceptable. Voluntary standards, which are not available to Offerors and Contractors from Government sources, may be obtained from the organization responsible for their preparation, maintenance, or publication.
Standardization Document
Order Desk, Building 4, Section D
700 Robbins Avenue
Philadelphia, PA 19111-5094
Facsimile No.....215-697-2978
(End of provision)

APPLIES TO MILITARY PROJECTS ONLY

6 52.211-14 NOTICE OF PRIORITY RATING FOR NATIONAL DEFENSE USE (SEP 1990)

Any contract awarded as a result of this solicitation will be / / DX rated order; /X/ DO rated order certified for national defense use under the Defense Priorities and Allocations System (DPAS) (15 CFR 700), and the Contractor will be required to follow all of the requirements of this regulation.
(End of provision)

7 52.216-1 TYPE OF CONTRACT (APR 1984)

The Government contemplates award of a firm fixed price contract resulting from this solicitation.
(End of provision)

8 52.217-5 EVALUATION OF OPTIONS (JUL 1990)

Except when it is determined in accordance with FAR 17.206(b) not to be in the Government's best interests, the Government will evaluate offers for award purposes by adding the total price for all options to the total price for the basic requirement. Evaluation of options will not obligate the Government to exercise the option(s).
(End of provision)

9 52.222-23 NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY (APR 1984)

(a) The offeror's attention is called to the Equal Opportunity clause and the Affirmative Action Compliance Requirements for Construction clause of this solicitation.
(b) The goals for minority and female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade on all construction work in the covered area, are as follows:

Goals for minority participation for each trade

ARKANSAS Goal Percent

109 Fayetteville, AR:
Non-SMSA Counties----------3.3
AR Baxter; AR Benton; AR Boone; AR Carroll; AR Madison; AR Marion; AR Newton; AR Searcy; AR Washington; OK Adair; OK Delaware.

110 Fort Smith, AR:
SMSA Counties:
2720 Fort Smith, AR-OK----------5.6
AR Crawford; AR Sebastian; OK La Flore; OK Sequoyah.
Non-SMSA Counties----------6.6
AR Franklin; AR Logan; AR Polk; AR Scott; OK Choctaw; OK Haskell; OK Latimer; OK McCurtain; OK Pittsburg; OK Pushmataha.

111 Little Rock-North Little Rock, AR:
SMSA Counties:
4400 Little Rock-North Little Rock, AR----------5.7

AR Pulaski; AR Saline.
6240 Pine Bluff, AR----------31.2
AR Jefferson.
Non-SMSA Counties-- ----------16.4
AR Arkansas; AR Ashley; AR Bradley; AR Calhoun; AR Chicot;
AR Clark; AR Cleburne; AR Cleveland; AR Conway; AR
Dallas; AR Desha; AR Drew; AR Faulkner; AR Fulton;
AR Garland; AR Grant; AR Hot Spring; AR Independence;
AR Izard; AR Jackson; AR Johnson; AR Lincoln;
AR Lonoke; AR Monroe; AR Montgomery; AR Ouachita;
AR Perry; AR Pope; AR Prairie; AR Sharp; AR Stone;
AR Union; AR Van Buren; AR White; AR Woodruff;
AR Yell.

MISSOURI

105 Kansas City, MO
SMSA Counties:
3760 Kansas City, MO-KS----------12.7
K8 Johnson; K8 Wayandotter; MO Cass; MO Clay;
MO Jackson; MO Platter; MO Ray.
4150 Lawrence, KS----------7.2
7000 St. Joseph, MO----------3.2
MO Andrew, MO Buchanan.
Non- SMSA Counties-- ----------10.0
KS Anderson; KS Atchison; KS Brown; KS Donphan;
KS Franklin; KS Leevenworth; KS Linn; KS Miami;
MO Atchison; Mo Bates; MO Benton; MO Caldwell;
MO Caroll; MO Clinton; MO Daviess; MO Detualto;
MO Gentry; MO Grundy; MO Harrison; MO Henry;
MO Holt; MO Johnson; MO Lafayette; MO Livingston;
MO Mercer; MO Modaway; MO Pettis; MO Saliner,
MO Worth.

106 Columbia, MO
SMSA Counties:
MO Boone.
1740 Columbia, MO----------6.3
Non-SMSA Counties----------4.0
MO Adair; MO Audrain; MO Callaway; MO Camden; MO
Chariton; MO Cole; MO Cooper; MO Howard; MO Knox; MO
Linn; MO Macon; MO Miller; MO Moniteau; MO Monroe; MO
Morgan; MO Osage; MO Putnam; MO Randolph; MO Schuyler;
MO Scotland; MO Shelby; MO Sullivan.

107 St. Louis, MO:
SMSA Counties:
70-40 St. Louis, MO-IL----------14.7
IL Clinton; IL Madison; IL Monroe; IL St. Clair;
MO Franklin; MO Jefferson; MO St. Charles;
MO St. Louis; MO St. Louis City.

Non- SMSA Counties----------11.4
IL Alexander; IL Bond; IL Calhoun; IL Clay;
IL Effingham; IL Fayette; IL Franklin; IL Greene;
IL Jackson IL Jasper; IL Jefferson; IL Jersey;
IL Johnson; IL Macoupin; IL Marion; IL Montgomery;
IL Perry; IL Pulaski; IL Randolph; IL RichLand;
IL Union; IL Washington; IL Wayne; IL Williamson;
MO Bollinger; MO Butler; MO Cape Girardeau;
MO Carter; MO Crawford; MO Dent; MO Gesconader;
MO Iron; MO Lincoln; MO Madison; MO Maries;
MO Mississippi; MO Montgomery; MO Perry; MO Phelps;
MO Reynolds; MO Ripley; MO St. Francois;
MO Ste.Genevieve; Scott; MO Stoddard; MO Warren;
MO Washington; MO Wayne.

106 Springfield, MO:
SMSA Counties:
7920 Springfield, MO----------2.0
MO Christian; MO Greene.

Non- SMSA Counties----------2.3

LOUISIANA

113 New Orleans, LA:
SMSA Counties:
0920 Biloxi-Gulfport, MS----------19.2
MS Hancock; MS Harriso n; MS Stone.
5560 New Orleans, LA----------31.0
LA Jefferson; LA Orleans; LA St. Bernard;
LA St. Tammany.
Non-SMSA Counties----------27.7
LA Assumption; LA Lafourche; LA Plaquemines;
LA St. Charles; LA St. James; LA St. John The Baptist;
LA Tangipahoa; LA Terrebonne; LA Washington;
MS Forrest; MS Lamar; MS Marion; MS Pearl River;
MS Perry; MS Pike; MS Walthall.

114 Baton Rouge, LA:
SMSA Counties:
0760 Baton Rouge, LA----------26.1
LA Ascension; LA East Baton Rouge;
LA Livingston; LA West Baton Rouge.
Non-SMSA Counties----------30.4
LA Concordla; LA E. Feliciana; LA Iberville;
LA Pointe Coupee; LA St. Helena; LA West Feliciana;
MS Adams; MS Amite; MS Wilkinson.

115 Lafayette, LA:
SMSA Counties:
3880 Lafayette, LA----------20.6
LA Lafayette.
Non-SMSA Counties----------24.1
LA Acadis; LA Evangeline; LA Iberia; LA St. Landry;
LA St. Martin; LA St. Mary; LA Vermillion.

116 Lake Charles, LA:
SMSA Counties:
3960 Lake Charles, LA----------19.3
LA Calcasieu.
Non-SMSA Counties----------17.8
LA Allen; LA Beauregard; LA Cameron;
LA Jefferson Davis; LA Vernon.

117 Shreveport, LA:
SMSA Counties:
0200 Alexandria, LA----------25.7
LA Grant; LA Rapides.
7680 Shreveport, LA----------29.3
LA Bossier; LA Caddo; LA Webster.
Non-SMSA Counties----------29.3
LA Avoyelles; LA Blenville; LA Claiborne; LA De Soto;
LA Natchitoches; LA Red River; LA Sabine; LA Winn.

118 Monroe, LA:
SMSA Counties:
5200 Monroe, LA----------22.8
LA Ouachita.
Non-SMSA Counties:----------27.9
LA Caldwell; LA Catahoula; LA East Carroll; LA Franklin;
LA Jackson; LA La Salle; LA Lincoln; LA Madison;
LA Morehouse; LA Richland; LA Tensas; LA Union;
LA West Carroll.

OKLAHOMA

136 Lawton, OK:
SMSA Counties:
4200 Lawton, OK----------14.8
Non-SMSA Counties----------10.8
OK Cotton; OK Greer; OK Harmon; OK Jackson;

OK Jefferson; OK Kiowa; OK Stephens; OK Tillman.

137 Oklahoma City, OK:
SMSA Counties:
5880 Oklahoma City, OK----------10.2
OK Canadian; OK Cleveland; OK McClain;
OK Oklahoma; OK Pottawatomie.
Non-SMSA Counties----------9.0
OK Alfalfa; OK Atoka; OK Beckham; OK Blaine;
OK Caddo; OK Carter; OK Coal; OK Custer; OK Dewey;
OK Ellis; OK Garfield; OK Garvin; OK Grady; OK Grant;
OK Harper; OK Hughes; OK Johnston; OK Kingfisher;
OK Lincoln; OK Logan; OK Love; OK Major; OK Marshall;
OK Murray; OK Okfuskee; OK Pontotoc; OK Roger Malt;
OK Seminoler; OK Washita; OK Woods; OK Woodward

138 Tulsa, OK:
SMSA Counties:
8585 Tulsa, OK----------10.2
OK Creek; OK Mayes; OK Osage; OK Rogers;
OK Tulsa; OK Wagoner.
Non-SMSA Counties----------10.0
OK Cherokee; OK Key; OK Mcintosh; OK Muskogee;
OK Noble; OK Nowata; OK Okmugee; OK Pawnee;
OK Payne; OK Washington.

TEXAS
119 Texarkana, TX:
SMSA Counties:
8360 Texarkana, TX-Texarkana, AR----------19.7
AR Little River; AR Miller; TX Bowie.
Non-SMSA Counties----------20.2
AR Columbia; AR Hempstead; AR Howard; AR Lafayette;
AR Nevada; AR Pike; AR Sevier; TX Camp;
TX Cass; TX Lamar; TX Morris; TX Red River;
TX Titus.
120 Tyler-Longview, TX:
SMSA Counties:
4420 Longview, TX----------22.8
TX Gregg; TX Harrison.
8640 Tyler, TX----------23.5
TX Smith.
Non-SMSA Counties----------22.5
TX Anderson; TX Angelina; TX Cherokee; TX Henderson;
TX Houston; TX Marion; TX Nacogdoches;
TX Panola; TX Rusk; TX San Augustine; TX Shelby;
TX Upshur; TX Wood.
121 Beaumont-Port Arthur, TX:
SMSA Counties:
0640 Beaumont-Port Arthur-Orange, TX----------22.6
TX Hardine; TX Jefferson; TX Orange.
Non-SMSA Counties----------22.6
TX Jasper; TX Newton; TX Sabine; TX Tyler.
122 Houston, TX:
SMSA Counties:
1260 Bryan-College Station, TX----------23.7
TX Brazos.
2920 Galveston-Texas City, TX----------28.9
TX Galveston.
3360 Houston, TX----------27.3
TX Brazonia; TX Fort Bend; TX Harris; TX Liberty;
TX Montgomery; TX Waller.
Non-SMSA Counties----------27.4
TX Austin; TX Burleson; TX Calhoun; TX Chambers;
TX Colorado; TX De Witt; TX Fayette; TX Gollad;
TX Grimes; TX Jackson; TX Lavaca; TX Leon; TX Madison;
TX Metagorda; TX Polk; TX Robertson; TX San Jacinto;
TX Washington; TX Wharton.

123 Austin, TX:
SMSA Counties:

0640 Austin, TX----------24.1
TX Hays; TX Travis; TX Williamson.
Non-SMSA Counties----------24.2
TX Bastrop; TX Blanco; TX Burnet; TX Caldwell;
TX Lee; TX Llano.

124 Waco-Killeen Temple, TX:
SMSA Counties:
3810 Killeen-Temple, TX----------16.4
TX Bell; TX Coryell.
8800 Waco, TX----------20.7

5TX-McLennan.
Non-SMSA Counties----------18.6
TX Bosque; TX Falls; TX Freestone; TX Hamilton;
TX Hill; TX Lampasas; TX Limestone; TX Milam; TX Mills.

125 Dallas-Fort Worth, TX:
SMSA Counties:
1920 Dallas-Fort Worth, TX----------16.2
TX Collin; TX Dallas; TX Denton; TX Ellis;
TX Hood; TX Johnson; TX Kaufman; TX Parker;
TX Rockwell; TX Tarrant; TX Wise.
7640 Sherman-Denison, TX----------9.4
TX Grayson.
Non-SMSA Counties----------17.2
OK Bryan; TX Cooke; TX Delta; TX Erath; TX Fannin;
TX Franklin; TX Hopkins; TX Hunt; TX Jack;
TX Montague; TX Navarro; TX Palo Pinto; TX Rains;
TX Somervell; TX Van Zandt.
126 Wichita Falls, TX:
SMSA Counties:
9060 Wichita Falls, TX----------12.4
TX Clay; TX Wichita.
Non-SMSA Counties----------11.0
4TX Archer, TX Baylor, TX Cottle; TX Foard;
TX Hardeman; TX Wilbarger; TX Young.

127 Abilene, TX:
SMSA Counties:
0040 Abilene, TX----------11.6
TX Callahan; TX Jones; TX Taylor.
Non-SMSA Counties----------10.9
TX Brown; TX Coleman; TX Comanche; TX Eastland;
TX Mitchell; TX Nolan; TX Scurry; TX Shackelford;
TX Stephens; TX Stonewall; TX Throckmorton.

128 San Angelo, TX:
SMSA Counties:
7200 San Angelo, TX----------19.2
TX Tom Green.
Non-SMSA Counties----------20.0
TX Coke; TX Concho; TX Crockett; TX Irion;
TX Kimble; TX McCulloch; TX Mason; TX Menard;
TX Reagan; TX Runnets; TX San Saba; TX Schleicher;
TX Sterling; TX Sutton; TX Terrell.

129 San Antonio, TX:
SMSA Counties:
4080 Laredo, TX----------87.3
TX Webb.
7240 San Antonio, TX----------47.8
TX Bexar; TX Comal; TX Guadalupa.
Non-SMSA Counties----------49.4
TX Atascosa; TX Bandera; TX Dimmit; TX Edwards;
TX Frio; TX Gilespie; TX Gonzales; TX Jim Hogg;
TX Karnes; TX Kendall; TX Kerr; TX Kinney;
TX La Salle; TX Mc Mullen; TX Maverick; TX Medina;
TX Real; TX Uvalde; TX Val Verde; TX Wilson;
TX Zapata; TX Zavala.

130 Corpus Christi, TX:
SMSA Counties:
1880 Corpus Christi, TX----------41.7
TX Nueces; TX San Patricio.
Non-SMSA Counties----------44.2
TX Aransas; TX Bee; TX Brooks; TX Duval;
TX Jim Wells; TX Kenedy; TX Kyberg; TX Live Oak;
TX Refugio.

131 Brownsville-McAllen-Harlingen, TX:
SMSA Counties:
1240 Brownsville-Harlingen-San Benito, TX----------71.0
TX Cameron.
4880 McAllen-Pharr-Edinburg, TX----------72.8
TX Hidalga.
Non-SMSA Counties----------72.9
TX Starr, TX Willacy.

132 Odessa-Midland, TX:
SMSA Counties:
5040 Midland, TX----------19.1
TX Midland.
5800 Odessa, TX----------15.1
TX Ector.
Non-SMSA Counties----------16.9
TX Andrews; TX Crane; TX Glassock; TX Howard;
TX Loving; TX Martin; TX Pecos; TX Reeves;
TX Upton; TX Ward; TX Winkler.

133 El Paso, TX:
SMSA Counties:
2320 El Paso, TX----------57.8
TX El Paso.
Non-SMSA Counties----------49.0
NM Chaves; NM Dona Ana; NM Eddy; NM Grant;
NM Hidalgo; NM Luna; NM Otero; NM Sierra;
TX Brewster; TX Culberson; TX Hudspeth;
TX Jeff Davis; TX Presidio

134 Lubbock, TX:
SMSA Counties:
4600 Lubbock, TX----------19.6
TX Lubbock.
Non-SMSA Counties----------19.5
NM Lea; NM Roosevelt; TX Bailey; TX Borden;
TX Cochran; TX Crosby; TX Dawson; TX Dickens;
TX Floyd; TX Gaines; TX Garza; TX Hale;
TX Hockley; TX King; TX Lamb; TX Lynn; TX Motley;
TX Terry; TX Yoakum.

135 Amarillo, TX:
SMSA Counties:
0320 Amarillo, TX----------9.3
TX Potter; TX Randell.
Non-SMSA Counties----------11.0

NEW MEXICO

160 Albuquerque, NM:
SMSA Counties:
0200 Albuquerque, NM----------3.8
NM Bernatillo; NM Sandoval.
Non-SMSA Counties----------45.9
NM Catron; NM Colfax; NM De Baca; NM Guadalupe;
NM Lincoln; NM Los Alamos; NM McKinley; NM Mora;
NM Rio Arriba; NM San Juan; NM San Miguet;
NM Santa Fe; NM Socorro; NM Taos; NM Torrance;
NM Valencia.

---
Goals for female participation for each trade
---

All areas - 6.9%

These goals are applicable to all the Contractor's construction work performed in the covered area. If the Contractor performs construction work in a geographical area located outside of the covered area, the Contractor shall apply the goals established for the geographical area where the work is actually performed. Goals are published periodically in the Federal Register in notice form, and these notices may be obtained from any Office of Federal Contract Compliance Programs office.

(c) The Contractor's compliance with Executive Order 11246, as amended, and the regulations in 41 CFR 60-4 shall be based on (1) its implementation of the Equal Opportunity clause, (2) specific affirmative action obligations required by the clause entitled "Affirmative Action Compliance Requirements for Construction," and (3) its efforts to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade. The Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor, or from project to project, for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, Executive Order 11246, as amended, and the regulations in 41 CFR 60-4. Compliance with the goals will be measured against the total work hours performed.

(d) The Contractor shall provide written notification to the Director, Office of Federal Contract Compliance Programs, within 10 working days following award of any construction subcontract in excess of $10,000 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the--

(1) Name, address, and telephone number of the subcontractor;
(2) Employer's identification number of the subcontractor;
(3) Estimated dollar amount of the subcontract;
(4) Estimated starting and completion dates of the subcontract; and
(5) Geographical area in which the subcontract is to be performed.

(e) As used in this Notice, and in any contract resulting from this solicitation, the "covered area" is as stated above.

(End of provision)
(R 7-2003.14(d) 1978 SEP)

10 52.225-12 NOTICE OF BUY AMERICAN ACT REQUIREMENT-CONSTRUCTION MATERIALS (MAY 1997)

(a) Offerors are required to comply with the requirements of Federal Acquisition Regulation (FAR) clause 52.225-5, Buy American Act Construction Materials, of this solicitation. The terms "construction material" and "domestic construction material," as used in this provision, have the meanings set forth in FAR clause 52.225-5.

(b) Offerors should request a determination regarding the inapplicability of the Buy American Act in time to allow determination before submission of offers. For evaluation of a request for a determination regarding the inapplicability of the requirements of the Buy American Act prior to the time set for receipt of offers, the information and applicable supporting data required by paragraphs (c) and (d) of FAR clause 52.225-5 shall be included in the request. If an offeror has not requested a determination regarding the inapplicability of the Buy American Act prior to submission of its offer, or has not received a response to a request made prior to submission of its offer, the information and supporting data shall be included in the offer.

(c) Evaluation of offers.

(1) For evaluation of offers, (unless agency regulations specify a higher percentage) the Government will add to the offered price 6 percent of the cost of any foreign construction material proposed for exception from the requirements of the Buy American Act based on claimed unreasonable cost of domestic construction materials in accordance with paragraph (b)(3)(i) of FAR clause 52.225-5.

(2) If the evaluation of offers results in a tie between an offer including such foreign construction material excepted on the basis of unreasonable cost, as evaluated, and an offer including solely domestic construction material or other foreign construction material listed in the solicitation at paragraph (b)(2) of FAR clause 52.225-5, or

subsequently excepted in accordance with paragraphs (b)(3) (ii) or (iii) of FAR clause 52.225-5, award shall be made to the offeror that submitted the latter offer.

(d) Alternate offers.

(1) When an offer includes foreign construction material not listed by the Government in the solicitation at paragraph (b)(2) of FAR clause 52.225-5, offerors also may submit alternate offers based on use of equivalent domestic construction material.

(2) If alternate offers are submitted, a separate Standard Form 1442 shall be submitted for each alternate offer, and a separate price comparison table, prepared in accordance with paragraphs (c) and (d) of FAR clause 52.225-5, shall be submitted for each offer that is based on the use of any foreign construction material for which the Government has not yet determined an exception to apply.

(3) If the Government determines that a particular exception requested under paragraph (c) of FAR clause 52.225-5 does not apply, the Government will evaluate only those offers based on use of the equivalent domestic construction material, and the offeror shall be required to furnish such domestic construction material.

(i) In sealed bid procurements, any offer based on use of that particular foreign construction material shall be rejected as nonresponsive.

(ii) In negotiated procurements, any offer based on use of that particular foreign construction material may not be accepted unless revised during negotiations.

(End of provision)

11 52.225-13 NOTICE OF BUY AMERICAN ACT REQUIREMENT--CONSTRUCTION MATERIALS UNDER TRADE AGREEMENTS ACT AND NORTH AMERICAN FREE TRADE AGREEMENT (MAY 1997)

(a) Offerors are required to comply with the requirements of Federal Acquisition Regulation (FAR) clause 52.225-15, Buy American Act--Construction Materials Under Trade Agreements Act and North American Free Trade Agreement, of this solicitation. The terms defined in FAR clause 52.225-15 have the same meaning in this provision.

(b) Offerors should request a determination regarding the inapplicability of the Buy American Act in time to allow determination before submission of offers. For evaluation of a request for a determination regarding the inapplicability of the requirements of the Buy American Act prior to the time set for receipt of offers, the information and applicable supporting data required by paragraphs (c) and (d) of FAR clause 52.225-15 shall be included in the request. If an offeror has not requested a determination regarding the inapplicability of the Buy American Act prior to submission of its offer, or has not received a response to a request made prior to submission of its offer, the information and supporting data shall be included in the offer.

(c) Evaluation of offers.

(1) For evaluation of offers, (unless agency regulations specify a higher percentage) the Government will add to the offered price 6 percent of the cost of any foreign construction material proposed for exception from the requirements of the Buy American Act based on claimed unreasonable cost of domestic construction materials in accordance with paragraph (b)(4)(i) of FAR clause 52.225-15.

(2) If the evaluation of offers results in a tie between an offer including such foreign construction material excepted on the basis of unreasonable cost, as evaluated, and an offer including solely domestic construction material or other foreign construction material, listed in the solicitation at paragraph (b)(3) of FAR clause 52.225-15, or subsequently excepted in accordance with paragraphs (b)(4)(ii) or (iii) of FAR clause 52.225-15, award shall be made to the offeror that submitted the latter offer.

(d) Alternate offers.

(1) When an offer includes foreign construction material not listed by the Government in the solicitation at paragraph (b)(3) of FAR clause 52.225-15, offerors also may submit alternate offers based on use of equivalent domestic construction material.

(2) If alternate offers are submitted, a separate Standard Form 1442 shall be submitted for each alternate offer, and a separate price comparison table, prepared in accordance with paragraphs (c) and (d) of FAR clause 52.225-15, shall be submitted for each offer that is based on

the use of any foreign construction material for which the Government has not yet determined an exception to apply.

(3) If the Government determines that a particular exception requested under paragraph (c) of FAR clause 52.225-15 does not apply, the Government will evaluate only those offers based on use of the equivalent domestic construction material, and the offeror shall be required to furnish such domestic construction material.

(i) In sealed bid procurements, any offer based on use of that particular foreign construction material shall be rejected as nonresponsive.

(ii) in negotiated procurements, any offer based on use of that particular foreign construction material may not be accepted unless revised during negotiations.

(End of provision)

12 52.228-1 BID GUARANTEE (SEP 1996)

(a) Failure to furnish a bid guarantee in the proper form and amount, by the time set for opening of bids, may be cause for rejection of the bid.

(b) The bidder shall furnish a bid guarantee in the form of a firm commitment, e.g., bid bond supported by good and sufficient surety or sureties acceptable to the Government, postal money order, certified check, cashier's check, irrevocable letter of credit, or, under Treasury Department regulations, certain bonds or notes of the United States. The Contracting Officer will return bid guarantees, other than bid bonds, (1) to unsuccessful bidders as soon as practicable after the opening of bids, and (2) to the successful bidder upon execution of contractual documents and bonds (including any necessary coinsurance or reinsurance agreements), as required by the bid as accepted.

(c) The amount of the bid guarantee shall be 20% percent of the guaranteed minimum amount.

(d) If the successful bidder, upon acceptance of its bid by the Government within the period specified for acceptance, fails to execute all contractual documents or furnish executed bond(s) within 10 days after receipt of the forms by the bidder, the Contracting Officer may terminate the contract for default.

(e) In the event the contract is terminated for default, the bidder is liable for any cost of acquiring the work that exceeds the amount of its bid, and the bid guarantee is available to offset the difference.

(End of provision)

13 52.228-11 PLEDGES OF ASSETS (FEB 1992)

(a) Offerors shall obtain from each person acting as an individual surety on a bid guarantee, a performance bond, or a payment bond--

(1) Pledge of assets; and

(2) Standard Form 28, Affidavit of Individual Surety.

(b) Pledges of assets from each person acting as an individual surety shall be in the form of--

(1) Evidence of an escrow account containing cash, certificates of deposit, commercial or Government securities, or other assets described in FAR 28.203-2 (except see 28.203-2(b)(2) with respect to Government securities held in book entry form) and/or;

(2) A recorded lien on real estate. The offeror will be required to provide--

(i) Evidence of title in the form of a certificate of title prepared by a title insurance company approved by the United States Department of Justice. This title evidence must show fee simple title vested in the surety along with any concurrent owners; whether any real estate taxes are due and payable; and any recorded encumbrances against the property, including the lien filed in favor of the Government as required by FAR 28.203-3(d);

(ii) Evidence of the amount due under any encumbrance shown in the evidence of title;

(iii) A copy of the current real estate tax assessment of the property or a current appraisal dated no earlier than 6 months prior to the date of the bond, prepared by a professional appraiser who

certifies that the appraisal has been conducted in accordance with the generally accepted appraisal standards as reflected in the Uniform Standards of Professional Appraisal Practice, as promulgated by the Appraisal Foundation.

(End of clause)

14 52.252-5 AUTHORIZED DEVIATIONS IN PROVISIONS (APR 1984)

(a) The use in this solicitation of any Federal Acquisition Regulation (48 CFR Chapter 1) provision with an authorized deviation is indicated by the addition of "(DEVIATION)" after the date of the provision.

(b) The use in this solicitation of any DOD FAR Supplement (48 CFR Chapter 2) provision with an authorized deviation is indicated by the addition of "(DEVIATION)" after the name of the regulation.

(End of provision)

(NM)

15 52.204-7001 COMMERCIAL AND GOVERNMENT ENTITY (CAGE) CODE REPORTING (DEC 1991)

(a) The Offeror is requested to enter its CAGE code on its offer in the block with its name and address. The CAGE code entered must be for that name and address. Enter CAGE before the number.

(b) If the Offeror does not have a CAGE code, it may ask the Contracting Officer to request one from the Defense Logistics Services Center (DLSC). The Contracting Officer will--

(1) Ask the Contractor to complete section B of a DD Form 2051, Request for Assignment of a Commercial and Government Entity (CAGE) Code;

(2) Complete section A and forward the form to DLSC; and

(3) Notify the Contractor of its assigned CAGE code.

(c) Do not delay submission of the offer pending receipt of a CAGE code.

(End of provision)

16 52.2-4066 OFFERS (LRD)(NOV 1997)

(a) Two coefficient factors and one non-prepriced (NPP) percentage factor must be submitted for each state covered by this solicitation. The first coefficient factor is to be applied to work anticipated to be accomplished during normal working hours or "straight time". The second coefficient factor will be applied to work anticipated to be accomplished during other than normal working hours or "overtime". The first NPP factor for each state is to be applied to work which is non-prepriced and anticipated to be accomplished during normal working hours or "straight time". The second NPP factor for each state is to be applied to work which is non-prepriced and anticipated to be accomplished during other than normal working hours or "overtime".

(b) The offers for prepriced and non-prepriced items shall be "net", (e.g., 1.0) or a percentage "decrease from" (e.g., .95) or "increase to" (e.g., 1.2) to the solicitation.

(c) The offeror's price coefficient factor(s) for prepriced items must contain all prime and subcontractor's costs including but not limited to items listed on the bidding schedule.

(d) The offeror's price percentage factor(s) for non-prepriced items must contain overheads and profit. Non-prepriced items will be negotiated at direct costs based on subcontractors quotes and Means.

(e) The unit prices stated in the UPB include material, labor and equipment. The specifications contain instructions and requirements of the Government, which will include any generally accepted practice in the construction industry.

(f) Coefficient factor(s) for option periods will be adjusted in accordance with AFARS Clause 52.217-9000, Adjustment to Contractor's Coefficient for Option Years (Job Order Contracts). NPP percentage factors will not be adjusted for option years. New or revised wage determinations for option years will be included in the contract by modification at time of renewal. No adjustment other than allowed in AFARS 52.217-9000 will be made for increased wage determinations, or additional or unexpected costs incurred by the contractor.

(g) The coefficients and NPP percentage factors shall be extended no

more than two decimal places. Offerors shall specify in their proposal what additional types of costs are included in their coefficients.

17 52.2-4067 COEFFICIENT FACTORS (NOV)(JAN 1997)

(a) Normal Working Hours - Offerors shall perform any or all functions during normal working hours, not in excess of 40 hours per week, in the quantities specified in individual task orders against this contract for the unit price sum specified in the UPB, multiplied times the coefficient factor for the applicable contract period.

(b) Other Than Normal Working Hours - Offerors shall perform any or all functions called out in the UPB, during other than normal working hours which requires work to be performed in excess of 40 hours per week in quantities specified in individual task orders against this contract for the unit price sum specified in the UPB, multiplied times the coefficient factor for the applicable contract period.

(c) "Non-prepriced" items - Offerors shall perform any or all functions called out in each task order which are not included in the UPB and are considered non-prepriced for Normal Working Hours and Other Than Normal Working Hours and defined in Paragraphs (a) and (b) above, multiplied times the applicable percentage factor

(d) The contractor shall include in the price proposal a detailed description of the types of costs included in the coefficient factors.

18 52.2-4068 PROPOSAL FORMAT AND CONTENT (LRD)(NOV 1997)

(a) The proposal submitted in response to this solicitation shall consist of three (3) volumes as follows:

| | |
|---|---|
| Volume I | Technical Proposal, including list of names and position titles of all persons attending the oral presentation and copies of all slides and other briefing materials and/or slides used at the oral presentation |
| Volume II | Price Proposal, Including a Detailed Description of the types of costs included in the coefficient factors |
| Volume III | Subcontracting Plan (if applicable, see Section 00700, FAR Clause 52.219-9 I) |

(b) The offeror must submit the original and five (5) separately bound and labeled copies of Volume I and the original of Volumes II, and the original and two (2) copies of volume III. Each volume must be submitted as distinctly severable parts. No reference to price shall be contained in Volume I. All volumes shall be prepared and tabbed in the format described below and shall contain all the data and information required by each tab/heading. Volumes shall be submitted using 8-1/2 by 11 inch pages with foldout sheets limited to 17 inches. Information shall be complete within itself and shall be supportive of a prompt and thorough evaluation.

(c) For ease of reference, the offeror shall use a page numbering system for each volume of the proposal. Consecutive page number within tabs is preferred; i.e., Page A-4 identifies Tab A, page 4 of a particular volume. Additionally, for document control purposes, any changes to the proposal requested by the Contracting Officer and provided after submission of the initial proposal shall be submitted as page changes with each page identified by date and revision number.

19 52.2-4071 PERFORMANCE AND PAYMENT BONDS (LRD)(NOV 1997)

(a) Within 10 days after the receipt of Notice of Award, the bidder shall furnish two bonds, each with good and sufficient surety or sureties acceptable to the Government, furnished; namely, a Performance Bond (Standard Form 25) and a Payment Bond (Standard Form 25A). The penal sums of such bonds will be as follows:

(1) Performance Bond. The penal sum of the performance bond shall equal 100 percent of the guaranteed minimum amount for the basic contract period.

(2) Payment Bond.

(A) When the contract price is $1,000,000 or less, the penal

sum will be 50 percent of the guaranteed minimum amount for the basic contract period.

(B) When the contract price is in excess of $1,000,000 but not more than $5,000,000, the penal sum shall be 40 percent of the contract price.

(C) When the contract price is more than $5,000,000, the penal sum shall be $2,500,000. Any bonds furnished will be furnished by the Contractor to the Government prior to commencement of contract performance.

(b) Additional bonding will be required to protect the Government and persons supplying labor or material under this contract. The Contracting Officer or his authorized Representative will contact the Contractor when additional security is required. Bonding shall be submitted in at least $500,000 increments after the initial amount of $60,000.

(c) Performance and Payment Bonds for the option period(s), if exercised, shall be either a renewal (Continuation Certificate) or new bonds.

20 52.2-4073 PRE-PROPROPOSAL CONFERENCE (LRD) (NOV 1997)

A pre-proposal conference is scheduled for 12 January 1997, 10:00 a.m. at the Federal Building, Little Rock, Arkansas. Any interpretation made will be in the form of an amendment of the solicitation which will be furnished to all prospective offerors. Its receipt by the offeror must be acknowledged in the space provided on Standard Form 1442 or by letter or telegram received before the time set for opening of offers. Oral explanations or instructions given before the award of the contract will not be binding.

21 52.5-4077 PARTNERING

In order to complete this contract most beneficially for both parties, the Government proposes to form a Partnering relationship with the Contractor. This Partnering relationship will draw on the strengths of each party in an effort to achieve a quality project done right the first time, within budget and on schedule. The Partnering relationship will be bilateral and participation will be totally voluntary. Any costs associated with Partnering will be shared equally with no change in contract price.

22 52.211-4004 a AVAILABILITY FOR EXAMINATION OF SPECIFICATIONS NOT LISTED IN THE GSA INDEX OF FEDERAL SPECIFICATIONS, STANDARDS AND COMMERCIAL ITEM DESCRIPTIONS (JUN 1988) (FAR 52.0211-0004)

The specifications cited in this solicitation are not available for distribution. However, they may be examined at the Little Rock District, Corps of Engineers, 700 W. Capitol, Little Rock, Arkansas, Telephone: 501-324-5676. Contact Specifications Section between 8:00 a.m. and 4:30 p.m., Monday through Friday.

(End of provision)

23 52.215-4001 A INSTRUCTIONS TO OFFERORS--COMPETITIVE ACQUISITION (OCT 1997) (FAR 52.215-1)

(a) Definitions. As used in this provision--

Discussions are negotiations that occur after establishment of the competitive range that may, at the Contracting Officer's discretion, result in the offeror being allowed to revise its proposal.

In writing or written means any worded or numbered expression which can be read, reproduced, and later communicated, and includes electronically transmitted and stored information.

Proposal modification is a change made to a proposal before the solicitation's closing date and time, or made in response to an amendment, or made to correct a mistake at any time before award.

Proposal revision is a change to a proposal made after the solicitation closing date, at the request of or as allowed by a Contracting Officer as

the result of negotiations.

Time, if stated as a number of days, is calculated using calendar days, unless otherwise specified, and will include Saturdays, Sundays, and legal holidays. However, if the last day falls on a Saturday, Sunday, or legal holiday, then the period shall include the next working day.

(b) Amendments to solicitations. If this solicitation is amended, all terms and conditions that are not amended remain unchanged. Offerors shall acknowledge receipt of any amendment to this solicitation by the date and time specified in the amendment(s).

(c) Submission, modification, revision, and withdrawal of proposals.

(1) Unless other methods (e.g., electronic commerce or facsimile) are permitted in the solicitation, proposals and modifications to proposals shall be submitted in paper media in sealed envelopes or packages (i) addressed to the office specified in the solicitation, and (ii) showing the time and date specified for receipt, the solicitation number, and the name and address of the offeror. Offerors using commercial carriers should ensure that the proposal is marked on the outermost wrapper with the information in paragraphs (c)(1)(i) and (c)(1)(ii) of this provision.

(2) The first page of the proposal must show--

(i) The solicitation number;

(ii) The name, address, and telephone and facsimile numbers of the offeror (and electronic address if available);

(iii) A statement specifying the extend of agreement with all terms, conditions, and provisions included in the solicitation and agreement to furnish any or all items upon which prices are offered at the price set opposite each item;

(iv) Names, titles, and telephone and facsimile numbers (and electronic addresses if available) of persons authorized to negotiate on the offeror's behalf with the Government in connection with this solicitation; and

(v) Name, title, and signature of person authorized to sign the proposal. Proposals signed by an agent shall be accompanied by evidence of that agent's authority, unless that evidence has been previously furnished to the issuing office.

(3) Late proposals and revisions.

(i) Any proposal received at the office designated in the solicitation after the exact time specified for receipt of offers will not be considered unless it is received before award is made and --

(A) It was sent by registered or certified mail not later than the fifth calendar day before the date specified for receipt of offers (e.g., an offer submitted in response to a solicitation requiring receipt of offers by the 20th of the month must have been mailed by the 15th);

(B) It was sent by mail (or telegram or facsimile, if authorized) or hand-carried (including delivery by a commercial carrier) if it is determined by the Government that the late receipt was due primarily to Government mishandling after receipt at the Government installation;

(C) It was sent by U.S. Postal Service Express mail Next Day Service-Post Office to Addressee, not later than 5:00 p.m. at the place of mailing two working days prior to the date specified for receipt of proposals. The term "working days" excludes weekends and U.S. Federal holidays;

(D) It was transmitted through an electronic commerce method authorized by the solicitation and was received at the initial point of entry to the Government infrastructure not later than 5:00 p.m. one working day prior to the date specified for receipt of proposals; or

(E) There is acceptable evidence to establish that it was received at the activity designated for receipt of offers and was under the Government's control prior to the time set for receipt of offers, and the Contracting officer determines that accepting the late offer would not unduly delay the procurement; or

(F) It is the only proposal received.

(ii) Any modification or revision of a proposal or response to request for information, including any final proposal revision, is subject to the same conditions as in subparagraphs (c)(3)(i)(A) through (c)(3)(i)(E) of this provision.

(iii) The only acceptable evidence to establish the date of mailing of a late proposal or modification or revision sent either by

registered or certified mail is the U.S. or Canadian Postal Service postmark both on the envelope or wrapper and on the original receipt from the U.S. or Canadian Postal Service. Both postmarks must show a legible date or the proposal, response to a request for information, or modification or revision shall be processed as if mailed late. "Postmark" means a printed, stamped, or otherwise placed impression (exclusive of a postage meter machine impression) that is readily identifiable without further action as having been supplied and affixed by employees of the U.S. or Canadian Postal Service on the date of mailing. Therefore, offerors or respondents should request the postal clerk to place a legible hand cancellation bull's eye postmark on both the receipt and the envelope or wrapper.

(iv) Acceptable evidence to establish the time of receipt at the Government installation includes the time/date stamp of the installation on the proposal wrapper, other documentary evidence of receipt maintained by the installation, or oral testimony or statements of Government personnel.

(v) The only acceptable evidence to establish the date of mailing of a late offer, modification or revision, or withdrawal sent by Express Mail Next Day Service-Post Office to Addressee is the date entered by the post office receiving clerk on the "Express Mail Next Day Service-Post Office to Addressee" label and the postmark on both the envelope or wrapper and on the original receipt from the U.S. Postal Service. "Postmark" has the same meaning as defined in paragraph (c)(3)(iii) of this provision, excluding postmarks of the Canadian Postal Service. Therefore, offerors or respondents should request the postal clerk to place a legible hand cancellation bull's eye postmark on both the receipt and the envelope or wrapper.

(vi) Notwithstanding paragraph (c)(3)(i) of this provision, a late modification or revision of an otherwise successful proposal that makes its terms more favorable to the Government will be considered at any time it is received and may be accepted.

(vii) Proposal may be withdrawn by written notice or telegram (including mailgram) received at any time before award. If the solicitation authorizes facsimile proposals, proposals may be withdrawn via facsimile received at any time before award, subject to the conditions specified in the provision entitled "Facsimile proposals." Proposals may be withdrawn in person by an offeror or an authorized representative, if the representative's identity is made known and the representative signs a receipt for the proposal before award.

(viii) If an emergency or unanticipated event interrupts normal Government processes so that proposal cannot be received at the office designated for receipt of proposals by the exact time specified in the solicitation, and urgent Government requirements preclude amendment of the solicitation or other notice of an extension of the closing date, the time specified for receipt of proposals will be deemed to be extended to the same time of day specified in the solicitation on the first work day on which normal Government processes resume. If no time is specified in the solicitation, the time for receipt is 4:30 p.m., local time, for the designated Government office.

(4) Unless otherwise specified in the solicitation, the offeror may propose to provide any item or combination of items.

(5) Proposals submitted in response to this solicitation shall be in English and in U.S. dollars, unless otherwise permitted by the solicitation.

(6) Offerors may submit modifications to their proposals at any time before the solicitation closing date and time, and may submit modifications in response to an amendment, or to correct a mistake at any time before award.

(7) Offerors may submit revised proposals only if requested or allowed by the Contracting Officer.

(8) Proposals may be withdrawn at any time before award. Withdrawals are effective upon receipt of notice by the Contracting officer.

(d) Offer expiration date. Proposals in response to this solicitation will be valid for the number of days specified on the solicitation cover sheet (unless a different period is proposed by the offeror).

(e) Restriction on disclosure and use of data. Offerors that include in their proposals data that they do not want disclosed to the public for any purpose, or used by the Government except for evaluation purposes

shall--

(1) Mark the title page with the following legend: This proposal includes data that shall not be disclosed outside the Government and shall not be duplicated, used, or disclosed--in whole or in part--for any purpose other than to evaluate this proposal. If, however, a contract is awarded to this offeror as a result of--or in connection with--the submission of this data, the Government shall have the right to duplicate, use, or disclose the data to the extent provided in the resulting contract. This restriction does not limit the Government's right to use information contained in this data if it is obtained from another source without restriction. The data subject to this restriction are contained in sheets (insert numbers or other identification of sheets); and

(2) Mark each sheet of data it wishes to restrict with the following legend: Use or disclosure of data contained on this sheet is subject to the restriction on the title page of this proposal.

(f) Contract award.

(1) The Government intends to award a contract or contracts resulting from this solicitation to the responsible offeror(s) whose proposals(s) represents the best value after evaluation in accordance with the factors and subfactors in the solicitation.

(2) The Government may reject any or all proposals if such action is in the Government's interest.

(3) The Government may waive informalities and minor irregularities in proposals received.

(4) The Government intends to evaluate proposals and award a contract without discussions with offerors (except clarifications as described in FAR 15.306(a)). Therefore, the offeror's initial proposal should contain the offeror's best terms from a cost or price and technical standpoint. The Government reserves the right to conduct discussions if the Contracting Officer later determines them to be necessary. If the Contracting Officer determines that the number of proposals that would otherwise be in the competitive range exceeds the number at which an efficient competition can be conducted, the Contracting Officer may limit the number of proposals in the competitive range to the greatest number that will permit an efficient competition among the most highly rated proposals.

(5) The Government reserves the right to make an award on any item for a quantity less than the quantity offered, at the unit cost or prices offered, unless the offeror specifies otherwise in the proposal.

(6) The Government reserves the right to make multiple awards if, after considering the additional administrative cost, it is in the Government's best interest to do so.

(7) Exchanges with offerors after receipt of a proposal do not constitute a rejection or counteroffer by the Government.

(8) The Government may determine that a proposal is unacceptable if the prices proposed are materially unbalanced between line items or subline items. Unbalanced pricing exists when, despite an acceptable total evaluated price, the price of one or more contract line items is significantly overstated or understated as indicated by the application of cost or price analysis techniques. A proposal may be rejected if the Contracting Officer determines that the lack of balance poses an unacceptable risk to the Government.

(9) If a cost realism analysis is performed, cost realism may be considered by the source selection authority in evaluating performance or schedule risk.

(10) A written award or acceptance of proposal mailed or otherwise furnished to the successful offeror within the time specified in the proposal shall result in a binding contract without further action by either party.

(11) The Government may disclose the following information in postaward debriefings to other offerors:

(i) The overall evaluated cost or price and technical rating of the successful offeror;

(ii) The overall ranking of all offerors, when any ranking was developed by the agency during source selection;

(iii) A summary of the rationale for award; and

(iv) For acquisitions of commercial items, the make and model of the item to be delivered by the successful offeror.

(End of provision)

24 52.233-4002 SERVICE OF PROTEST (AUG 1996) (FAR 52.233-2)

(a) Protests, as defined in section 33.101 of the Federal Acquisition Regulation, that are filed directly with an agency, and copies of any protests that are filed with the General Accounting Office (GAO), shall be served on the Contracting Officer (addressed as follows) by obtaining written and dated acknowledgment of receipt from Department of the Army, Little Rock District, Corps of Engineers, 700 West Capitol, Room 7412, Little Rock, Arkansas 72203.

(b) The copy of any protest shall be received in the office designated above within one day of filing a protest with the GAO.

(End of provision)

25 52.236-4028 A PREPARATION OF PROPOSALS--CONSTRUCTION (OCT 1997)

(a) Proposals must be (1) submitted on the forms furnished by the Government or on copies of those forms, and (2) manually signed. The person signing a proposal must initial each erasure or change appearing on any proposal form.

(b) The proposal form may require offerors to submit proposed prices for one or more items on various bases, including--

(1) Lump sum price;

(2) Alternate prices;

(3) Units of construction; or

(4) Any combination of paragraphs (b)(1) through (b)(3) of this provision.

(c) If the solicitation requires submission of a proposal on all items, failure to do so may result in the proposal being rejected without further consideration. If a proposal on all items is not required, offerors should insert the words "no proposal" in the space provided for any item on which no price is submitted.

(d) Alternate proposals will not be considered unless this solicitation authorizes their submission.

(End of provision)

26 52.1000-4000 CONTRACT CLAUSE AND SOLICITATION PROVISION NUMBERING (LRD)

This document is computer generated by the Standard Army Automated Contracting System (SAACONS). The numbering system used by the computer for contract clauses and solicitation provisions differs slightly from the procurement regulations. It is similar and easily recognizable. The Federal Acquisition Regulation (FAR) numbering format for contract clauses and solicitation provisions is 52.2xx-x, with the specific FAR provision or clause number being a sequence assigned within each section or subpart 52.2. SAACONS always uses a 9 digit number (e.g. 52.2xx.xxxx).

FAR contract clauses and solicitation provisions are recognized by an "0" in the 6th digit of the SAACONS number. Department of Defense Federal Acquisition Regulation Supplement (DFARS) contract clauses and solicitation provisions are recognized by a "7" in the 6th digit of the SAACONS number. Army Federal Acquisition Regulation Supplement (AFARS) contract clauses and solicitation provisions are recognized by a "9" in the 6th digit of the SAACONS number. Engineering Federal Acquisition Regulation Supplement (EFARS) are recognized by a "1" in the 6th digit of the SAACONS number. Local instructions and provisions are referred to by paragraph number only, with no reference number shown. (FAR, DFARS and AFARS clauses and provisions that have recently been modified or added, and pending integration into the SAACONS Database, will be displayed as local clauses, except the FAR, DFARS, AFARS or EFARS number will be referenced on the Title line:

"THE TITLE LINE WILL APPEAR IN BOLD TEXT FOLLOWED BY (FAR 52.212-6)"

Examples of the numbering are provided below:

| STANDARD NUMBERING SYSTEM | | SAACONS |
|---|---|---|
| FAR | 52.227-1 | 52.227-0001 |
| DFARS | 252.243-7000 | 52.243-7000 |
| AFARS | 52.237-9030 | 52.237-9030 |
| EFARS | 52.202-1000 | 52.202-1000 |

LOCAL NONE NONE

27 52.1000-4229 I DRAWINGS AND SPECIFICATIONS (APR 1984) (LRD)

One copy of the CD-ROM containing the solicitation, technical specifications, and the unit price book will be furnished for each offeror free of charge.

28 52.1000-4232 OFFEROR'S QUALIFICATIONS (APR 1984) (LRD)

Before an offer is considered for award, the Offeror may be requested by the Government to submit a statement regarding his previous experience in performing comparable work, his business and technical organization, financial resources, and plant available to be used in performing the work.

29 52.7211-4002 a AVAILABILITY FOR EXAMINATION OF SPECIFICATIONS, STANDARDS, PLANS, DRAWINGS, DATA ITEM DESCRIPTIONS, AND OTHER PERTINENT DOCUMENTS (DEC 1991)(DFARS 52.210-7002)

The specifications, standards, plans, drawings, data item descriptions, and other pertinent documents cited in this solicitation are not available for distribution but may be examined at the following location:

Little Rock District, Corps of Engineers
P.O. Box 867 / 700 W. Capitol Ave.
Little Rock, AR 72203-0867

(End of provision)

30 52.9999-4998 III
ENCLOSURES

Encl 1 Bid Bond (SF 24)
Encl 2 Financial Information
Encl 3 Disclosure of Lobbying Activities (SF LLL)
Encl 4 Sample Small Business and Small Disadvantaged Business Subcontracting Plan

31 ORAL PRESENTATIONS (DEC 1997) (LRD)

Oral presentations will be used in evaluation and selection of contractors. The presentation must follow the detailed outline listed in Evaluation Factors for Award below. DO NOT DEVELOP OVERLY ELABORATE PRESENTATIONS OR PRESENTATION MATERIAL.

a. The offeror shall present an oral presentation for all elements stated in Evaluation Factors for Award listed below for Evaluation Factors 1 and 4, including all sub-items therein.

b. The maximum amount of time available to make the presentation will be 30 minutes. Upon completion of the presentation, or after 30 minutes, whichever comes first, the government may ask questions.

c. Discussion or questions will pertain to the presented information only. **Deficiencies or omissions may not be discussed**. The discussion period WILL NOT CONSTITUTE NEGOTIATIONS AS DEFINED IN FAR 15.601.

d. No information pertaining to any price or cost elements of the proposal shall be discussed in the oral presentation.

e. Oral presentations will be presented in the Little Rock District, U.S. Army Corps of Engineers Conference Room (Room 7208) located in the Federal Building, 700 W. Capitol Ave., Little Rock, Arkansas. The building and the room are accessible for the handicapped.

f. Room accessories include slide projector, overhead projector, and flip chart. There is ample room for any style of presentation. The room includes a large conference table with chairs, a one step raised platform between the conference table and the projection screen, a podium, electrical outlets, and a computer connection to the projection screen. An IBM compatible computer with Power Point software will be provided; however, computer

connections for similar type hardware/software provided by the offeror will be available. For questions concerning specific elements of the room, contact Mrs. Janet Holmes at 501-324-6078.

g. The room and accessories will be available for inspection by offerors prior to the time set for the actual presentation.

h. All presentations will be videotaped with a copy provided to the offeror. The offeror shall provide a listing of names and position titles of all presenters and copies of all slides and other briefing materials that will actually be used in the presentation with the written proposal. No printed information will be accepted from the offeror by the government at the time the oral presentation is made.

i. The presentation **shall** follow the outline listed in the Evaluation Factors for Award for factors and subfactors pertaining to oral presentations.

j. The government anticipates eight employees to be present for the presentation. The Offeror is limited to three presenters. **The presenters for the offeror must be the actual key personnel who will perform or personally direct the work being described.**

k. The order in which offerors will make their presentations will be determined by a drawing of lots by the contracting officer after receipt of proposals. Once notified of their scheduled presentation date and time, offerors shall complete their presentations on the scheduled date and time. No requests to reschedule will be entertained. Oral presentations are anticipated to be held the week after proposals are received.

32 EVALUATION FACTORS FOR AWARD (DEC 1997) (LRD)

a. Basis of Award -

(1) No proposal will be accepted that does not contain clear and concise evidence of the Offeror's ability to provide work in accordance with this solicitation

(2) The Government will evaluate each proposal strictly in accordance with its content and will not assume that performance will include areas not specified in the Offeror's proposal.

(3) This is a multiple award solicitation. The first award will be made to an 8(a) firms whose offer, when compared to other 8(a) firms, is most advantageous to the Government, considering the evaluation factors stated below. The second award will be made to a firm whose offer, when compared to all offers, will be most advantageous to the Government, considering the evaluation factors stated below.

(4) All Offerors are advised that the Government intends to evaluate proposals and award this contract **without negotiations** with Offerors (other than a request for clarification of information submitted in the initial proposal or for elimination of minor irregularities, informalities, or apparent clerical mistakes in the proposal). However, the Government reserves the right to conduct discussions if later determined by the Contracting Officer to be necessary at which time discussions will be conducted with all Offerors determined to be in the competitive range. Therefore, each initial offer should contain the Offeror's best terms from a cost or price and technical standpoint. **DO NOT ASSUME YOU WILL BE AFFORDED AN OPPORTUNITY TO SUBMIT BEST AND FINAL OFFERS**.

b. Evaluation Factors - The technical evaluation factors and sub-factors are listed in descending order of importance. Clarification on any information provided may be requested during or after the oral presentation. Factors 1 and 4 shall be included in the oral presentation. The only written information accepted for Factors 1 and 4 will be a listing of names and position titles of all presenters and copies of all briefing materials and/or slides presented in the oral presentation. **This information must be submitted with the written technical proposal and will not be accepted at the time of oral presentations.** Factors 2, 3 and 5 shall be submitted in writing with the written technical proposal. Failure to address factors and sub-factors will result in a deficiency; however, omissions of requested information for a reference may be requested as a clarification.

1. Management Ability - (Oral Presentation)
   - Management Plan
   - Quality Control
   - Safety Plan

2. Past and Present Experience and Performance

3. Staffing -
   - Project Management Staff
   - Quality Control Staff
   - Technical Support Staff

4. Subcontracting - (Oral Presentation)
Subcontracting Management
Subcontracting Support Capability

5. Small Business and Small Disadvantaged Business Subcontracting Plan (Applicable to Large Business Only) This is a pass/fail factor.

c. Price -

(1) The Offeror shall submit, with the price proposal volume, a completed Standard Form 1442, completed Bidding Schedule, completed Section 00600 (Representations and Certifications) and a Bid Guarantee (See Bid Guarantee Requirement in this section).

(2) A detailed description of the types of costs included in the coefficient factors shall be submitted with the price proposal. A clear audit trail must be evident as to the conversion of costs to the coefficients to accomplish the tasks described herein.

(3) Coefficient increases for renewal options, if exercised, will be accomplished through economic adjustments in accordance with AFARS Clause 52.217-9000 located in Section 00700. NPP percentages shall not be increased.

(4) The cost for bonding shall be included in the coefficient factors.

(5) The technical proposal is significantly more important than cost or price. The Government will award two contracts to the best value proposals as evaluated in accordance with the criteria in this solicitation. The first award will be selected from 8(a) firms on a competitive basis. The second award will be selected from all remaining offers on an unrestricted basis.

33 CONTENTS OF TECHNICAL PROPOSALS (DEC 1997) (LRD)

Offerors are advised that the technical evaluation and rating of proposals are conducted in strict confidence in that technical evaluation personnel review and rate each proposal without knowledge of the price offered. Offerors are required to segregate their cost and pricing information.

(1) Management Ability

(a) Management Plan - Describe how the contract will be implemented and managed. Demonstrate ability to coordinate multiple subcontractors on single or multiple projects at various locations, simultaneously. Address how staff levels will adjust to accommodate variations in workload at different locations. Include procedures for providing sketches, plans, working drawings, and calculations. Discuss how the Offeror's corporate and on-site staff will interface with the Government. Describe the measures that will be taken by the Offeror's staff to ensure that response times are met. Describe how the Offeror's payroll system will operate.

(b) Quality Control and Safety Plans - Describe how the requirements of quality control and how the requirements of Occupational Safety Health Administration (OSHA) and EM 385-1-1 will be implemented and met.

NOTE - The Offeror is not required to submit the Quality Control Plan and the Safety Plan at this time; however, a description of how the contractor plans to implement their plan is required. The Quality Control Plan and the Safety Plan must be approved by the Contracting Officer prior to the first task order being issued.

(2) Past and Present Experience and Performance - Evaluation of past and present performance will be a subjective assessment based on consideration of all relevant facts and circumstances.

(a) The Offeror shall illustrate overall experience in providing the required services in Government or comparable private sector projects of the same or similar scope, size, and complexity contemplated by this solicitation. The Offeror shall identify the contract title, contract number, dollar value, client name and address, location of work, point of contact with telephone number, and clearly explain how this experience relates to the work requirements of this solicitation for each reference provided.

(b) The Government may contact clients other than those identified. In investigating an Offeror's past performance, the Government will consider information in the Offeror's proposal and information that may be obtained from other sources.

(c) The Government will evaluate the Offeror in terms of extent of experience as well as relative size and complexity of past projects. The Government will also consider the Offeror's commitment to customer satisfaction, timely completion of work, and proven technical and management ability.

(3) Staffing - Required positions listed in the Offeror's proposal for staffing must list the qualifying factors for selection of employees filling the position. Evaluation for staffing will be performed on qualifying factors, not on personnel resumes. Resumes

submitted for positions described in the Offeror's proposal will be reviewed only to verify that the qualifying factors are met. **Substitution of the personnel submitted in the technical proposal must be approved by the Contracting Officer.**

(a) Project Management Staff - Describe the positions required to implement the requirements of this solicitation other than the Quality Control Staff and Technical Support Staff listed below. List the educational requirements, experience, and any specialized training required for each position. Provide a resume for each person proposed to fill the position, including the name, education, experience, and specialized training for that person.

(b) Quality Control Staff - Describe the positions required to implement the Quality Control Plan. List the educational requirements, experience, and any specialized training required for each position. Provide a resume for each person proposed to fill the position, including the name, education, experience, and specialized training for that person.

(c) Technical Support Staff - Describe the positions required to implement the requirements of this solicitation. List the educational requirements, experience, and any specialized training required for each position. Provide a resume for each person proposed to fill the position, including the name, education, experience, and specialized training for that person.

(4) Subcontracting

(a) Subcontracting Management - Describe how subcontractor management will be accomplished.

(b) Subcontracting Support Capability - Describe how response time between the prime contractor and his subcontractors will be minimized.

(5) Small Business and Small Disadvantaged Business Subcontracting Plan (Applicable to Large Business Only) - This is a pass/fail factor. The subcontracting plan required by FAR 19.704 will be evaluated in accordance with AFARS Appendix CC. The following minimum percentage goals must be included in the subcontracting plan to be considered acceptable:

| | | |
|---|---|---|
| Small Business Subcontracting | 61.2% | (Includes small disadvantaged and woman-owned small businesses) |
| Small Disadvantaged Business | 9.1% | (Includes Historically Black Colleges or Universities/Minority Institutions) |
| Women Owned Small Business | 5% | |
| Historically Black Colleges or Universities/Minority Institution | 9% | |

34 COEFFICIENT EVALUATION

a. **FOR PRICE EVALUATION PURPOSES ONLY** , the following percentage estimates shall be applied to the estimated maximum work:

| | |
|---|---|
| 65% | Arkansas |
| 5% | Louisiana |
| 15% | Missouri |
| 5% | New Mexico |
| 5% | Oklahoma |
| 5% | Texas |

b. **FOR PRICE EVALUATION PURPOSES ONLY**, the following percentage estimates shall be applied to each state for the estimated maximum work:

| | |
|---|---|
| 90% | Normal Working Hours |
| 5% | Other Than Normal Working Hours |
| 5% | Non-prepriced Percentage Factor |

c. **Percentages of work listed are for PRICE EVALUATION PURPOSES ONLY. Price evaluation using these percentages does not guarantee the amount of work awarded for a particular state.**

35 PROPOSAL SUBMITTAL PROCEDURES

a. Handcarried offers must be deposited in Room 7412 at the Federal Building, 700 West Capitol, Little Rock, Arkansas. Proposals shall be received by the Corps of Engineers no later than the time and date specified in Block 13 of Standard Form 1442. Note FAR Clause 52.215-1, Clause 23, in this section for late submissions, modifications, and withdrawals of proposals. Offers will not be publicly opened.

b. The proposal shall consist of three (3) volumes as follows:

| | |
|---|---|
| Volume I | Technical Proposal<br>**(original plus five copies)** |
| Volume II | Price Proposal, Including a detailed description of the types of costs included in the coefficient factors<br>**(original only)** |
| Volume III | Subcontracting Plan (if applicable, see Section 00700, FAR Clause 52.219 I)<br>**(original plus one copy)** |

c. All proposed materials shall be submitted in binders with a table of contents and tabbed section dividers. The sections shall parallel the submission requirements identified in the Evaluation Factors listed in this section. Each volume must be submitted as distinctly several parts, with all references to cost or price confined to Volume II. Volumes shall be submitted using 8 1/2 by 11-inch pages with foldout sheets limited to 17 inches. Information shall be complete within itself and shall be supportive of a prompt and thorough evaluation.

d. For ease of reference, the Offeror shall use a page numbering system for each volume of the proposal. Consecutive page number within tabs is preferred; i.e., Page A-4 identifies Tab A, Page 4 of a particular volume. Additionally, for document control purposes, any changes to the proposal requested by the Contracting Officer and provided after submission of the initial proposal shall be submitted as page changes with each page identified by date and revision number.

End of Section 00100

TABLE OF CONTENTS
SECTION 00600
REPRESENTATIONS & CERTIFICATIONS


| | | |
|---|---|---|
| 1 | 52.203-2 | CERTIFICATE OF INDEPENDENT PRICE DETERMINATION (APR 1985) |
| 2 | 52.203-11 | CERTIFICATION AND DISCLOSURE REGARDING PAYMENTS TO INFLUENCE CERTAIN FEDERAL TRANSACTIONS (APR 1991) |
| 3 | 52.204-3 | TAXPAYER IDENTIFICATION (JUN 1997) |
| 4 | 52.204-5 | WOMEN-OWNED BUSINESS (OCT 1995) |
| 5 | 52.209-5 | CERTIFICATION REGARDING DEBARMENT, SUSPENSION, PROPOSED DEBARMENT, AND OTHER RESPONSIBILITY MATTERS (MAR 1996) |
| 6 | 52.219-1 | SMALL BUSINESS PROGRAM REPRESENTATIONS (JAN 1997) |
| 7 | 52.219-19 | SMALL BUSINESS CONCERN REPRESENTATION FOR THE SMALL BUSINESS COMPETITIVENESS DEMONSTRATION PROGRAM (JAN 1997) |
| 8 | 52.222-21 | CERTIFICATION OF NONSEGREGATED FACILITIES (APR 1984) |
| 9 | 52.222-22 | PREVIOUS CONTRACTS AND COMPLIANCE REPORTS (APR 1984) |
| 10 | 52.223-1 | CLEAN AIR AND WATER CERTIFICATION (APR 1984) |
| 11 | 52.223-13 | CERTIFICATION OF TOXIC CHEMICAL RELEASE REPORTING (OCT 1996) |
| 12 | 52.230-1 | COST ACCOUNTING STANDARDS NOTICES AND CERTIFICATION (APR 1996) |
| 13 | 52.209-7001 | DISCLOSURE OF OWNERSHIP OR CONTROL BY THE GOVERNMENT OF A TERRORIST COUNTRY (SEP 1994) |
| 14 | 52.219-7000 | SMALL DISADVANTAGED BUSINESS CONCERN REPRESENTATION (DoD CONTRACTS) (JUN 1997) |
| 15 | 52.225-7031 | SECONDARY ARAB BOYCOTT OF ISRAEL (JUN 1992) |
| 16 | 52.247-7022 | REPRESENTATION OF EXTENT OF TRANSPORTATION BY SEA (AUG 1992) |
| 17 | 52.215-4004 A | TYPE OF BUSINESS ORGANIZATION (OCT 1997) |

SECTION 00600

REPRESENTATIONS & CERTIFICATIONS

1 52.203-2 CERTIFICATE OF INDEPENDENT PRICE DETERMINATION (APR 1985)

(a) The offeror certifies that--

(1) The prices in this offer have been arrived at independently, without, for the purpose of restricting competition, any consultation, communication, or agreement with any other offeror or competitor relating to (i) those prices, (ii) the intention to submit an offer, or (iii) the methods or factors used to calculate the prices offered;

(2) The prices in this offer have not been and will not be knowingly disclosed by the offeror, directly or indirectly, to any other offeror or competitor before bid opening (in the case of a sealed bid solicitation) or contract award (in the case of a negotiated solicitation) unless otherwise required by law; and

(3) No attempt has been made or will be made by the offeror to induce any other concern to submit or not to submit an offer for the purpose of restricting competition.

(b) Each signature on the offer is considered to be a certification by the signatory that the signatory--

(1) Is the person in the offeror's organization responsible for determining the prices being offered in this bid or proposal, and that the signatory has not participated and will not participate in any action contrary to subparagraphs (a)(1) through (a)(3) above; or

(2)(i) Has been authorized, in writing, to act as agent for the following principals in certifying that those principals have not participated, and will not participate in any action contrary to subparagraphs (a)(1) through (a)(3) above _____

_____

(insert full name of person(s) in the offeror's organization responsible for determining the prices offered in this bid or proposal, and the title of his or her position in the offeror's organization);

(ii) As an authorized agent, does certify that the principals named in subdivision (b)(2)(i) above have not participated, and will not participate, in any action contrary to subparagraphs (a)(1) through (a)(3) above; and

(iii) As an agent, has not personally participated, and will not participate, in any action contrary to subparagraphs (a)(1) through (a)(3) above.

(c) If the offeror deletes or modifies subparagraph (a)(2) above, the offeror must furnish with its offer a signed statement setting forth in detail the circumstances of the disclosure.

(End of provision)

2 52.203-11 CERTIFICATION AND DISCLOSURE REGARDING PAYMENTS TO INFLUENCE CERTAIN FEDERAL TRANSACTIONS (APR 1991)

(a) The definitions and prohibitions contained in the clause, at FAR 52.203-12, Limitation on Payments to Influence Certain Federal Transactions, included in this solicitation, are hereby incorporated by reference in paragraph (b) of this certification.

(b) The offeror, by signing its offer, hereby certifies to the best of his or her knowledge and belief that on or after December 23, 1989--

(1) No Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress on his or her behalf in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment or modification of any Federal contract, grant, loan, or cooperative agreement;

(2) If any funds other than Federal appropriated funds (including profit or fee received under a covered Federal transaction) have been paid, or will be paid, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress

on his or her behalf in connection with this solicitation, the offeror shall complete and submit, with its offer, OMB standard form LLL, Disclosure of Lobbying Activities, to the Contracting Officer; and

(3) He or she will include the language of this certification in all subcontract awards at any tier and require that all recipients of subcontract awards in excess of $100,000 shall certify and disclose accordingly.

(c) Submission of this certification and disclosure is a prerequisite for making or entering into this contract imposed by section 1352, title 31, United States Code. Any person who makes an expenditure prohibited under this provision or who fails to file or amend the disclosure form to be filed or amended by this provision, shall be subject to a civil penalty of not less than $10,000, and not more than $100,000, for each such failure.

(End of provision)

3 52.204-3 TAXPAYER IDENTIFICATION (JUN 1997)

(a) Definitions.

"Common parent," as used in this solicitation provision, means that corporate entity that owns or controls an affiliated group of corporations that files its Federal income tax returns on a consolidated basis, and of which the offeror is a member.

"Corporate status," as used in this solicitation provision, means a designation as to whether the offeror is a corporate entity, an unincorporated entity (e.g., sole proprietorship or partnership), or a corporation providing medical and health care services.

"Taxpayer Identification Number (TIN)," as used in this solicitation provision, means the number required by the IRS to be used by the offeror in reporting income tax and other returns.

(b) All offerors are required to submit the information required in paragraphs (c) through (e) of this solicitation provision in order to comply with reporting requirements of 26 U.S.C. 6041, 6041A, and 6050M and implementing regulations issued by the Internal Revenue Service (IRS). If the resulting contract is subject to the reporting requirements described in FAR 4.903, the failure or refusal by the offeror to furnish the information may result in a 31 percent reduction of payments otherwise due under the contract.

(c) Taxpayer Identification Number (TIN).

/_/ TIN: _____.

/_/ TIN has been applied for.

/_/ TIN is not required because:

/_/ Offeror is a nonresident alien, foreign corporation, or foreign partnership that does not have income effectively connected with the conduct of a trade or business in the U.S. and does not have an office or place of business or a fiscal paying agent in the U.S.;

/_/ Offeror is an agency or instrumentality of a foreign government;

/_/ Offeror is an agency or instrumentality of a Federal, state, or local government;

/_/ Other. State basis. _____

(d) Corporate Status.

/_/ Corporation providing medical and health care services, or engaged in the billing and collecting of payments for such services;

/_/ Other corporate entity;

/_/ Not a corporate entity;

/_/ Sole proprietorship

/_/ Partnership

/_/ Hospital or extended care facility described in 26 CFR 501(c)(3) that is exempt from taxation under 26 CFR 501(a).

(e) Common Parent.

/_/ Offeror is not owned or controlled by a common parent as defined in paragraph (a) of this provision.

/_/ Name and TIN of common parent:

Name _____

TIN _____

(End of provision)

4 52.204-5 WOMEN-OWNED BUSINESS (OCT 1995)

(a) Representation. The offeror represents that it [ ] is, [ ] is not a women-owned business concern.

(b) Definition. "Women-owned business concern," as used in this provision, means a concern which is at least 51 percent owned by one or more women; or in the case of any publicly owned business, at least 51 percent of the stock of which is owned by one or more women; and whose management and daily business operations are controlled by one or more women.

(End of provision)

5 52.209-5 CERTIFICATION REGARDING DEBARMENT, SUSPENSION, PROPOSED DEBARMENT, AND OTHER RESPONSIBILITY MATTERS (MAR 1996)

(a)(1) The Offeror certifies, to the best of its knowledge and belief, that--

(i) The Offeror and/or any of its Principals--

(A) Are / / are not / / presently debarred, suspended, proposed for debarment, or declared ineligible for the award of contracts by any Federal agency;

(B) Have / / have not / /, within a three-year period preceding this offer, been convicted of or had a civil judgment rendered against them for: commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, state, or local) contract or subcontract; violation of Federal or state antitrust statutes relating to the submission of offers; or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, tax evasion, or receiving stolen property; and

(C) Are / / are not / / presently indicted for, or otherwise criminally or civilly charged by a governmental entity with, commission of any of the offenses enumerated in subdivision (a)(1)(i)(B) of this provision.

(ii) The Offeror has / / has not / /, within a three-year period preceding this offer, had one or more contracts terminated for default by any Federal agency.

(2) "Principals," for the purposes of this certification, means officers; directors; owners; partners; and, persons having primary management or supervisory responsibilities within a business entity (e.g., general manager; plant manager; head of a subsidiary, division, or business segment, and similar positions).

THIS CERTIFICATION CONCERNS A MATTER WITHIN THE JURISDICTION OF AN AGENCY OF THE UNITED STATES AND THE MAKING OF A FALSE, FICTITIOUS, OR FRAUDULENT CERTIFICATION MAY RENDER THE MAKER SUBJECT TO PROSECUTION UNDER SECTION 1001, TITLE 18, UNITED STATES CODE.

(b) The Offeror shall provide immediate written notice to the Contracting Officer if, at any time prior to contract award, the Offeror learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

(c) A certification that any of the items in paragraph (a) of this provision exists will not necessarily result in withholding of an award under this solicitation. However, the certification will be considered in connection with a determination of the Offeror's responsibility. Failure of the Offeror to furnish a certification or provide such additional information as requested by the Contracting Officer may render the Offeror nonresponsible.

(d) Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render, in good faith, the certification required by paragraph (a) of this provision. The knowledge and information of an Offeror is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

(e) The certification in paragraph (a) of this provision is a material representation of fact upon which reliance was placed when making award. If it is later determined that the Offeror knowingly rendered an erroneous certification, in addition to other remedies available to the Government, the Contracting Officer may terminate the contract resulting from this solicitation for default.

(End of provision)

6 52.219-1 SMALL BUSINESS PROGRAM REPRESENTATIONS (JAN 1997)

(a)(1) The standard industrial classification (SIC) code for this acquisition is 1541

(2) The small business size standard is $17 million

(3) The small business size standard for a concern which submits an offer in its own name, other than on a construction or service contract, but which proposes to furnish a product which it did not itself manufacture, is 500 employees.

(b) Representations. (1) The offeror represents as part of its offer that it [ ] is, [ ] is not a small business concern.

(2) (Complete only if offeror represented itself as a small business concern in block (b)(1) of this section.) The offeror represents as part of its offer that it [ ] is, [ ] is not a small disadvantaged business concern.

(3) (Complete only if offeror represented itself as a small business concern in block (b)(1) of this section.) The offeror represents as part of its offer that it [ ] is, [ ] is not a women-owned small business concern.

(c) Definitions. "Joint venture," for purposes of a small disadvantaged business (SDB) set-aside or price evaluation preference (as prescribed at 13 CFR 124.321), is a concern that is owned and controlled by one or more socially and economically disadvantaged individuals entering into a joint venture agreement with one or more business concerns and is considered to be affiliated for size purposes with such other concern(s). The combined annual receipts or employees of the concerns entering into the joint venture must meet the applicable size standard corresponding to the SIC code designated for the contract. The majority of the venture's earnings must accrue directly to the socially and economically disadvantaged individuals in the SDB concern(s) in the joint venture. The percentage of the ownership involvement in a joint venture by disadvantaged individuals must be at least 51 percent.

"Small business concern," as used in this provision, means a concern, including its affiliates, that is independently owned and operated, not dominant in the field of operation in which it is bidding on Government contracts, and qualified as a small business under the criteria in 13 CFR Part 121 and the size standard in paragraph (a) of this provision.

"Small disadvantaged business concern," as used in this provision, means a small business concern that (1) is at least 51 percent unconditionally owned by one or more individuals who are both socially and economically disadvantaged, or a publicly owned business having at least 51 percent of its stock unconditionally owned by one or more socially and economically disadvantaged individuals, and (2) has its management and daily business controlled by one or more such individuals. This term also means a small business concern that is at least 51 percent unconditionally owned by an economically disadvantaged Indian tribe or Native Hawaiian Organization, or a publicly owned business having at least 51 percent of its stock unconditionally owned by one or more of these entities, which has its management and daily business controlled by members of an economically disadvantaged Indian tribe or Native Hawaiian Organization, and which meets the requirements of 13 CFR Part 124.

"Women-owned small business concern," as used in this provision, means a small business concern--

(1) Which is at least 51 percent owned by one or more women or, in the case of any publicly owned business, at least 51 percent of the stock of which is owned by one or more women; and

(2) Whose management and daily business operations are controlled by one or more women.

(d) Notice. (1) If this solicitation is for supplies and has been set aside, in whole or in part, for small business concerns, then the clause in this solicitation providing notice of the set-aside contains restrictions on the source of the end items to be furnished.

(2) Under 15 U.S.C. 645(d), any person who misrepresents a firm's status as a small or small disadvantaged business concern in order to obtain a contract to be awarded under the preference programs established pursuant to sections 8(a), 8(d), 9, or 15 of the Small Business Act or any other provision of Federal law that specifically references section 8(d) for a definition of program eligibility, shall--

(i) Be punished by imposition of fine, imprisonment, or both;

(ii) Be subject to administrative remedies, including suspension and debarment; and

(iii) Be ineligible for participation in programs conducted under the authority of the Act.

(End of provision)

DOES NOT APPLY TO 8(A) PROCUREMENT

7 52.219-19 SMALL BUSINESS CONCERN REPRESENTATION FOR THE SMALL BUSINESS COMPETITIVENESS DEMONSTRATION PROGRAM (JAN 1997)

(a) Definition.

"Emerging small business" as used in this solicitation, means a small business concern whose size is no greater than 50 percent of the numerical size standard applicable to the standard industrial classification code assigned to a contracting opportunity.

(b) (Complete only if the Offeror has represented itself under the provision at 52.219-1 as a small business concern under the size standards of this solicitation.)

The Offeror [ ] is, [ ] is not an emerging small business.

(c) (Complete only if the Offeror is a small business or an emerging small business, indicating its size range.)

Offeror's number of employees for the past 12 months (check this column if size standard stated in solicitation is expressed in terms of number of employees) or Offeror's average annual gross revenue for the last 3 fiscal years (check this column if size standard stated in solicitation is expressed in terms of annual receipts). (Check one of the following.)

| No. of Employees | Avg. Annual Gross Revenues |
|---|---|
| ____50 or fewer | _____$1 million or less |
| ____51-100 | _____$1,000,001-$2 million |
| ____101-250 | _____$2,000,001-$3.5 million |
| ____251-500 | _____$3,500,001-$5 million |
| ____501-750 | _____$5,000,001-$10 million |
| ____751-1,000 | _____$10,000,001-$17 million |
| ____Over 1,000 | _____Over $17 million |

(End of provision)

8 52.222-21 CERTIFICATION OF NONSEGREGATED FACILITIES (APR 1984)

(a) "Segregated facilities," as used in this provision, means any waiting rooms, work areas, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees, that are segregated by explicit directive or are in fact segregated on the basis of race, color, religion, or national origin because of habit, local custom, or otherwise.

(b) By the submission of this offer, the offeror certifies that it does not and will not maintain or provide for its employees any segregated facilities at any of its establishments, and that it does not and will not permit its employees to perform their services at any location under its control where segregated facilities are maintained. The offeror agrees that a breach of this certification is a violation of the Equal Opportunity clause in the contract.

(c) The offeror further agrees that (except where it has obtained identical certifications from proposed subcontractors for specific time periods) it will--

(1) Obtain identical certifications from proposed subcontractors before the award of subcontracts under which the subcontractor will be subject to the Equal Opportunity clause;

(2) Retain the certifications in the files; and

(3) Forward the following notice to the proposed subcontractors (except if the proposed subcontractors have submitted identical certifications for specific time periods):

NOTICE TO PROSPECTIVE SUBCONTRACTORS OF REQUIREMENT FOR CERTIFICATIONS OF NONSEGREGATED FACILITIES.

A Certification of Nonsegregated Facilities must be submitted

before the award of a subcontract under which the subcontractor will be subject to the Equal Opportunity clause. The certification may be submitted either for each subcontract or for all subcontracts during a period (i.e., quarterly, semiannually, or annually).
NOTE: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.

(End of provision)
(R 7-2003.14(b)(1)(A) 1970 AUG)
(R 1-12.803-10(d))

9 52.222-22 PREVIOUS CONTRACTS AND COMPLIANCE REPORTS (APR 1984)

The offeror represents that--
(a) It /_/ has, /_/ has not, participated in a previous contract or subcontract subject either to the Equal Opportunity clause of this solicitation, the clause originally contained in Section 310 of Executive Order No. 10925, or the clause contained in Section 201 of Executive Order No. 11114;
(b) It /_/ has, /_/ has not, filed all required compliance reports; and
(c) Representations indicating submission of required compliance reports, signed by proposed subcontractors, will be obtained before subcontract awards.

(End of provision)
(R 7-2003.14(b)(1)(B) 1973 APR)

10 52.223-1 CLEAN AIR AND WATER CERTIFICATION (APR 1984)

The Offeror certifies that--
(a) Any facility to be used in the performance of this proposed contract is /_/ is not /_/ listed on the Environmental Protection Agency (EPA) List of Violating Facilities;
(b) The Offeror will immediately notify the Contracting Officer, before award, of the receipt of any communication from the Administrator, or a designee, of the EPA, indicating that any facility that the Offeror proposes to use for the performance of the contract is under consideration to be listed on the EPA List of Violating Facilities; and
(c) The Offeror will include a certification substantially the same as this certification, including this paragraph (c), in every nonexempt subcontract.

(End of provision)
(AV 7-2003.71 1977 JUN)
(AV 1-1.2302-1)

11 52.223-13 CERTIFICATION OF TOXIC CHEMICAL RELEASE REPORTING (OCT 1996)

(a) Submission of this certification is a prerequisite for making or entering into this contract imposed by Executive Order 12969, August 8, 1995.
(b) By signing this offer, the offeror certifies that----
(1) As the owner or operator of facilities that will be used in the performance of this contract that are subject to the filing and reporting requirements described in section 313 of the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA) (42 U.S.C. 11023) and section 6607 of the Pollution Prevention Act of 1990 (PPA) (42 U.S.C. 13106), the offeror will file and continue to file for such facilities for the life of the contract the Toxic Chemical Release Inventory Form (Form R) as described in sections 313(a) and (g) of EPCRA and section 6607 of PPA; or
(2) None of its owned or operated facilities to be used in the performance of this contract is subject to the Form R filing and reporting requirements because each such facility is exempt for at least one of the following reasons: (Check each block that is applicable.)
/__/ (i) The facility does not manufacture, process, or otherwise use any toxic chemicals listed under section 313(c) of EPCRA, 42 U.S.C. 11023(c);
/__/ (ii) The facility does not have 10 or more full-time employees as specified in section 313(b)(1)(A) of EPCRA, 42 U.S.C. 11023(b)(1)(A);
/__/ (iii) The facility does not meet the reporting thresholds of

toxic chemicals established under section 313(f) of EPCRA, 42 U.S.C. 11023(f) (including the alternate thresholds at 40 CFR 372.27, provided an appropriate certification form has been filed with EPA);

/__/ (iv) The facility does not fall within Standard Industrial Classification Code (SIC) designations 20 through 39 as set forth in Section 19.102 of the Federal Acquisition Regulation; or

/__/ (v) The facility is not located within any State of the United States, the District of Columbia, the Commonwealth of Puerto Rico, Guam, American Samoa, the United States Virgin Islands, the Northern Mariana Islands, or any other territory or possession over which the United States has jurisdiction.

(End of provision)

APPLIES TO LARGE BUSINESSES ONLY

12 52.230-1 COST ACCOUNTING STANDARDS NOTICES AND CERTIFICATION (APR 1996)

Note: This notice does not apply to small businesses or foreign governments. This notice is in three parts, identified by Roman numerals I through III.

Offerors shall examine each part and provide the requested information in order to determine Cost Accounting Standards (CAS) requirements applicable to any resultant contract.

If the offeror is an educational institution, Part II does not apply unless the contemplated contract will be subject to full or modified CAS coverage pursuant to 48 CFR 9903.201-2(c)(5) or 9903.201-2(c)(6), respectively.

I. DISCLOSURE STATEMENT--COST ACCOUNTING PRACTICES AND CERTIFICATION

(a) Any contract in excess of $500,000 resulting from this solicitation, except contracts in which the price negotiated is based on (1) established catalog or market prices of commercial items sold in substantial quantities to the general public, or (2) prices set by law or regulation, will be subject to the requirements of the Cost Accounting Standards Board (48 CFR Chapter 99), except for those contracts which are exempt as specified in 48 CFR 9903.201-1.

(b) Any offeror submitting a proposal which, if accepted, will result in a contract subject to the requirements of 48 CFR Chapter 99 must, as a condition of contracting, submit a Disclosure Statement as required by 48 CFR 9903.202. When required, the Disclosure Statement must be submitted as a part of the offeror's proposal under this solicitation unless the offeror has already submitted a Disclosure Statement disclosing the practices used in connection with the pricing of this proposal. If an applicable Disclosure Statement has already been submitted, the offeror may satisfy the requirement for submission by providing the information requested in paragraph (c) of Part I of this provision.

CAUTION: In the absence of specific regulations or agreement, a practice disclosed in a Disclosure Statement shall not, by virtue of such disclosure, be deemed to be a proper, approved, or agreed-to practice for pricing proposals or accumulating and reporting contract performance cost data.

(c) Check the appropriate box below:

/_/ (1) Certificate of Concurrent Submission of Disclosure Statement.

The offeror hereby certifies that, as a part of the offer, copies of the Disclosure Statement have been submitted as follows: (i) Original and one copy to the cognizant Administrative Contracting Officer (ACO) or cognizant Federal agency official authorized to act in that capacity (Federal official), as applicable, and (ii) One copy to the cognizant Federal auditor.

(Disclosure must be on Form No. CASB DS-1 or CASB DS-2, as applicable. Forms may be obtained from the cognizant ACO or Federal official and/or from the loose-leaf version of the Federal Acquisition Regulation.)

Date of Disclosure Statement: _____

Name and Address of Cognizant ACO or Federal Official Where Filed: _____

_____

The offeror further certifies that practices used in estimating costs in pricing this proposal are consistent with the cost accounting practices disclosed in the applicable Disclosure Statement.

/_/ (2) Certificate of Previously Submitted Disclosure Statement.

The offeror hereby certifies that the required Disclosure Statement was filed as follows:

Date of Disclosure Statement: _____

Name and Address of Cognizant ACO or Federal Official Where Filed: _____
_____

The offeror further certifies that the practices used in estimating costs in pricing this proposal are consistent with the cost accounting practices disclosed in the applicable disclosure statement.

/_/ (3) Certificate of Monetary Exemption.

The offeror hereby certifies that the offeror, together with all divisions, subsidiaries, and affiliates under common control, did not receive net awards of negotiated prime contracts and subcontracts subject to CAS totaling more than $25 million (of which at least one award exceeded $1 million) in the cost accounting period immediately preceding the period in which this proposal was submitted. The offeror further certifies that if such status changes before an award resulting from this proposal, the offeror will advise the Contracting Officer immediately.

/_/ (4) Certificate of Interim Exemption.

The offeror hereby certifies that (i) the offeror first exceeded the monetary exemption for disclosure, as defined in (3) of this subsection, in the cost accounting period immediately preceding the period in which this offer was submitted and (ii) in accordance with the 48 CFR 9903.202-1 the offeror is not yet required to submit a Disclosure Statement. The offeror further certifies that if an award resulting from this proposal has not been made within 90 days after the end of that period, the offeror will immediately submit a revised certificate to the Contracting Officer, in the form specified under subparagraphs (c)(1) or (c)(2) of Part I of this provision, as appropriate, to verify submission of a completed Disclosure Statement.

CAUTION: Offerors currently required to disclose because they were awarded a CAS-covered prime contract or subcontract of $25 million or more in the current cost accounting period may not claim this exemption (4). Further, the exemption applies only in connection with proposals submitted before expiration of the 90-day period following the cost accounting period in which the monetary exemption was exceeded.

II. COST ACCOUNTING STANDARDS--ELIGIBILITY FOR MODIFIED CONTRACT COVERAGE

If the offeror is eligible to use the modified provisions of 48 CFR 9903.201-2(b) and elects to do so, the offeror shall indicate by checking the box below. Checking the box below shall mean that the resultant contract is subject to the Disclosure and Consistency of Cost Accounting Practices clause in lieu of the Cost Accounting Standards clause.

/_/ The offeror hereby claims an exemption from the Cost Accounting Standards clause under the provisions of 48 CFR 9903.201-2(b) and certifies that the offeror is eligible for use of the Disclosure and Consistency of Cost Accounting Practices clause because during the cost accounting period immediately preceding the period in which this proposal was submitted, the offeror received less than $25 million in awards of CAS-covered prime contracts and subcontracts, or the offeror did not receive a single CAS-covered award exceeding $1 million. The offeror further certifies that if such status changes before an award resulting from this proposal, the offeror will advise the Contracting Officer immediately.

CAUTION: An offeror may not claim the above eligibility for modified contract coverage if this proposal is expected to result in the award of a CAS-covered contract of $25 million or more or if, during its current cost accounting period, the offeror has been awarded a single CAS-covered prime contract or subcontract of $25 million or more.

III. ADDITIONAL COST ACCOUNTING STANDARDS APPLICABLE TO EXISTING CONTRACTS

The offeror shall indicate below whether award of the contemplated contract would, in accordance with subparagraph (a)(3) of the Cost Accounting Standards clause, require a change in established cost accounting practices affecting existing contracts and subcontracts.

/_/ YES /_/ NO

(End of provision)

13 52.209-7001 DISCLOSURE OF OWNERSHIP OR CONTROL BY THE GOVERNMENT OF A TERRORIST COUNTRY (SEP 1994)

(a) Definitions.

As used in this provision--

(1) "Government of a terrorist country" includes the state and the government of a terrorist country, as well as any political subdivision, agency, or instrumentality thereof.

(2) "Terrorist country" means a country determined by the Secretary of

State, under section 6(j)(1)(A) of the Export Administration Act of 1979 (50 U.S.C. App. 2405(j)(i)(A)), to be a country the government of which has repeatedly provided support for acts of international terrorism. As of the date of this provision, terrorist countries include: Cuba, Iran, Iraq, Libya, North Korea, Sudan, and Syria.

(3) "Significant interest" means--

(i) Ownership of or beneficial interest in 5 percent or more of the firm's or subsidiary's securities. Beneficial interest includes holding 5 percent or more of any class of the firm's securities in "nominee shares," "street names," or some other method of holding securities that does not disclose the beneficial owner;

(ii) Holding a management position in the firm, such as a director or officer;

(iii) Ability to control or influence the election, appointment, or tenure of directors or officers in the firm;

(iv) Ownership of 10 percent or more of the assets of a firm such as equipment, buildings, real estate, or other tangible assets of the firm; or

(v) Holding 50 percent or more of the indebtedness of a firm.

(b) Prohibition on award.

In accordance with 10 U.S.C. 2327, no contract may be awarded to a firm or a subsidiary of a firm if the government of a terrorist country has a significant interest in the firm or subsidiary, unless a waiver is granted by the Secretary of Defense.

(c) Disclosure.

If the government of a terrorist country has a significant interest in the Offeror or a subsidiary of the Offeror, the Offeror shall disclose such interest in an attachment to its offer. If the Offeror is a subsidiary, it shall also disclose any significant interest the government of a terrorist country has in any firm that owns or controls the subsidiary. The disclosure shall include--

(1) Identification of each government holding a significant interest; and

(2) A description of the significant interest held by each government.

(End of provision)

14 52.219-7000 SMALL DISADVANTAGED BUSINESS CONCERN REPRESENTATION (DoD CONTRACTS) (JUN 1997)

(a) Definition. "Small disadvantaged business concern," as used in this provision, means a small business concern, owned and controlled by individuals who are both socially and economically disadvantaged, as defined by the Small Business Administration at 13 CFR Part 124, the majority of earnings of which directly accrue to such individuals. This term also means a small business concern owned and controlled by an economically disadvantaged Indian tribe or Native Hawaiian organization which meets the requirements of 13 CFR 124.112 or 13 CFR 124.113, respectively. In general, 13 CFR Part 124 describes a small disadvantaged business concern as a small business concern--

(1) Which is at least 51 percent unconditionally owned by one or more socially and economically disadvantaged individuals; or

(2) In the case of any publicly owned business, at least 51 percent of the voting stock is unconditionally owned by one or more socially and economically disadvantaged individuals; and

(3) Whose management and daily business operations are controlled by one or more such individuals.

(b) Representations. Check the category in which your ownership falls--

_____ Subcontinent Asian (Asian-Indian) American (U.S. citizen with origins from India, Pakistan, Bangladesh, Sri Lanka, Bhutan, the Maldives Islands, or Nepal)

_____ Asian-Pacific American (U.S. citizen with origins from Japan, China, the Philippines, Vietnam, Korea, Samoa, Guam, U.S. Trust Territory of the Pacific Islands (Republic of Palau), the Northern Mariana Islands, Laos, Kampuchea (Cambodia), Taiwan, Burma, Thailand, Malaysia, Indonesia, Singapore, Brunei, Republic of the Marshall Islands, the Federated States of Micronesia, Macao, Hong Kong, Fiji, Tonga, Kiribati, Tuvalu, or Nauru)

_____ Black American (U.S. citizen)

_____ Hispanic American (U.S. citizen with origins from South America, Central America, Mexico, Cuba, the Dominican Republic, Puerto Rico, Spain, or Portugal)

_____ Native American (American Indians, Eskimos, Aleuts, or Native Hawaiians, including Indian tribes or Native Hawaiian organizations)
_____ Individual/concern, other than one of the preceding, currently certified for participation in the Minority Small Business and Capital Ownership Development Program under Section 8(a) of the Small Business Act
_____ Other

(c) Complete the following--

(1) The offeror is_____ is not _____a small disadvantaged business concern.

(2) The Small Business Administration (SBA) has _____ has not _____ made a determination concerning the offeror's status as a small disadvantaged business concern. If the SBA has made a determination, the date of the determination was _____ and the offeror--

_____ Was found by SBA to be socially and economically disadvantaged and no circumstances have changed to vary that determination.
_____ Was found by SBA not to be socially and economically disadvantaged but circumstances which caused the determination have changed.

(d) Penalties and Remedies. Anyone who misrepresents the status of a concern as a small disadvantaged business for the purpose of securing a contract or subcontract shall--

(1) Be punished by imposition of a fine, imprisonment, or both;

(2) Be subject to administrative remedies, including suspension and debarment; and

(3) Be ineligible for participation in programs conducted under authority of the Small Business Act.

(End of provision)

15 52.225-7031 SECONDARY ARAB BOYCOTT OF ISRAEL (JUN 1992)

(a) Definitions.

As used in this clause--

(1) "Foreign person" means any person other than a United States person as defined in section 16(2) of the Export Administration Act of 1979 (50 U.S.C. App. Sec 2415).

(2) "United States person" is defined in section 16(2) of the Export Administration Act of 1979 and means any United States resident or national (other than an individual resident outside the United States and employed by other than a United States person), any domestic concern (including any permanent domestic establishment of any foreign concern), and any foreign subsidiary or affiliate (including any permanent foreign establishment) of any domestic concern which is controlled in fact by such domestic concern, as determined under regulations of the President.

(b) Certification.

By submitting this offer, the Offeror, if a foreign person, company or entity, certifies that it--

(1) Does not comply with the Secondary Arab Boycott of Israel; and

(2) Is not taking or knowingly agreeing to take any action, with respect to the Secondary Boycott of Israel by Arab countries, which 50 U.S.C. App. Sec 2407(a) prohibits a United States person from taking.

(End of clause)

16 52.247-7022 REPRESENTATION OF EXTENT OF TRANSPORTATION BY SEA (AUG 1992)

(a) The Offeror shall indicate by checking the appropriate blank in paragraph (b) of this provision whether transportation of supplies by sea is anticipated under the resultant contract. The term "supplies" is defined in the Transportation of Supplies by Sea clause of this solicitation.

(b) Representation. The Offeror represents that it--

_____ Does anticipate that supplies will be transported by sea in the performance of any contract or subcontract resulting from this solicitation.
_____ Does not anticipate that supplies will be transported by sea in the performance of any contract or subcontract resulting from this solicitation.

(c) Any contract resulting from this solicitation will include the Transportation of Supplies by Sea clause. If the Offeror represents that it will not use ocean transportation, the resulting contract will also

include the Defense FAR Supplement clause at 252.247-7024, Notification of Transportation of Supplies by Sea.

(End of provision)

17 52.215-4004 A TYPE OF BUSINESS ORGANIZATION (OCT 1997)

The offeror or quoter, by checking the applicable box, represents that--

(a) It operates as /_/ an individual, /_/ a partnership, /_/ a nonprofit organization, /_/ a joint venture, or /_/ a corporation incorporated under laws of the State of _____.

(b) If the offeror or quoter is a foreign entity, it operates as /_/ an individual, /_/ a partnership, /_/ a nonprofit organization, /_/ a joint venture, or /_/ a corporation, registered for business in _____ (country).

(End of provision)

END OF SECTION 00600

**SMALL BUSINESS AND SMALL DISADVANTAGED BUSINESS SUBCONTRACTING PLAN**

(Applicable to Large Business Only)

Date:_____

Subcontracting Plan for Solicitation No. _____, submitted in accordance with Clause No. 52.219-0009, Public Law 95-507, Public Law 99-661, Section 1207 and Public Law 100-108, Section 806 by _____.
(Name of Contractor)

1. Dollar Amounts:

   a. Total amount of Prime Contract: $_____

   b. Total estimated amount of planned subcontracting dollars: $_____

   c. Total dollars planned to be subcontracted to Small Business (SB): (including d., e., and f. below) $_____

   d. Total dollars planned to be subcontracted to Small Disadvantaged Business (SDB), Historically Black Colleges and Universities (HBCU), and Minority Institutions (MIs): $_____

   e. Total dollars planned to be subcontracted to Women-Owned Small Business (WOSB) $_____

2. Percentage goals (expressed in terms of percentage of total planned subcontracting dollars).

   a. Percentage of Prime Contract to be Subcontracted: (1b divided by 1a) _____%

   b. Percentage of subcontracting dollars to be subcontracted to SB: (1c divided by 1b) _____%

   c. Percentage of subcontracting dollars to be subcontracted to SDB, HBCU/MIs, and Women-Owned SDB: (1d divided by 1b) _____%

   d. Percentage of subcontracting dollars to be subcontracted to WOSB: (1e divided by 1b) _____%

3. The principal items or areas we will seek to subcontract under this contract are:

_____

_____

a. Of these items or areas stated in 3 above; the following are considered appropriate for award of subcontracts to SB: (List names of targeted SBs, if available.)

_____

_____

b. Of the items or areas stated in 3a. above, the following are considered appropriate for award of subcontracts to SDB and HBCU/MIs: (List names of targeted SDB/HBCU/MIs, if available.)

_____

_____

c. Of the items or areas stated in 3a. above, the following are considered appropriate for award of subcontracts to WOSB: (List names of targeted WOSBs, if available.)

_____

_____

4. The method used to develop the above subcontracting goals is described as follows: (i.e. Statement explaining how the product and service areas to be subcontracted were established, how the areas to be subcontracted to SB, SDB, HBCU/MIs, and WOSB concerns were determined and how their capabilities were determined, to include identification of source lists utilized in making these determinations.)

_____

_____

_____

_____

5. The method used to identify potential sources for solicitation purposes is as follows:

_____

_____

_____

_____

6. Indirect costs are ( ) are not ( ) included in the above goals. If indirect costs are included, a description of the method used to determine the proportionate share of indirect costs to be incurred with (a) SB concerns, (b) SDB concerns, (c) HBCU/MIs, and (d) WOSB concerns:

_____

_____

_____

_____

7. The individual who will administer the firm's subcontracting program is:

a. Name: _____

Address: _____

_____

Telephone No. _____

b. Description of the duties of _____ are as follows: i.e., General overall responsibility for this company's SB Program, the development, preparation and execution of individual subcontracting plans and for monitoring performance relative to contractual subcontracting requirements contained in this plan, including but not limited to:

(1) Developing and maintaining bidders lists of SB, SDB, HBCU/MIs, and WOSB concerns from all possible sources.

(2) Ensuring that procurement packages are structured to permit SB, SDB, HBCU/MIs, and WOSB concerns to participate to the maximum extent possible.

(3) Assuring inclusion of SB, SDB, HBCU/MIs, and WOSB concerns in all solicitations for products or services which they are capable of providing.

(4) Reviewing solicitations to remove statements, clauses, etc. which may tend to restrict or prohibit SB, SDB, HBCU/MIs, and WOSB concerns participation.

(5) Ensuring periodic rotation of potential subcontractors on bidders lists.

(6) Ensuring that the bid proposal review board documents its' reasons for not selecting low bids submitted by SB, SDB, HBCU/MIs, and WOSB concerns.

(7) Ensuring the establishment and maintenance of records of solicitations and subcontract award activity.

(8) Attending or arranging for attendance of company counselors at Business Opportunity Workshops, Minority Business Enterprise Seminars, Trade Fairs, etc.

(9) Conducting or arranging for conduct of motivational training for purchasing personnel pursuant to the intent of P.L 95-607.

(10) Providing technical assistance, i.e., engineering, quality control and managerial to SB, SDB, HBCU/MIs, and WOSB concerns as needed.

(11) Ensuring that SB, SDB, HBCU and MIs will be provided the maximum practicable opportunities to participate in the performance of contracts let by any Federal agency.

(12) Monitoring attainment of proposed goals.

(13) Preparing and submitting periodic subcontracting reports required.

(14) Coordinating contractor's activities during the conduct of compliance reviews by Federal agencies.

(15) Coordinating the conduct of contractor's activities involving its , SDB, HBCU/MIs, and WOSB subcontracting program.

(16) Additions to the duties specified above are as follows:

_____

_____

_____

8. The _____ will make the following efforts to assure that ,
(Name of Company)
SB, SDB, HBCU/MIs, and WOSB concerns will have an equitable opportunity to compete for subcontracts (description of efforts):

a. Outreach efforts will be made as follows:

(1) Contracts with minority and SB trade associations

(2) Contracts with business development organizations

(3) Attendance at small and minority business procurement conferences and trade fairs

(4) Sources will be requested from SBA's Procurement Automated Source System (PASS)

b. SB, SDB, HBCU/MIs, and WOSB concerns source lists, guides and other data identifying SB, SDB, HBCU/MIs, and WOSB concerns will be maintained and utilized by buyers in soliciting subcontracts.

c. Additions to (or deletions from) the above listed efforts are as follows:

_____

_____

9. The _____ will include the clause entitled "Utilization of
(Name of Company)
Small Business Concerns and Small Disadvantaged Business Concerns" in all subcontracts which offer further subcontracting opportunities and will require all subcontractors (except SB concerns) who receive subcontracts in excess of $500,000, or in the case of a contract for the construction of any public facility, $1,000,000; to adopt and comply with a plan similar to the plan agreed to by this firm. Such plans will be reviewed by comparing them with the provisions of Public Law 95-607, and assuring that all minimum requirements of an acceptable subcontracting plan have been satisfied. The acceptability of percentage goals shall be determined on a case-by-case basis depending on the supplies/services involved, the availability of potential small and small disadvantaged contractors and prior experience. Once approved and implemented, plans will be monitored through the submission of periodic reports, and/or, as time and availability of funds permit, periodic visits to subcontractor's facilities to review applicable records and subcontracting program progress.

10. The _____ will submit such periodic reports and cooperate in
(Name of Company)
any studies or surveys as may be required by the Little Rock District (LED), Corps of Engineers, or the Small Business Administration (SBA). In order to determine the extent of compliance by the company with the subcontracting plan. Standard Form (SF) 294, Subcontracting Report for Individual Contracts and SF 295, Summary Subcontract Report will be prepared and submitted in accordance with prescribed instructions. The address and telephone number of the office responsible for preparation and submission of the report is:

_____

_____

11. _____ will maintain the following types of records to
(Name of Company)
demonstrate procedures which have been adopted to comply with the requirements and goals set forth in the plan. (Set forth here are the records to be maintained. In order to be considered acceptable, the records shall include at least the following:)

a. SB, SDB, HBCU/MIs, and WOSB concerns source lists, guides and other data identifying SB, SDB, HBCU/MIs, and WOSB vendors.

b. Organizations contacted or to be contacted for SB, SDB, HBCU/MIs, and WOSB sources.

c. Records of all subcontract solicitations indicating on each solicitation (i) whether SB, SDB, HBCU/MIs, and WOSB concerns were solicited, and if not , why not; (ii) reasons for the failure of solicited SB, SDB, HBCU/MIs, and WOSB to receive the subcontract award.

d. Records to support other outreach efforts, to include the following:

Contracts with SB, SDB, HBCU/MIs, and WOSB concern trade associations.
Contacts with business development organizations.
Attendance at small and minority business procurement conferences
and trade fairs.

e. Records to support internal activities to guide and encourage buyers to include the following:

Workshops, seminars, training programs.
monitoring activities to evaluate compliance.

f. Records to support award data on a contact-by-contract basis, submitted to the

Government to include name, address and business size of subcontractor.

g. Records to be maintained in addition to the above are as follows:

_____

_____

12. I, the undersigned, a designated officer of _____
(Name of Company)
do hereby state that the company agrees to carry out the Government's policy to provide the maximum practicable opportunity for SB, SDB, HBCU/MIs, and WOSB concerns owned and controlled by individuals in accordance with definitions of the SBA to participate in the performance of this contract consistent with its efficient performance.

_____
(Signature)

_____
(Title)

# DIRECT DEPOSIT AUTHORIZATION FORM

I hereby authorized U. S. Army Corps of Engineer, hereinafter called USACE, to initiate direct deposit credit entries and to initiate, a necessary debit entries and adjustments for any credit entry in error to my (our) account indicated below and the financial institution named below, hereinafter called DEPOSITORY, to credit and/or debit the same to such account. This authority is to remain in full force and effect until USACE has received written notification from me (or either of us) of its termination in such time and in such manner as to afford USACE and DEPOSITORY a reasonable opportunity to act on it.

Check One: I am not currently participating in the Direct Deposit Program.

( ) **ADD** - Deposit my payment to the account shown.

I am currently participating in the Direct Deposit Program.

( ) **CHANGE** - Change financial institutions and/or account number.
( ) **CANCEL** - Stop my participation in the program.

| | | |
|---|---|---|
| Name or (Company as shown on invoice): | | |
| Address: | | |
| City: | State: | Zip: |
| Mailing Address (if different): | | |
| Daytime Phone: ( ) | | |

Please ask your Financial Institution for your Depositor Account Number and Routing Number
**(Indicate which type account to credit)**

| | | | | |
|---|---|---|---|---|
| Type of Depositor Account<br>Please check a box. | | Checking | | Saving |
| **Depositor Account Number** | | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Name of Financial Institution: | | | | | | | | | |
| Address: | | | | | | | | | |
| City: | | | State: | | | | Zip: | | |
| **Routing Number:** | | | | | | | | | |
| Depositor Account Title: | | | | | | | | | |

| | |
|---|---|
| Tax ID Number (TIN) for Business: | |

**SIGNATURE:**_____ **DATE:**_____

FORM: UFC-DISB-4

| **BID BOND**<br>(See instructions on reverse) | DATE BOND EXECUTED (Must not be later than bid opening date) | FORM APPROVED OMB NO.<br>**9000-0045** |
|---|---|---|

Public reporting burden for this collection of information is estimated to average 25 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the FAR Secretariat (VRS), Office of Federal Acquisition Policy, GSA, Washington, D.C. 20405; and to the Office of Management and Budget, Paperwork Reduction Project (9000-0045), Washington, D.C. 20503.

| PRINCIPAL (Legal name and business address) | TYPE OF ORGANIZATION ("X" one)<br>☐ INDIVIDUAL ☐ PARTNERSHI<br>☐ JOINT VENTURE ☐ CORPORATION<br>STATE OF INCORPORATION |
|---|---|

SURETY(IES) (Name and business address)

| PENAL SUM OF BOND | | | | | BID IDENTIFICATION | |
|---|---|---|---|---|---|---|
| PERCENT OF BID PRICE | AMOUNT NOT TO EXCEED | | | | BID DATE | INVITATION NO. |
| | MILLION(S) | THOUSAND(S) | HUNDRED(S) | CENTS | FOR (Construction, Supplies or Services) | |

OBLIGATION:

We, the Principal and Surety(ies) are firmly bound to the United States of America (hereinafter called the Government) in the above penal sum. For payment of the penal sum, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally. However, where the Sureties are corporations acting as co-sureties, we, the Sureties, bind ourselves in such sum "jointly and severally" as well as "severally" only for the purpose of allowing a joint action or actions against any or all of us. For all other purposes, each Surety binds itself, jointly and severally with the Principal, for the payment of the sum shown opposite the name of the Surety. If no limit of liability is indicated, the limit of liability is the full amount of the penal sum.

CONDITIONS:

The Principal has submitted the bid identified above.

THEREFORE:

The above obligation is void if the Principal - (a) upon acceptance by the Government of the bid identified above, within the period specified therein for acceptance (sixty (60) days if no period is specified), executes the further contractual documents and gives the bond(s) required by the terms of the bid as accepted within the time specified (ten (10) days if no period is specified) after receipt of the forms by the principal; or (b) in the event of failure to execute such further contractual documents and give such bonds, pays the Government for any cost of procuring the work which exceeds the amount of the bid.

Each Surety executing this instrument agrees that its obligation is not impaired by any extension(s) of the time for acceptance of the bid that the Principal may grant to the Government. Notice to the surety(ies) of extension(s) are waived. Howevet, waiver of the notice applies only to extensions aggregating not more than sixty (60) calendar days in addition to the period originally allowed for acceptance of the bid.

WITNESS:

The Principal and Surety(ies) executed this bid bond and affixed their seals on the above date.

**PRINCIPAL**

| | | | | |
|---|---|---|---|---|
| SIGNATURE(S) | 1. (Seal) | 2. (Seal) | 3. (Seal) | Corporate Seal |
| NAME(S) & TITLE(S) (Typed) | 1. | 2. | 3. | |

**INDIVIDUAL SURETY(IES)**

| | | |
|---|---|---|
| SIGNATURE(S) | 1. (Seal) | 2. (Seal) |
| NAME(S) (Typed) | 1. | 2. |

**CORPORATE SURETY(IES)**

| | | | | | |
|---|---|---|---|---|---|
| **SURETY A** | NAME & ADDRESS | | STATE OF INC. | LIABILTY LIMIT<br>**$** | Corporate Seal |
| | SIGNATURE(S) | 1. | 2. | | |
| | NAME(S) & TITLE(S) (Typed) | 1. | 2. | | |

**CORPORATE SURETY(IES) (Continued)**

| | | | | | |
|---|---|---|---|---|---|
| **SURETY B** | NAME & ADDRESS | | STATE OF INC. | LIABILTY LIMIT **$** | Corporate Seal |
| | SIGNATURE(S) | 1. | 2. | | |
| | NAME(S) & TITLE(S) (Typed) | 1. | 2. | | |
| **SURETY C** | NAME & ADDRESS | | STATE OF INC. | LIABILTY LIMIT **$** | Corporate Seal |
| | SIGNATURE(S) | 1. | 2. | | |
| | NAME(S) & TITLE(S) (Typed) | 1. | 2. | | |
| **SURETY D** | NAME & ADDRESS | | STATE OF INC. | LIABILTY LIMIT **$** | Corporate Seal |
| | SIGNATURE(S) | 1. | 2. | | |
| | NAME(S) & TITLE(S) (Typed) | 1. | 2. | | |
| **SURETY E** | NAME & ADDRESS | | STATE OF INC. | LIABILTY LIMIT **$** | Corporate Seal |
| | SIGNATURE(S) | 1. | 2. | | |
| | NAME(S) & TITLE(S) (Typed) | 1. | 2. | | |
| **SURETY F** | NAME & ADDRESS | | STATE OF INC. | LIABILTY LIMIT **$** | Corporate Seal |
| | SIGNATURE(S) | 1. | 2. | | |
| | NAME(S) & TITLE(S) (Typed) | 1. | 2. | | |
| **SURETY G** | NAME & ADDRESS | | STATE OF INC. | LIABILTY LIMIT **$** | Corporate Seal |
| | SIGNATURE(S) | 1. | 2. | | |
| | NAME(S) & TITLE(S) (Typed) | 1. | 2. | | |

INSTRUCTIONS

1. This form is authorized for use when a bid guaranty is required. Any deviation from this form will require the written approval of the Administrator of General Services.

2. Insert the full legal name and business address of the Principal in the space designated "Principal" on the face of the form. An authorized person shall sign the bond. Any person signing in a representative capacity (e.g., an attorney - in - fact) must furnish evidence of authority if that representative is not a member of the firm, partnership, or joint venture, or an officer of the corporation involved.

3. The bond may express penal sum as a percentage of the bid price. In these cases, the bond may state a maximum dollar limitation (e.g., 20% of the bid price but the amount not to exceed _____ dollars).

4. (a) Corporations executing the bond as sureties must appear on the Department of the Treasury's list of approved sureties and must act within the limitation listed therein. Where more than one corporate surety is involved, their names and addresses shall appear in the spaces (Surety A, Surety B, etc.) headed "CORPORATE SURETY(IES)." In the space designated "SURETY(IES)" on the face of the form, insert only the letter identification of the sureties.

(b) Where individual sureties are involved, a completed Affidavit of Individual Surety (Standard Form 28), for each individual surety, shall accompany the bond. The Government may require the surety to furnish additional substantiating information concerning its financial capability.

5. Corporations executing the bond shall affix their corporate seals. Individuals shal l execute the bond opposite the word "Corporate Seal"; and shall affix an adhesive seal if executed in Maine, New Hampshire, or any other jurisdiction requiring adhesive seals.

6. Type the name and title of each person signing this bond in the space provided.

7. In its application to negotiated contracts, the terms "bid" and "bidder" shall include "proposal" and "offeror."

# FINANCIAL INFORMATION

Contractor's Name_____

Solicitation No._____for_____

_____

Request that the following information be completed and submitted with your offer to expedite award in the event you are the low responsive offeror.

## Banking Information

Name of Bank_____

Address_____

Telephone No. _____ Person to Contract_____

Checking Acct. No._____ Savings Acct. No._____

## Credit References

List name and address of three company credit references you have done business with in order to check your credit rating.

1. _____ Telephone No._____

   _____ Contract_____

2. _____ Telephone No._____

   _____ Contract_____

3. _____ Telephone No._____

   _____ Contract_____

Approved by OM 0348-0046

# DISCLOSURE OF LOBBYING ACTIVITIES

Complete this form to disclose lobbying activities pursuant to 31 U.S.C. 1352
(See reverse for public burden disclosure.)

**1. Type of Federal Action:**

☐ a. contract
b. grant
c. cooperative agreement
d. loan
e. loan guarantee
f. loan insurance

**2. Status of Federal Action:**

☐ a. bid/offer/application
b. initial award
c. post-award

**3. Report Type:**

☐ a. initial filing
b. material change

**For Material Change Only:**
year _____ quarter _____
date of last report _____

**4. Name and Address of Reporting Entity:**

☐ Prime ☐ Subawardee
Tier _____, *if known*:

**Congressional District,** *if known:*

**5. If Reporting Entity in No. 4 is Subawardee, Enter Name and Address of Prime:**

**Congressional District,** *if known*:

**6. Federal Department/Agency:**

**7. Federal Program Name/Description:**

**CFDA Number,** *if applicable*: _____

**8. Federal Action Number,** *if known*:

**9. Award Amount,** *if known*:

$

**10. a. Name and Address of Lobbying Entity**
(*if individual, last name, first name, MI):*

**b. Individuals Performing Services** *(including address if different from No. 10a)*
*(last name, first name, MI)*:

(attach Continuation Sheet(s) SF-LLL-A, *if necessary*)

**11. Amount of Payment** *(check all that apply)*:

$ _____ ☐ actual ☐ planned

**12. Form of Payment** *(check all that apply)*:

☐ a. cash
☐ b. in-kind; specify: nature _____
value _____

**13. Type of Payment** *(check all that apply)*:

☐ a. retainer
☐ b. one-time fee
☐ c. commission
☐ d. contingent fee
☐ e. deferred
☐ f. other; specify: _____

**14. Brief Description of Services Performed or to be Performed and Date(s) of Service, including officer(s), employee(s), or Member(s) contacted, for Payment indicated in Item 11:**

(attach Continuation Sheet(s) SF-LLL-A, *if necessary*)

**15. Continuation Sheet(s) SF-LLL-A attached:** ☐ Yes ☐ No

**16. Information requested through this form is authorized by title 31 U.S.C section 1352. This disclosure of lobbyig activities is a materia representation of fact upon which reliance was placed by the tier above when this transaction was made or entered into. This disclosure is required pursuant to 31 U.S.C. 1352 . This information will be reported to the Congress semi-annually and will be available for public inspection. Any person who fails to**

**Signature:** _____

**Print Name:** _____

**Title:** _____

**Telephone No.:** _____ **Date:** _____

**Federal Use Only:**

**Authorized for Local Reproduction**

## INSTRUCTIONS FOR COMPLETION OF SF-LLL, DISCLOSURE OF LOBBYING ACTIVITIES

This disclosure form shall be completed by the reporting entity, whether subawardee or prime Federal recipient, at the initiation or receipt of a covered Federal action, or a material change to a previous filing, pursuant to title 31 U.S.C. section 1352. The filing of a form is required for each payment or agreement to make payment to any lobbying entity for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a member of Congress in connection with a covered Federal action. Use the SF-LLL-A Continuation Sheet for additional information if the space on the form is inadequate. Complete all items that apply for both the initial filing and material change report. Refer to the implementing guidance published by the Office of Management and Budget for additional information.

1. Identify the type of covered Federal action for which lobbying activity is and/or has been secured to influence the outcome of a covered Federal action.

2. Identify the status of the covered Federal action.

3. Identify the appropriate classification of this report. If this is a followup report caused by a material change to the information previously reported, enter the year and quarter in which the change occurred. Enter the date of the last previously submitted report by this reporting entity for this covered Federal action.

4. Enter the full name, address, city, state and zip code of the reporting entity. Include Congressional District, if known. Check the appropriate classification of the reporting entity that designates if it is, or expects to be, a prime or subaward recipient. Identify the tier of the subawardee, e.g., the first subawardee of the prime is the 1st tier. Subawards include but are not limited to subcontracts, subgrants and contract awards under grants.

5. If the organization filing the report in item 4 checks “Subawardee”, then enter the full name, address, city, state and zip code of the prime Federal recipient. Include Congressional District, if known.

6. Enter the name of the Federal agency making the award or loan commitment. Include at least one organizational level below agency name, if known. For example, Department of Transportation, United States Coast Guard.

7. Enter the Federal program name or description for the covered Federal action (item 1). If known, enter the full Catalog of Federal Domestic Assistance (CFDA) number for grants, cooperative agreements, loans, and loan commitments.

8. Enter the most appropriate Federal identifying number available for the Federal action identified in item 1 (e.g., Request for Proposal (RFP) number; Invitation for Bid (IFB) number; grant announcement number; the contract, grant, or loan award number; the application/proposal control number assigned by the Federal agency). Include prefixes, e.g., “RFP-DE-90-001.”

9. For a covered Federal action where there has been an award or loan commitment by the Federal agency, enter the Federal amount of the award/loan commitment for the prime entity identified in item 4 or 5.

10. (a) Enter the full name, address, city, state and zip code of the lobbying entity engaged by the reporting entity identified in item 4 to influence the covered Federal action.

    (b) Enter the full names of the individuals(s) performing services, and include full address if different from 10 (a). Enter Last Name, First Name, and Middle Initial (MI).

11. Enter the amount of compensation paid or reasonably expected to be paid by the reporting entity (item 4) to the lobbying entity (item 10). Indicate whether the payment has been made (actual) or will be made (planned). Check all boxes that apply. If this is a material change report, enter the cumulative amount of payment made or planned to be made.

12. Check the appropriate box(es). Check all boxes that apply. If payment is made through an in-kind contribution, specify the nature and value of the in-kind payment.

13. Check the appropriate box(es). Check all boxes that apply. If other, specify nature.

    Provide a specific and detailed description of the services that the lobbyist has performed, or will be expected to perform, and the date(s) of any services rendered. Include all preparatory and related activity, not just time spent in

Public reporting burden for this collection of information is estimated to average 30 minutes per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Office of Management and Budget, Paperwork Reduction Project (0348-0046), Washington, D.C. 20503.

# DISCLOSURE OF LOBBYING ACTIVITIES
# CONTINUATION SHEET

Approved by OM
0348-0046

Reporting Entity: _____ Page ____ of ____ ____

*U.S. G.P.O. 1990-260-708:00012

TABLE OF CONTENTS
SECTION 00700
CONTRACT CLAUSES


| | | |
|---|---|---|
| ~~1~~ | ~~52.252-2~~ | ~~CLAUSES INCORPORATED BY REFERENCE (JUN 1988)~~ |
| ~~2~~ | ~~52.232-34~~ | ~~OPTIONAL INFORMATION FOR ELECTRONIC FUNDS TRANSFER PAYMENT (AUG 1996)~~ |
| 3 | 52.202-1 I | DEFINITIONS (OCT 1995)--ALTERNATE I (APR 1984) |
| 4 | 52.203-3 | GRATUITIES (APR 1984) |
| 5 | 52.203-5 | COVENANT AGAINST CONTINGENT FEES (APR 1984) |
| 6 | 52.203-7 | ANTI-KICKBACK PROCEDURES (JUL 1995) |
| 7 | 52.203-8 | CANCELLATION, RESCISSION, AND RECOVERY OF FUNDS FOR ILLEGAL OR IMPROPER ACTIVITY (JAN 1997) |
| 8 | 52.203-10 | PRICE OR FEE ADJUSTMENT FOR ILLEGAL OR IMPROPER ACTIVITY (JAN 1997) |
| 9 | 52.203-12 | LIMITATION ON PAYMENTS TO INFLUENCE CERTAIN FEDERAL TRANSACTIONS (JUN 1997) |
| 10 | 52.204-1 | APPROVAL OF CONTRACT (DEC 1989) |
| 11 | 52.204-4 | PRINTING/COPYING DOUBLE-SIDED ON RECYCLED PAPER (JUN 1996) |
| 12 | 52.209-6 | PROTECTING THE GOVERNMENT'S INTEREST WHEN SUBCONTRACTING WITH CONTRACTOR DEBARRED, SUSPENDED, OR PROPOSED FOR DEBARMENT (JUL 1995) |
| 13 | 52.211-15 | DEFENSE PRIORITY AND ALLOCATION REQUIREMENTS (SEP 1990) |
| 14 | 52.215-2 | AUDIT AND RECORDS--NEGOTIATION (AUG 1996) |
| 15 | 52.217-9 | OPTION TO EXTEND THE TERM OF THE CONTRACT (MAR 1989) |
| 16 | 52.219-8 | UTILIZATION OF SMALL, SMALL DISADVANTAGED AND WOMEN-OWNED SMALL BUSINESS CONCERNS (JUN 1997) |
| 17 | 52.219-9 II | SMALL, SMALL DISADVANTAGED AND WOMEN-OWNED SMALL BUSINESS SUBCONTRACTING PLAN (AUG 1996)--ALTERNATE II (MAR 1996) |
| 18 | 52.219-11 | SPECIAL 8(a) CONTRACT CONDITIONS (FEB 1990) |
| 19 | 52.219-16 | LIQUIDATED DAMAGES--SUBCONTRACTING PLAN (OCT 1995) |
| 20 | 52.219-18 I | NOTIFICATION OF COMPETITION LIMITED TO ELIGIBLE 8(A) CONCERNS (JAN 1997)--ALTERNATE I (NOV 1989) |
| 21 | 52.222-3 | CONVICT LABOR (AUG 1996) |
| 22 | 52.222-4 | CONTRACT WORK HOURS AND SAFETY STANDARDS ACT--OVERTIME COMPENSATION (JUL 1995) |
| 23 | 52.222-6 | DAVIS-BACON ACT (FEB 1995) |
| 24 | 52.222-7 | WITHHOLDING OF FUNDS (FEB 1988) |
| 25 | 52.222-8 | PAYROLLS AND BASIC RECORDS (FEB 1988) |
| 26 | 52.222-9 | APPRENTICES AND TRAINEES (FEB 1988) |
| 27 | 52.222-10 | COMPLIANCE WITH COPELAND ACT REQUIREMENTS (FEB 1988) |
| 28 | 52.222-11 | SUBCONTRACTS (LABOR STANDARDS) (FEB 1988) |
| 29 | 52.222-12 | CONTRACT TERMINATION--DEBARMENT (FEB 1988) |
| 30 | 52.222-13 | COMPLIANCE WITH DAVIS-BACON AND RELATED ACT REGULATIONS (FEB 1988) |
| 31 | 52.222-14 | DISPUTES CONCERNING LABOR STANDARDS (FEB 1988) |
| 32 | 52.222-15 | CERTIFICATION OF ELIGIBILITY (FEB 1988) |
| 33 | 52.222-26 | EQUAL OPPORTUNITY (APR 1984) |
| 34 | 52.222-27 | AFFIRMATIVE ACTION COMPLIANCE REQUIREMENTS FOR CONSTRUCTION (APR 1984) |
| 35 | 52.222-35 | AFFIRMATIVE ACTION FOR SPECIAL DISABLED AND VIETNAM ERA VETERANS (APR 1984) |
| 36 | 52.222-36 | AFFIRMATIVE ACTION FOR HANDICAPPED WORKERS (APR 1984) |
| 37 | 52.222-37 | EMPLOYMENT REPORTS ON SPECIAL DISABLED VETERANS AND VETERANS OF THE VIETNAM ERA (JAN 1988) |
| 38 | 52.223-2 | CLEAN AIR AND WATER (APR 1984) |
| 39 | 52.223-3 | HAZARDOUS MATERIAL IDENTIFICATION AND MATERIAL SAFETY DATA (JAN 1997) |
| 40 | 52.223-5 | POLLUTION PREVENTION AND RIGHT-TO-KNOW INFORMATION (MAR 1997) |
| 41 | 52.223-6 | DRUG-FREE WORKPLACE (JAN 1997) |
| 42 | 52.223-14 | TOXIC CHEMICAL RELEASE REPORTING (OCT 1996) |
| 43 | 52.224-1 | PRIVACY ACT NOTIFICATION (APR 1984) |
| 44 | 52.224-2 | PRIVACY ACT (APR 1984) |
| 45 | 52.225-5 | BUY AMERICAN ACT--CONSTRUCTION MATERIALS (JUN 1997) |
| 46 | 52.225-11 | RESTRICTIONS ON CERTAIN FOREIGN PURCHASES (OCT 1996) |
| 47 | 52.225-15 | BUY AMERICAN ACT--CONSTRUCTION MATERIALS UNDER TRADE AGREEMENTS ACT AND NORTH AMERICAN FREE TRADE AGREEMENT (JUN 1997) |
| 48 | 52.226-1 | UTILIZATION OF INDIAN ORGANIZATIONS AND INDIAN-OWNED ECONOMIC ENTERPRISE (SEP 1996) |
| 49 | 52.227-1 | AUTHORIZATION AND CONSENT (JUL 1995) |
| 50 | 52.227-2 | NOTICE AND ASSISTANCE REGARDING PATENT AND COPYRIGHT INFRINGEMENT (AUG 1996) |
| 51 | 52.227-4 | PATENT INDEMNITY--CONSTRUCTION CONTRACTS (APR 1984) |
| 52 | 52.228-2 | ADDITIONAL BOND SECURITY (OCT 1997) |
| 53 | 52.228-5 | INSURANCE--WORK ON A GOVERNMENT INSTALLATION (JAN 1997) |
| 54 | 52.228-12 | PROSPECTIVE SUBCONTRACTOR REQUESTS FOR BONDS (OCT 1995) |
| 55 | 52.228-14 | IRREVOCABLE LETTER OF CREDIT (OCT 1997) |

| | | |
|---|---|---|
| 56 | 52.228-15 | Performance and Payment Bonds--Construction (SEP 1996) |
| 57 | 52.229-3 | FEDERAL, STATE, AND LOCAL TAXES (JAN 1991) |
| 58 | 52.229-5 | TAXES--CONTRACTS PERFORMED IN U.S. POSSESSIONS OR PUERTO RICO (APR 1984) |
| 59 | 52.232-5 | PAYMENTS UNDER FIXED-PRICE CONSTRUCTION CONTRACTS (MAY 1997) |
| 60 | 52.232-17 | INTEREST (JUN 1996) |
| 61 | 52.232-23 I | ASSIGNMENT OF CLAIMS (JAN 1986)--ALTERNATE I (APR 1984) |
| 62 | 52.232-27 | PROMPT PAYMENT FOR CONSTRUCTION CONTRACTS (JUN 1997) |
| 63 | 52.233-1 | DISPUTES (OCT 1995) |
| 64 | 52.233-3 | PROTEST AFTER AWARD (AUG 1996) |
| 65 | 52.236-1 | PERFORMANCE OF WORK BY THE CONTRACTOR (APR 1984) |
| 66 | 52.236-2 | DIFFERING SITE CONDITIONS (APR 1984) |
| 67 | 52.236-3 | SITE INVESTIGATION AND CONDITIONS AFFECTING THE WORK (APR 1984) |
| 68 | 52.236-5 | MATERIAL AND WORKMANSHIP (APR 1984) |
| 69 | 52.236-6 | SUPERINTENDENCE BY THE CONTRACTOR (APR 1984) |
| 70 | 52.236-7 | PERMITS AND RESPONSIBILITIES (NOV 1991) |
| 71 | 52.236-8 | OTHER CONTRACTS (APR 1984) |
| 72 | 52.236-9 | PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES, AND IMPROVEMENTS (APR 1984) |
| 73 | 52.236-10 | OPERATIONS AND STORAGE AREAS (APR 1984) |
| 74 | 52.236-11 | USE AND POSSESSION PRIOR TO COMPLETION (APR 1984) |
| 75 | 52.236-12 | CLEANING UP (APR 1984) |
| 76 | 52.236-13 I | ACCIDENT PREVENTION (NOV 1991)--ALTERNATE I (NOV 1991) |
| 77 | 52.236-15 | SCHEDULES FOR CONSTRUCTION CONTRACTS (APR 1984) |
| 78 | 52.236-17 | LAYOUT OF WORK (APR 1984) |
| 79 | 52.236-21 | SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION (FEB 1997) |
| 80 | 52.242-13 | BANKRUPTCY (JUL 1995) |
| 81 | 52.242-14 | SUSPENSION OF WORK (APR 1984) |
| 82 | 52.243-4 | CHANGES (AUG 1987) |
| 83 | 52.244-1 | SUBCONTRACTS (FIXED-PRICE CONTRACTS) (FEB 1995) |
| 84 | 52.245-1 | PROPERTY RECORDS (APR 1984) |
| 85 | 52.245-4 | GOVERNMENT-FURNISHED PROPERTY (SHORT FORM) (APR 1984) |
| 86 | 52.246-12 | INSPECTION OF CONSTRUCTION (AUG 1996) |
| 87 | 52.248-3 I | VALUE ENGINEERING--CONSTRUCTION (MAR 1989)--ALTERNATE I (APR 1984) |
| 88 | 52.249-2 I | TERMINATION FOR CONVENIENCE OF THE GOVERNMENT (FIXED-PRICE) (SEP 1996) --ALTERNATE I (SEP 1996) |
| 89 | 52.249-10 | DEFAULT (FIXED-PRICE CONSTRUCTION) (APR 1984) |
| 90 | 52.252-6 | AUTHORIZED DEVIATIONS IN CLAUSES (APR 1984) |
| 91 | 52.201-7000 | CONTRACTING OFFICER'S REPRESENTATIVE (DEC 1991) |
| 92 | 52.203-7001 | SPECIAL PROHIBITION ON EMPLOYMENT (JUN 1997) |
| 93 | 52.203-7002 | DISPLAY OF DOD HOTLINE POSTER (DEC 1991) |
| 94 | 52.204-7003 | CONTROL OF GOVERNMENT PERSONNEL WORK PRODUCT (APR 1992) |
| 95 | 52.205-7000 | PROVISION OF INFORMATION TO COOPERATIVE AGREEMENT HOLDERS (DEC 1991) |
| 96 | 52.209-7000 | ACQUISITION FROM SUBCONTRACTORS SUBJECT TO ON-SITE INSPECTION UNDER THE INTERMEDIATE-RANGE NUCLEAR FORCES (INF) TREATY (NOV 1995) |
| 97 | 52.215-7000 | PRICING ADJUSTMENTS (DEC 1991) |
| 98 | 52.219-7003 | SMALL, SMALL DISADVANTAGED AND WOMEN-OWNED SMALL BUSINESS SUBCONTRACTING PLAN (DoD CONTRACTS) (APR 1996) |
| 99 | 52.223-7004 | DRUG-FREE WORK FORCE (SEP 1988) |
| 100 | 52.223-7006 | PROHIBITION ON STORAGE AND DISPOSAL OF TOXIC AND HAZARDOUS MATERIALS (APR 1993) |
| 101 | 52.225-7016 | RESTRICTION ON ACQUISITION OF BALL AND ROLLER BEARINGS (JUN 1997) |
| 102 | 52.225-7036 | NORTH AMERICAN FREE TRADE AGREEMENT IMPLEMENTATION ACT (JAN 1994) |
| 103 | 52.227-7030 | TECHNICAL DATA--WITHHOLDING OF PAYMENT (OCT 1988) |
| 104 | 52.227-7033 | RIGHTS IN SHOP DRAWINGS (APR 1966) |
| 105 | 52.231-7000 | SUPPLEMENTAL COST PRINCIPLES (DEC 1991) |
| 106 | 52.232-7006 | REDUCTION OR SUSPENSION OF CONTRACT PAYMENTS UPON FINDING OF FRAUD (AUG 1992) |
| 107 | 52.236-7000 | MODIFICATION PROPOSALS--PRICE BREAKDOWN (DEC 1991) |
| 108 | 52.236-7005 | AIRFIELD SAFETY PRECAUTIONS (DEC 1991) |
| 109 | 52.242-7004 | MATERIAL MANAGEMENT AND ACCOUNTING SYSTEM (SEP 1996) |
| 110 | 52.243-7001 | PRICING OF CONTRACT MODIFICATIONS (DEC 1991) |
| 111 | 52.247-7024 | NOTIFICATION OF TRANSPORTATION OF SUPPLIES BY SEA (NOV 1995) |
| 112 | 52.215-4011 A | PRICE REDUCTION FOR DEFECTIVE COST OR PRICING DATA--MODIFICATIONS (OCT 1997) |
| 113 | 52.215-4013 A | SUBCONTRACTOR COST OR PRICING DATA--MODIFICATIONS (OCT 1997) |
| 114 | 52.215-4021 A | REQUIREMENTS FOR COST OR PRICING DATA OR INFORMATION OTHER THAN COSTS OR PRICING DATA--MODIFICATIONS (OCT 1997) (FAR 52.215-0021) |
| 115 | 52.7243-4002 A | DFARS 252.243-7002 CERTIFICATION OF REQUESTS FOR EQUITABLE ADJUSTMENT (JULY 1997) |

SECTION 00700

CONTRACT CLAUSES

~~1 52.252-2 CLAUSES INCORPORATED BY REFERENCE (JUN 1988)~~

~~This contract incorporates one or more clauses by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available.~~
~~(End of clause)~~

~~2 52.232-34 OPTIONAL INFORMATION FOR ELECTRONIC FUNDS TRANSFER PAYMENT (AUG 1996) (Reference 32.1103(b)&)~~

3 52.202-1 I DEFINITIONS (OCT 1995)--ALTERNATE I (APR 1984)

(a) "Head of the agency" (also called "agency head") or "Secretary" means the Secretary (or Attorney General, Administrator, Governor, Chairperson, or other chief official, as appropriate) of the agency, including any deputy or assistant chief official of the agency; and the term "authorized representative" means any person, persons, or board (other than the Contracting Officer) authorized to act for the head of the agency or Secretary.

(b) Commercial component means any component that is a commercial item.

(c) Component means any item supplied to the Federal Government as part of an end item or of another component.

(d) Nondevelopmental item means--

(1) Any previously developed item of supply used exclusively for governmental purposes by a Federal agency, a State or local government, or a foreign government with which the United States has a mutual defense cooperation agreement;

(2) Any item described in paragraph (e)(1) of this definition that requires only minor modification or modifications of a type customarily available in the commercial marketplace in order to meet the requirements of the procuring department or agency; or

(3) Any item of supply being produced that does not meet the requirements of paragraph (e)(1) or (e)(2) solely because the item is not yet in use.

(e) "Contracting Officer" means a person with the authority to enter into, administer, and/or terminate contracts and make related determinations and findings. The term includes certain authorized representatives of the Contracting Officer acting within the limits of their authority as delegated by the Contracting Officer.

(f) Except as otherwise provided in this contract, the term "subcontracts" includes, but is not limited to, purchase orders and changes and modifications to purchase orders under this contract.

(End of clause)

4 52.203-3 GRATUITIES (APR 1984)

(a) The right of the Contractor to proceed may be terminated by written notice if, after notice and hearing, the agency head or a designee determines that the Contractor, its agent, or another representative--

(1) Offered or gave a gratuity (e.g., an entertainment or gift) to an officer, official, or employee of the Government; and

(2) Intended, by the gratuity, to obtain a contract or favorable treatment under a contract.

(b) The facts supporting this determination may be reviewed by any court having lawful jurisdiction.

(c) If this contract is terminated under paragraph (a) above, the Government is entitled--

(1) To pursue the same remedies as in a breach of the contract; and

(2) In addition to any other damages provided by law, to exemplary damages of not less than 3 nor more than 10 times the cost incurred by the Contractor in giving gratuities to the person concerned, as determined by the agency head or a designee. (This subparagraph (c)(2) is applicable only if this contract uses money appropriated to the Department of Defense.)

(d) The rights and remedies of the Government provided in this clause shall not be exclusive and are in addition to any other rights and remedies provided by law or under this contract.

(End of clause)

(R 7-104.16 1952 MAR)

5 52.203-5 COVENANT AGAINST CONTINGENT FEES (APR 1984)

(a) The Contractor warrants that no person or agency has been employed or retained to solicit or obtain this contract upon an agreement or understanding for a contingent fee, except a bona fide employee or agency. For breach or violation of this warranty, the Government shall have the right to annul this contract without liability or, in its discretion, to deduct from the contract price or consideration, or otherwise recover, the full amount of the contingent fee.

(b) "Bona fide agency," as used in this clause, means an established commercial or selling agency, maintained by a contractor for the purpose of securing business, that neither exerts nor proposes to exert improper influence to solicit or obtain Government contracts nor holds itself out as being able to obtain any Government contract or contracts through improper influence.

"Bona fide employee," as used in this clause, means a person, employed by a Contractor and subject to the Contractor's supervision and control as to time, place, and manner of performance, who neither exerts nor proposes to exert improper influence to solicit or obtain Government contracts nor holds out as being able to obtain any Government contract or contracts through improper influence.

"Contingent fee," as used in this clause, means any commission, percentage, brokerage, or other fee that is contingent upon the success that a person or concern has in securing a Government contract.

"Improper influence," as used in this clause, means any influence that induces or tends to induce a Government employee or officer to give consideration or to act regarding a Government contract on any basis other than the merits of the matter.

(End of clause)

(R 7-103.20 1958 JAN)

(R 1-1.503)

(R 1-7.102-18)

6 52.203-7 ANTI-KICKBACK PROCEDURES (JUL 1995)

(a) Definitions.

"Kickback," as used in this clause, means any money, fee, commission, credit, gift, gratuity, thing of value, or compensation of any kind which is provided, directly or indirectly, to any prime Contractor, prime Contractor employee, subcontractor, or subcontractor employee for the purpose of improperly obtaining or rewarding favorable treatment in connection with a prime contract or in connection with a subcontract relating to a prime contract.

"Person," as used in this clause, means a corporation, partnership, business association of any kind, trust, joint-stock company, or individual.

"Prime contract," as used in this clause, means a contract or contractual action entered into by the United States for the purpose of obtaining supplies, materials, equipment, or services of any kind.

"Prime Contractor" as used in this clause, means a person who has entered into a prime contract with the United States.

"Prime Contractor employee," as used in this clause, means any officer, partner, employee, or agent of a prime Contractor.

"Subcontract," as used in this clause, means a contract or contractual action entered into by a prime Contractor or subcontractor for the purpose of obtaining supplies, materials, equipment, or services of any kind under a prime contract.

"Subcontractor," as used in this clause, (1) means any person, other than the prime Contractor, who offers to furnish or furnishes any supplies, materials, equipment, or services of any kind under a prime contract or a subcontract entered into in connection with such prime contract, and (2) includes any person who offers to furnish or furnishes general supplies to the prime Contractor or a higher tier subcontractor.

"Subcontractor employee," as used in this clause, means any officer, partner, employee, or agent of a subcontractor.

(b) The Anti-Kickback Act of 1986 (41 U.S.C. 51-58) (the Act), prohibits any person from--

(1) Providing or attempting to provide or offering to provide any kickback;

(2) Soliciting, accepting, or attempting to accept any kickback; or

(3) Including, directly or indirectly, the amount of any kickback in the contract price charged by a prime Contractor to the United States or in the contract price charged by a subcontractor to a prime Contractor or higher tier subcontractor.

(c)(1) The Contractor shall have in place and follow reasonable procedures designed to prevent and detect possible violations described in paragraph (b) of this clause in its own operations and direct business relationships.

(2) When the Contractor has reasonable grounds to believe that a violation described in paragraph (b) of this clause may have occurred, the Contractor shall promptly report in writing the possible violation. Such reports shall be made to the inspector general of the contracting agency, the head of the contracting agency if the agency does not have an inspector general, or the Department of Justice.

(3) The Contractor shall cooperate fully with any Federal agency investigating a possible violation described in paragraph (b) of this clause.

(4) The Contracting Officer may (i) offset the amount of the kickback against any monies owed by the United States under the prime contract and/or (ii) direct that the Prime Contractor withhold from sums owed a subcontractor under the prime contract the amount of the kickback. The Contracting Officer may order that monies withheld under subdivision (c)(4)(ii) of this clause be paid over to the Government unless the Government has already offset those monies under subdivision (c)(4)(i) of this clause. In either case, the Prime Contractor shall notify the Contracting Officer when the monies are withheld.

(5) The Contractor agrees to incorporate the substance of this clause, including subparagraph (c)(5) but excepting subparagraph (c)(1), in all subcontracts under this contract which exceed $100,000.

(End of clause)

7 52.203-8 CANCELLATION, RESCISSION, AND RECOVERY OF FUNDS FOR ILLEGAL OR IMPROPER ACTIVITY (JAN 1997)

(a) If the Government receives information that a contractor or a person has engaged in conduct constituting a violation of subsection (a), (b), (c), or (d) of Section 27 of the Office of Federal Procurement Policy Act (41 U.S.C. 423) (the Act), as amended by section 4304 of the National Defense Authorization Act for Fiscal Year 1996 (Pub. L. 104-106), the Government may--

(1) Cancel the solicitation, if the contract has not yet been awarded or issued; or

(2) Rescind the contract with respect to which--

(i) The Contractor or someone acting for the Contractor has been convicted for an offense where the conduct constitutes a violation of subsection 27 (a) or (b) of the Act for the purpose of either--

(A) Exchanging the information covered by such subsections for anything of value; or

(B) Obtaining or giving anyone a competitive advantage in the award of a Federal agency procurement contract; or

(ii) The head of the contracting activity has determined, based upon a preponderance of the evidence, that the Contractor or someone acting for the Contractor has engaged in conduct constituting an offense punishable under subsection 27(e)(1) of the Act.

(b) If the Government rescinds the contract under paragraph (a) of this clause, the Government is entitled to recover, in addition to any penalty prescribed by law, the amount expended under the contract.

(c) The rights and remedies of the Government specified herein are not exclusive, and are in addition to any other rights and remedies provided by law, regulation, or under this contract.

(End of clause)

8 52.203-10 PRICE OR FEE ADJUSTMENT FOR ILLEGAL OR IMPROPER ACTIVITY (JAN 1997)

(a) The Government, at its election, may reduce the price of a fixed-price type contract and the total cost and fee under a cost-type contract by the amount of profit or fee determined as set forth in paragraph (b) of this clause if the head of the contracting activity or designee determines that there was a violation of subsection 27 (a), (b), or (c) of the Office of Federal Procurement Policy Act, as amended (41 U.S.C. 423), as implemented in section 3.104 of the Federal Acquisition Regulation.

(b) The price or fee reduction referred to in paragraph (a) of this clause shall be--

(1) For cost-plus-fixed-fee contracts, the amount of the fee specified in the contract at the time of award;

(2) For cost-plus-incentive-fee contracts, the target fee specified in the contract at the time of award, notwithstanding any minimum fee or "fee floor" specified in the contract;

(3) For cost-plus-award-fee contracts--

(i) The base fee established in the contract at the time of contract award;

(ii) If no base fee is specified in the contract, 30 percent of the amount of each award fee otherwise payable to the Contractor for each award fee evaluation period or at each award fee determination point.

(4) For fixed-price-incentive contracts, the Government may--

(i) Reduce the contract target price and contract target profit both by an amount equal to the initial target profit specified in the contract at the time of contract award; or

(ii) If an immediate adjustment to the contract target price and contract target profit would have a significant adverse impact on the incentive price revision relationship under the contract, or adversely affect the contract financing provisions, the Contracting Officer may defer such adjustment until establishment of the total final price of the contract. The total final price established in accordance with the incentive price revision provisions of the contract shall be reduced by an amount equal to the initial target profit specified in the contract at the time of contract award and such reduced price shall be the total final contract price.

(5) For firm-fixed-price contracts, by 10 percent of the initial contract price or a profit amount determined by the Contracting Officer from records or documents in existence prior to the date of the contract award.

(c) The Government may, at its election, reduce a prime contractor's price or fee in accordance with the procedures of paragraph (b) of this clause for violations of the Act by its subcontractors by an amount not to exceed the amount of profit or fee reflected in the subcontract at the time the subcontract was first definitively priced.

(d) In addition to the remedies in paragraphs (a) and (c) of this clause, the Government may terminate this contract for default. The rights and remedies of the Government specified herein are not exclusive, and are in addition to any other rights and remedies provided by law or under this contract.

(End of clause)

9 52.203-12 LIMITATION ON PAYMENTS TO INFLUENCE CERTAIN FEDERAL TRANSACTIONS (JUN 1997)

(a) Definitions.

"Agency," as used in this clause, means executive agency as defined in 2.101.

"Covered Federal action," as used in this clause, means any of the following Federal actions:

(1) The awarding of any Federal contract.

(2) The making of any Federal grant.

(3) The making of any Federal loan.

(4) The entering into of any cooperative agreement.

(5) The extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

"Indian tribe" and "tribal organization," as used in this clause, have the meaning provided in section 4 of the Indian Self-Determination and Education Assistance Act (25 U.S.C. 450B) and include Alaskan Natives.

"Influencing or attempting to influence," as used in this clause, means making, with the intent to influence, any communication to or appearance before an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with any covered Federal action.

"Local government," as used in this clause, means a unit of government in a State and, if chartered, established, or otherwise recognized by a State for the performance of a governmental duty, including a local public authority, a special district, an intrastate district, a council of governments, a sponsor group representative organization, and any other instrumentality of a local government.

"Officer or employee of an agency," as used in this clause, includes the following individuals who are employed by an agency:

(1) An individual who is appointed to a position in the Government under title 5, United States Code, including a position under a temporary appointment.

(2) A member of the uniformed services, as defined in subsection 101(3), title 37, United States Code.

(3) A special Government employee, as defined in section 202, title 18, United States Code.

(4) An individual who is a member of a Federal advisory committee, as defined by the Federal Advisory Committee Act, title 5, United States Code, appendix 2.

"Person," as used in this clause, means an individual, corporation, company, association, authority, firm, partnership, society, State, and local government, regardless of whether such entity is operated for profit, or not for profit. This term excludes an Indian tribe, tribal organization, or any other Indian organization with respect to expenditures specifically permitted by other Federal law.

"Reasonable compensation," as used in this clause, means, with respect to a regularly employed officer or employee of any person, compensation that is consistent with the normal compensation for such officer or employee for work that is not furnished to, not funded by, or not furnished in cooperation with the Federal Government.

"Reasonable payment," as used in this clause, means, with respect to professional and other technical services, a payment in an amount that is consistent with the amount normally paid for such services in the private sector.

"Recipient," as used in this clause, includes the Contractor and all subcontractors. This term excludes an Indian tribe, tribal organization, or any other Indian organization with respect to expenditures specifically permitted by other Federal law.

"Regularly employed," as used in this clause, means, with respect to an officer or employee of a person requesting or receiving a Federal contract, an officer or employee who is employed by such person for at least 130 working days within 1 year immediately preceding the date of the submission that initiates agency consideration of such person for receipt of such contract. An officer or employee who is employed by such person for less than 130 working days within 1 year immediately preceding the date of the submission that initiates agency consideration of such person shall be considered to be regularly employed as soon as he or she is employed by such person for 130 working days.

"State," as used in this clause, means a State of the United States, the District of Columbia, the Commonwealth of Puerto Rico, a territory or possession of the United States, an agency or instrumentality of a State, and multi-State, regional, or interstate entity having governmental duties and powers.

(b) Prohibitions.

(1) Section 1352 of title 31, United States Code, among other things, prohibits a recipient of a Federal contract, grant, loan, or cooperative agreement from using appropriated funds to pay any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with any of the following covered Federal actions: the awarding of any Federal contract; the making of any Federal grant; the making of any Federal loan; the entering into of any cooperative agreement; or the modification of any Federal contract, grant, loan, or cooperative agreement.

(2) The Act also requires Contractors to furnish a disclosure if any funds other than Federal appropriated funds (including profit or fee received under a covered Federal transaction) have been paid, or will be

paid, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with a Federal contract, grant, loan, or cooperative agreement.

(3) The prohibitions of the Act do not apply under the following conditions:

(i) Agency and legislative liaison by own employees.

(A) The prohibition on the use of appropriated funds, in subparagraph (b)(1) of this clause, does not apply in the case of a payment of reasonable compensation made to an officer or employee of a person requesting or receiving a covered Federal action if the payment is for agency and legislative liaison activities not directly related to a covered Federal action.

(B) For purposes of subdivision (b)(3)(i)(A) of this clause, providing any information specifically requested by an agency or Congress is permitted at any time.

(C) The following agency and legislative liaison activities are permitted at any time where they are not related to a specific solicitation for any covered Federal action:

(1) Discussing with an agency the qualities and characteristics (including individual demonstrations) of the person's products or services, conditions or terms of sale, and service capabilities.

(2) Technical discussions and other activities regarding the application or adaptation of the person's products or services for an agency's use.

(D) The following agency and legislative liaison activities are permitted where they are prior to formal solicitation of any covered Federal action--

(1) Providing any information not specifically requested but necessary for an agency to make an informed decision about initiation of a covered Federal action;

(2) Technical discussions regarding the preparation of an unsolicited proposal prior to its official submission; and

(3) Capability presentations by persons seeking awards from an agency pursuant to the provisions of the Small Business Act, as amended by Pub. L. 95-507, and subsequent amendments.

(E) Only those services expressly authorized by subdivision (b)(3)(i)(A) of this clause are permitted under this clause.

(ii) Professional and technical services.

(A) The prohibition on the use of appropriated funds, in subparagraph (b)(1) of this clause, does not apply in the case of--

(1) A payment of reasonable compensation made to an officer or employee of a person requesting or receiving a covered Federal action or an extension, continuation, renewal, amendment, or modification of a covered Federal action, if payment is for professional or technical services rendered directly in the preparation, submission, or negotiation of any bid, proposal, or application for that Federal action or for meeting requirements imposed by or pursuant to law as a condition for receiving that Federal action.

(2) Any reasonable payment to a person, other than an officer or employee of a person requesting or receiving a covered Federal action or an extension, continuation, renewal, amendment, or modification of a covered Federal action if the payment is for professional or technical services rendered directly in the preparation, submission, or negotiation of any bid, proposal, or application for that Federal action or for meeting requirements imposed by or pursuant to law as a condition for receiving that Federal action. Persons other than officers or employees of a person requesting or receiving a covered Federal action include consultants and trade associations.

(B) For purposes of subdivision (b)(3)(ii)(A) of this clause, "professional and technical services" shall be limited to advice and analysis directly applying any professional or technical discipline. For example, drafting of a legal document accompanying a bid or proposal by a lawyer is allowable. Similarly, technical advice provided by an engineer on the performance or operational capability of a piece of equipment rendered directly in the negotiation of a contract is allowable. However, communications with the intent to influence made by a professional (such as a licensed lawyer) or a technical person (such as a licensed accountant) are not allowable under this

section unless they provide advice and analysis directly applying their professional or technical expertise and unless the advice or analysis is rendered directly and solely in the preparation, submission or negotiation of a covered Federal action. Thus, for example, communications with the intent to influence made by a lawyer that do not provide legal advice or analysis directly and solely related to the legal aspects of his or her client's proposal, but generally advocate one proposal over another are not allowable under this section because the lawyer is not providing professional legal services. Similarly, communications with the intent to influence made by an engineer providing an engineering analysis prior to the preparation or submission of a bid or proposal are not allowable under this section since the engineer is providing technical services but not directly in the preparation, submission or negotiation of a covered Federal action.

(C) Requirements imposed by or pursuant to law as a condition for receiving a covered Federal award include those required by law or regulation and any other requirements in the actual award documents.

(D) Only those services expressly authorized by subdivisions (b)(3)(ii)(A)(1) and (2) of this clause are permitted under this clause.

(E) The reporting requirements of FAR 3.803(a) shall not apply with respect to payments of reasonable compensation made to regularly employed officers or employees of a person.

(c) Disclosure.

(1) The Contractor who requests or receives from an agency a Federal contract shall file with that agency a disclosure form, OMB standard form LLL, Disclosure of Lobbying Activities, if such person has made or has agreed to make any payment using nonappropriated funds (to include profits from any covered Federal action), which would be prohibited under subparagraph (b)(1) of this clause, if paid for with appropriated funds.

(2) The Contractor shall file a disclosure form at the end of each calendar quarter in which there occurs any event that materially affects the accuracy of the information contained in any disclosure form previously filed by such person under subparagraph (c)(1) of this clause. An event that materially affects the accuracy of the information reported includes--

(i) A cumulative increase of $25,000 or more in the amount paid or expected to be paid for influencing or attempting to influence a covered Federal action; or

(ii) A change in the person(s) or individual(s) influencing or attempting to influence a covered Federal action; or

(iii) A change in the officer(s), employee(s), or Member(s) contacted to influence or attempt to influence a covered Federal action.

(3) The Contractor shall require the submittal of a certification, and if required, a disclosure form by any person who requests or receives any subcontract exceeding $100,000 under the Federal contract.

(4) All subcontractor disclosure forms (but not certifications) shall be forwarded from tier to tier until received by the prime Contractor. The prime Contractor shall submit all disclosures to the Contracting Officer at the end of the calendar quarter in which the disclosure form is submitted by the subcontractor. Each subcontractor certification shall be retained in the subcontract file of the awarding Contractor.

(d) Agreement. The Contractor agrees not to make any payment prohibited by this clause.

(e) Penalties.

(1) Any person who makes an expenditure prohibited under paragraph (a) of this clause or who fails to file or amend the disclosure form to be filed or amended by paragraph (b) of this clause shall be subject to civil penalties as provided for by 31 U.S.C. 1352. An imposition of a civil penalty does not prevent the Government from seeking any other remedy that may be applicable.

(2) Contractors may rely without liability on the representation made by their subcontractors in the certification and disclosure form.

(f) Cost allowability. Nothing in this clause makes allowable or reasonable any costs which would otherwise be unallowable or unreasonable. Conversely, costs made specifically unallowable by the requirements in this clause will not be made allowable under any other provision.

(End of clause)

10 52.204-1 APPROVAL OF CONTRACT (DEC 1989)

This contract is subject to the written approval of Commander, Little Rock District, U.S. Army Corps of Engineers and shall not be binding until so approved.

(End of clause)

11 52.204-4 PRINTING/COPYING DOUBLE-SIDED ON RECYCLED PAPER (JUN 1996)

(a) In accordance with Executive Order 12873, dated October 20, 1993, as amended by Executive Order 12995, dated March 25, 1996, the Offeror/Contractor is encouraged to submit paper documents, such as offers, letters, or reports, that are printed/copied double-sided on recycled paper that has at least 20 percent postconsumer material.

(b) The 20 percent standard applies to high-speed copier paper, offset paper, forms bond, computer printout paper, carbonless paper, file folders, white woven envelopes, and other uncoated printed and writing paper, such as writing and office paper, book paper, cotton fiber paper, and cover stock. An alternative to meeting the 20 percent postconsumer material standard is 50 percent recovered material content of certain industrial by-products.

(End of clause)

12 52.209-6 PROTECTING THE GOVERNMENT'S INTEREST WHEN SUBCONTRACTING WITH CONTRACTORS DEBARRED, SUSPENDED, OR PROPOSED FOR DEBARMENT (JUL 1995)

(a) The Government suspends or debars Contractors to protect the Government's interest. The Contractor shall not enter into any subcontract in excess of $25,000 with a Contractor that is debarred, suspended, or proposed for debarment unless there is a compelling reason to do so.

(b) The Contractor shall require each proposed first-tier subcontractor, whose subcontract will exceed $25,000, to disclose to the Contractor, in writing, whether as of the time of award of the subcontract, the subcontractor, or its principals, is or is not debarred, suspended, or proposed for debarment by the Federal Government.

(c) A corporate officer or a designee of the Contractor shall notify the Contracting Officer, in writing, before entering into a subcontract with a party that is debarred, suspended, or proposed for debarment (see FAR 9.404 for information on the List of Parties Excluded from Federal Procurement and Nonprocurement Programs). The notice must include the following:

(1) The name of the subcontractor.

(2) The Contractor's knowledge of the reasons for the subcontractor being on the List of Parties Excluded from Federal Procurement and Nonprocurement Programs.

(3) The compelling reason(s) for doing business with the subcontractor notwithstanding its inclusion on the List of Parties Excluded from Federal Procurement and Nonprocurement Programs.

(4) The systems and procedures the Contractor has established to ensure that it is fully protecting the Government's interests when dealing with such subcontractor in view of the specific basis for the party's debarment, suspension, or proposed debarment.

(End of clause)

APPLIES TO MILITARY ORDERS ONLY

13 52.211-15 DEFENSE PRIORITY AND ALLOCATION REQUIREMENTS (SEP 1990)

This is a rated order certified for national defense use, and the Contractor shall follow all the requirements of the Defense Priorities and Allocations System regulation (15 CFR 700).

(End of clause)

14 52.215-2 AUDIT AND RECORDS--NEGOTIATION (AUG 1996)

(a) As used in this clause, records includes books, documents, accounting procedures and practices, and other data, regardless of type and regardless

of whether such items are in written form, in the form of computer data, or in any other form.

(b) Examination of costs. If this is a cost-reimbursement, incentive, time-and-materials, labor-hour, or price redeterminable contract, or any combination of these, the Contractor shall maintain and the Contracting Officer, or an authorized representative of the Contracting Officer, shall have the right to examine and audit all records and other evidence sufficient to reflect properly all costs claimed to have been incurred or anticipated to be incurred directly or indirectly in performance of this contract. This right of examination shall include inspection at all reasonable times of the Contractor's plants, or parts of them, engaged in performing the contract.

(c) Cost or pricing data. If the Contractor has been required to submit cost or pricing data in connection with any pricing action relating to this contract, the Contracting Officer, or an authorized representative of the Contracting Officer, in order to evaluate the accuracy, completeness, and currency of the cost or pricing data, shall have the right to examine and audit all of the Contractor's records, including computations and projections, related to--

(1) The proposal for the contract, subcontract, or modification;

(2) The discussions conducted on the proposal(s), including those related to negotiating;

(3) Pricing of the contract, subcontract, or modification; or

(4) Performance of the contract, subcontract or modification.

(d) Comptroller General--(1) The Comptroller General of the United States, or an authorized representative, shall have access to and the right to examine any of the Contractor's directly pertinent records involving transactions related to this contract or a subcontract hereunder.

(2) This paragraph may not be construed to require the Contractor or subcontractor to create or maintain any record that the Contractor or subcontractor does not maintain in the ordinary course of business or pursuant to a provision of law.

(e) Reports. If the Contractor is required to furnish cost, funding, or performance reports, the Contracting Officer or an authorized representative of the Contracting Officer shall have the right to examine and audit the supporting records and materials, for the purpose of evaluating (1) the effectiveness of the Contractor's policies and procedures to produce data compatible with the objectives of these reports and (2) the data reported.

(f) Availability. The Contractor shall make available at its office at all reasonable times the records, materials, and other evidence described in paragraphs (a), (b), (c), (d), and (e) of this clause, for examination, audit, or reproduction, until 3 years after final payment under this contract or for any shorter period specified in Subpart 4.7, Contractor Records Retention, of the Federal Acquisition Regulation (FAR), or for any longer period required by statute or by other clauses of this contract. In addition--

(1) If this contract is completely or partially terminated, the records relating to the work terminated shall be made available for 3 years after any resulting final termination settlement; and

(2) Records relating to appeals under the Disputes clause or to litigation or the settlement of claims arising under or relating to this contract shall be made available until such appeals, litigation, or claims are finally resolved.

(g) The Contractor shall insert a clause containing all the terms of this clause, including this paragraph (a), in all subcontracts under this contract that exceed the simplified acquisition threshold, and--

(1) That are cost-reimbursement, incentive, time-and-materials, labor-hour, or price-redeterminable type or any combination of these;

(2) For which cost or pricing data are required; or

(3) That require the subcontractor to furnish reports as discussed in paragraph (e) of this clause.

The clause may be altered only as necessary to identify properly the contracting parties and the Contracting Officer under the Government prime contract.

(End of clause)

15 52.217-9 OPTION TO EXTEND THE TERM OF THE CONTRACT (MAR 1989)

(a) The Government may extend the term of this contract by written notice to the Contractor within 30 calendar days ; provided, that the Government shall give the Contractor a preliminary written notice of its intent to extend at least 60 days before the contract expires. The preliminary notice does not commit the Government to an extension.

(b) If the Government exercises this option, the extended contract shall be considered to include this option provision.

(c) The total duration of this contract, including the exercise of any options under this clause, shall not exceed 31 May 2004.

(End of clause)

16 52.219-8 UTILIZATION OF SMALL, SMALL DISADVANTAGED AND WOMEN-OWNED SMALL BUSINESS CONCERNS (JUN 1997)

(a) It is the policy of the United States that small business concerns, small business concerns owned and controlled by socially and economically disadvantaged individuals and small business concerns owned and controlled by women shall have the maximum practicable opportunity to participate in performing contracts let by any Federal agency, including contracts and subcontracts for subsystems, assemblies, components, and related services for major systems. It is further the policy of the United States that its prime contractors establish procedures to ensure the timely payment of amounts due pursuant to the terms of their subcontracts with small business concerns, small business concerns owned and controlled by socially and economically disadvantaged individuals and small business concerns owned and controlled by women.

(b) The Contractor hereby agrees to carry out this policy in the awarding of subcontracts to the fullest extent consistent with efficient contract performance. The Contractor further agrees to cooperate in any studies or surveys as may be conducted by the United States Small Business Administration or the awarding agency of the United States as may be necessary to determine the extent of the Contractor's compliance with this clause.

(c) As used in this contract, the term "small business concern" shall mean a small business as defined pursuant to section 3 of the Small Business Act and relevant regulations promulgated pursuant thereto. The term "small business concern owned and controlled by socially and economically disadvantaged individuals" shall mean a small business concern (1) which is at least 51 percent unconditionally owned by one or more socially and economically disadvantaged individuals; or, in the case of any publicly owned business, at least 51 per centum of the stock of which is unconditionally owned by one or more socially and economically disadvantaged individuals; and (2) whose management and daily business operations are controlled by one or more of such individuals. This term also means a small business concern that is at least 51 percent unconditionally owned by an economically disadvantaged Indian tribe or Native Hawaiian Organization, or a publicly owned business having at least 51 percent of its stock unconditionally owned by one of these entities which has its management and daily business controlled by members of an economically disadvantaged Indian tribe or Native Hawaiian Organization, and which meets the requirements of 13 CFR 124. The Contractor shall presume that socially and economically disadvantaged individuals include Black Americans, Hispanic Americans, Native Americans, Asian-Pacific Americans, Subcontinent Asian Americans, and other minorities, or any other individual found to be disadvantaged by the Administration pursuant to section 8(a) of the Small Business Act. The Contractor shall presume that socially and economically disadvantaged entities also include Indian Tribes and Native Hawaiian Organizations.

(d) The term "small business concern owned and controlled by women" shall mean a small business concern (1) which is at least 51 percent owned by one or more women, or, in the case of any publicly owned business, at least 51 percent of the stock of which is owned by one or more women, and (2) whose management and daily business operations are controlled by one or more women; and

(e) Contractors acting in good faith may rely on written representations by their subcontractors regarding their status as a small business concern, a small business concern owned and controlled by socially and economically disadvantaged individuals or a small business concern owned and controlled by women.

(End of clause)

APPLIES TO LARGE BUSINESSES ONLY

17 52.219-9 II SMALL, SMALL DISADVANTAGED AND WOMEN-OWNED SMALL BUSINESS SUBCONTRACTING PLAN (AUG 1996)--ALTERNATE II (MAR 1996)

(a) This clause does not apply to small business concerns.

(b) "Commercial product," as used in this clause, means a product in regular production that is sold in substantial quantities to the general public and/or industry at established catalog or market prices. It also means a product which, in the opinion of the Contracting Officer, differs only insignificantly from the Contractor's commercial product.

"Subcontract," as used in this clause, means any agreement (other than one involving an employer-employee relationship) entered into by a Federal Government prime Contractor or subcontractor calling for supplies or services required for performance of the contract or subcontract.

(c) Proposals submitted in response to this solicitation shall include a subcontracting plan, which separately addresses subcontracting with small business concerns, small disadvantaged business concerns and women-owned small business concerns. If the offeror is submitting an individual contract plan, the plan must separately address subcontracting with small business concerns, small disadvantaged business concerns and women-owned small business concerns with a separate part for the basic contract and separate parts for each option (if any). The plan shall be included in and made a part of the resultant contract. The subcontracting plan shall be negotiated within the time specified by the Contracting Officer. Failure to submit and negotiate a subcontracting plan shall make the offeror ineligible for award of a contract.

(d) The offeror's subcontracting plan shall include the following:

(1) Goals, expressed in terms of percentages of total planned subcontracting dollars, for the use of small business concerns, small disadvantaged business concerns and women-owned small business concerns as subcontractors. The offeror shall include all subcontracts that contribute to contract performance, and may include a proportionate share of products and services that are normally allocated as indirect costs.

(2) A statement of--

(i) Total dollars planned to be subcontracted;

(ii) Total dollars planned to be subcontracted to small business concerns;

(iii) Total dollars planned to be subcontracted to small disadvantaged business concerns; and

(iv) Total dollars planned to be subcontracted to women-owned small business concerns.

(3) A description of the principal types of supplies and services to be subcontracted, and an identification of the types planned for subcontracting to (i) small business concerns, (ii) small disadvantaged business concerns and (iii) women-owned small business concerns.

(4) A description of the method used to develop the subcontracting goals in paragraph (d)(1) of this clause.

(5) A description of the method used to identify potential sources for solicitation purposes (e.g., existing company source lists, the Procurement Automated Source System (PASS) of the Small Business Administration, the National Minority Purchasing Council Vendor Information Service, the Research and Information Division of the Minority Business Development Agency in the Department of Commerce, or small, small disadvantaged and women-owned small business concerns trade associations). A firm may rely on the information contained in PASS as an accurate representation of a concern's size and ownership characteristics for purposes of maintaining a small business source list. A firm may rely on PASS as its small business source list. Use of the PASS as its source list does not relieve a firm of its responsibilities (e.g., outreach, assistance, counseling, publicizing subcontracting opportunities) in this clause.

(6) A statement as to whether or not the offeror included indirect costs in establishing subcontracting goals, and a description of the method used to determine the proportionate share of indirect costs to be incurred with (i) small business concerns, (ii) small disadvantaged business concerns, and (iii) women-owned small business concerns.

(7) The name of the individual employed by the offeror who will administer the offeror's subcontracting program, and a description of the duties of the individual.

(8) A description of the efforts the offeror will make to assure that

small, small disadvantaged and women-owned small business concerns have an equitable opportunity to compete for subcontracts.

(9) Assurances that the offeror will include the clause in this contract entitled "Utilization of Small, Small Disadvantaged and Women-Owned Small Business Concerns" in all subcontracts that offer further subcontracting opportunities, and that the offeror will require all subcontractors (except small business concerns) who receive subcontracts in excess of $500,000 ($1,000,000 for construction of any public facility) to adopt a plan similar to the plan agreed to by the offeror.

(10) Assurances that the offeror will (i) cooperate in any studies or surveys as may be required, (ii) submit periodic reports in order to allow the Government to determine the extent of compliance by the offeror with the subcontracting plan, (iii) submit Standard Form (SF) 294, Subcontracting Report for Individual Contracts, and/or SF 295, Summary Subcontract Report, in accordance with the instructions on the forms, and (iv) ensure that its subcontractors agree to submit Standard Forms 294 and 295.

(11) A recitation of the types of records the offeror will maintain to demonstrate procedures that have been adopted to comply with the requirements and goals in the plan, including establishing source lists; and a description of its efforts to locate small, small disadvantaged and women-owned small business concerns and award subcontracts to them. The records shall include at least the following (on a plant-wide or company-wide basis, unless otherwise indicated):

(i) Source lists (e.g., PASS), guides, and other data that identify small, small disadvantaged and women-owned small business concerns.

(ii) Organizations contacted in an attempt to locate sources that are small, small disadvantaged or women-owned small business concerns.

(iii) Records on each subcontract solicitation resulting in an award of more than $100,000, indicating (A) whether small business concerns were solicited and if not, why not, (B) whether small disadvantaged business concerns were solicited and if not, why not, (C) whether women-owned small business concerns were solicited and if not, why not, and (D) if applicable, the reason award was not made to a small business concern.

(iv) Records of any outreach efforts to contact (A) trade associations, (B) business development organizations, and (C) conferences and trade fairs to locate small, small disadvantaged and women-owned small business sources.

(v) Records of internal guidance and encouragement provided to buyers through (A) workshops, seminars, training, etc., and (B) monitoring performance to evaluate compliance with the program's requirements.

(vi) On a contract-by-contract basis, records to support award data submitted by the offeror to the Government, including the name, address, and business size of each subcontractor. Contractors having company or division-wide annual plans need not comply with this requirement.

(e) In order to effectively implement this plan to the extent consistent with efficient contract performance, the Contractor shall perform the following functions:

(1) Assist small, small disadvantaged and women-owned small business concerns by arranging solicitations, time for the preparation of bids, quantities, specifications, and delivery schedules so as to facilitate the participation by such concerns. Where the contractor's lists of potential small, small disadvantaged and women-owned small business subcontractors are excessively long, reasonable effort shall be made to give all such small business concerns an opportunity to compete over a period of time.

(2) Provide adequate and timely consideration of the potentialities of small, small disadvantaged and women-owned small business concerns in all "make-or-buy" decisions.

(3) Counsel and discuss subcontracting opportunities with representatives of small, small disadvantaged and women-owned small business firms.

(4) Provide notice to subcontractors concerning penalties and remedies for misrepresentations of business status as small, small disadvantaged or women-owned small business for the purpose of obtaining a subcontract that is to be included as part or all of a goal contained in the Contractor's subcontracting plan.

(f) A master subcontracting plan on a plant or division-wide basis which

contains all the elements required by (d) above, except goals, may be incorporated by reference as a part of the subcontracting plan required of the offeror by this clause; provided, (1) the master plan has been approved, (2) the offeror provides copies of the approved master plan and evidence of its approval to the Contracting Officer, and (3) goals and any deviations from the master plan deemed necessary by the Contracting Officer to satisfy the requirements of this contract are set forth in the individual subcontracting plan.

(g)(1) If a commercial product is offered, the subcontracting plan required by this clause may relate to the offeror's production generally, for both commercial and noncommercial products, rather than solely to the Government contract. In these cases, the offeror shall, with the concurrence of the Contracting Officer, submit one company-wide or division-wide annual plan.

(2) The annual plan shall be reviewed for approval by the agency awarding the offeror its first prime contract requiring a subcontracting plan during the fiscal year, or by an agency satisfactory to the Contracting Officer.

(3) The approved plan shall remain in effect during the offeror's fiscal year for all of the offeror's commercial products.

(h) Prior compliance of the offeror with other such subcontracting plans under previous contracts will be considered by the Contracting Officer in determining the responsibility of the offeror for award of the contract.

(i) The failure of the Contractor or subcontractor to comply in good faith with (1) the clause of this contract entitled "Utilization Of Small, Small Disadvantaged and Women-Owned Small Business Concerns," or (2) an approved plan required by this clause, shall be a material breach of the contract.

(End of clause)

APPLIES TO 8(a) CONTRACTORS ONLY

18 52.219-11 SPECIAL 8(a) CONTRACT CONDITIONS (FEB 1990)

The Small Business Administration (SBA) agrees to the following:

(a) To furnish the supplies or services set forth in this contract according to the specifications and the terms and conditions hereof by subcontracting with an eligible concern pursuant to the provisions of section 8(a) of the Small Business Act, as amended (15 U.S.C. 637(a)).

(b) That in the event SBA does not award a subcontract for all or a part of the work hereunder, this contract may be terminated either in whole or in part without cost to either party.

(c) Except for novation agreements and advance payments, delegate to the Little Rock District, U.S. Army Corps of Engineers the responsibility for administering the subcontract to be awarded hereunder with complete authority to take any action on behalf of the Government under the terms and conditions of the subcontract; provided, however, that the Little Rock District, U.S. Army Corps of Engineers shall give advance notice to the SBA before it issues a final notice terminating the right of a subcontractor to proceed with further performance, either in whole or in part, under the subcontract for default or for the convenience of the Government.

(d) That payments to be made under any subcontract awarded under this contract will be made directly to the subcontractor by the Little Rock District, U.S. Army Corps of Engineers.

(e) That the subcontractor awarded a subcontract hereunder shall have the right of appeal from decisions of the Contracting Officer cognizable under the "Disputes" clause of said subcontract.

(f) To notify the Little Rock District, U.S. Army, Corps of Engineers Contracting Officer immediately upon notification by the subcontractor that the owner or owners upon whom 8(a) eligibility was based plan to relinquish ownership or control of the concern.

(End of clause)

19 52.219-16 LIQUIDATED DAMAGES--SUBCONTRACTING PLAN (OCT 1995)

(a) "Failure to make a good faith effort to comply with the subcontracting plan," as used in this clause, means a willful or intentional failure to perform in accordance with the requirements of the subcontracting plan approved under the clause in this contract entitled "Small, Small Disadvantaged and Women-Owned Small Business Subcontracting Plan," or willful or intentional action to frustrate the plan.

(b) If, at contract completion, or in the case of a commercial product plan, at the close of the fiscal year for which the plan is applicable, the Contractor has failed to meet its subcontracting goals and the Contracting Officer decides in accordance with paragraph (c) of this clause that the Contractor failed to make a good faith effort to comply with its subcontracting plan, established in accordance with the clause in this contract entitled "Small, Small Disadvantaged and Women-Owned Small Business Subcontracting Plan," the Contractor shall pay the Government liquidated damages in an amount stated. The amount of probable damages attributable to the Contractor's failure to comply, shall be an amount equal to the actual dollar amount by which the Contractor failed to achieve each subcontract goal or, in the case of a commercial products plan, that portion of the dollar amount allocable to Government contracts by which the Contractor failed to achieve each subcontract goal.

(c) Before the Contracting Officer makes a final decision that the Contractor has failed to make such good faith effort, the Contracting Officer shall give the Contractor written notice specifying the failure and permitting the Contractor to demonstrate what good faith efforts have been made. Failure to respond to the notice may be taken as an admission that no valid explanation exists. If, after consideration of all the pertinent data, the Contracting Officer finds that the Contractor failed to make a good faith effort to comply with the subcontracting plan, the Contracting Officer shall issue a final decision to that effect and require that the Contractor pay the Government liquidated damages as provided in paragraph (b) of this clause.

(d) With respect to commercial product plans; i.e., company-wide or division-wide subcontracting plans approved under paragraph (g) of the clause in this contract entitled "Small, Small Disadvantaged and Women-Owned Small Business Subcontracting Plan," the Contracting Officer of the agency that originally approved the plan will exercise the functions of the Contracting Officer under this clause on behalf of all agencies that awarded contracts covered by that commercial product plan.

(e) The Contractor shall have the right of appeal, under the clause in this contract entitled, Disputes, from any final decision of the Contracting Officer.

(f) Liquidated damages shall be in addition to any other remedies that the Government may have.

(End of clause)

APPLIES TO 8(a) CONTRACTORS ONLY

20 52.219-18 I NOTIFICATION OF COMPETITION LIMITED TO ELIGIBLE 8(A) CONCERNS (JAN 1997)--ALTERNATE I (NOV 1989)

(a) Offers are solicited only from small business concerns expressly certified by the Small Business Administration (SBA) for participation in the SBA's 8(a) Program and which meet the following criteria at the time of submission of offer--

(1) SIC code 1541 is specifically included in the Offeror's approved business plan;

(2) The Offeror is in conformance with the 8(a) support limitation set forth in its approved business plan; and

(3) The Offeror is in conformance with the Business Activity Targets set forth in its approved business plan or any remedial action directed by the SBA.

(4) The offeror's approved business plan is on the file and serviced by U.S. Small Business Administration, Little Rock District Office.

(b) By submission of its offer, the Offeror represents that it meets all of the criteria set forth in paragraph (a) of this clause.

(c) Any award resulting from this solicitation will be made to the Small Business Administration, which will subcontract performance to the successful 8(a) offeror selected through the evaluation criteria set forth in this solicitation.

(d)(1) Agreement. A small business concern submitting an offer in its own name agrees to furnish, in performing the contract, only end items manufactured or produced by small business concerns in the United States. The term "United States" includes its territories and possessions, the Commonwealth of Puerto Rico, the Trust Territory of the Pacific Islands, and the District of Columbia. If this procurement is processed under simplified acquisition procedures and the total amount of this contract does not exceed $25,000, a small business concern may furnish the product of any domestic firm. This subparagraph does not apply in connection with

construction or service contracts.
(2) The Small Business Administration, Little Rock District, will notify the Little Rock District, U.S. Army Corps of Engineers Contracting Officer in writing immediately upon entering an agreement (either oral or written) to transfer all or part of its stock or other ownership interest to any other party.

(End of clause)

21 52.222-3 CONVICT LABOR (AUG 1996)

The Contractor agrees not to employ in the performance of this contract any person undergoing a sentence of imprisonment which has been imposed by any court of a State, the District of Columbia, the Commonwealth of Puerto Rico, the Virgin Islands, Guam, American Samoa, the Commonwealth of the Northern Mariana Islands, or the Trust Territory of the Pacific Islands. This limitation, however, shall not prohibit the employment by the Contractor in the performance of this contract of persons on parole or probation to work at paid employment during the term of their sentence or persons who have been pardoned or who have served their terms. Nor shall it prohibit the employment by the Contractor in the performance of this contract of persons confined for violation of the laws of any of the States, the District of Columbia, the Commonwealth of Puerto Rico, the Virgin Islands, Guam, American Samoa, the Commonwealth of the Northern Mariana Islands, or the Trust Territory of the Pacific Islands who are authorized to work at paid employment in the community under the laws of such jurisdiction, if--

(a)(1) The worker is paid or is in an approved work training program on a voluntary basis;

(2) Representatives of local union central bodies or similar labor union organizations have been consulted;

(3) Such paid employment will not result in the displacement of employed workers, or be applied in skills, crafts, or trades in which there is a surplus of available gainful labor in the locality, or impair existing contracts for services; and

(4) The rates of pay and other conditions of employment will not be less than those paid or provided for work of a similar nature in the locality in which the work is being performed; and

(b) The Attorney General of the United States has certified that the work-release laws or regulations of the jurisdiction involved are in conformity with the requirements of Executive Order 11755, as amended by Executive Orders 12608 and 12943.

(End of clause)

22 52.222-4 CONTRACT WORK HOURS AND SAFETY STANDARDS ACT--OVERTIME COMPENSATION (JUL 1995)

(a) Overtime requirements. No Contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics (see Federal Acquisition Regulation (FAR) 22.300) shall require or permit any such laborers or mechanics in any workweek in which the individual is employed on such work to work in excess of 40 hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than 1 1/2 times the basic rate of pay for all hours worked in excess of 40 hours in such workweek.

(b) Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the provisions set forth in paragraph (a) of this clause, the Contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such Contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic employed in violation of the provisions set forth in paragraph (a) of this clause in the sum of $10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of 40 hours without payment of the overtime wages required by provisions set forth in paragraph (a) of this clause.

(c) Withholding for unpaid wages and liquidated damages. The Contracting Officer shall upon his or her own action or upon written request of an

authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the Contractor or subcontractor under any such contract or any other Federal contract with the same Prime Contractor, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act which is held by the same Prime Contractor, such sums as may be determined to be necessary to satisfy any liabilities of such Contractor or subcontractor for unpaid wages and liquidated damages as provided in the provisions set forth in paragraph (b) of this clause.

(d) Payrolls and basic records. (1) The Contractor or subcontractor shall maintain payrolls and basic payroll records during the course of contract work and shall preserve them for a period of 3 years from the completion of the contract for all laborers and mechanics working on the contract. Such records shall contain the name and address of each such employee, social security number, correct classifications, hourly rates of wages paid, daily and weekly number of hours worked, deductions made, and actual wages paid. Nothing in this paragraph shall require the duplication of records required to be maintained for construction work by Department of Labor regulations at 29 CFR 5.5(a)(3) implementing the Davis-Bacon Act.

(2) The records to be maintained under paragraph (d)(1) of this clause shall be made available by the Contractor or subcontractor for inspection, copying, or transcription by authorized representatives of the Contracting Officer or the Department of Labor. The Contractor or subcontractor shall permit such representatives to interview employees during working hours on the job.

(e) Subcontracts. The Contractor or subcontractor shall insert in any subcontracts exceeding $100,000, the provisions set forth in paragraphs (a) through (e) of this clause and also a clause requiring the subcontractors to include these provisions in any lower tier subcontracts. The Prime Contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the provisions set forth in paragraphs (a) through (e) of this clause.

(End of clause)

23 52.222-6 DAVIS-BACON ACT (FEB 1995)

(a) All laborers and mechanics employed or working upon the site of the work will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR Part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the Contractor and such laborers and mechanics. Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph (d) of this clause; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such period. Such laborers and mechanics shall be paid not less than the appropriate wage rate and fringe benefits in the wage determination for the classification of work actually performed, without regard to skill, except as provided in the clause entitled Apprentices and Trainees. Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein; provided, that the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classifications and wage rates conformed under paragraph (b) of this clause) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the Contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

(b)(1) The Contracting Officer shall require that any class of laborers or mechanics which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The Contracting Officer shall approve an additional

classification and wage rate and fringe benefits therefor only when all the following criteria have been met:

(i) The work to be performed by the classification requested is not performed by a classification in the wage determination.

(ii) The classification is utilized in the area by the construction industry.

(iii) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(iv) With respect to helpers, such a classification prevails in the area in which the work is performed.

(2) If the Contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the Contracting Officer agree on the classification and wage rate (including the amount designated for fringe benefits, where appropriate), a report of the action taken shall be sent by the Contracting Officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210. The Administrator or an authorized representative will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the Contracting Officer or will notify the Contracting Officer within the 30-day period that additional time is necessary.

(3) In the event the Contractor, the laborers or mechanics to be employed in the classification, or their representatives, and the Contracting Officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the Contracting Officer shall refer the questions, including the views of all interested parties and the recommendation of the Contracting Officer, to the Administrator of the Wage and Hour Division for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the Contracting Officer or will notify the Contracting Officer within the 30-day period that additional time is necessary.

(4) The wage rate (including fringe benefits, where appropriate) determined pursuant to subparagraphs (b)(2) and (b)(3) of this clause shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

(c) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the Contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(d) If the Contractor does not make payments to a trustee or other third person, the Contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program; provided, that the Secretary of Labor has found, upon the written request of the Contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the Contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

(End of clause)

24 52.222-7 WITHHOLDING OF FUNDS (FEB 1988)

The Contracting Officer shall, upon his or her own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the Contractor under this contract or any other Federal contract with the same Prime Contractor, or any other Federally assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same Prime Contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the Contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the Contracting Officer may, after written notice to the Contractor, take such action as may be necessary to cause the suspension of any further payment,

advance, or guarantee of funds until such violations have ceased.
(End of clause)

25 52.222-8 PAYROLLS AND BASIC RECORDS (FEB 1988)

(a) Payrolls and basic records relating thereto shall be maintained by the Contractor during the course of the work and preserved for a period of 3 years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made, and actual wages paid. Whenever the Secretary of Labor has found, under paragraph (d) of the clause entitled Davis-Bacon Act, that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the Contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

(b)(1) The Contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the Contracting Officer. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under paragraph (a) of this clause. This information may be submitted in any form desired. Optional Form WH-347 (Federal Stock Number 029-005-00014-1) is available for this purpose and may be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. The Prime Contractor is responsible for the submission of copies of payrolls by all subcontractors.

(2) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the Contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify--

(i) That the payroll for the payroll period contains the information required to be maintained under paragraph (a) of this clause and that such information is correct and complete;

(ii) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in the Regulations, 29 CFR Part 3; and

(iii) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(3) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by subparagraph (b)(2) of this clause.

(4) The falsification of any of the certifications in this clause may subject the Contractor or subcontractor to civil or criminal prosecution under Section 1001 of Title 18 and Section 3729 of Title 31 of the United States Code.

(c) The Contractor or subcontractor shall make the records required under paragraph (a) of this clause available for inspection, copying, or transcription by the Contracting Officer or authorized representatives of the Contracting Officer or the Department of Labor. The Contractor or subcontractor shall permit the Contracting Officer or representatives of the Contracting Officer or the Department of Labor to interview employees

during working hours on the job. If the Contractor or subcontractor fails to submit required records or to make them available, the Contracting Officer may, after written notice to the Contractor, take such action as may be necessary to cause the suspension of any further payment. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

(End of clause)

26 52.222-9 APPRENTICES AND TRAINEES (FEB 1988)

(a) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Bureau of Apprenticeship and Training, or with a State Apprenticeship Agency recognized by the Bureau, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Bureau of Apprenticeship and Training or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the Contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated in this paragraph, shall be paid not less than the applicable wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the Contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Bureau of Apprenticeship and Training, or a State Apprenticeship Agency recognized by the Bureau, withdraws approval of an apprenticeship program, the Contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(b) Trainees. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed in the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate in the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by

the Employment and Training Administration shall be paid not less than the applicable wage rate in the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate in the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the Contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(c) Equal employment opportunity. The utilization of apprentices, trainees, and journeymen under this clause shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR Part 30.

(End of clause)

27 52.222-10 COMPLIANCE WITH COPELAND ACT REQUIREMENTS (FEB 1988)

The Contractor shall comply with the requirements of 29 CFR Part 3, which are hereby incorporated by reference in this contract.

(End of clause)

28 52.222-11 SUBCONTRACTS (LABOR STANDARDS) (FEB 1988)

(a) The Contractor or subcontractor shall insert in any subcontracts the clauses entitled Davis-Bacon Act, Contract Work Hours and Safety Standards Act--Overtime Compensation, Apprentices and Trainees, Payrolls and Basic Records, Compliance with Copeland Act Requirements, Withholding of Funds, Subcontracts (Labor Standards), Contract Termination--Debarment, Disputes Concerning Labor Standards, Compliance with Davis-Bacon and Related Act Regulations, and Certification of Eligibility, and such other clauses as the Contracting Officer may, by appropriate instructions, require, and also a clause requiring subcontractors to include these clauses in any lower tier subcontracts. The Prime Contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with all the contract clauses cited in this paragraph.

(b)(1) Within 14 days after award of the contract, the Contractor shall deliver to the Contracting Officer a completed Statement and Acknowledgment Form (SF 1413) for each subcontract, including the subcontractor's signed and dated acknowledgment that the clauses set forth in paragraph (a) of this clause have been included in the subcontract.

(2) Within 14 days after the award of any subsequently awarded subcontract the Contractor shall deliver to the Contracting Officer an updated completed SF 1413 for such additional subcontract.

(End of clause)

29 52.222-12 CONTRACT TERMINATION--DEBARMENT (FEB 1988)

A breach of the contract clauses entitled Davis-Bacon Act, Contract Work Hours and Safety Standards Act--Overtime Compensation, Apprentices and Trainees, Payrolls and Basic Records, Compliance with Copeland Act Requirements, Subcontracts (Labor Standards), Compliance with Davis-Bacon and Related Act Regulations, or Certification of Eligibility may be grounds for termination of the contract, and for debarment as a Contractor and subcontractor as provided in 29 CFR 5.12.

(End of clause)

30 52.222-13 COMPLIANCE WITH DAVIS-BACON AND RELATED ACT REGULATIONS (FEB 1988)

All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR Parts 1, 3, and 5 are hereby incorporated by reference in this contract.

(End of clause)

31 52.222-14 DISPUTES CONCERNING LABOR STANDARDS (FEB 1988)

The United States Department of Labor has set forth in 29 CFR Parts 5, 6, and 7 procedures for resolving disputes concerning labor standards requirements. Such disputes shall be resolved in accordance with those procedures and not the Disputes clause of this contract. Disputes within the meaning of this clause include disputes between the Contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees of their representatives.

(End of clause)

32 52.222-15 CERTIFICATION OF ELIGIBILITY (FEB 1988)

(a) By entering into this contract, the Contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the Contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(b) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(c) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

(End of clause)

33 52.222-26 EQUAL OPPORTUNITY (APR 1984)

(a) If, during any 12-month period (including the 12 months preceding the award of this contract), the Contractor has been or is awarded nonexempt Federal contracts and/or subcontracts that have an aggregate value in excess of $10,000, the Contractor shall comply with subparagraphs (b)(1) through (11) below. Upon request, the Contractor shall provide information necessary to determine the applicability of this clause.

(b) During performing this contract, the Contractor agrees as follows:

(1) The Contractor shall not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin.

(2) The Contractor shall take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, or national origin. This shall include, but not be limited to, (i) employment, (ii) upgrading, (iii) demotion, (iv) transfer, (v) recruitment or recruitment advertising, (vi) layoff or termination, (vii) rates of pay or other forms of compensation, and (viii) selection for training, including apprenticeship.

(3) The Contractor shall post in conspicuous places available to employees and applicants for employment the notices to be provided by the Contracting Officer that explain this clause.

(4) The Contractor shall, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin.

(5) The Contractor shall send, to each labor union or representative of workers with which it has a collective bargaining agreement or other contract or understanding, the notice to be provided by the Contracting Officer advising the labor union or workers' representative of the Contractor's commitments under this clause, and post copies of the notice in conspicuous places available to employees and applicants for employment.

(6) The Contractor shall comply with Executive Order 11246, as amended, and the rules, regulations, and orders of the Secretary of Labor.

(7) The Contractor shall furnish to the contracting agency all information required by Executive Order 11246, as amended, and by the rules, regulations, and orders of the Secretary of Labor. Standard Form 100 (EEO-1), or any successor form, is the prescribed form to be filed within 30 days following the award, unless filed within 12 months preceding the date of award.

(8) The Contractor shall permit access to its books, records, and accounts by the contracting agency or the Office of Federal Contract Compliance Programs (OFCCP) for the purposes of investigation to

ascertain the Contractor's compliance with the applicable rules, regulations, and orders.

(9) If the OFCCP determines that the Contractor is not in compliance with this clause or any rule, regulation, or order of the Secretary of Labor, this contract may be canceled, terminated, or suspended in whole or in part and the Contractor may be declared ineligible for further Government contracts, under the procedures authorized in Executive Order 11246, as amended. In addition, sanctions may be imposed and remedies invoked against the Contractor as provided in Executive Order 11246, as amended, the rules, regulations, and orders of the Secretary of Labor, or as otherwise provided by law.

(10) The Contractor shall include the terms and conditions of subparagraph (b)(1) through (11) of this clause in every subcontract or purchase order that is not exempted by the rules, regulations, or orders of the Secretary of Labor issued under Executive Order 11246, as amended, so that these terms and conditions will be binding upon each subcontractor or vendor.

(11) The Contractor shall take such action with respect to any subcontract or purchase order as the contracting agency may direct as a means of enforcing these terms and conditions, including sanctions for noncompliance; provided, that if the Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of any direction, the Contractor may request the United States to enter into the litigation to protect the interests of the United States.

(c) Notwithstanding any other clause in this contract, disputes relative to this clause will be governed by the procedures in 41 CFR 60-1.1.

(End of clause)
(R 7-103.18 1978 SEP)
(R 1-12.803-2)
(R 7-607.13 1978 SEP)

34 52.222-27 AFFIRMATIVE ACTION COMPLIANCE REQUIREMENTS FOR CONSTRUCTION (APR 1984)

(a) Definitions.

"Covered area," as used in this clause, means the geographical area described in the solicitation for this contract.

"Director," as used in this clause, means Director, Office of Federal Contract Compliance Programs (OFCCP), United States Department of Labor, or any person to whom the Director delegates authority.

"Employer's identification number," as used in this clause, means the Federal Social Security number used on the employer's quarterly federal tax return, U.S. Treasury Department Form 941.

"Minority," as used in this clause, means--

(1) American Indian or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).

(2) Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands);

(3) Black (all persons having origins in any of the black African racial groups not of Hispanic origin); and

(4) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race).

(b) If the Contractor, or a subcontractor at any tier, subcontracts a portion of the work involving any construction trade, each such subcontract in excess of $10,000 shall include this clause and the Notice containing the goals for minority and female participation stated in the solicitation for this contract.

(c) If the Contractor is participating in a Hometown Plan (41 CFR 60-4) approved by the U.S. Department of Labor in a covered area, either individually or through an association, its affirmative action obligations on all work in the plan area (including goals) shall comply with the plan for those trades that have unions participating in the plan. Contractors must be able to demonstrate participation in, and compliance with, the provisions of the plan. Each Contractor or subcontractor participating in an approved plan is also required to comply with its obligations under the Equal Opportunity clause, and to make a good faith effort to achieve each goal under the plan in each trade in which it has employees. The overall good-faith performance by other Contractors or subcontractors toward a

goal in an approved plan does not excuse any Contractor's or subcontractor's failure to make good-faith efforts to achieve the plan's goals.

(d) The Contractor shall implement the affirmative action procedures in subparagraphs (g)(1) through (16) of this clause. The goals stated in the solicitation for this contract are expressed as percentages of the total hours of employment and training of minority and female utilization that the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. If the Contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for the geographical area where that work is actually performed. The Contractor is expected to make substantially uniform progress toward its goals in each craft.

(e) Neither the terms and conditions of any collective bargaining agreement, nor the failure by a union with which the Contractor has a collective bargaining agreement, to refer minorities or women shall excuse the Contractor's obligations under this clause, Executive Order 11246, as amended, or the regulations thereunder.

(f) In order for the nonworking training hours of apprentices and trainees to be counted in meeting the goals, apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.

(g) The Contractor shall take affirmative action to ensure equal employment opportunity. The evaluation of the Contractor's compliance with this clause shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully and implement affirmative action steps at least as extensive as the following:

(1) Ensure a working environment free of harassment, intimidation, and coercion at all sites and in all facilities where the Contractor's employees are assigned to work. The Contractor, if possible, will assign two or more women to each construction project. The Contractor shall ensure that foremen, superintendents, and other onsite supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at these sites or facilities.

(2) Establish and maintain a current list of sources for minority and female recruitment. Provide written notification to minority and female recruitment sources and community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.

(3) Establish and maintain a current file of the names, addresses, and telephone numbers of each minority and female off-the-street applicant, referrals of minorities or females from unions, recruitment sources, or community organizations, and the action taken with respect to each individual. If an individual was sent to the union hiring hall for referral and not referred back to the Contractor by the union or, if referred back, not employed by the Contractor, this shall be documented in the file, along with whatever additional actions the Contractor may have taken.

(4) Immediately notify the Director when the union or unions with which the Contractor has a collective bargaining agreement has not referred back to the Contractor a minority or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.

(5) Develop on-the-job training opportunities and/or participate in training programs for the area that expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under subparagraph (g)(2) above.

(6) Disseminate the Contractor's equal employment policy by--

(i) Providing notice of the policy to unions and to training, recruitment, and outreach programs, and requesting their cooperation in assisting the Contractor in meeting its contract obligations;

(ii) Including the policy in any policy manual and in collective bargaining agreements;

(iii) Publicizing the policy in the company newspaper, annual report, etc.;

(iv) Reviewing the policy with all management personnel and with all minority and female employees at least once a year; and

(v) Posting the policy on bulletin boards accessible to employees at each location where construction work is performed.

(7) Review, at least annually, the Contractor's equal employment policy and affirmative action obligations with all employees having responsibility for hiring, assignment, layoff, termination, or other employment decisions. Conduct review of this policy with all onsite supervisory personnel before initiating construction work at a job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.

(8) Disseminate the Contractor's equal employment policy externally by including it in any advertising in the news media, specifically including minority and female news media. Provide written notification to, and discuss this policy with, other Contractors and subcontractors with which the Contractor does or anticipates doing business.

(9) Direct recruitment efforts, both oral and written, to minority, female, and community organizations, to schools with minority and female students, and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than 1 month before the date for acceptance of applications for apprenticeship or training by any recruitment source, send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.

(10) Encourage present minority and female employees to recruit minority persons and women. Where reasonable, provide after-school, summer, and vacation employment to minority and female youth both on the site and in other areas of the Contractor's workforce.

(11) Validate all tests and other selection requirements where required under 41 CFR 60-3.

(12) Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities. Encourage these employees to seek or to prepare for, through appropriate training, etc., opportunities for promotion.

(13) Ensure that seniority practices job classifications, work assignments, and other personnel practices do not have a discriminatory effect by continually monitoring all personnel and employment-related activities to ensure that the Contractor's obligations under this contract are being carried out.

(14) Ensure that all facilities and company activities are nonsegrated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.

(15) Maintain a record of solicitations for subcontracts for minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.

(16) Conduct a review, at least annually, of all supervisors' adherence to and performance under the Contractor's equal employment policy and affirmative action obligations.

(h) The Contractor is encouraged to participate in voluntary associations that may assist in fulfilling one or more of the affirmative action obligations contained in subparagraphs (g)(1) through (16). The efforts of a contractor association, joint contractor-union, contractor-community, or similar group of which the contractor is a member and participant may be asserted as fulfilling one or more of its obligations under subparagraphs (g)(1) through (16), provided the Contractor--

(1) Actively participates in the group;

(2) Makes every effort to ensure that the group has a positive impact on the employment of minorities and women in the industry;

(3) Ensures that concrete benefits of the program are reflected in the Contractor's minority and female workforce participation;

(4) Makes a good-faith effort to meet its individual goals and timetables; and

(5) Can provide access to documentation that demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply is the Contractor's, and failure of such a

group to fulfill an obligation shall not be a defense for the Contractor's noncompliance.

(i) A single goal for minorities and a separate single goal for women shall be established. The Contractor is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and nonminority. Consequently, the Contractor may be in violation of Executive Order 11246, as amended, if a particular group is employed in a substantially disparate manner.

(j) The Contractor shall not use goals or affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.

(k) The Contractor shall not enter into any subcontract with any person or firm debarred from Government contracts under Executive Order 11246, as amended.

(l) The Contractor shall carry out such sanctions and penalties for violation of this clause and of the Equal Opportunity clause, including suspension, termination, and cancellation of existing subcontracts, as may be imposed or ordered under Executive Order 11246, as amended, and its implementing regulations, by the OFCCP. Any failure to carry out these sanctions and penalties as ordered shall be a violation of this clause and Executive Order 11246, as amended.

(m) The Contractor in fulfilling its obligations under this clause shall implement affirmative action procedures at least as extensive as those prescribed in paragraph (g) above, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of Executive Order 11246, as amended, the implementing regulations, or this clause, the Director shall take action as prescribed in 41 CFR 60-4.8.

(n) The Contractor shall designate a responsible official to--

(1) Monitor all employment-related activity to ensure that the Contractor's equal employment policy is being carried out;

(2) Submit reports as may be required by the Government; and

(3) Keep records that shall at least include for each employee the name, address, telephone number, construction trade, union affiliation (if any), employee identification number, social security number, race, sex, status (e.g., mechanic, apprentice, trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, separate records are not required to be maintained.

(o) Nothing contained herein shall be construed as a limitation upon the application of other laws that establish different standards of compliance or upon the requirements for the hiring of local or other area residents (e.g., those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

(End of clause)

(R 7-603.60 1978 SEP)

35 52.222-35 AFFIRMATIVE ACTION FOR SPECIAL DISABLED AND VIETNAM ERA VETERANS (APR 1984)

(a) Definitions.

"Appropriate office of the State employment service system," as used in this clause, means the local office of the Federal-State national system of public employment offices assigned to serve the area where the employment opening is to be filled, including the District of Columbia, Guam, Puerto Rico, Virgin Islands, American Samoa, and the Trust Territory of the Pacific Islands.

"Openings that the Contractor proposes to fill from within its own organization," as used in this clause, means employment openings for which no one outside the Contractor's organization (including any affiliates, subsidiaries, and the parent companies) will be considered and includes any openings that the Contractor proposes to fill from regularly established "recall" lists.

"Openings that the Contractor proposes to fill under a customary and traditional employer-union hiring arrangement," as used in this clause, means employment openings that the Contractor proposes to fill from union halls, under their customary and traditional employer-union hiring

relationship.

"Suitable employment openings," as used in this clause--

(1) Includes, but is not limited to, openings that occur in jobs categorized as--

(i) Production and nonproduction;

(ii) Plant and office;

(iii) Laborers and mechanics;

(iv) Supervisory and nonsupervisory;

(v) Technical; and

(vi) Executive, administrative, and professional positions compensated on a salary basis of less than $25,000 a year; and

(2) Includes full-time employment, temporary employment of over 3 days, and part-time employment, but not openings that the Contractor proposes to fill from within its own organization or under a customary and traditional employer-union hiring arrangement, nor openings in an educational institution that are restricted to students of that institution.

(b) General. (1) Regarding any position for which the employee or applicant for employment is qualified, the Contractor shall not discriminate against the individual because the individual is a special disabled or Vietnam Era veteran. The Contractor agrees to take affirmative action to employ, advance in employment, and otherwise treat qualified special disabled and Vietnam Era veterans without discrimination based upon their disability or veterans' status in all employment practices such as--

(i) Employment;

(ii) Upgrading;

(iii) Demotion or transfer;

(iv) Recruitment;

(v) Advertising;

(vi) Layoff or termination;

(vii) Rates of pay or other forms of compensation; and

(viii) Selection for training, including apprenticeship.

(2) The Contractor agrees to comply with the rules, regulations, and relevant orders of the Secretary of Labor (Secretary) issued under the Vietnam Era Veterans' Readjustment Assistance Act of 1972 (the Act), as amended.

(c) Listing openings. (1) The Contractor agrees to list all suitable employment openings existing at contract award or occurring during contract performance, at an appropriate office of the State employment service system in the locality where the opening occurs. These openings include those occurring at any Contractor facility, including one not connected with performing this contract. An independent corporate affiliate is exempt from this requirement.

(2) State and local government agencies holding Federal contracts of $10,000 or more shall also list all their suitable openings with the appropriate office of the State employment service.

(3) The listing of suitable employment openings with the State employment service system is required at least concurrently with using any other recruitment source or effort and involves the obligations of placing a bona fide job order, including accepting referrals of veterans and nonveterans. This listing does not require hiring any particular job applicant or hiring from any particular group of job applicants and is not intended to relieve the Contractor from any requirements of Executive orders or regulations concerning nondiscrimination in employment.

(4) Whenever the Contractor becomes contractually bound to the listing terms of this clause, it shall advise the State employment service system, in each State where it has establishments, of the name and location of each hiring location in the State. As long as the Contractor is contractually bound to these terms and has so advised the State system, it need not advise the State system of subsequent contracts. The Contractor may advise the State system when it is no longer bound by this contract clause.

(5) Under the most compelling circumstances, an employment opening may not be suitable for listing, including situations when (i) the Government's needs cannot reasonably be supplied, (ii) listing would be contrary to national security, or (iii) the requirement of listing would not be in the Government's interest.

(d) Applicability. (1) This clause does not apply to the listing of employment openings which occur and are filled outside the 50 States, the District of Columbia, Puerto Rico, Guam, Virgin Islands, American Samoa,

and the Trust Territory of the Pacific Islands.

(2) The terms of paragraph (c) above of this clause do not apply to openings that the Contractor proposes to fill from within its own organization or under a customary and traditional employer-union hiring arrangement. This exclusion does not apply to a particular opening once an employer decides to consider applicants outside of its own organization or employer-union arrangement for that opening.

(e) Postings. (1) The Contractor agrees to post employment notices stating (i) the Contractor's obligation under the law to take affirmative action to employ and advance in employment qualified special disabled veterans and veterans of the Vietnam era, and (ii) the rights of applicants and employees.

(2) These notices shall be posted in conspicuous places that are available to employees and applicants for employment. They shall be in a form prescribed by the Director, Office of Federal Contract Compliance Programs, Department of Labor (Director), and provided by or through the Contracting Officer.

(3) The Contractor shall notify each labor union or representative of workers with which it has a collective bargaining agreement or other contract understanding, that the Contractor is bound by the terms of the Act, and is committed to take affirmative action to employ, and advance in employment, qualified special disabled and Vietnam Era veterans.

(f) Noncompliance. If the Contractor does not comply with the requirements of this clause, appropriate actions may be taken under the rules, regulations, and relevant orders of the Secretary issued pursuant to the Act.

(g) Subcontracts. The Contractor shall include the terms of this clause in every subcontract or purchase order of $10,000 or more unless exempted by rules, regulations, or orders of the Secretary. The Contractor shall act as specified by the Director to enforce the terms, including action for noncompliance.

(End of clause)
(R 7-103.27 1976 JUL)
(R FPR Temp. Reg. 39)

36 52.222-36 AFFIRMATIVE ACTION FOR HANDICAPPED WORKERS (APR 1984)

(a) General. (1) Regarding any position for which the employee or applicant for employment is qualified, the Contractor shall not discriminate against any employee or applicant because of physical or mental handicap. The Contractor agrees to take affirmative action to employ, advance in employment, and otherwise treat qualified handicapped individuals without discrimination based upon their physical or mental handicap in all employment practices such as--

(i) Employment;
(ii) Upgrading;
(iii) Demotion or transfer;
(iv) Recruitment;
(v) Advertising;
(vi) Layoff or termination;
(vii) Rates of pay or other forms of compensation; and
(viii) Selection for training, including apprenticeship.

(2) The Contractor agrees to comply with the rules, regulations, and relevant orders of the Secretary of Labor (Secretary) issued under the Rehabilitation Act of 1973 (29 U.S.C. 793) (the Act), as amended.

(b) Postings. (1) The Contractor agrees to post employment notices stating (i) the Contractor's obligation under the law to take affirmative action to employ and advance in employment qualified handicapped individuals and (ii) the rights of applicants and employees.

(2) These notices shall be posted in conspicuous places that are available to employees and applicants for employment. They shall be in a form prescribed by the Director, Office of Federal Contract Compliance Programs, Department of Labor (Director), and provided by or through the Contracting Officer.

(3) The Contractor shall notify each labor union or representative of workers with which it has a collective bargaining agreement or other contract understanding, that the Contractor is bound by the terms of Section 503 of the Act and is committed to take affirmative action to employ, and advance in employment, qualified physically and mentally handicapped individuals.

(c) Noncompliance. If the Contractor does not comply with the requirements of this clause, appropriate actions may be taken under the rules, regulations, and relevant orders of the Secretary issued pursuant to the Act.

(d) Subcontracts. The Contractor shall include the terms of this clause in every subcontract or purchase order in excess of $2,500 unless exempted by rules, regulations, or orders of the Secretary. The Contractor shall act as specified by the Director to enforce the terms, including action for noncompliance.

(End of clause)
(R 7-103.28 1976 MAY)
(R FPR Temp. Reg. 38)

37 52.222-37 EMPLOYMENT REPORTS ON SPECIAL DISABLED VETERANS AND VETERANS OF THE VIETNAM ERA (JAN 1988)

(a) The contractor shall report at least annually, as required by the Secretary of Labor, on:

(1) The number of special disabled veterans and the number of veterans of the Vietnam era in the workforce of the contractor by job category and hiring location; and

(2) The total number of new employees hired during the period covered by the report, and of that total, the number of special disabled veterans, and the number of veterans of the Vietnam era.

(b) The above items shall be reported by completing the form entitled "Federal Contractor Veterans' Employment Report VETS-100."

(c) Reports shall be submitted no later than March 31 of each year beginning March 31, 1988.

(d) The employment activity report required by paragraph (a)(2) of this clause shall reflect total hires during the most recent 12-month period as of the ending date selected for the employment profile report required by paragraph (a)(1) of this clause. Contractors may select an ending date: (1) As of the end of any pay period during the period January through March 1st of the year the report is due, or (2) as of December 31, if the contractor has previous written approval from the Equal Employment Opportunity Commission to do so for purposes of submitting the Employer Information Report EEO-1 (Standard Form 100).

(e) The count of veterans reported according to paragraph (a) of this clause shall be based on voluntary disclosure. Each contractor subject to the reporting requirements at 38 U.S.C. 2012(d) shall invite all special disabled veterans and veterans of the Vietnam era who wish to benefit under the affirmative action program at 38 U.S.C. 2012 to identify themselves to the contractor. The invitation shall state that the information is voluntarily provided, that the information will be kept confidential, that disclosure or refusal to provide the information will not subject the applicant or employee to any adverse treatment and that the information will be used only in accordance with the regulations promulgated under 38 U.S.C. 2012.

(f) Subcontracts. The Contractor shall include the terms of this clause in every subcontract or purchase order of $10,000 or more unless exempted by rules, regulations, or orders of the Secretary.

(End of clause)

38 52.223-2 CLEAN AIR AND WATER (APR 1984)

(a) "Air Act", as used in this clause, means the Clean Air Act (42 U.S.C. 7401, et seq.).

"Clean air standards," as used in this clause, means--

(1) Any enforceable rules, regulations, guidelines, standards, limitations, orders, controls, prohibitions, work practices, or other requirements contained in, issued under, or otherwise adopted under the Air Act or Executive Order 11738;

(2) An applicable implementation plan as described in section 110(d) of the Air Act (42 U.S.C. 7410(d));

(3) An approved implementation procedure or plan under section 111(c) or section 111(d) of the Air Act (42 U.S.C. 7411(c) or (d)); or

(4) An approved implementation procedure under section 112(d) of the Air Act (42 U.S.C. 7412(d)).

"Clean water standards," as used in this clause, means any enforceable

limitation, control, condition, prohibition, standard, or other requirement promulgated under the Water Act or contained in a permit issued to a discharger by the EPA or by a State under an approved program, as authorized by section 402 of the Water Act (33 U.S.C. 1342), or by local government to ensure compliance with pretreatment regulations as required by section 307 of the Water Act (33 U.S.C. 1317).

"Compliance," as used in this clause, means compliance with--

(1) Clean air or water standards; or

(2) A schedule or plan ordered or approved by a court of competent jurisdiction, the EPA, or an air or water pollution control agency under the requirements of the Air Act or Water Act and related regulations.

"Facility," as used in this clause, means any building, plant, installation, structure, mine, vessel or other floating craft, location, or site of operations, owned, leased, or supervised by a Contractor or subcontractor, used in the performance of a contract or subcontract. When a location or site of operations includes more than one building, plant, installation, or structure, the entire location or site shall be deemed a facility except when the Administrator, or a designee, of the EPA determines that independent facilities are collocated in one geographical area.

"Water Act," as used in this clause, means Clean Water Act (33 U.S.C. 1251, et seq.).

(b) The Contractor agrees--

(1) To comply with all the requirements of section 114 of the Clean Air Act (42 U.S.C. 7414) and section 308 of the Clean Water Act (33 U.S.C. 1318) relating to inspection, monitoring, entry, reports, and information, as well as other requirements specified in section 114 and section 308 of the Air Act and the Water Act, and all regulations and guidelines issued to implement those acts before the award of this contract;

(2) That no portion of the work required by this prime contract will be performed in a facility listed on the EPA List of Violating Facilities on the date when this contract was awarded unless and until the EPA eliminates the name of the facility from the listing;

(3) To use best efforts to comply with clean air standards and clean water standards at the facility in which the contract is being performed; and

(4) To insert the substance of this clause into any nonexempt subcontract, including this subparagraph (b)(4).

(End of clause)

(R 7-103.29 1975 OCT)

(R 1-1.2302)

39 52.223-3 HAZARDOUS MATERIAL IDENTIFICATION AND MATERIAL SAFETY DATA (JAN 1997)

(a) "Hazardous material," as used in this clause, includes any material defined as hazardous under the latest version of Federal Standard No. 313 (including revisions adopted during the term of the contract).

(b) The Offeror must list any hazardous material, as defined in paragraph (a) of this clause, to be delivered under this contract. The hazardous material shall be properly identified and include any applicable identification number, such as National Stock Number or Special Item Number. This information shall also be included on the Material Safety Data Sheet submitted under this contract.

| Material | Identification No. (If none, insert None) |
|---|---|
| | |
| | |
| | |

(c) This list must be updated during performance of the contract whenever the Contractor determines that any other material to be delivered under this contract is hazardous.

(d) The apparently successful Offeror agrees to submit, for each item as required prior to award, a Material Safety Data Sheet, meeting the requirements of 29 CFR 1910.1200(g) and the latest version of Federal Standard No. 313, for all hazardous material identified in paragraph (b) of this clause. Data shall be submitted in accordance with Federal Standard No. 313, whether or not the apparently successful Offeror is the actual manufacturer of these items. Failure to submit the Material Safety Data Sheet prior to award may result in the apparently successful Offeror

being considered nonresponsible and ineligible for award.

(e) If, after award, there is a change in the composition of the item(s) or a revision to Federal Standard No. 313, which renders incomplete or inaccurate the data submitted under paragraph (d) of this clause, the Contractor shall promptly notify the Contracting Officer and resubmit the data.

(f) Neither the requirements of this clause nor any act or failure to act by the Government shall relieve the Contractor of any responsibility or liability for the safety of Government, Contractor, or subcontractor personnel or property.

(g) Nothing contained in this clause shall relieve the Contractor from complying with applicable Federal, State, and local laws, codes, ordinances, and regulations (including the obtaining of licenses and permits) in connection with hazardous material.

(h) The Government's rights in data furnished under this contract with respect to hazardous material are as follows:

(1) To use, duplicate and disclose any data to which this clause is applicable. The purposes of this right are to--

(i) Apprise personnel of the hazards to which they may be exposed in using, handling, packaging, transporting, or disposing of hazardous materials;

(ii) Obtain medical treatment for those affected by the material; and

(iii) Have others use, duplicate, and disclose the data for the Government for these purposes.

(2) To use, duplicate, and disclose data furnished under this clause, in accordance with subparagraph (h)(1) of this clause, in precedence over any other clause of this contract providing for rights in data.

(3) The Government is not precluded from using similar or data acquired from other sources.

(End of clause)

40 52.223-5 POLLUTION PREVENTION AND RIGHT-TO-KNOW INFORMATION (MAR 1997)

(a) Executive Order 12856 of August 3, 1993, requires Federal facilities to comply with the provisions of the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA) (42 U.S.C. 11001-11050) and the Pollution Prevention Act of 1990 (PPA) (42 U.S.C. 13101-13109).

(b) The Contractor shall provide all information needed by the Federal facility to comply with the emergency planning reporting requirements of Section 302 of EPCRA, the emergency notice requirements of Section 304 of EPCRA, the list of Material Data Safety Sheets required by Section 311 of EPCRA, the emergency and hazardous chemical inventory forms of Section 312 of EPCRA, and the toxic chemical release inventory of Section 313 of EPCRA, which includes the reduction and recycling information required by Section 6607 of PPA.

(End of clause)

41 52.223-6 DRUG-FREE WORKPLACE (JAN 1997)

(a) Definitions. As used in this clause--

"Controlled substance" means a controlled substance in schedules I through V of section 202 of the Controlled Substances Act (21 U.S.C. 812) and as further defined in regulation at 21 CFR 1308.11 - 1308.15.

"Conviction" means a finding of guilt (including a plea of nolo contendere) or imposition of sentence, or both, by any judicial body charged with the responsibility to determine violations of the Federal or State criminal drug statutes.

"Criminal drug statute" means a Federal or non-Federal criminal statute involving the manufacture, distribution, dispensing, possession or use of any controlled substance.

"Drug-free workplace" means the site(s) for the performance of work done by the Contractor in connection with a specific contract at which employees of the Contractor are prohibited from engaging in the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance.

"Employee" means an employee of a Contractor directly engaged in the performance of work under a Government contract. "Directly engaged" is defined to include all direct cost employees and any other Contractor employee who has other than a minimal impact or involvement in contract

performance.

"Individual" means an offeror/contractor that has no more than one employee including the offeror/contractor.

(b) The Contractor, if other than an individual, shall--within 30 days after award (unless a longer period is agreed to in writing for contracts of 30 days or more performance duration), or as soon as possible for contracts of less than 30 days performance duration--

(1) Publish a statement notifying its employees that the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance is prohibited in the Contractor's workplace and specifying the actions that will be taken against employees for violations of such prohibition;

(2) Establish an ongoing drug-free awareness program to inform such employees about--

(i) The dangers of drug abuse in the workplace;

(ii) The Contractor's policy of maintaining a drug-free workplace;

(iii) Any available drug counseling, rehabilitation, and employee assistance programs; and

(iv) The penalties that may be imposed upon employees for drug abuse violations occurring in the workplace;

(3) Provide all employees engaged in performance of the contract with a copy of the statement required by subparagraph (b)(1) of this clause;

(4) Notify such employees in writing in the statement required by subparagraph (b)(1) of this clause that, as a condition of continued employment on this contract, the employee will--

(i) Abide by the terms of the statement; and

(ii) Notify the employer in writing of the employee's conviction under a criminal drug statute for a violation occurring in the workplace no later than 5 days after such conviction.

(5) Notify the Contracting Officer in writing within 10 days after receiving notice under subdivision (b)(4)(ii) of this clause, from an employee or otherwise receiving actual notice of such conviction. The notice shall include the position title of the employee;

(6) Within 30 days after receiving notice under subdivision (b)(4)(ii) of this clause of a conviction, take one of the following actions with respect to any employee who is convicted of a drug abuse violation occurring in the workplace:

(i) Taking appropriate personnel action against such employee, up to and including termination; or

(ii) Require such employee to satisfactorily participate in a drug abuse assistance or rehabilitation program approved for such purposes by a Federal, State, or local health, law enforcement, or other appropriate agency, and

(7) Make a good faith effort to maintain a drug-free workplace through implementation of subparagraphs (b)(1) through (b)(6) of this clause.

(c) The Contractor, if an individual, agrees by award of the contract or acceptance of a purchase order, not to engage in the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance while performing this contract.

(d) In addition to other remedies available to the Government, the Contractor's failure to comply with the requirements of paragraph (b) or (c) of this clause may, pursuant to FAR 23.506, render the Contractor subject to suspension of contract payments, termination of the contract for default, and suspension or debarment.

(End of clause)

42 52.223-14 TOXIC CHEMICAL RELEASE REPORTING (OCT 1996)

(a) Unless otherwise exempt, the Contractor, as owner or operator of a facility used in the performance of this contract, shall file by July 1 for the prior calendar year an annual Toxic Chemical Release Inventory Form (Form R) as described in sections 313(a) and (g) of the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA) (42 U.S.C. 11023(a) and (g)), and section 6607 of the Pollution Prevention Act of 1990 (PPA) (42 U.S.C. 13106). The Contractor shall file, for each facility subject to the Form R filing and reporting requirements, the annual Form R throughout the life of the contract.

(b) A Contractor owned or operated facility used in the performance of this contract is exempt from the requirement to file an annual Form R if--

(1) The facility does not manufacture, process, or otherwise use any toxic chemicals listed under section 313(c) of EPCRA, 42 U.S.C. 11023(c);

(2) The facility does not have 10 or more full-time employees as specified in section 313(b)(1)(A) of EPCRA, 42 U.S.C. 11023(b)(1)(A);

(3) The facility does not meet the reporting thresholds of toxic chemicals established under section 313(f) of EPCRA, 42 U.S.C. 11023(f) (including the alternate thresholds at 40 CFR 372.27, provided an appropriate certification form has been filed with EPA);

(4) The facility does not fall within Standard Industrial Classification Code (SIC) designations 20 through 39 as set forth in Section 19.102 of the Federal Acquisition Regulation (FAR); or

(5) The facility is not located within any State of the United States, the District of Columbia, the Commonwealth of Puerto Rico, Guam, American Samoa, the United States Virgin Islands, the Northern Mariana Islands, or any other territory or possession over which the United States has jurisdiction.

(c) If the Contractor has certified to an exemption in accordance with one or more of the criteria in paragraph (b) of this clause, and after award of the contract circumstances change so that any of its owned or operated facilities used in the performance of this contract is no longer exempt--

(1) The Contractor shall notify the Contracting Officer; and

(2) The Contractor, as owner or operator of a facility used in the performance of this contract that is no longer exempt, shall (i) submit a Toxic Chemical Release Inventory Form (Form R) on or before July 1 for the prior calendar year during which the facility becomes eligible; and (ii) continue to file the annual Form R for the life of the contract for such facility.

(d) The Contracting Officer may terminate this contract or take other action as appropriate, if the Contractor fails to comply accurately and fully with the EPCRA and PPA toxic chemical release filing and reporting requirements.

(e) Except for acquisitions of commercial items as defined in FAR Part 2, the Contractor shall--

(1) For competitive subcontracts expected to exceed $100,000 (including all options), include a solicitation provision substantially the same as the provision at FAR 52.223-13, Certification of Toxic Chemical Release Reporting; and

(2) Include in any resultant subcontract exceeding $100,000 (including all options), the substance of this clause, except this paragraph (e).

(End of clause)

43 52.224-1 PRIVACY ACT NOTIFICATION (APR 1984)

The Contractor will be required to design, develop, or operate a system of records on individuals, to accomplish an agency function subject to the Privacy Act of 1974, Public Law 93-579, December 31, 1974 (5 U.S.C. 552a) and applicable agency regulations. Violation of the Act may involve the imposition of criminal penalties.

(End of clause)
(R 7-2003.72 1975 NOV)
(R 1-1.327-5(b))

44 52.224-2 PRIVACY ACT (APR 1984)

(a) The Contractor agrees to--

(1) Comply with the Privacy Act of 1974 (the Act) and the agency rules and regulations issued under the Act in the design, development, or operation of any system of records on individuals to accomplish an agency function when the contract specifically identifies--

(i) The systems of records; and

(ii) The design, development, or operation work that the contractor is to perform;

(2) Include the Privacy Act notification contained in this contract in every solicitation and resulting subcontract and in every subcontract awarded without a solicitation, when the work statement in the proposed subcontract requires the redesign, development, or operation of a system of records on individuals that is subject to the Act; and

(3) Include this clause, including this subparagraph (3), in all

subcontracts awarded under this contract which requires the design, development, or operation of such a system of records.

(b) In the event of violations of the Act, a civil action may be brought against the agency involved when the violation concerns the design, development, or operation of a system of records on individuals to accomplish an agency function, and criminal penalties may be imposed upon the officers or employees of the agency when the violation concerns the operation of a system of records on individuals to accomplish an agency function. For purposes of the Act, when the contract is for the operation of a system of records on individuals to accomplish an agency function, the Contractor is considered to be an employee of the agency.

(c)(1) "Operation of a system of records," as used in this clause, means performance of any of the activities associated with maintaining the system of records, including the collection, use, and dissemination of records.

(2) "Record," as used in this clause, means any item, collection, or grouping of information about an individual that is maintained by an agency, including, but not limited to, education, financial transactions, medical history, and criminal or employment history and that contains the person's name, or the identifying number, symbol, or other identifying particular assigned to the individual, such as a fingerprint or voiceprint or a photograph.

(3) "System of records on individuals," as used in this clause, means a group of any records under the control of any agency from which information is retrieved by the name of the individual or by some identifying number, symbol, or other identifying particular assigned to the individual.

(End of clause)
(AV 7-104.96 1975 NOV)
(AV 1-1.327-5(c))

45 52.225-5 BUY AMERICAN ACT--CONSTRUCTION MATERIALS (JUN 1997)

(a) The Buy American Act (41 U.S.C. 10) provides that the Government give preference to domestic construction material.

"Components," means those articles, materials, and supplies incorporated directly into construction materials.

"Construction materials," means an article, material, or supply brought to the construction site for incorporation into the building or work. Construction material also includes an item brought to the site pre-assembled from articles, materials or supplies. However, emergency life safety systems, such as emergency lighting, fire alarm, and audio evacuation systems, which are discrete systems incorporated into a public building or work and which are produced as a complete system, shall be evaluated as a single and distinct construction material regardless of when or how the individual parts or components of such systems are delivered to the construction site.

"Domestic construction material," means (1) an unmanufactured construction material mined or produced in the United States, or (2) a construction material manufactured in the United States, if the cost of its components mined, produced, or manufactured in the United States exceeds 50 percent of the cost of all its components. Components of foreign origin of the same class or kind as the construction materials determined to be unavailable pursuant to subparagraph 25.202(a)(2) of the Federal Acquisition Regulation (FAR) shall be treated as domestic.

(b)(1) The Buy American Act (41 U.S.C. 10a-10d) requires that only domestic construction material be used in performing this contract, except as provided in paragraphs (b)(2) and (b)(3) of this clause.

(2) This requirement does not apply to the excepted construction material or components listed by the Government as follows:

%%Insert list of applicable accepted materials or indicate "none"

none

(3) Other foreign construction material may be added to the list in paragraph (b)(2) of this clause if the Government determines that--

(i) The cost would be unreasonable (the cost of a particular domestic construction material shall be determined to be unreasonable when the cost of such material exceeds the cost of foreign material by more than 6 percent, unless the agency head determines a higher percentage to be appropriate);

(ii) The application of the restriction of the Buy American Act to a

particular construction material would be impracticable or inconsistent with the public interest; or

(iii) The construction material is not mined, produced, or manufactured in the United States in sufficient and reasonably available commercial quantities of a satisfactory quality.

(4) The Contractor agrees that only domestic construction material will be used by the Contractor, subcontractors, material men, and suppliers in the performance of this contract, except for foreign construction materials, if any, listed in paragraph (b)(2) of this clause.

(c) Request for determination. (1) Contractors requesting to use foreign construction material under paragraph (b)(3) of this clause shall provide adequate information for Government evaluation of the request for a determination regarding the inapplicability of the Buy American Act. Each submission shall include a description of the foreign and domestic construction materials, including unit of measure, quantity, price, time of delivery or availability, location of the construction project, name and address of the proposed contractor, and a detailed justification of the reason for use of foreign materials cited in accordance with paragraph (b)(3) of this clause. A submission based on unreasonable cost shall include a reasonable survey of the market and a completed price comparison table in the format in paragraph (d) of this clause. The price of construction material shall include all delivery costs to the construction site and any applicable duty (whether or not a duty-free certificate may be issued).

(2) If the Government determines after contract award that an exception to the Buy American Act applies, the contract shall be modified to allow use of the foreign construction material, and adequate consideration shall be negotiated. However, when the basis for the exception is the unreasonable price of a domestic construction material, adequate consideration shall not be less than the differential established in paragraph (b)(3)(i) of this clause.

(3) If the Government does not determine that an exception to the Buy American Act applies, the use of that particular foreign construction material will be a failure to comply with the Act.

(d) For evaluation of requests under paragraph (c) of this clause based on unreasonable cost, the following information and any applicable supporting data based on the survey of suppliers shall be included in the request:

Foreign and Domestic Construction Materials Price Comparison

| Construction material description | Unit of measure | Quantity | Price (dollars) + |
|---|---|---|---|
| Item 1: | | | |
| Foreign construction material..... | ..... | ..... | ..... |
| Domestic construction material..... | ..... | ..... | ..... |
| Item 2: | | | |
| Foreign construction material..... | ..... | ..... | ..... |
| Domestic construction material..... | ..... | ..... | ..... |

List name, address, telephone number, and contact for suppliers surveyed. Attach copy of response; if oral, attach summary. Include other applicable supporting information.

+ Include all delivery costs to the construction site and any applicable duty (whether or not a duty-free entry certificate is issued).

(End of clause)

46 52.225-11 RESTRICTIONS ON CERTAIN FOREIGN PURCHASES (OCT 1996)

(a) Unless advance written approval of the Contracting Officer is obtained, the Contractor shall not acquire, for use in the performance of this contract, any supplies or services originating from sources within, or that were located in or transported from or through, countries whose products are banned from importation into the United States under regulations of the Office of Foreign Assets Control, Department of the Treasury. Those countries include Cuba, Iran, Iraq, Libya, and North Korea.

(b) The Contractor shall not acquire for use in the performance of this contract any supplies or services from entities controlled by the Government of Iraq.

(c) The Contractor agrees to insert the provisions of this clause, including this paragraph (c), in all subcontracts hereunder.

(End of clause)

47 52.225-15 BUY AMERICAN ACT--CONSTRUCTION MATERIALS UNDER TRADE AGREEMENTS ACT AND NORTH AMERICAN FREE TRADE AGREEMENT (JUN 1997)

(a) Definitions. As used in this clause--

"Components" means those articles, materials, and supplies incorporated directly into construction materials.

"Construction material" means an article, material, or supply brought to the construction site for incorporation into the building or work. Construction material also includes an item brought to the site pre-assembled from articles, materials, or supplies. However, emergency life safety systems, such as emergency lighting, fire alarm, and audio evacuation systems, which are discrete systems incorporated into a public building or work and which are produced as a complete system, shall be evaluated as a single and distinct construction material regardless of when or how the individual parts or components of such systems are delivered to the construction site.

"Designated country construction material" means a construction material that (a) is wholly the growth, product, or manufacture of a designated country (as defined at FAR 25.401), or (b) in the case of a construction material which consists in whole or in part of materials from another country or instrumentality, has been substantially transformed in a designated country into a new and different construction material distinct from the materials from which it was transformed.

"Domestic construction material" means (l) an unmanufactured construction material mined or produced in the United States, or (2) a construction material manufactured in the United States, if the cost of its components mined, produced, or manufactured in the United States exceeds 50 percent of the cost of all its components. Components of foreign origin of the same class or kind as the construction materials determined to be unavailable pursuant to subparagraph 25.202(a)(2) of the Federal Acquisition Regulation (FAR) shall be treated as domestic.

"North American Free Trade Agreement (NAFTA) country" means Canada or Mexico.

"NAFTA country construction material" means a construction material that (a) is wholly the growth, product, or manufacture of a NAFTA country, or (b) in the case of a construction material which consists in whole or in part of materials from another country or instrumentality, has been substantially transformed in a NAFTA country into a new and different construction material distinct from the materials from which it was transformed.

(b)(1) The Buy American Act (41 U.S.C. 10a--10d) requires that only domestic construction material be used in performing this contract, except as provided in paragraphs (b)(2), (b)(3), and (b)(4) of this clause.

(2) The Trade Agreements Act and the North American Free Trade Agreement (NAFTA) provide that designated country and NAFTA country construction materials are exempted from application of the Buy American Act.

(3) The requirement in paragraph (b)(1) of this clause does not apply to the excepted construction material or components listed by the Government as follows:

%%Insert list of applicable accepted materials or indicate "none"

none

(4) Other foreign construction material may be added to the list in paragraph (b)(3) of this clause if the Government determines that--

(i) The cost would be unreasonable (the cost of a particular domestic construction material shall be determined to be unreasonable when the cost of such material exceeds the cost of foreign material by more than 6 percent, unless the agency head determines a higher percentage to be appropriate);

(ii) The application of the restriction of the Buy American Act to a particular construction material would be impracticable or inconsistent with the public interest; or (iii) The construction material is not mined, produced, or manufactured in the United States in sufficient and reasonably available commercial quantities of a satisfactory quality.

(5) The Contractor agrees that only domestic construction materials, NAFTA country construction materials, or designated country construction

materials will be used by the Contractor, subcontractors, material men, and suppliers in the performance of this contract, except for foreign construction materials, if any, listed in paragraph (b)(3) of this clause.

(c) Request for determination.

(1) Contractors requesting to use foreign construction material under paragraph (b)(4) of this clause shall provide adequate information for Government evaluation of the request for a determination regarding the inapplicability of the Buy American Act. Each submission shall include a description of the foreign and domestic construction materials, including unit of measure, quantity, price, time of delivery or availability, location of the construction project, name and address of the proposed contractor, and a detailed justification of the reason for use of foreign materials cited in accordance with paragraph (b)(4) of this clause. A submission based on unreasonable cost shall include a reasonable survey of the market and a completed price comparison table in the format in paragraph (d) of this clause. The price of construction material shall include all delivery costs to the construction site and any applicable duty (whether or not a duty-free certificate may be issued).

(2) If the Government determines after contract award that an exception to the Buy American Act applies, the contract shall be modified to allow use of the foreign construction material, and adequate consideration shall be negotiated. However, when the basis for the exception is the unreasonable price of a domestic construction material, adequate consideration shall not be less than the differential established in paragraph (b)(4)(i) of this clause.

(3) If the Government does not determine that an exception to the Buy American Act applies, the use of that particular foreign construction material will be a failure to comply with the Act.

(d) For evaluation of requests under paragraph (c) of this clause based on unreasonable cost, the following information and any applicable supporting data based on the survey of suppliers shall be included in the request:

Foreign and Domestic Construction Materials Price Comparison

| Construction material description | Unit of measure | Quantity | Price (dollars) + |
|---|---|---|---|
| Item 1: | | | |
| Foreign construction material..... | ..... | ..... | ..... |
| Domestic construction material..... | ..... | ..... | ..... |
| Item 2: | | | |
| Foreign construction material..... | ..... | ..... | ..... |
| Domestic construction material..... | ..... | ..... | ..... |

List name, address, telephone number, and contact for suppliers surveyed. Attach copy of response; if oral, attach summary. Include other applicable supporting information.

+ Include all delivery costs to the construction site and any applicable duty (whether or not a duty-free entry certificate is issued).

(End of clause)

48 52.226-1 UTILIZATION OF INDIAN ORGANIZATIONS AND INDIAN-OWNED ECONOMIC ENTERPRISES (SEP 1996)

(a) For Department of Defense contracts, this clause applies only if the contract includes a subcontracting plan incorporated under the terms of the clause at 52.219-9, Small, Small Disadvantaged and Women-Owned Small Business Subcontracting Plan. It does not apply to contracts awarded based on a subcontracting plan submitted and approved under paragraph (g) of the clause at 52.219

(b) Definitions. As used in this clause:

"Indian" means any person who is a member of any Indian tribe, band, group, pueblo or community which is recognized by the Federal Government as eligible for services from the Bureau of Indian Affairs (BIA) in accordance with 25 U.S.C. 1452(c) and any "Native" as defined in the Alaska Native Claims Settlement Act (43 U.S.C. 1601).

"Indian organization" means the governing body of any Indian tribe or entity established or recognized by the governing body of an Indian tribe for the purposes of 25 U.S.C., Chapter 17.

"Indian-owned economic enterprise" means any Indian-owned (as determined by the Secretary of the Interior) commercial, industrial, or business activity established or organized for the purpose of profit, provided that Indian ownership shall constitute not less than 51 percent of the enterprise.

"Indian tribe" means any Indian tribe, band, group, pueblo or community, including native villages and native groups (including corporations organized by Kenai, Juneau, Sitka, and Kodiak) as defined in the Alaska Native Claims Settlement Act, which is recognized by the Federal Government as eligible for services from BIA in accordance with 25 U.S.C. 1542(c).

"Interested party" means a prime contractor or an actual or prospective offeror whose direct economic interest would be affected by the award of a subcontract or by the failure to award a subcontract.

(c) The Contractor agrees to use its best efforts to give Indian organizations and Indian-owned economic enterprises (25 U.S.C. 1544) the maximum practicable opportunity to participate in the subcontracts it awards to the fullest extent consistent with efficient performance of its contract.

(1) The Contracting Officer and the Contractor, acting in good faith, may rely on the self-certification of an Indian organization or Indian-owned economic enterprise as to its eligibility, unless an interested party challenges its status or the Contracting Officer has independent reason to question that status. In the event of a challenge to the self-certification of a subcontractor, the Contracting Officer shall refer the matter to the U.S. Department of the Interior, Bureau of Indian Affairs (BIA), Attn: Chief, Division of Contracting and Grants Administration, 1849 C Street, NW, MS-334A-SIB, Washington, DC 20245. The BIA will determine the eligibility and notify the Contracting Officer. The 5 percent incentive payment will not be made within 50 working days of subcontract award or while a challenge is pending. If a subcontractor is determined to be an ineligible participant, no incentive payment will be made under the Indian Incentive Program.

(2) The Contractor may request an adjustment under the Indian Incentive Program to the following:

(i) The estimated cost of a cost-type contract.

(ii) The target cost of a cost-plus-incentive-fee prime contract.

(iii) The target cost and ceiling price of a fixed-price incentive prime contract.

(iv) The price of a firm-fixed-price prime contract.

(3) The amount of the equitable adjustment to the prime contract shall be 5 percent of the estimated cost, target cost or firm-fixed-price included in the subcontract initially awarded to the Indian organization or Indian-owned economic enterprise.

(4) The Contractor has the burden of proving the amount claimed and must assert its request for an adjustment prior to completion of contract performance.

(d) The Contracting Officer, subject to the terms and conditions of the contract and the availability of funds, shall authorize an incentive payment of 5 percent of the amount paid to the subcontractor. Contracting Officers shall seek funding in accordance with agency procedures. The Contracting Officer's decision is final and not subject to the Disputes clause of this contract.

(End of clause)

49 52.227-1 AUTHORIZATION AND CONSENT (JUL 1995)

(a) The Government authorizes and consents to all use and manufacture, in performing this contract or any subcontract at any tier, of any invention described in and covered by a United States patent (1) embodied in the structure or composition of any article the delivery of which is accepted by the Government under this contract or (2) used in machinery, tools, or methods whose use necessarily results from compliance by the Contractor or a subcontractor with (i) specifications or written provisions forming a part of this contract or (ii) specific written instructions given by the Contracting Officer directing the manner of performance. The entire liability to the Government for infringement of a patent of the United States shall be determined solely by the provisions of the indemnity clause, if any, included in this contract or any subcontract hereunder (including any lower-tier subcontract), and the Government assumes

liability for all other infringement to the extent of the authorization and consent hereinabove granted.

(b) The Contractor agrees to include, and require inclusion of, this clause, suitably modified to identify the parties, in all subcontracts at any tier for supplies or services (including construction, architect-engineer services, and materials, supplies, models, samples, and design or testing services expected to exceed the simplified acquisition threshold); however, omission of this clause from any subcontract, including those at or below the simplified acquisition threshold, does not affect this authorization and consent.

(End of clause)

50 52.227-2 NOTICE AND ASSISTANCE REGARDING PATENT AND COPYRIGHT INFRINGEMENT (AUG 1996)

(a) The Contractor shall report to the Contracting Officer, promptly and in reasonable written detail, each notice or claim of patent or copyright infringement based on the performance of this contract of which the Contractor has knowledge.

(b) In the event of any claim or suit against the Government on account of any alleged patent or copyright infringement arising out of the performance of this contract or out of the use of any supplies furnished or work or services performed under this contract, the Contractor shall furnish to the Government, when requested by the Contracting Officer, all evidence and information in possession of the Contractor pertaining to such suit or claim. Such evidence and information shall be furnished at the expense of the Government except where the Contractor has agreed to indemnify the Government.

(c) The Contractor agrees to include, and require inclusion of, this clause in all subcontracts at any tier for supplies or services (including construction and architect-engineer subcontracts and those for material, supplies, models, samples, or design or testing services) expected to exceed the simplified acquisition threshold at FAR 2.101.

(End of clause)

51 52.227-4 PATENT INDEMNITY--CONSTRUCTION CONTRACTS (APR 1984)

Except as otherwise provided, the Contractor agrees to indemnify the Government and its officers, agents, and employees against liability, including costs and expenses, for infringement upon any United States patent (except a patent issued upon an application that is now or may hereafter be withheld from issue pursuant to a Secrecy Order under 35 U.S.C. 181) arising out of performing this contract or out of the use or disposal by or for the account of the Government of supplies furnished or work performed under this contract.

(End of clause)

(R 7-602.16 1964 JUN)

52 52.228-2 ADDITIONAL BOND SECURITY (OCT 1997)

The Contractor shall promptly furnish additional security required to protect the Government and persons supplying labor or materials under this contract if--

(a) Any surety upon any bond, or issuing financial institution for other security, furnished with this contract becomes unacceptable to the Government;

(b) Any surety fails to furnish reports on its financial condition as required by the Government;

(c) The contract price is increased so that the penal sum of any bond becomes inadequate in the opinion of the Contracting Officer; or

(d) An irrevocable letter of credit (ILC) used as security will expire before the end of the period of required security. If the Contractor does not furnish an acceptable extension or replacement ILC, or other acceptable substitute, at least 30 days before an ILC's scheduled expiration, the Contracting officer has the right to immediately draw on the ILC.

(End of clause)

53 52.228-5 INSURANCE--WORK ON A GOVERNMENT INSTALLATION (JAN 1997)

(a) The Contractor shall, at its own expense, provide and maintain during the entire performance of this contract, at least the kinds and minimum amounts of insurance required in the Schedule or elsewhere in the contract.

(b) Before commencing work under this contract, the Contractor shall notify the Contracting Officer in writing that the required insurance has been obtained. The policies evidencing required insurance shall contain an endorsement to the effect that any cancellation or any material change adversely affecting the Government's interest shall not be effective (1) for such period as the laws of the State in which this contract is to be performed prescribe, or (2) until 30 days after the insurer or the Contractor gives written notice to the Contracting Officer, whichever period is longer.

(c) The Contractor shall insert the substance of this clause, including this paragraph (c), in subcontracts under this contract that require work on a Government installation and shall require subcontractors to provide and maintain the insurance required in the Schedule or elsewhere in the contract. The Contractor shall maintain a copy of all subcontractors' proofs of required insurance, and shall make copies available to the Contracting Officer upon request.

(End of clause)

54 52.228-12 PROSPECTIVE SUBCONTRACTOR REQUESTS FOR BONDS (OCT 1995)

In accordance with Section 806(a)(3) of Pub. L. 102-190, as amended by Sections 2091 and 8105 of Pub. L. 103-355, upon the request of a prospective subcontractor or supplier offering to furnish labor or material for the performance of this contract for which a payment bond has been furnished to the Government pursuant to the Miller Act, the Contractor shall promptly provide a copy of such payment bond to the requester.

(End of clause)

55 52.228-14 IRREVOCABLE LETTER OF CREDIT (OCT 1997)

(a) "Irrevocable letter of credit" (ILC), as used in this clause, means a written commitment by a federally insured financial institution to pay all or part of a stated amount of money, until the expiration date of the letter, upon presentation by the Government (the beneficiary) of a written demand therefor. Neither the financial institution nor the offeror/Contractor can revoke or condition the letter of credit.

(b) If the offeror intends to use an ILC in lieu of a bid bond, or to secure other types of bonds such as performance and payment bonds, the letter of credit and letter of confirmation formats in paragraphs (e) and (f) of this clause shall be used.

(c) The letter of credit shall be irrevocable, shall require presentation of no document other than a written demand and the ILC (including confirming letter, if any), shall be issued/confirmed by an acceptable federally insured financial institution as provided in paragraph (d) of this clause, and--

(1) If used as a bid guarantee, the ILC shall expire no earlier than 60 days after the close of the bid acceptance period;

(2) If used as an alternative to corporate or individual sureties as security for a performance or payment bond, the offeror/Contractor may submit an ILC with an initial expiration date estimated to cover the entire period for which financial security is required or may submit an ILC with an initial expiration date that is a minimum period of one year from the date of issuance. The ILC shall provide that, unless the issuer provides the beneficiary written notice of non-renewal at least 60 days in advance of the current expiration date, the ILC is automatically extended without amendment for one year from the expiration date, or any future expiration date, until the period of required coverage is completed and the Contracting Officer provides the financial institution with a written statement waiving the right to payment. The period of required coverage shall be:

(i) For contracts subject to the Miller Act, the later of--

(A) One year following the expected date of final payment;

(B) For performance bonds only, until completion of any warranty

period; or

(C) For payment bonds only, until resolution of all claims filed against the payment bond during the one-year period following final payment.

(ii) For contracts not subject to the Miller Act, the later of--

(A) 90 days following final payment; or

(B) For performance bonds only, until completion of any warranty period.

(d) Only federally insured financial institutions rated investment grade or higher shall issue or confirm the ILC. The offeror/Contractor shall provide the Contracting Officer a credit rating that indicates the financial institution has the required rating(s) as of the date of issuance of the ILC. Unless the financial institution issuing the ILC had letter of credit business of at least $25 million in the past year, ILCs over $5 million must be confirmed by another acceptable financial institution that had letter of credit business of at least $25 million in the past year.

(e) The following format shall be used by the issuing financial institution to create an ILC:

(Issuing Financial Institution's Letterhead or Name and Address)

Issue Date_____

Irrevocable Letter of Credit No._____

Account party's name_____

Account party's address_____

For Solicitation No._____

(For reference only)

TO: (U.S. Government agency)

(U.S. Government agency's address)

1. We hereby establish this irrevocable and transferable Letter of Credit in your favor for one or more drawings up to United States $_____. This Letter of Credit is payable at (issuing financial institution's and, if any, confirming financial institution's) office at (issuing financial institution's address and, if any, confirming financial institution's address) and expires with our close of business on _____, or any automatically extended expiration date.

2. We hereby undertake to honor your or the transferee's sight draft(s) drawn on the issuing or, if any, the confirming financial institution, for all or any part of this credit if presented with this Letter of Credit and confirmation, if any, at the office specified in paragraph 1 of this Letter of Credit on or before the expiration date or any automatically extended expiration date.

3. (This paragraph is omitted if used as a bid guarantee, and subsequent paragraphs are renumbered.) It is a condition of this Letter of Credit that it is deemed to be automatically extended without amendment for one year from the expiration date hereof, or any future expiration date, unless at least 60 days prior to any expiration date, we notify you or the transferee by registered mail, or other receipted means of delivery, that we elect not to consider this Letter of Credit renewed for any such additional period. At the time we notify you, we also agree to notify the account party (and confirming financial institution, if any) by the same means of delivery.

4. This Letter of Credit is transferable. Transfers and assignments of proceeds are to be effected without charge to either the beneficiary or the transferee/assignee of proceeds. Such transfer or assignment shall be only at the written direction of the Government (the beneficiary) in a form satisfactory to the issuing financial institution and the confirming financial institution, if any.

5. This Letter of Credit is subject to the Uniform Customs and Practice (UCP) for Documentary Credits, 1993 Revision, International Chamber of Commerce Publication No. 500, and to the extent not inconsistent therewith, to the laws of _____ (state of confirming financial institution, if any, otherwise state of issuing financial institution).

6. If this credit expires during an interruption of business of this financial institution as described in Article 17 of the UCP, the financial institution specifically agrees to effect payment if this credit is drawn against within 30 days after the resumption of our business.

Sincerely,

(Issuing financial institution)

(f) The following format shall be used by the financial institution to confirm an ILC:

(Confirming Financial Institution's Letterhead or Name and Address)

Date _____ 19_____

Our Letter of Credit Advice Number_____

Beneficiary:_____

(U.S. Government agency)

Issuing Financial Institution:_____

Issuing Financial Institution's LC No.:_____

Gentlemen:

1. We hereby confirm the above indicated Letter of Credit, the original of which is attached, issued by _____ (name of issuing financial institution) for drawings of up to United States dollars _____/U.S. $_____ and expiring with our close of business on _____ (the expiration date), or any automatically extended expiration date.

2. Draft(s) drawn under the Letter of Credit and this Confirmation are payable at our office located at _____.

3. We hereby undertake to honor sight draft(s) drawn under and presented with the Letter of Credit and this Confirmation at our offices as specified herein.

4. (This paragraph is omitted if used as a bid guarantee, and subsequent paragraphs are renumbered.) It is a condition of this confirmation that it be deemed automatically extended without amendment for one year from the expiration date hereof, or any automatically extended expiration date, unless:

(a) At least 60 days prior to any such expiration date, we shall notify the Contracting Officer, or the transferee and the issuing financial institution, by registered mail or other receipted means of delivery, that we elect not to consider this confirmation extended for any such additional period; or

(b) The issuing financial institution shall have exercised its right to notify you or the transferee, the account party, and ourselves, of its election not to extend the expiration date of the Letter of Credit.

5. This confirmation is subject to the Uniform Customs and Practice (UCP) for Documentary Credits, 1993 Revision, International Chamber of Commerce Publication No. 500, and to the extent not inconsistent therewith, to the laws of _____ (state of confirming financial institution).

6. If this confirmation expires during an interruption of business of this financial institution as described in Article 17 of the UCP, we specifically agree to effect payment if this credit is drawn against within 30 days after the resumption of our business.

Sincerely,

(Confirming financial institution)

(g) The following format shall be used by the Contracting Officer for a sight draft to draw on the Letter of Credit:

SIGHT DRAFT

_____

(City, State)

_____, 19_____

_____

(Name and address of financial institution)

Pay to the order of_____

(Beneficiary Agency)

the sum of United States $ _____

This draft is drawn under_____

Irrevocable Letter of Credit No._____

By: _____

(Beneficiary Agency)

(End of clause)

56 52.228-15 Performance and Payment Bonds--Construction (SEP 1996)

(a) Definitions. As used in this clause--

Contract price means the award price of the contract or, for requirements contracts, the price payable for the estimated quantity; or for indefinite-delivery type contracts, the price payable for the specified minimum quantity.

(b) Unless the resulting contract price is $100,000 or less, the successful offeror shall be required to furnish performance and payment bonds to the Contracting Officer as follows:

(1) Performance Bonds (Standard Form 25):

(i) The penal amount of performance bonds shall be 100 percent of the original contract price.

(ii) The Government may require additional performance bond protection when the contract price is increased. The increase in protection shall generally equal 100 percent of the increase in contract price.

(iii) The Government may secure additional protection by directing the Contractor to increase the penal amount of the existing bond or to obtain an additional bond.

(2) Payment Bonds (Standard Form 25-A):

(i) The penal amount of payment bonds shall equal--

(A) 50 percent of the contract price if the contract price is not more than $1 million;

(B) 40 percent of the contract price if the contract price is more than $1 million but not more than $5 million; or

(C) $2.5 million if the contract price is more than $5 million.

(ii) If the original contract price is $5 million or less, the Government may require additional protection if the contract price is increased. The penal amount of the total protection shall meet the requirement of subparagraph (b)(2)(i) of this clause.

(iii) The Government may secure additional protection by directing the Contractor to increase the penal sum of the existing bond or to obtain an additional bond.

(c) The Contractor shall furnish all executed bonds, including any necessary reinsurance agreements, to the Contracting Officer, within the time period specified in the Bid Guarantee provision of the solicitation, or otherwise specified by the Contracting Officer, but in any event, before starting work.

(d) The bonds shall be in the form of firm commitment, supported by corporate sureties whose names appear on the list contained in Treasury Department Circular 570, individual sureties, or by other acceptable security such as postal money order, certified check, cashier's check, irrevocable letter of credit, or, in accordance with Treasury Department regulations, certain bonds or notes of the United States. Treasury Circular 570 is published in the Federal Register, or may be obtained from the U.S. Department of Treasury, Financial Management Service, Surety Bond Branch, 401 14th Street, NW., 2nd Floor, West Wing, Washington, DC 20227.

(End of clause)

57 52.229-3 FEDERAL, STATE, AND LOCAL TAXES (JAN 1991)

(a) "Contract date," as used in this clause, means the date set for bid opening or, if this is a negotiated contract or a modification, the effective date of this contract or modification.

"All applicable Federal, State, and local taxes and duties," as used in this clause, means all taxes and duties, in effect on the contract date, that the taxing authority is imposing and collecting on the transactions or property covered by this contract.

"After-imposed Federal tax," as used in this clause, means any new or increased Federal excise tax or duty, or tax that was exempted or excluded on the contract date but whose exemption was later revoked or reduced during the contract period, on the transactions or property covered by this contract that the Contractor is required to pay or bear as the result of legislative, judicial, or administrative action taking effect after the contract date. It does not include social security tax or other employment taxes.

"After-relieved Federal tax," as used in this clause, means any amount of Federal excise tax or duty, except social security or other employment taxes, that would otherwise have been payable on the transactions or property covered by this contract, but which the Contractor is not required to pay or bear, or for which the Contractor obtains a refund or drawback, as the result of legislative, judicial, or administrative action taking effect after the contract date.

(b) The contract price includes all applicable Federal, State, and local taxes and duties.

(c) The contract price shall be increased by the amount of any after-imposed Federal tax, provided the Contractor warrants in writing that no amount for such newly imposed Federal excise tax or duty or rate increase was included in the contract price, as a contingency reserve or otherwise.

(d) The contract price shall be decreased by the amount of any after-relieved Federal tax.

(e) The contract price shall be decreased by the amount of any Federal excise tax or duty, except social security or other employment taxes, that the Contractor is required to pay or bear, or does not obtain a refund of, through the Contractor's fault, negligence, or failure to follow instructions of the Contracting Officer.

(f) No adjustment shall be made in the contract price under this clause unless the amount of the adjustment exceeds $250.

(g) The Contractor shall promptly notify the Contracting Officer of all matters relating to any Federal excise tax or duty that reasonably may be expected to result in either an increase or decrease in the contract price and shall take appropriate action as the Contracting Officer directs.

(h) The Government shall, without liability, furnish evidence appropriate to establish exemption from any Federal, State, or local tax when the Contractor requests such evidence and a reasonable basis exists to sustain the exemption.

(End of clause)

58 52.229-5 TAXES--CONTRACTS PERFORMED IN U.S. POSSESSIONS OR PUERTO RICO (APR 1984)

The term "local taxes," as used in the Federal, State, and local taxes clause of this contract, includes taxes imposed by a possession of the United States or by Puerto Rico.

(End of clause)

(AV 7-103.10(c) 1963 NOV)

(AV 1-11.401-3(a))

59 52.232-5 PAYMENTS UNDER FIXED-PRICE CONSTRUCTION CONTRACTS (MAY 1997)

(a) Payment of price. The Government shall pay the Contractor the contract price as provided in this contract.

(b) Progress payments. The Government shall make progress payments monthly as the work proceeds, or at more frequent intervals as determined by the Contracting Officer, on estimates of work accomplished which meets the standards of quality established under the contract, as approved by the Contracting Officer.

(1) The Contractor's request for progress payments shall include the following substantiation:

(i) An itemization of the amounts requested, related to the various elements of work required by the contract covered by the payment requested.

(ii) A listing of the amount included for work performed by each subcontractor under the contract.

(iii) A listing of the total amount of each subcontract under the contract.

(iv) A listing of the amounts previously paid to each such subcontractor under the contract.

(v) Additional supporting data in a form and detail required by the Contracting Officer.

(2) In the preparation of estimates, the Contracting Officer may authorize material delivered on the site and preparatory work done to be taken into consideration. Material delivered to the Contractor at locations other than the site also may be taken into consideration if--

(i) Consideration is specifically authorized by this contract; and

(ii) The Contractor furnishes satisfactory evidence that it has acquired title to such material and that the material will be used to perform this contract.

(c) Contractor certification. Along with each request for progress payments, the Contractor shall furnish the following certification, or payment shall not be made: (However, if the Contractor elects to delete paragraph (c)(4) from the certification, the certification is still acceptable.)

I hereby certify, to the best of my knowledge and belief, that--

(1) The amounts requested are only for performance in accordance with the specifications, terms, and conditions of the contract;

(2) Payments to subcontractors and suppliers have been made from previous payments received under the contract, and timely payments will

be made from the proceeds of the payment covered by this certification, in accordance with subcontract agreements and the requirements of chapter 39 of Title 31, United States Code;

(3) This request for progress payments does not include any amounts which the prime contractor intends to withhold or retain from a subcontractor or supplier in accordance with the terms and conditions of the subcontract; and

(4) This certification is not to be construed as final acceptance of a subcontractor's performance.

_____
(Name)

_____
(Title)

_____
(Date)

(d) Refund of unearned amounts. If the Contractor, after making a certified request for progress payments, discovers that a portion or all of such request constitutes a payment for performance by the Contractor that fails to conform to the specifications, terms, and conditions of this contract (hereinafter referred to as the "unearned amount"), the Contractor shall--

(1) Notify the Contracting Officer of such performance deficiency; and

(2) Be obligated to pay the Government an amount (computed by the Contracting Officer in the manner provided in paragraph (j) of this clause) equal to interest on the unearned amount from the 8th day after the date of receipt of the unearned amount until--

(i) The date the Contractor notifies the Contracting Officer that the performance deficiency has been corrected; or

(ii) The date the Contractor reduces the amount of any subsequent certified request for progress payments by an amount equal to the unearned amount.

(e) Retainage. If the Contracting Officer finds that satisfactory progress was achieved during any period for which a progress payment is to be made, the Contracting Officer shall authorize payment to be made in full. However, if satisfactory progress has not been made, the Contracting Officer may retain a maximum of 10 percent of the amount of the payment until satisfactory progress is achieved. When the work is substantially complete, the Contracting Officer may retain from previously withheld funds and future progress payments that amount the Contracting Officer considers adequate for protection of the Government and shall release to the Contractor all the remaining withheld funds. Also, on completion and acceptance of each separate building, public work, or other division of the contract, for which the price is stated separately in the contract, payment shall be made for the completed work without retention of a percentage.

(f) Title, liability, and reservation of rights. All material and work covered by progress payments made shall, at the time of payment, become the sole property of the Government, but this shall not be construed as--

(1) Relieving the Contractor from the sole responsibility for all material and work upon which payments have been made or the restoration of any damaged work; or

(2) Waiving the right of the Government to require the fulfillment of all of the terms of the contract.

(g) Reimbursement for bond premiums. In making these progress payments, the Government shall, upon request, reimburse the Contractor for the amount of premiums paid for performance and payment bonds (including coinsurance and reinsurance agreements, when applicable) after the Contractor has furnished evidence of full payment to the surety. The retainage provisions in paragraph (e) of this clause shall not apply to that portion of progress payments attributable to bond premiums.

(h) Final payment. The Government shall pay the amount due the Contractor under this contract after--

(1) Completion and acceptance of all work;

(2) Presentation of a properly executed voucher; and

(3) Presentation of release of all claims against the Government arising by virtue of this contract, other than claims, in stated amounts, that the Contractor has specifically excepted from the operation of the release. A release may also be required of the assignee if the Contractor's claim to amounts payable under this contract has been assigned under the Assignment of Claims Act of 1940 (31 U.S.C. 3727 and 41 U.S.C. 15).

(i) Limitation because of undefinitized work. Notwithstanding any

provision of this contract, progress payments shall not exceed 80 percent on work accomplished on undefinitized contract actions. A "contract action" is any action resulting in a contract, as defined in FAR Subpart 2.1, including contract modifications for additional supplies or services, but not including contract modifications that are within the scope and under the terms of the contract, such as contract modifications issued pursuant to the Changes clause, or funding and other administrative changes.

(j) Interest computation on unearned amounts. In accordance with 31 U.S.C. 3903(c)(1), the amount payable under subparagraph (d)(2) of this clause shall be--

(1) Computed at the rate of average bond equivalent rates of 91-day Treasury bills auctioned at the most recent auction of such bills prior to the date the Contractor receives the unearned amount; and

(2) Deducted from the next available payment to the Contractor.

(End of clause)

60 52.232-17 INTEREST (JUN 1996)

(a) Except as otherwise provided in this contract under a Price Reduction for Defective Cost or Pricing Data clause or a Cost Accounting Standards clause, all amounts that become payable by the Contractor to the Government under this contract (net of any applicable tax credit under the Internal Revenue Code (26 U.S.C. 1481)) shall bear simple interest from the date due until paid unless paid within 30 days of becoming due. The interest rate shall be the interest rate established by the Secretary of the Treasury as provided in Section 12 of the Contract Disputes Act of 1978 (Public Law 95-563), which is applicable to the period in which the amount becomes due, as provided in paragraph (b) of this clause, and then at the rate applicable for each six-month period as fixed by the Secretary until the amount is paid.

(b) Amounts shall be due at the earliest of the following dates:

(1) The date fixed under this contract.

(2) The date of the first written demand for payment consistent with this contract, including any demand resulting from a default termination.

(3) The date the Government transmits to the Contractor a proposed supplemental agreement to confirm completed negotiations establishing the amount of debt.

(4) If this contract provides for revision of prices, the date of written notice to the Contractor stating the amount of refund payable in connection with a pricing proposal or a negotiated pricing agreement not confirmed by contract modification.

(c) The interest charge made under this clause may be reduced under the procedures prescribed in 32.614-2 of the Federal Acquisition Regulation in effect on the date of this contract.

(End of clause)

61 52.232-23 I ASSIGNMENT OF CLAIMS (JAN 1986)--ALTERNATE I (APR 1984)

(a) The Contractor, under the Assignment of Claims Act, as amended, 31 U.S.C. 3727, 41 U.S.C. 15 (hereafter referred to as "the Act"), may assign its rights to be paid amounts due or to become due as a result of the performance of this contract to a bank, trust company, or other financing institution, including any Federal lending agency. The assignee under such an assignment may thereafter further assign or reassign its right under the original assignment to any type of financing institution described in the preceding sentence. Unless otherwise stated in this contract, payments to an assignee of any amounts due or to become due under this contract shall not, to the extent specified in the Act, be subject to reduction or setoff.

(b) Any assignment or reassignment authorized under the Act and this clause shall cover all unpaid amounts payable under this contract, and shall not be made to more than one party, except that an assignment or reassignment may be made to one party as agent or trustee for two or more parties participating in the financing of this contract.

(c) The Contractor shall not furnish or disclose to any assignee under this contract any classified document (including this contract) or information related to work under this contract until the Contracting Officer authorizes such action in writing.

(End of clause)
(R 7-103.8 1962 FEB)
(R 1-30.703 1976 MAY)

62 52.232-27 PROMPT PAYMENT FOR CONSTRUCTION CONTRACTS (JUN 1997)

Notwithstanding any other payment terms in this contract, the Government will make invoice payments and contract financing payments under the terms and conditions specified in this clause. Payment shall be considered as being made on the day a check is dated or the date of an electronic funds transfer. Definitions of pertinent terms are set forth in section 32.902 of the Federal Acquisition Regulation. All days referred to in this clause are calendar days, unless otherwise specified. (However, see subparagraph (a)(3) concerning payments due on Saturdays, Sundays, and legal holidays.)

(a) Invoice payments--

(1) Types of invoice payments. For purposes of this clause, there are several types of invoice payments that may occur under this contract, as follows:

(i) Progress payments, if provided for elsewhere in this contract, based on Contracting Officer approval of the estimated amount and value of work or services performed, including payments for reaching milestones in any project:

(A) The due date for making such payments shall be 14 days after receipt of the payment request by the designated billing office. If the designated billing office fails to annotate the payment request with the actual date of receipt at the time of receipt, the payment due date shall be the 14th day after the date of the Contractor's payment request, provided a proper payment request is received and there is no disagreement over quantity, quality, or Contractor compliance with contract requirements.

(B) The due date for payment of any amounts retained by the Contracting Officer in accordance with the clause at 52.232-5, Payments Under Fixed-Price Construction Contracts, shall be as specified in the contract or, if not specified, 30 days after approval for release to the Contractor by the Contracting Officer.

(ii) Final payments based on completion and acceptance of all work and presentation of release of all claims against the Government arising by virtue of the contract, and payments for partial deliveries that have been accepted by the Government (e.g., each separate building, public work, or other division of the contract for which the price is stated separately in the contract):

(A) The due date for making such payments shall be either the 30th day after receipt by the designated billing office of a proper invoice from the Contractor, or the 30th day after Government acceptance of the work or services completed by the Contractor, whichever is later. If the designated billing office fails to annotate the invoice with the date of actual receipt at the time of receipt, the invoice payment due date shall be the 30th day after the date of the Contractor's invoice, provided a proper invoice is received and there is no disagreement over quantity, quality, or Contractor compliance with contract requirements.

(B) On a final invoice where the payment amount is subject to contract settlement actions (e.g., release of claims), acceptance shall be deemed to have occurred on the effective date of the contract settlement.

(2) Contractor's invoice. The Contractor shall prepare and submit invoices to the designated billing office specified in the contract. A proper invoice must include the items listed in paragraphs (a)(2)(i) through (a)(2)(ix) of this clause. If the invoice does not comply with these requirements, it shall be returned within 7 days after the date the designated billing office received the invoice, with a statement of the reasons why it is not a proper invoice. Untimely notification will be taken into account in computing any interest penalty owed the Contractor in the manner described in subparagraph (a)(4) of this clause.

(i) Name and address of the Contractor.

(ii) Invoice date. (The Contractor is encouraged to date invoices as close as possible to the date of mailing or transmission.)

(iii) Contract number or other authorization for work or services performed (including order number and contract line item number).

(iv) Description of work or services performed.

(v) Delivery and payment terms (e.g., prompt payment discount terms).

(vi) Name and address of Contractor official to whom payment is to be sent (must be the same as that in the contract or in a proper notice of assignment).

(vii) Name (where practicable), title, phone number, and mailing address of person to be notified in the event of a defective invoice.

(viii) For payments described in paragraph (a)(1)(i) of this clause, substantiation of the amounts requested and certification in accordance with the requirements of the clause at 52.232-5, Payments Under Fixed-Price Construction Contracts.

(ix) Any other information or documentation required by the contract.

(x) While not required, the Contractor is strongly encouraged to assign an identification number to each invoice.

(3) Interest penalty. An interest penalty shall be paid automatically by the designated payment office, without request from the Contractor, if payment is not made by the due date and the conditions listed in paragraphs (a)(3)(i) through (a)(3)(iii) of this clause are met, if applicable. However, when the due date falls on a Saturday, Sunday, or legal holiday when Federal Government offices are closed and Government business is not expected to be conducted, payment may be made on the following business day without incurring a late payment interest penalty.

(i) A proper invoice was received by the designated billing office.

(ii) A receiving report or other Government documentation authorizing payment was processed and there was no disagreement over quantity, quality, Contractor compliance with any contract term or condition, or requested progress payment amount.

(iii) In the case of a final invoice for any balance of funds due the Contractor for work or services performed, the amount was not subject to further contract settlement actions between the Government and the Contractor.

(4) Computing penalty amount. The interest penalty shall be at the rate established by the Secretary of the Treasury under section 12 of the Contract Disputes Act of 1978 (41 U.S.C. 611) that is in effect on the day after the due date, except where the interest penalty is prescribed by other governmental authority (e.g., tariffs). This rate is referred to as the "Renegotiation Board Interest Rate," and it is published in the Federal Register semiannually on or about January 1 and July 1. The interest penalty shall accrue daily on the invoice principal payment amount approved by the Government until the payment date of such approved principal amount; and will be compounded in 30-day increments inclusive from the first day after the due date through the payment date. That is, interest accrued at the end of any 30-day period will be added to the approved invoice principal payment amount and will be subject to interest penalties if not paid in the succeeding 30-day period. If the designated billing office failed to notify the Contractor of a defective invoice within the periods prescribed in subparagraph (a)(2) of this clause, the due date on the corrected invoice will be adjusted by subtracting from such date the number of days taken beyond the prescribed notification of defects period. Any interest penalty owed the Contractor will be based on this adjusted due date. Adjustments will be made by the designated payment office for errors in calculating interest penalties.

(i) For the sole purpose of computing an interest penalty that might be due the Contractor for payments described in paragraph (a)(1)(ii) of this clause, Government acceptance or approval shall be deemed to have occurred constructively on the 7th day after the Contractor has completed the work or services in accordance with the terms and conditions of the contract. In the event that actual acceptance or approval occurs within the constructive acceptance or approval period, the determination of an interest penalty shall be based on the actual date of acceptance or approval. Constructive acceptance or constructive approval requirements do not apply if there is a disagreement over quantity, quality, or Contractor compliance with a contract provision. These requirements also do not compel Government officials to accept work or services, approve Contractor estimates, perform contract administration functions, or make payment prior to fulfilling their responsibilities.

(ii) The following periods of time will not be included in the determination of an interest penalty:

(A) The period taken to notify the Contractor of defects in invoices submitted to the Government, but this may not exceed 7 days.

(B) The period between the defects notice and resubmission of the

corrected invoice by the Contractor.

(C) For incorrect electronic funds transfer (EFT) information, in accordance with the EFT clause of this contract.

(iii) Interest penalties will not continue to accrue after the filing of a claim for such penalties under the clause at 52.233-1, Disputes, or for more than 1 year. Interest penalties of less than $1 need not be paid.

(iv) Interest penalties are not required on payment delays due to disagreement between the Government and the Contractor over the payment amount or other issues involving contract compliance, or on amounts temporarily withheld or retained in accordance with the terms of the contract. Claims involving disputes, and any interest that may be payable, will be resolved in accordance with the clause at 52.233-1, Disputes.

(5) Prompt payment discounts. An interest penalty also shall be paid automatically by the designated payment office, without request from the Contractor, if a discount for prompt payment is taken improperly. The interest penalty will be calculated on the amount of discount taken for the period beginning with the first day after the end of the discount period through the date when the Contractor is paid.

(6) Additional interest penalty.

(i) A penalty amount, calculated in accordance with subdivision (a)(6)(iii) of this clause, shall be paid in addition to the interest penalty amount if the Contractor--

(A) Is owed an interest penalty of $1 or more;

(B) Is not paid the interest penalty within 10 days after the date the invoice amount is paid; and

(C) Makes a written demand to the designated payment office for additional penalty payment, in accordance with subdivision (a)(6)(ii) of this clause, postmarked not later than 40 days after the date the invoice amount is paid.

(ii)(A) Contractors shall support written demands for additional penalty payments with the following data. No additional data shall be required. Contractors shall--

(1) Specifically assert that late payment interest is due under a specific invoice, and request payment of all overdue late payment interest penalty and such additional penalty as may be required;

(2) Attach a copy of the invoice on which the unpaid late payment interest was due; and

(3) State that payment of the principal has been received, including the date of receipt.

(B) Demands must be postmarked on or before the 40th day after payment was made, except that--

(1) If the postmark is illegible or nonexistent, the demand must have been received and annotated with the date of receipt by the designated payment office on or before the 40th day after payment was made; or

(2) If the postmark is illegible or nonexistent and the designated payment office fails to make the required annotation, the demand's validity will be determined by the date the Contractor has placed on the demand; provided such date is no later than the 40th day after payment was made.

(iii)(A) The additional penalty shall be equal to 100 percent of any original late payment interest penalty, except--

(1) The additional penalty shall not exceed $5,000;

(2) The additional penalty shall never be less than $25; and

(3) No additional penalty is owed if the amount of the underlying interest penalty is less than $1.

(B) If the interest penalty ceases to accrue in accordance with the limits stated in subdivision (a)(4)(iii) of this clause, the amount of the additional penalty shall be calculated on the amount of interest penalty that would have accrued in the absence of these limits, subject to the overall limits on the additional penalty specified in subdivision (a)(6)(iii)(A) of this clause.

(C) For determining the maximum and minimum additional penalties, the test shall be the interest penalty due on each separate payment made for each separate contract. The maximum and minimum additional penalty shall not be based upon individual invoices unless the invoices are paid separately. Where payments are consolidated for disbursing purposes, the maximum and minimum additional penalty determination shall be made separately for each contract therein.

(D) The additional penalty does not apply to payments regulated by other Government regulations (e.g., payments under utility contracts subject to tariffs and regulation).

(b) Contract financing payments--

(1) Due dates for recurring financing payments. If this contract provides for contract financing, requests for payment shall be submitted to the designated billing office as specified in this contract or as directed by the Contracting Officer. Contract financing payments shall be made on the 30th day after receipt of a proper contract financing request by the designated billing office. In the event that an audit or other review of a specific financing request is required to ensure compliance with the terms and conditions of the contract, the designated payment office is not compelled to make payment by the due date specified.

(2) Due dates for other contract financing. For advance payments, loans, or other arrangements that do not involve recurring submissions of contract financing requests, payment shall be made in accordance with the corresponding contract terms or as directed by the Contracting Officer.

(3) Interest penalty not applicable. Contract financing payments shall not be assessed an interest penalty for payment delays.

(c) Subcontract clause requirements. The Contractor shall include in each subcontract for property or services (including a material supplier) for the purpose of performing this contract the following:

(1) Prompt payment for subcontractors. A payment clause that obligates the Contractor to pay the subcontractor for satisfactory performance under its subcontract not later than 7 days from receipt of payment out of such amounts as are paid to the Contractor under this contract.

(2) Interest for subcontractors. An interest penalty clause that obligates the Contractor to pay to the subcontractor an interest penalty for each payment not made in accordance with the payment clause--

(i) For the period beginning on the day after the required payment date and ending on the date on which payment of the amount due is made; and

(ii) Computed at the rate of interest established by the Secretary of the Treasury, and published in the Federal Register, for interest payments under section 12 of the Contract Disputes Act of 1978 (41 U.S.C. 611) in effect at the time the Contractor accrues the obligation to pay an interest penalty.

(3) Subcontractor clause flowdown. A clause requiring each subcontractor to include a payment clause and an interest penalty clause conforming to the standards set forth in subparagraphs (c)(1) and (c)(2) of this clause in each of its subcontracts, and to require each of its subcontractors to include such clauses in their subcontracts with each lower-tier subcontractor or supplier.

(d) Subcontract clause interpretation. The clauses required by paragraph (c) of this clause shall not be construed to impair the right of the Contractor or a subcontractor at any tier to negotiate, and to include in their subcontract, provisions that--

(1) Retainage permitted. Permit the Contractor or a subcontractor to retain (without cause) a specified percentage of each progress payment otherwise due to a subcontractor for satisfactory performance under the subcontract without incurring any obligation to pay a late payment interest penalty, in accordance with terms and conditions agreed to by the parties to the subcontract, giving such recognition as the parties deem appropriate to the ability of a subcontractor to furnish a performance bond and a payment bond;

(2) Withholding permitted. Permit the Contractor or subcontractor to make a determination that part or all of the subcontractor's request for payment may be withheld in accordance with the subcontract agreement; and

(3) Withholding requirements. Permit such withholding without incurring any obligation to pay a late payment penalty if--

(i) A notice conforming to the standards of paragraph (g) of this clause previously has been furnished to the subcontractor; and

(ii) A copy of any notice issued by a Contractor pursuant to subdivision (d)(3)(i) of this clause has been furnished to the Contracting Officer.

(e) Subcontractor withholding procedures. If a Contractor, after making a request for payment to the Government but before making a payment to a subcontractor for the subcontractor's performance covered by the payment request, discovers that all or a portion of the payment otherwise due such subcontractor is subject to withholding from the subcontractor in

accordance with the subcontract agreement, then the Contractor shall--

(1) Subcontractor notice. Furnish to the subcontractor a notice conforming to the standards of paragraph (g) of this clause as soon as practicable upon ascertaining the cause giving rise to a withholding, but prior to the due date for subcontractor payment;

(2) Contracting Officer notice. Furnish to the Contracting Officer, as soon as practicable, a copy of the notice furnished to the subcontractor pursuant to subparagraph (e)(1) of this clause;

(3) Subcontractor progress payment reduction. Reduce the subcontractor's progress payment by an amount not to exceed the amount specified in the notice of withholding furnished under subparagraph (e)(1) of this clause;

(4) Subsequent subcontractor payment. Pay the subcontractor as soon as practicable after the correction of the identified subcontract performance deficiency, and--

(i) Make such payment within--

(A) Seven days after correction of the identified subcontract performance deficiency (unless the funds therefor must be recovered from the Government because of a reduction under paragraph (e)(5)(i)) of this clause; or

(B) Seven days after the Contractor recovers such funds from the Government; or

(ii) Incur an obligation to pay a late payment interest penalty computed at the rate of interest established by the Secretary of the Treasury, and published in the Federal Register, for interest payments under section 12 of the Contracts Disputes Act of 1978 (41 U.S.C. 611) in effect at the time the Contractor accrues the obligation to pay an interest penalty;

(5) Notice to Contracting Officer. Notify the Contracting Officer upon--

(i) Reduction of the amount of any subsequent certified application for payment; or

(ii) Payment to the subcontractor of any withheld amounts of a progress payment, specifying--

(A) The amounts withheld under subparagraph (e)(1) of this clause; and

(B) The dates that such withholding began and ended; and

(6) Interest to Government. Be obligated to pay to the Government an amount equal to interest on the withheld payments (computed in the manner provided in 31 U.S.C. 3903(c)(1)), from the 8th day after receipt of the withheld amounts from the Government until--

(i) The day the identified subcontractor performance deficiency is corrected; or

(ii) The date that any subsequent payment is reduced under subdivision (e)(5)(i) of this clause.

(f) Third-party deficiency reports--

(1) Withholding from subcontractor. If a Contractor, after making payment to a first-tier subcontractor, receives from a supplier or subcontractor of the first-tier subcontractor (hereafter referred to as a "second-tier subcontractor") a written notice in accordance with section 2 of the Act of August 24, 1935 (40 U.S.C. 270b, Miller Act), asserting a deficiency in such first-tier subcontractor's performance under the contract for which the Contractor may be ultimately liable, and the Contractor determines that all or a portion of future payments otherwise due such first-tier subcontractor is subject to withholding in accordance with the subcontract agreement, the Contractor may, without incurring an obligation to pay an interest penalty under subparagraph (e)(6) of this clause--

(i) Furnish to the first-tier subcontractor a notice conforming to the standards of paragraph (g) of this clause as soon as practicable upon making such determination; and

(ii) Withhold from the first-tier subcontractor's next available progress payment or payments an amount not to exceed the amount specified in the notice of withholding furnished under paragraph (f)(1)(i) of this clause.

(2) Subsequent payment or interest charge. As soon as practicable, but not later than 7 days after receipt of satisfactory written notification that the identified subcontract performance deficiency has been corrected, the Contractor shall--

(i) Pay the amount withheld under paragraph (f)(1)(ii) of this clause to such first-tier subcontractor; or

(ii) Incur an obligation to pay a late payment interest penalty to such first-tier subcontractor computed at the rate of interest established by the Secretary of the Treasury, and published in the Federal Register, for interest payments under section 12 of the Contracts Disputes Act of 1978 (41 U.S.C. 611) in effect at the time the Contractor accrues the obligation to pay an interest penalty.

(g) Written notice of subcontractor withholding. A written notice of any withholding shall be issued to a subcontractor (with a copy to the Contracting Officer of any such notice issued by the Contractor), specifying--

(1) The amount to be withheld;

(2) The specific causes for the withholding under the terms of the subcontract; and

(3) The remedial actions to be taken by the subcontractor in order to receive payment of the amounts withheld.

(h) Subcontractor payment entitlement. The Contractor may not request payment from the Government of any amount withheld or retained in accordance with paragraph (d) of this clause until such time as the Contractor has determined and certified to the Contracting Officer that the subcontractor is entitled to the payment of such amount.

(i) Prime-subcontractor disputes. A dispute between the Contractor and subcontractor relating to the amount or entitlement of a subcontractor to a payment or a late payment interest penalty under a clause included in the subcontract pursuant to paragraph (c) of this clause does not constitute a dispute to which the United States is a party. The United States may not be interpleaded in any judicial or administrative proceeding involving such a dispute.

(j) Preservation of prime-subcontractor rights. Except as provided in paragraph (i) of this clause, this clause shall not limit or impair any contractual, administrative, or judicial remedies otherwise available to the Contractor or a subcontractor in the event of a dispute involving late payment or nonpayment by the Contractor or deficient subcontract performance or nonperformance by a subcontractor.

(k) Non-recourse for prime contractor interest penalty. The Contractor's obligation to pay an interest penalty to a subcontractor pursuant to the clauses included in a subcontract under paragraph (c) of this clause shall not be construed to be an obligation of the United States for such interest penalty. A cost-reimbursement claim may not include any amount for reimbursement of such interest penalty.

(End of clause)

63 52.233-1 DISPUTES (OCT 1995)

(a) This contract is subject to the Contract Disputes Act of 1978, as amended (41 U.S.C. 601-613).

(b) Except as provided in the Act, all disputes arising under or relating to this contract shall be resolved under this clause.

(c) "Claim," as used in this clause, means a written demand or written assertion by one of the contracting parties seeking, as a matter of right, the payment of money in a sum certain, the adjustment or interpretation of contract terms, or other relief arising under or relating to this contract. A claim arising under a contract, unlike a claim relating to that contract, is a claim that can be resolved under a contract clause that provides for the relief sought by the claimant. However, a written demand or written assertion by the Contractor seeking the payment of money exceeding $100,000 is not a claim under the Act until certified as required by subparagraph (d)(2) of this clause. A voucher, invoice, or other routine request for payment that is not in dispute when submitted is not a claim under the Act. The submission may be converted to a claim under the Act, by complying with the submission and certification requirements of this clause, if it is disputed either as to liability or amount or is not acted upon in a reasonable time.

(d)(1) A claim by the Contractor shall be made in writing and, unless otherwise stated in this contract, submitted within 6 years after accrual of the claim to the Contracting Officer for a written decision. A claim by the Government against the Contractor shall be subject to a written decision by the Contracting Officer.

(2)(i) Contractors shall provide the certification specified in subparagraph (d)(2)(iii) of this clause when submitting any claim--

(A) Exceeding $100,000; or

(B) Regardless of the amount claimed, when using--
(1) Arbitration conducted pursuant to 5 U.S.C. 575-580; or
(2) Any other alternative means of dispute resolution (ADR) technique that the agency elects to handle in accordance with the Administrative Dispute Resolution Act (ADRA).

(ii) The certification requirement does not apply to issues in controversy that have not been submitted as all or part of a claim.

(iii) The certification shall state as follows:
"I certify that the claim is made in good faith; that the supporting data are accurate and complete to the best of my knowledge and belief; that the amount requested accurately reflects the contract adjustment for which the Contractor believes the Government is liable; and that I am duty authorized to certify the claim on behalf of the Contractor."

(3) The certification may be executed by any person duly authorized to bind the Contractor with respect to the claim.

(e) For Contractor claims of $100,000 or less, the Contracting Officer must, if requested in writing by the Contractor, render a decision within 60 days of the request. For Contractor-certified claims over $100,000, the Contracting Officer must, within 60 days, decide the claim or notify the Contractor of the date by which the decision will be made.

(f) The Contracting Officer's decision shall be final unless the Contractor appeals or files a suit as provided in the Act.

(g) If the claim by the Contractor is submitted to the Contracting Officer or a claim by the Government is presented to the Contractor, the parties, by mutual consent, may agree to use ADR. If the Contractor refuses an offer for alternative disputes resolution, the Contractor shall inform the Contracting Officer, in writing, of the Contractor's specific reasons for rejecting the request. When using arbitration conducted pursuant to 5 U.S.C. 575-580, or when using any other ADR technique that the agency elects to handle in accordance with the ADRA, any claim, regardless of amount, shall be accompanied by the certification described in subparagraph (d)(2)(iii) of this clause, and executed in accordance with subparagraph (d)(3) of this clause.

(h) The Government shall pay interest on the amount found due and unpaid from (1) the date that the Contracting Officer receives the claim (certified, if required); or (2) the date that payment otherwise would be due, if that date is later, until the date of payment. With regard to claims having defective certifications, as defined in (FAR) 48 CFR 33.201, interest shall be paid from the date that the Contracting Officer initially receives the claim. Simple interest on claims shall be paid at the rate, fixed by the Secretary of the Treasury as provided in the Act, which is applicable to the period during which the Contracting Officer receives the claim and then at the rate applicable for each 6-month period as fixed by the Treasury Secretary during the pendency of the claim.

(i) The Contractor shall proceed diligently with performance of this contract, pending final resolution of any request for relief, claim, appeal, or action arising under the contract, and comply with any decision of the Contracting Officer.

(End of clause)

64 52.233-3 PROTEST AFTER AWARD (AUG 1996)

(a) Upon receipt of a notice of protest (as defined in FAR 33.101) or a determination that a protest is likely (see FAR 33.102(d)), the Contracting Officer may, by written order to the Contractor, direct the Contractor to stop performance of the work called for by this contract. The order shall be specifically identified as a stop-work order issued under this clause. Upon receipt of the order, the Contractor shall immediately comply with its terms and take all reasonable steps to minimize the incurrence of costs allocable to the work covered by the order during the period of work stoppage. Upon receipt of the final decision in the protest, the Contracting Officer shall either--

(1) Cancel the stop-work order; or

(2) Terminate the work covered by the order as provided in the Default, or the Termination for Convenience of the Government, clause of this contract.

(b) If a stop-work order issued under this clause is canceled either before or after a final decision in the protest, the Contractor shall resume work. The Contracting Officer shall make an equitable adjustment in the delivery schedule or contract price, or both, and the contract shall be

modified, in writing, accordingly, if--

(1) The stop-work order results in an increase in the time required for, or in the Contractor's cost properly allocable to, the performance of any part of this contract; and

(2) The Contractor asserts its right to an adjustment within 30 days after the end of the period of work stoppage; provided, that if the Contracting Officer decides the facts justify the action, the Contracting Officer may receive and act upon a proposal at any time before final payment under this contract.

(c) If a stop-work order is not canceled and the work covered by the order is terminated for the convenience of the Government, the Contracting Officer shall allow reasonable costs resulting from the stop-work order in arriving at the termination settlement.

(d) If a stop-work order is not canceled and the work covered by the order is terminated for default, the Contracting Officer shall allow, by equitable adjustment or otherwise, reasonable costs resulting from the stop-work order.

(e) The Government's rights to terminate this contract at any time are not affected by action taken under this clause.

(f) If, as the result of the Contractor's intentional or negligent misstatement, misrepresentation, or miscertification, a protest related to this contract is sustained, and the Government pays costs, as provided in FAR 33.102(b)(2) or 33.104(h)(1), the Government may require the Contractor to reimburse the Government the amount of such costs. In addition to any other remedy available, and pursuant to the requirements of Subpart 32.6, the Government may collect this debt by offsetting the amount against any payment due the Contractor under any contract between the Contractor and the Government.

(End of clause)

65 52.236-1 PERFORMANCE OF WORK BY THE CONTRACTOR (APR 1984)

The Contractor shall perform on the site, and with its own organization, work equivalent to at least fifteen (15%) percent of the total amount of work to be performed under the contract. This percentage may be reduced by a supplemental agreement to this contract if, during performing the work, the Contractor requests a reduction and the Contracting Officer determines that the reduction would be to the advantage of the Government.

(End of clause)

(R 7-603.15 1965 JAN)

(R 1-18.104)

66 52.236-2 DIFFERING SITE CONDITIONS (APR 1984)

(a) The Contractor shall promptly, and before the conditions are disturbed, give a written notice to the Contracting Officer of (1) subsurface or latent physical conditions at the site which differ materially from those indicated in this contract, or (2) unknown physical conditions at the site, of an unusual nature, which differ materially from those ordinarily encountered and generally recognized as inhering in work of the character provided for in the contract.

(b) The Contracting Officer shall investigate the site conditions promptly after receiving the notice. If the conditions do materially so differ and cause an increase or decrease in the Contractor's cost of, or the time required for, performing any part of the work under this contract, whether or not changed as a result of the conditions, an equitable adjustment shall be made under this clause and the contract modified in writing accordingly.

(c) No request by the Contractor for an equitable adjustment to the contract under this clause shall be allowed, unless the Contractor has given the written notice required; provided, that the time prescribed in (a) above for giving written notice may be extended by the Contracting Officer.

(d) No request by the Contractor for an equitable adjustment to the contract for differing site conditions shall be allowed if made after final payment under this contract.

(End of clause)

67 52.236-3 SITE INVESTIGATION AND CONDITIONS AFFECTING THE WORK (APR 1984)

(a) The Contractor acknowledges that it has taken steps reasonably necessary to ascertain the nature and location of the work, and that it has investigated and satisfied itself as to the general and local conditions which can affect the work or its cost, including but not limited to (1) conditions bearing upon transportation, disposal, handling, and storage of materials; (2) the availability of labor, water, electric power, and roads; (3) uncertainties of weather, river stages, tides, or similar physical conditions at the site; (4) the conformation and conditions of the ground; and (5) the character of equipment and facilities needed preliminary to and during work performance. The Contractor also acknowledges that it has satisfied itself as to the character, quality, and quantity of surface and subsurface materials or obstacles to be encountered insofar as this information is reasonably ascertainable from an inspection of the site, including all exploratory work done by the Government, as well as from the drawings and specifications made a part of this contract. Any failure of the Contractor to take the actions described and acknowledged in this paragraph will not relieve the Contractor from responsibility for estimating properly the difficulty and cost of successfully performing the work, or for proceeding to successfully perform the work without additional expense to the Government.

(b) The Government assumes no responsibility for any conclusions or interpretations made by the Contractor based on the information made available by the Government. Nor does the Government assume responsibility for any understanding reached or representation made concerning conditions which can affect the work by any of its officers or agents before the execution of this contract, unless that understanding or representation is expressly stated in this contract.

(End of clause)

68 52.236-5 MATERIAL AND WORKMANSHIP (APR 1984)

(a) All equipment, material, and articles incorporated into the work covered by this contract shall be new and of the most suitable grade for the purpose intended, unless otherwise specifically provided in this contract. References in the specifications to equipment, material, articles, or patented processes by trade name, make, or catalog number, shall be regarded as establishing a standard of quality and shall not be construed as limiting competition. The Contractor may, at its option, use any equipment, material, article, or process that, in the judgment of the Contracting Officer, is equal to that named in the specifications, unless otherwise specifically provided in this contract.

(b) The Contractor shall obtain the Contracting Officer's approval of the machinery and mechanical and other equipment to be incorporated into the work. When requesting approval, the Contractor shall furnish to the Contracting Officer the name of the manufacturer, the model number, and other information concerning the performance, capacity, nature, and rating of the machinery and mechanical and other equipment. When required by this contract or by the Contracting Officer, the Contractor shall also obtain the Contracting Officer's approval of the material or articles which the Contractor contemplates incorporating into the work. When requesting approval, the Contractor shall provide full information concerning the material or articles. When directed to do so, the Contractor shall submit samples for approval at the Contractor's expense, with all shipping charges prepaid. Machinery, equipment, material, and articles that do not have the required approval shall be installed or used at the risk of subsequent rejection.

(c) All work under this contract shall be performed in a skillful and workmanlike manner. The Contracting Officer may require, in writing, that the Contractor remove from the work any employee the Contracting Officer deems incompetent, careless, or otherwise objectionable.

(End of clause)

(R 7-602.9 1964 JUN)

69 52.236-6 SUPERINTENDENCE BY THE CONTRACTOR (APR 1984)

At all times during performance of this contract and until the work is

completed and accepted, the Contractor shall directly superintend the work or assign and have on the work site a competent superintendent who is satisfactory to the Contracting Officer and has authority to act for the Contractor.

(End of clause)

70 52.236-7 PERMITS AND RESPONSIBILITIES (NOV 1991)

The Contractor shall, without additional expense to the Government, be responsible for obtaining any necessary licenses and permits, and for complying with any Federal, State, and municipal laws, codes, and regulations applicable to the performance of the work. The Contractor shall also be responsible for all damages to persons or property that occur as a result of the Contractor's fault or negligence. The Contractor shall also be responsible for all materials delivered and work performed until completion and acceptance of the entire work, except for any completed unit of work which may have been accepted under the contract.

(End of clause)

71 52.236-8 OTHER CONTRACTS (APR 1984)

The Government may undertake or award other contracts for additional work at or near the site of the work under this contract. The Contractor shall fully cooperate with the other contractors and with Government employees and shall carefully adapt scheduling and performing the work under this contract to accommodate the additional work, heeding any direction that may be provided by the Contracting Officer. The Contractor shall not commit or permit any act that will interfere with the performance of work by any other contractor or by Government employees.

(End of clause)

72 52.236-9 PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES, AND IMPROVEMENTS (APR 1984)

(a) The Contractor shall preserve and protect all structures, equipment, and vegetation (such as trees, shrubs, and grass) on or adjacent to the work site, which are not to be removed and which do not unreasonably interfere with the work required under this contract. The Contractor shall only remove trees when specifically authorized to do so, and shall avoid damaging vegetation that will remain in place. If any limbs or branches of trees are broken during contract performance, or by the careless operation of equipment, or by workmen, the Contractor shall trim those limbs or branches with a clean cut and paint the cut with a tree-pruning compound as directed by the Contracting Officer.

(b) The Contractor shall protect from damage all existing improvements and utilities (1) at or near the work site, and (2) on adjacent property of a third party, the locations of which are made known to or should be known by the Contractor. The Contractor shall repair any damage to those facilities, including those that are the property of a third party, resulting from failure to comply with the requirements of this contract or failure to exercise reasonable care in performing the work. If the Contractor fails or refuses to repair the damage promptly, the Contracting Officer may have the necessary work performed and charge the cost to the Contractor.

(End of clause)

73 52.236-10 OPERATIONS AND STORAGE AREAS (APR 1984)

(a) The Contractor shall confine all operations (including storage of materials) on Government premises to areas authorized or approved by the Contracting Officer. The Contractor shall hold and save the Government, its officers and agents, free and harmless from liability of any nature occasioned by the Contractor's performance.

(b) Temporary buildings (e.g., storage sheds, shops, offices) and utilities may be erected by the Contractor only with the approval of the Contracting Officer and shall be built with labor and materials furnished by the Contractor without expense to the Government. The

temporary buildings and utilities shall remain the property of the Contractor and shall be removed by the Contractor at its expense upon completion of the work. With the written consent of the Contracting Officer, the buildings and utilities may be abandoned and need not be removed.

(c) The Contractor shall, under regulations prescribed by the Contracting Officer, use only established roadways, or use temporary roadways constructed by the Contractor when and as authorized by the Contracting Officer. When materials are transported in prosecuting the work, vehicles shall not be loaded beyond the loading capacity recommended by the manufacturer of the vehicle or prescribed by any Federal, State, or local law or regulation. When it is necessary to cross curbs or sidewalks, the Contractor shall protect them from damage. The Contractor shall repair or pay for the repair of any damaged curbs, sidewalks, or roads.

(End of clause)

74 52.236-11 USE AND POSSESSION PRIOR TO COMPLETION (APR 1984)

(a) The Government shall have the right to take possession of or use any completed or partially completed part of the work. Before taking possession of or using any work, the Contracting Officer shall furnish the Contractor a list of items of work remaining to be performed or corrected on those portions of the work that the Government intends to take possession of or use. However, failure of the Contracting Officer to list any item of work shall not relieve the Contractor of responsibility for complying with the terms of the contract. The Government's possession or use shall not be deemed an acceptance of any work under the contract.

(b) While the Government has such possession or use, the Contractor shall be relieved of the responsibility for the loss of or damage to the work resulting from the Government's possession or use, notwithstanding the terms of the clause in this contract entitled "Permits and Responsibilities." If prior possession or use by the Government delays the progress of the work or causes additional expense to the Contractor, an equitable adjustment shall be made in the contract price or the time of completion, and the contract shall be modified in writing accordingly.

(End of clause)

75 52.236-12 CLEANING UP (APR 1984)

The Contractor shall at all times keep the work area, including storage areas, free from accumulations of waste materials. Before completing the work, the Contractor shall remove from the work and premises any rubbish, tools, scaffolding, equipment, and materials that are not the property of the Government. Upon completing the work, the Contractor shall leave the work area in a clean, neat, and orderly condition satisfactory to the Contracting Officer.

(End of clause)

76 52.236-13 I ACCIDENT PREVENTION (NOV 1991)--ALTERNATE I (NOV 1991)

(a) The Contractor shall provide and maintain work environments and procedures which will (1) safeguard the public and Government personnel, property, materials, supplies, and equipment exposed to Contractor operations and activities; (2) avoid interruptions of Government operations and delays in project completion dates; and (3) control costs in the performance of this contract.

(b) For these purposes on contracts for construction or dismantling, demolition, or removal of improvements, the Contractor shall--

(1) Provide appropriate safety barricades, signs, and signal lights;

(2) Comply with the standards issued by the Secretary of Labor at 29 CFR Part 1926 and 29 CFR Part 1910; and

(3) Ensure that any additional measures the Contracting Officer determines to be reasonably necessary for the purposes are taken.

(c) If this contract is for construction or dismantling, demolition or removal of improvements with any Department of Defense agency or component, the Contractor shall comply with all pertinent provisions of the latest version of U.S. Army Corps of Engineers Safety and Health

Requirements Manual, EM 385-1-1, in effect on the date of the solicitation.

(d) Whenever the Contracting Officer becomes aware of any noncompliance with these requirements or any condition which poses a serious or imminent danger to the health or safety of the public or Government personnel, the Contracting Officer shall notify the Contractor orally, with written confirmation, and request immediate initiation of corrective action. This notice, when delivered to the Contractor or the Contractor's representative at the work site, shall be deemed sufficient notice of the noncompliance and that corrective action is required. After receiving the notice, the Contractor shall immediately take corrective action. If the Contractor fails or refuses to promptly take corrective action, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. The Contractor shall not be entitled to any equitable adjustment of the contract price or extension of the performance schedule on any stop work order issued under this clause.

(e) The Contractor shall insert this clause, including this paragraph (e), with appropriate changes in the designation of the parties, in subcontracts.

(f) Before commencing the work, the Contractor shall--

(1) Submit a written proposed plan for implementing this clause. The plan shall include an analysis of the significant hazards to life, limb, and property inherent in contract work performance and a plan for controlling these hazards; and

(2) Meet with representatives of the Contracting Officer to discuss and develop a mutual understanding relative to administration of the overall safety program.

(End of clause)

77 52.236-15 SCHEDULES FOR CONSTRUCTION CONTRACTS (APR 1984)

(a) The Contractor shall, within five days after the work commences on the contract or another period of time determined by the Contracting Officer, prepare and submit to the Contracting Officer for approval three copies of a practicable schedule showing the order in which the Contractor proposes to perform the work, and the dates on which the Contractor contemplates starting and completing the several salient features of the work (including acquiring materials, plant, and equipment). The schedule shall be in the form of a progress chart of suitable scale to indicate appropriately the percentage of work scheduled for completion by any given date during the period. If the Contractor fails to submit a schedule within the time prescribed, the Contracting Officer may withhold approval of progress payments until the Contractor submits the required schedule.

(b) The Contractor shall enter the actual progress on the chart as directed by the Contracting Officer, and upon doing so shall immediately deliver three copies of the annotated schedule to the Contracting Officer. If, in the opinion of the Contracting Officer, the Contractor falls behind the approved schedule, the Contractor shall take steps necessary to improve its progress, including those that may be required by the Contracting Officer, without additional cost to the Government. In this circumstance, the Contracting Officer may require the Contractor to increase the number of shifts, overtime operations, days of work, and/or the amount of construction plant, and to submit for approval any supplementary schedule or schedules in chart form as the Contracting Officer deems necessary to demonstrate how the approved rate of progress will be regained.

(c) Failure of the Contractor to comply with the requirements of the Contracting Officer under this clause shall be grounds for a determination by the Contracting Officer that the Contractor is not prosecuting the work with sufficient diligence to ensure completion within the time specified in the contract. Upon making this determination, the Contracting Officer may terminate the Contractor's right to proceed with the work, or any separable part of it, in accordance with the default terms of this contract.

(End of clause)

78 52.236-17 LAYOUT OF WORK (APR 1984)

The Contractor shall lay out its work from Government-established base lines and bench marks indicated on the drawings, and shall be responsible for all measurements in connection with the layout. The Contractor shall

furnish, at its own expense, all stakes, templates, platforms, equipment, tools, materials, and labor required to lay out any part of the work. The Contractor shall be responsible for executing the work to the lines and grades that may be established or indicated by the Contracting Officer. The Contractor shall also be responsible for maintaining and preserving all stakes and other marks established by the Contracting Officer until authorized to remove them. If such marks are destroyed by the Contractor or through its negligence before their removal is authorized, the Contracting Officer may replace them and deduct the expense of the replacement from any amounts due or to become due to the Contractor.

(End of clause)

(R 7-604.3 1965 JAN)

79 52.236-21 SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION (FEB 1997)

(a) The Contractor shall keep on the work site a copy of the drawings and specifications and shall at all times give the Contracting Officer access thereto. Anything mentioned in the specifications and not shown on the drawings, or shown on the drawings and not mentioned in the specifications, shall be of like effect as if shown or mentioned in both. In case of difference between drawings and specifications, the specifications shall govern. In case of discrepancy in the figures, in the drawings, or in the specifications, the matter shall be promptly submitted to the Contracting Officer, who shall promptly make a determination in writing. Any adjustment by the Contractor without such a determination shall be at its own risk and expense. The Contracting Officer shall furnish from time to time such detailed drawings and other information as considered necessary, unless otherwise provided.

(b) Wherever in the specifications or upon the drawings the words "directed", "required", "ordered", "designated", "prescribed", or words of like import are used, it shall be understood that the "direction", "requirement", "order", "designation", or "prescription", of the Contracting Officer is intended and similarly the words "approved", "acceptable", "satisfactory", or words of like import shall mean "approved by", or "acceptable to", or "satisfactory to" the Contracting Officer, unless otherwise expressly stated.

(c) Where "as shown," "as indicated", "as detailed", or words of similar import are used, it shall be understood that the reference is made to the drawings accompanying this contract unless stated otherwise. The word "provided" as used herein shall be understood to mean "provide complete in place," that is "furnished and installed".

(d) Shop drawings means drawings, submitted to the Government by the Contractor, subcontractor, or any lower tier subcontractor pursuant to a construction contract, showing in detail (1) the proposed fabrication and assembly of structural elements, and (2) the installation (i.e., fit, and attachment details) of materials or equipment. It includes drawings, diagrams, layouts, schematics, descriptive literature, illustrations, schedules, performance and test data, and similar materials furnished by the contractor to explain in detail specific portions of the work required by the contract. The Government may duplicate, use, and disclose in any manner and for any purpose shop drawings delivered under this contract.

(e) If this contract requires shop drawings, the Contractor shall coordinate all such drawings, and review them for accuracy, completeness, and compliance with contract requirements and shall indicate its approval thereon as evidence of such coordination and review. Shop drawings submitted to the Contracting Officer without evidence of the Contractor's approval may be returned for resubmission. The Contracting Officer will indicate an approval or disapproval of the shop drawings and if not approved as submitted shall indicate the Government's reasons therefor. Any work done before such approval shall be at the Contractor's risk. Approval by the Contracting Officer shall not relieve the Contractor from responsibility for any errors or omissions in such drawings, nor from responsibility for complying with the requirements of this contract, except with respect to variations described and approved in accordance with (f) below.

(f) If shop drawings show variations from the contract requirements, the Contractor shall describe such variations in writing, separate from the drawings, at the time of submission. If the Contracting Officer approves any such variation, the Contracting Officer shall issue an appropriate contract modification, except that, if the variation is minor or does not

involve a change in price or in time of performance, a modification need not be issued.

(g) The Contractor shall submit to the Contracting Officer for approval four copies (unless otherwise indicated) of all shop drawings as called for under the various headings of these specifications. Three sets (unless otherwise indicated) of all shop drawings, will be retained by the Contracting Officer and one set will be returned to the Contractor.

(End of clause)

80 52.242-13 BANKRUPTCY (JUL 1995)

In the event the Contractor enters into proceedings relating to bankruptcy, whether voluntary or involuntary, the Contractor agrees to furnish, by certified mail or electronic commerce method authorized by the contract, written notification of the bankruptcy to the Contracting Officer responsible for administering the contract. This notification shall be furnished within five days of the initiation of the proceedings relating to bankruptcy filing. This notification shall include the date on which the bankruptcy petition was filed, the identity of the court in which the bankruptcy petition was filed, and a listing of Government contract numbers and contracting offices for all Government contracts against which final payment has not been made. This obligation remains in effect until final payment under this contract.

(End of clause)

81 52.242-14 SUSPENSION OF WORK (APR 1984)

(a) The Contracting Officer may order the Contractor, in writing, to suspend, delay, or interrupt all or any part of the work of this contract for the period of time that the Contracting Officer determines appropriate for the convenience of the Government.

(b) If the performance of all or any part of the work is, for an unreasonable period of time, suspended, delayed, or interrupted (1) by an act of the Contracting Officer in the administration of this contract, or (2) by the Contracting Officer's failure to act within the time specified in this contract (or within a reasonable time if not specified), an adjustment shall be made for any increase in the cost of performance of this contract (excluding profit) necessarily caused by the unreasonable suspension, delay, or interruption, and the contract modified in writing accordingly. However, no adjustment shall be made under this clause for any suspension, delay, or interruption to the extent that performance would have been so suspended, delayed, or interrupted by any other cause, including the fault or negligence of the Contractor, or for which an equitable adjustment is provided for or excluded under any other term or condition of this contract.

(c) A claim under this clause shall not be allowed (1) for any costs incurred more than 20 days before the Contractor shall have notified the Contracting Officer in writing of the act or failure to act involved (but this requirement shall not apply as to a claim resulting from a suspension order), and (2) unless the claim, in an amount stated, is asserted in writing as soon as practicable after the termination of the suspension, delay, or interruption, but not later than the date of final payment under the contract.

(End of clause)

82 52.243-4 CHANGES (AUG 1987)

(a) The Contracting Officer may, at any time, without notice to the sureties, if any, by written order designated or indicated to be a change order, make changes in the work within the general scope of the contract, including changes--

(1) In the specifications (including drawings and designs);

(2) In the method or manner of performance of the work;

(3) In the Government-furnished facilities, equipment, materials, services, or site; or

(4) Directing acceleration in the performance of the work.

(b) Any other written or oral order (which, as used in this paragraph (b), includes direction, instruction, interpretation, or determination)

from the Contracting Officer that causes a change shall be treated as a change order under this clause; provided, that the Contractor gives the Contracting Officer written notice stating (1) the date, circumstances, and source of the order and (2) that the Contractor regards the order as a change order.

(c) Except as provided in this clause, no order, statement, or conduct of the Contracting Officer shall be treated as a change under this clause or entitle the Contractor to an equitable adjustment.

(d) If any change under this clause causes an increase or decrease in the Contractor's cost of, or the time required for, the performance of any part of the work under this contract, whether or not changed by any such order, the Contracting Officer shall make an equitable adjustment and modify the contract in writing. However, except for an adjustment based on defective specifications, no adjustment for any change under paragraph (b) of this clause shall be made for any costs incurred more than 20 days before the Contractor gives written notice as required. In the case of defective specifications for which the Government is responsible, the equitable adjustment shall include any increased cost reasonably incurred by the Contractor in attempting to comply with the defective specifications.

(e) The Contractor must assert its right to an adjustment under this clause within 30 days after (1) receipt of a written change order under paragraph (a) of this clause or (2) the furnishing of a written notice under paragraph (b) of this clause, by submitting to the Contracting Officer a written statement describing the general nature and amount of the proposal, unless this period is extended by the Government. The statement of proposal for adjustment may be included in the notice under paragraph (b) above.

(f) No proposal by the Contractor for an equitable adjustment shall be allowed if asserted after final payment under this contract.

(End of clause)

83 52.244-1 SUBCONTRACTS (FIXED-PRICE CONTRACTS) (FEB 1995)

(a) This clause does not apply to firm-fixed-price contracts and fixed-price contracts with economic price adjustment. However, it does apply to subcontracts resulting from unpriced modifications to such contracts.

(b) "Subcontract," as used in this clause, includes but is not limited to purchase orders, and changes and modifications to purchase orders. The Contractor shall notify the Contracting Officer reasonably in advance of entering into any subcontract if the Contractor does not have an approved purchasing system and if the subcontract--

(1) Is proposed to exceed $100,000; or

(2) Is one of a number of subcontracts with a single subcontractor, under this contract, for the same or related supplies or services, that in the aggregate are expected to exceed $100,000.

(c) The advance notification required by paragraph (b) above shall include--

(1) A description of the supplies or services to be subcontracted;

(2) Identification of the type of subcontract to be used;

(3) Identification of the proposed subcontractor and an explanation of why and how the proposed subcontractor was selected, including the competition obtained;

(4) The proposed subcontract price and the Contractor's cost or price analysis;

(5) The subcontractor's current, complete, and accurate cost or pricing data and Certificate of Current Cost or Pricing Data, if required by other contract provisions;

(6) The subcontractor's Disclosure Statement or Certificate relating to Cost Accounting Standards when such data are required by other provisions of this contract; and

(7) A negotiation memorandum reflecting--

(i) The principal elements of the subcontract price negotiations;

(ii) The most significant considerations controlling establishment of initial or revised prices;

(iii) The reason cost or pricing data were or were not required;

(iv) The extent, if any, to which the Contractor did not rely on the subcontractor's cost or pricing data in determining the price objective and in negotiating the final price;

(v) The extent, if any, to which it was recognized in the negotiation that the subcontractor's cost or pricing data were not

accurate, complete, or current; the action taken by the Contractor and subcontractor; and the effect of any such defective data on the total price negotiated;

(vi) The reasons for any significant difference between the Contractor's price objective and the price negotiated; and

(vii) A complete explanation of the incentive fee or profit plan when incentives are used. The explanation shall identify each critical performance element, management decisions used to quantify each incentive element, reasons for the incentives, and a summary of all trade-off possibilities considered.

(d) The Contractor shall obtain the Contracting Officer's written consent before placing any subcontract for which advance notification is required under paragraph (b) above. However, the Contracting Officer may ratify in writing any such subcontract. Ratification shall constitute the consent of the Contracting Officer.

(e) Even if the Contractor's purchasing system has been approved, the Contractor shall obtain the Contracting Officer's written consent before placing subcontracts identified below: N/A

(f) Unless the consent or approval specifically provides otherwise, neither consent by the Contracting Officer to any subcontract nor approval of the Contractor's purchasing system shall constitute a determination (1) of the acceptability of any subcontract terms or conditions, (2) of the acceptability of any subcontract price or of any amount paid under any subcontract, or (3) to relieve the Contractor of any responsibility for performing this contract.

(g) No subcontract placed under this contract shall provide for payment on a cost-plus-a-percentage-of-cost basis, and any fee payable under cost-reimbursement subcontracts shall not exceed the fee limitations in subsection 15.903(d) of the Federal Acquisition Regulation (FAR).

(h) The Government reserves the right to review the Contractor's purchasing system as set forth in FAR Subpart 44.3.

(End of clause)

84 52.245-1 PROPERTY RECORDS (APR 1984)

The Government shall maintain the Government's official property records in connection with Government property under this contract. The Government Property clause is hereby modified by deleting the requirement for the Contractor to maintain such records.

(End of clause)

(AV 7-104.24(g) 1967 AUG)

85 52.245-4 GOVERNMENT-FURNISHED PROPERTY (SHORT FORM) (APR 1984)

(a) The Government shall deliver to the Contractor, at the time and locations stated in this contract, the Government-furnished property described in the Schedule or specifications. If that property, suitable for its intended use, is not delivered to the Contractor, the Contracting Officer shall equitably adjust affected provisions of this contract in accordance with the Changes clause when--

(1) The Contractor submits a timely written request for an equitable adjustment; and

(2) The facts warrant an equitable adjustment.

(b) Title to Government-furnished property shall remain in the Government. The Contractor shall use the Government-furnished property only in connection with this contract. The Contractor shall maintain adequate property control records in accordance with sound industrial practice and will make such records available for Government inspection at all reasonable times, unless the clause at Federal Acquisition Regulation 52.245-1, Property Records, is included in this contract.

(c) Upon delivery of Government-furnished property to the Contractor, the Contractor assumes the risk and responsibility for its loss or damage, except--

(1) For reasonable wear and tear;

(2) To the extent property is consumed in performing this contract; or

(3) As otherwise provided for by the provisions of this contract.

(d) Upon completing this contract, the Contractor shall follow the instructions of the Contracting Officer regarding the disposition of all

Government-furnished property not consumed in performing this contract or previously delivered to the Government. The Contractor shall prepare for shipment, deliver f.o.b. origin, or dispose of the Government property, as may be directed or authorized by the Contracting Officer. The net proceeds of any such disposal shall be credited to the contract price or shall be paid to the Government as directed by the Contracting Officer.

(e) If this contract is to be performed outside the United States of America, its territories, or possessions, the words "Government" and "Government-furnished" (wherever they appear in this clause) shall be construed as "United States Government" and "United States Government-furnished," respectively.

(End of clause)

(R 7-104.24(f) 1964 NOV)

86 52.246-12 INSPECTION OF CONSTRUCTION (AUG 1996)

(a) Definition. "Work" includes, but is not limited to, materials, workmanship, and manufacture and fabrication of components.

(b) The Contractor shall maintain an adequate inspection system and perform such inspections as will ensure that the work performed under the contract conforms to contract requirements. The Contractor shall maintain complete inspection records and make them available to the Government. All work shall be conducted under the general direction of the Contracting Officer and is subject to Government inspection and test at all places and at all reasonable times before acceptance to ensure strict compliance with the terms of the contract.

(c) Government inspections and tests are for the sole benefit of the Government and do not--

(1) Relieve the Contractor of responsibility for providing adequate quality control measures;

(2) Relieve the Contractor of responsibility for damage to or loss of the material before acceptance;

(3) Constitute or imply acceptance; or

(4) Affect the continuing rights of the Government after acceptance of the completed work under paragraph (i) below.

(d) The presence or absence of a Government inspector does not relieve the Contractor from any contract requirement, nor is the inspector authorized to change any term or condition of the specification without the Contracting Officer's written authorization.

(e) The Contractor shall promptly furnish, at no increase in contract price, all facilities, labor, and material reasonably needed for performing such safe and convenient inspections and tests as may be required by the Contracting Officer. The Government may charge to the Contractor any additional cost of inspection or test when work is not ready at the time specified by the Contractor for inspection or test, or when prior rejection makes reinspection or retest necessary. The Government shall perform all inspections and tests in a manner that will not unnecessarily delay the work. Special, full size, and performance tests shall be performed as described in the contract.

(f) The Contractor shall, without charge, replace or correct work found by the Government not to conform to contract requirements, unless in the public interest the Government consents to accept the work with an appropriate adjustment in contract price. The Contractor shall promptly segregate and remove rejected material from the premises.

(g) If the Contractor does not promptly replace or correct rejected work, the Government may (1) by contract or otherwise, replace or correct the work and charge the cost to the Contractor or (2) terminate for default the Contractor's right to proceed.

(h) If, before acceptance of the entire work, the Government decides to examine already completed work by removing it or tearing it out, the Contractor, on request, shall promptly furnish all necessary facilities, labor, and material. If the work is found to be defective or nonconforming in any material respect due to the fault of the Contractor or its subcontractors, the Contractor shall defray the expenses of the examination and of satisfactory reconstruction. However, if the work is found to meet contract requirements, the Contracting Officer shall make an equitable adjustment for the additional services involved in the examination and reconstruction, including, if completion of the work was thereby delayed, an extension of time.

(i) Unless otherwise specified in the contract, the Government shall

accept, as promptly as practicable after completion and inspection, all work required by the contract or that portion of the work the Contracting Officer determines can be accepted separately. Acceptance shall be final and conclusive except for latent defects, fraud, gross mistakes amounting to fraud, or the Government's rights under any warranty or guarantee.

(End of clause)

87 52.248-3 I VALUE ENGINEERING--CONSTRUCTION (MAR 1989)--ALTERNATE I (APR 1984)

(a) General. The Contractor is encouraged to develop, prepare, and submit value engineering change proposals (VECP's) voluntarily. The Contractor shall share in any instant contract savings realized from accepted VECP's, in accordance with paragraph (f) below.

(b) Definitions. "Collateral costs," as used in this clause, means agency costs of operation, maintenance, logistic support, or Government-furnished property.

"Collateral savings," as used in this clause, means those measurable net reductions resulting from a VECP in the agency's overall projected collateral costs, exclusive of acquisition savings, whether or not the acquisition cost changes.

"Contractor's development and implementation costs," as used in this clause, means those costs the Contractor incurs on a VECP specifically in developing, testing, preparing, and submitting the VECP, as well as those costs the Contractor incurs to make the contractual changes required by Government acceptance of a VECP.

"Government costs," as used in this clause, means those agency costs that result directly from developing and implementing the VECP, such as any net increases in the cost of testing, operations, maintenance, and logistic support. The term does not include the normal administrative costs of processing the VECP.

"Instant contract savings," as used in this clause, means the estimated reduction in Contractor cost of performance resulting from acceptance of the VECP, minus allowable Contractor's development and implementation costs, including subcontractors' development and implementation costs (see paragraph (h) below).

"Value engineering change proposal (VECP)" means a proposal that--

(1) Requires a change to this, the instant contract, to implement; and

(2) Results in reducing the contract price or estimated cost without impairing essential functions or characteristics; provided, that it does not involve a change--

(i) In deliverable end item quantities only; or

(ii) To the contract type only.

(c) VECP preparation. As a minimum, the Contractor shall include in each VECP the information described in subparagraphs (1) through (7) below. If the proposed change is affected by contractually required configuration management or similar procedures, the instructions in those procedures relating to format, identification, and priority assignment shall govern VECP preparation. The VECP shall include the following:

(1) A description of the difference between the existing contract requirement and that proposed, the comparative advantages and disadvantages of each, a justification when an item's function or characteristics are being altered, and the effect of the change on the end item's performance.

(2) A list and analysis of the contract requirements that must be changed if the VECP is accepted, including any suggested specification revisions.

(3) A separate, detailed cost estimate for (i) the affected portions of the existing contract requirement and (ii) the VECP. The cost reduction associated with the VECP shall take into account the Contractor's allowable development and implementation costs, including any amount attributable to subcontracts under paragraph (h) below.

(4) A description and estimate of costs the Government may incur in implementing the VECP, such as test and evaluation and operating and support costs.

(5) A prediction of any effects the proposed change would have on collateral costs to the agency.

(6) A statement of the time by which a contract modification accepting the VECP must be issued in order to achieve the maximum cost reduction, noting any effect on the contract completion time or delivery schedule.

(7) Identification of any previous submissions of the VECP, including

the dates submitted, the agencies and contract numbers involved, and previous Government actions, if known.

(d) Submission. The Contractor shall submit VECP's to the Resident Engineer at the worksite, with a copy to the Contracting Officer.

(e) Government action. (1) The Contracting Officer shall notify the Contractor of the status of the VECP within 45 calendar days after the contracting office receives it. If additional time is required, the Contracting Officer shall notify the Contractor within the 45-day period and provide the reason for the delay and the expected date of the decision. The Government will process VECP's expeditiously; however, it shall not be liable for any delay in acting upon a VECP.

(2) If the VECP is not accepted, the Contracting Officer shall notify the Contractor in writing, explaining the reasons for rejection. The Contractor may withdraw any VECP, in whole or in part, at any time before it is accepted by the Government. The Contracting Officer may require that the Contractor provide written notification before undertaking significant expenditures for VECP effort.

(3) Any VECP may be accepted, in whole or in part, by the Contracting Officer's award of a modification to this contract citing this clause. The Contracting Officer may accept the VECP, even though an agreement on price reduction has not been reached, by issuing the Contractor a notice to proceed with the change. Until a notice to proceed is issued or a contract modification applies a VECP to this contract, the Contractor shall perform in accordance with the existing contract. The Contracting Officer's decision to accept or reject all or part of any VECP shall be final and not subject to the Disputes clause or otherwise subject to litigation under the Contract Disputes Act of 1978 (41 U.S.C. 601-613).

(f) Sharing. (1) Rates. The Government's share of savings is determined by subtracting Government costs from instant contract savings and multiplying the result by (i) 45 percent for fixed-price contracts or (ii) 75 percent for cost-reimbursement contracts.

(2) Payment. Payment of any share due the Contractor for use of a VECP on this contract shall be authorized by a modification to this contract to--

(i) Accept the VECP;

(ii) Reduce the contract price or estimated cost by the amount of instant contract savings; and

(iii) Provide the Contractor's share of savings by adding the amount calculated to the contract price or fee.

(g) Subcontracts. The Contractor shall include an appropriate value engineering clause in any subcontract of $50,000 or more and may include one in subcontracts of lesser value. In computing any adjustment in this contract's price under paragraph (f) above, the Contractor's allowable development and implementation costs shall include any subcontractor's allowable development and implementation costs clearly resulting from a VECP accepted by the Government under this contract, but shall exclude any value engineering incentive payments to a subcontractor. The Contractor may choose any arrangement for subcontractor value engineering incentive payments; provided, that these payments shall not reduce the Government's share of the savings resulting from the VECP.

(h) Data. The Contractor may restrict the Government's right to use any part of a VECP or the supporting data by marking the following legend on the affected parts:

"These data, furnished under the Value Engineering--Construction clause of contract _____, shall not be disclosed outside the Government or duplicated, used, or disclosed, in whole or in part, for any purpose other than to evaluate a value engineering change proposal submitted under the clause. This restriction does not limit the Government's right to use information contained in these data if it has been obtained or is otherwise available from the Contractor or from another source without limitations."

If a VECP is accepted, the Contractor hereby grants the Government unlimited rights in the VECP and supporting data, except that, with respect to data qualifying and submitted as limited rights technical data, the Government shall have the rights specified in the contract modification implementing the VECP and shall appropriately mark the data. (The terms "unlimited rights" and "limited rights" are defined in Part 27 of the Federal Acquisition Regulation.)

(End of clause)

88 52.249-2 I TERMINATION FOR CONVENIENCE OF THE GOVERNMENT (FIXED-PRICE) (SEP 1996)--ALTERNATE I (SEP 1996)

(a) The Government may terminate performance of work under this contract in whole or, from time to time, in part if the Contracting Officer determines that a termination is in the Government's interest. The Contracting Officer shall terminate by delivering to the Contractor a Notice of Termination specifying the extent of termination and the effective date.

(b) After receipt of a Notice of Termination, and except as directed by the Contracting Officer, the Contractor shall immediately proceed with the following obligations, regardless of any delay in determining or adjusting any amounts due under this clause:

(1) Stop work as specified in the notice.

(2) Place no further subcontracts or orders (referred to as subcontracts in this clause) for materials, services, or facilities, except as necessary to complete the continued portion of the contract.

(3) Terminate all subcontracts to the extent they relate to the work terminated.

(4) Assign to the Government, as directed by the Contracting Officer, all right, title, and interest of the Contractor under the subcontracts terminated, in which case the Government shall have the right to settle or to pay any termination settlement proposal arising out of those terminations.

(5) With approval or ratification to the extent required by the Contracting Officer, settle all outstanding liabilities and termination settlement proposals arising from the termination of subcontracts; the approval or ratification will be final for purposes of this clause.

(6) As directed by the Contracting Officer, transfer title and deliver to the Government (i) the fabricated or unfabricated parts, work in process, completed work, supplies, and other material produced or acquired for the work terminated, and (ii) the completed or partially completed plans, drawings, information, and other property that, if the contract had been completed, would be required to be furnished to the Government.

(7) Complete performance of the work not terminated.

(8) Take any action that may be necessary, or that the Contracting Officer may direct, for the protection and preservation of the property related to this contract that is in the possession of the Contractor and in which the Government has or may acquire an interest.

(9) Use its best efforts to sell, as directed or authorized by the Contracting Officer, any property of the types referred to in subparagraph (b)(6) of this clause; provided, however, that the Contractor (i) is not required to extend credit to any purchaser and (ii) may acquire the property under the conditions prescribed by, and at prices approved by, the Contracting Officer. The proceeds of any transfer or disposition will be applied to reduce any payments to be made by the Government under this contract, credited to the price or cost of the work, or paid in any other manner directed by the Contracting Officer.

(c) The Contractor shall submit complete termination inventory schedules no later than 120 days from the effective date of termination, unless extended in writing by the Contracting Officer upon written request of the Contractor within this 120-day period.

(d) After expiration of the plant clearance period as defined in Subpart 45.6 of the Federal Acquisition Regulation, the Contractor may submit to the Contracting Officer a list, certified as to quantity and quality, of termination inventory not previously disposed of, excluding items authorized for disposition by the Contracting Officer. The Contractor may request the Government to remove those items or enter into an agreement for their storage. Within 15 days, the Government will accept title to those items and remove them or enter into a storage agreement. The Contracting Officer may verify the list upon removal of the items, or if stored, within 45 days from submission of the list, and shall correct the list, as necessary, before final settlement.

(e) After termination, the Contractor shall submit a final termination settlement proposal to the Contracting Officer in the form and with the certification prescribed by the Contracting Officer. The Contractor shall submit the proposal promptly, but no later than 1 year from the effective date of termination, unless extended in writing by the Contracting Officer upon written request of the Contractor within this 1 year period. However,

if the Contracting Officer determines that the facts justify it, a termination settlement proposal may be received and acted on after 1 year or any extension. If the Contractor fails to submit the proposal within the time allowed, the Contracting Officer may determine, on the basis of information available, the amount, if any, due the Contractor because of the termination and shall pay the amount determined.

(f) Subject to paragraph (e) of this clause, the Contractor and the Contracting Officer may agree upon the whole or any part of the amount to be paid or remaining to be paid because of the termination. The amount may include a reasonable allowance for profit on work done. However, the agreed amount, whether under this paragraph (f) or paragraph (g) of this clause, exclusive of costs shown in subparagraph (g)(3) of this clause, may not exceed the total contract price as reduced by (1) the amount of payments previously made and (2) the contract price of work not terminated. The contract shall be modified, and the Contractor paid the agreed amount. Paragraph (g) of this clause shall not limit, restrict, or affect the amount that may be agreed upon to be paid under this paragraph.

(g) If the Contractor and Contracting Officer fail to agree on the whole amount to be paid the Contractor because of the termination of work, the Contracting Officer shall pay the Contractor the amounts determined as follows, but without duplication of any amounts agreed upon under paragraph (f) of this clause:

(1) For contract work performed before the effective date of termination, the total (without duplication of any items) of--

(i) The cost of this work;

(ii) The cost of settling and paying termination settlement proposals under terminated subcontracts that are properly chargeable to the terminated portion of the contract if not included in subdivision (g)(1)(i) of this clause; and

(iii) A sum, as profit on subdivision (g)(1)(i) of this clause, determined by the Contracting Officer under 49.202 of the Federal Acquisition Regulation, in effect on the date of this contract, to be fair and reasonable; however, if it appears that the Contractor would have sustained a loss on the entire contract had it been completed, the Contracting Officer shall allow no profit under this subdivision (iii) and shall reduce the settlement to reflect the indicated rate of loss.

(2) The reasonable costs of settlement of the work terminated, including--

(i) Accounting, legal, clerical, and other expenses reasonably necessary for the preparation of termination settlement proposals and supporting data;

(ii) The termination and settlement of subcontracts (excluding the amounts of such settlements); and

(iii) Storage, transportation, and other costs incurred, reasonably necessary for the preservation, protection, or disposition of the termination inventory.

(h) Except for normal spoilage, and except to the extent that the Government expressly assumed the risk of loss, the Contracting Officer shall exclude from the amounts payable to the Contractor under paragraph (g) of this clause, the fair value, as determined by the Contracting Officer, of property that is destroyed, lost, stolen, or damaged so as to become undeliverable to the Government or to a buyer.

(i) The cost principles and procedures of Part 31 of the Federal Acquisition Regulation, in effect on the date of this contract, shall govern all costs claimed, agreed to, or determined under this clause.

(j) The Contractor shall have the right of appeal, under the Disputes clause, from any determination made by the Contracting Officer under paragraph (e), (g), or (l) of this clause, except that if the Contractor failed to submit the termination settlement proposal or request for equitable adjustment within the time provided in paragraph (e) or (l), respectively, and failed to request a time extension, there is no right of appeal.

(k) In arriving at the amount due the Contractor under this clause, there shall be deducted--

(1) All unliquidated advance or other payments to the Contractor under the terminated portion of this contract;

(2) Any claim which the Government has against the Contractor under this contract; and

(3) The agreed price for, or the proceeds of sale of, materials, supplies, or other things acquired by the Contractor or sold under the provisions of this clause and not recovered by or credited to the

Government.

(l) If the termination is partial, the Contractor may file a proposal with the Contracting Officer for an equitable adjustment of the price(s) of the continued portion of the contract. The Contracting Officer shall make any equitable adjustment agreed upon. Any proposal by the Contractor for an equitable adjustment under this clause shall be requested within 90 days from the effective date of termination unless extended in writing by the Contracting Officer.

(m)(1) The Government may, under the terms and conditions it prescribes, make partial payments and payments against costs incurred by the Contractor for the terminated portion of the contract, if the Contracting Officer believes the total of these payments will not exceed the amount to which the Contractor will be entitled.

(2) If the total payments exceed the amount finally determined to be due, the Contractor shall repay the excess to the Government upon demand, together with interest computed at the rate established by the Secretary of the Treasury under 50 U.S.C. App. 1215(b)(2). Interest shall be computed for the period from the date the excess payment is received by the Contractor to the date the excess is repaid. Interest shall not be charged on any excess payment due to a reduction in the Contractor's termination settlement proposal because of retention or other disposition of termination inventory until 10 days after the date of the retention or disposition, or a later date determined by the Contracting Officer because of the circumstances.

(n) Unless otherwise provided in this contract or by statute, the Contractor shall maintain all records and documents relating to the terminated portion of this contract for 3 years after final settlement. This includes all books and other evidence bearing on the Contractor's costs and expenses under this contract. The Contractor shall make these records and documents available to the Government, at the Contractor's office, at all reasonable times, without any direct charge. If approved by the Contracting Officer, photographs, microphotographs, or other authentic reproductions may be maintained instead of original records and documents.

(End of clause)

89 52.249-10 DEFAULT (FIXED-PRICE CONSTRUCTION) (APR 1984)

(a) If the Contractor refuses or fails to prosecute the work or any separable part, with the diligence that will insure its completion within the time specified in this contract including any extension, or fails to complete the work within this time, the Government may, by written notice to the Contractor, terminate the right to proceed with the work (or the separable part of the work) that has been delayed. In this event, the Government may take over the work and complete it by contract or otherwise, and may take possession of and use any materials, appliances, and plant on the work site necessary for completing the work. The Contractor and its sureties shall be liable for any damage to the Government resulting from the Contractor's refusal or failure to complete the work within the specified time, whether or not the Contractor's right to proceed with the work is terminated. This liability includes any increased costs incurred by the Government in completing the work.

(b) The Contractor's right to proceed shall not be terminated nor the Contractor charged with damages under this clause, if-

(1) The delay in completing the work arises from unforeseeable causes beyond the control and without the fault or negligence of the Contractor. Examples of such causes include (i) acts of God or of the public enemy, (ii) acts of the Government in either its sovereign or contractual capacity, (iii) acts of another Contractor in the performance of a contract with the Government, (iv) fires, (v) floods, (vi) epidemics, (vii) quarantine restrictions, (viii) strikes, (ix) freight embargoes, (x) unusually severe weather, or (xi) delays of subcontractors or suppliers at any tier arising from unforeseeable causes beyond the control and without the fault or negligence of both the Contractor and the subcontractors or suppliers; and

(2) The Contractor, within 10 days from the beginning of any delay (unless extended by the Contracting Officer), notifies the Contracting Officer in writing of the causes of delay. The Contracting Officer shall ascertain the facts and the extent of delay. If, in the judgment of the Contracting Officer, the findings of fact warrant such action,

the time for completing the work shall be extended. The findings of the Contracting Officer shall be final and conclusive on the parties, but subject to appeal under the Disputes clause.

(c) If, after termination of the Contractor's right to proceed, it is determined that the Contractor was not in default, or that the delay was excusable, the rights and obligations of the parties will be the same as if the termination had been issued for the convenience of the Government.

(d) The rights and remedies of the Government in this clause are in addition to any other rights and remedies provided by law or under this contract.

(End of clause)

90 52.252-6 AUTHORIZED DEVIATIONS IN CLAUSES (APR 1984)

(a) The use in this solicitation or contract of any Federal Acquisition Regulation (48 CFR Chapter 1) clause with an authorized deviation is indicated by the addition of "(DEVIATION)" after the date of the clause.

(b) The use in this solicitation or contract of any DOD FAR Supplement (48 CFR Chapter 2) clause with an authorized deviation is indicated by the addition of "(DEVIATION)" after the name of the regulation.

(End of clause)

(NM)

91 52.201-7000 CONTRACTING OFFICER'S REPRESENTATIVE (DEC 1991)

(a) Definition. "Contracting officer's representative" means an individual designated in accordance with subsection 201.602-2 of the Defense Federal Acquisition Regulation Supplement and authorized in writing by the Contracting Officer to perform specific technical or administrative functions.

(b) If the Contracting Officer designates a contracting officer's representative (COR), the Contractor will receive a copy of the written designation. It will specify the extent of the COR's authority to act on behalf of the Contracting Officer. The COR is not authorized to make any commitments or changes that will affect price, quality, quantity, delivery, or any other term or condition of the contract.

(End of clause)

92 52.203-7001 SPECIAL PROHIBITION ON EMPLOYMENT (JUN 1997)

(a) Definitions.

As used in this clause--

(1) "Arising out of a contract with the DoD" means any act in connection with--

(i) Attempting to obtain,

(ii) Obtaining, or

(iii) Performing a contract or first-tier subcontract of any agency, department, or component of the Department of Defense (DoD).

(2) "Conviction of fraud or any other felony" means any conviction for fraud or a felony in violation of state or Federal criminal statutes, whether entered on a verdict or plea, including a plea of nolo contendere, for which sentence has been imposed.

(3) "Date of conviction" means the date judgment was entered against the individual.

(b) 10 U.S.C. 2408 provides that any individual who is convicted after September 29, 1988, of fraud or any other felony arising out of a contract with the DoD is prohibited from:

(1) Working in a management or supervisory capacity on any DoD contract or first-tier subcontract;

(2) Serving on the board of directors of any DoD Contractor or first-tier subcontractor; or

(3) Serving as a consultant to any DoD Contractor or first-tier subcontractor.

(c) Unless waived, the prohibition in paragraph (b) applies for five years from the date of conviction.

(d) 10 U.S.C. 2408 further provides that a defense Contractor or first-tier subcontractor shall be subject to a criminal penalty of not more than $500,000 if convicted of knowingly--

(1) Employing a person under a prohibition specified in paragraph (b) of this clause; or

(2) Allowing such a person to serve on the board of directors of the Contractor or first-tier subcontractor.

(e) In addition to the criminal penalties contained in 10 U.S.C. 2408, the Government may consider other available remedies, such as--

(1) Suspension or debarment;

(2) Cancellation of the contract at no cost to the Government; or

(3) Termination of the contract for default.

(f) The Contractor may submit written requests for waiver of the prohibitions in paragraph (b) of this clause to the Contracting Officer. Requests shall clearly identify--

(1) The person involved;

(2) The nature of the conviction and resultant sentence or punishment imposed;

(3) The reasons for the requested waiver; and,

(4) An explanation of why a waiver is in the interest of national security.

(g) The Contractor agrees to include the substance of this clause, appropriately modified to reflect the identity and relationship of the parties, in all first-tier subcontracts exceeding the simplified acquisition threshold in Part 2 of the Federal Acquisition Regulation, except those for commercial items or components.

(h) Pursuant to 10 U.S.C. 2408(c), defense contractors and subcontractors may obtain information as to whether a particular person has been convicted of fraud or any other felony arising out of a contract with the DoD by contacting The Office of Justice Programs, The Denial of Benefits Office, U.S. Department of Justice, telephone (202) 616-3507.

(End of clause)

93 52.203-7002 DISPLAY OF DOD HOTLINE POSTER (DEC 1991)

(a) The Contractor shall display prominently in common work areas within business segments performing work under Department of Defense (DoD) contracts, DoD Hotline Posters prepared by the DoD Office of the Inspector General.

(b) DoD Hotline Posters may be obtained from the DoD Inspector General, ATTN: Defense Hotline, 400 Army Navy Drive, Washington, DC 22202-2884.

(c) The Contractor need not comply with paragraph (a) of this clause if it has established a mechanism, such as a hotline, by which employees may report suspected instances of improper conduct, and instructions that encourage employees to make such reports.

(End of clause)

94 52.204-7003 CONTROL OF GOVERNMENT PERSONNEL WORK PRODUCT (APR 1992)

The Contractor's procedures for protecting against unauthorized disclosure of information shall not require Department of Defense employees or members of the Armed Forces to relinquish control of their work products, whether classified or not, to the Contractor.

(End of clause)

95 52.205-7000 PROVISION OF INFORMATION TO COOPERATIVE AGREEMENT HOLDERS (DEC 1991)

(a) Definition.

"Cooperative agreement holder" means a State or local government; a private, nonprofit organization; a tribal organization (as defined in section 4(c) of the Indian Self-Determination and Education Assistance Act (Pub. L. 93-268; 25 U.S.C. 450(c))); or an economic enterprise (as defined in section 3(e) of the Indian Financing Act of 1974 (Pub. L. 93-362; 25 U.S.C. 1452(e))) whether such economic enterprise is organized for profit or nonprofit purposes; which has an agreement with the Defense Logistics Agency to furnish procurement technical assistance to business entities.

(b) The Contractor shall provide cooperative agreement holders, upon their request, with a list of those appropriate employees or offices responsible for entering into subcontracts under defense contracts. The list shall include the business address, telephone number, and area of

responsibility of each employee or office.
(c) The Contractor need not provide the listing to a particular cooperative agreement holder more frequently than once a year.
(End of clause)

96 52.209-7000 ACQUISITION FROM SUBCONTRACTORS SUBJECT TO ON-SITE INSPECTION UNDER THE INTERMEDIATE-RANGE NUCLEAR FORCES (INF) TREATY (NOV 1995)

(a) The Contractor shall not deny consideration for a subcontract award under this contract to a potential subcontractor subject to on-site inspection under the INF Treaty, or a similar treaty, solely or in part because of the actual or potential presence of Soviet inspectors at the subcontractor's facility, unless the decision is approved by the Contracting Officer.
(b) The Contractor shall incorporate this clause, including this paragraph (b), in all solicitations and contracts exceeding the simplified acquisition threshold in Part 13 of the Federal Acquisition Regulation, except those for commercial items.
(End of clause)

97 52.215-7000 PRICING ADJUSTMENTS (DEC 1991)

The term "pricing adjustment," as used in paragraph (a) of the clauses entitled "Price Reduction for Defective Cost or Pricing Data--Modifications," "Subcontractor Cost or Pricing Data," and "Subcontractor Cost or Pricing Data--Modifications," means the aggregate increases and/or decreases in cost plus applicable profits.
(End of clause)

98 52.219-7003 SMALL, SMALL DISADVANTAGED AND WOMEN-OWNED SMALL BUSINESS SUBCONTRACTING PLAN (DoD CONTRACTS) (APR 1996)

This clause supplements the Federal Acquisition Regulation 52.219-9, Small, Small Disadvantaged and Women-Owned Small Business Subcontracting Plan, clause of this contract.
(a) Definitions.
"Historically black colleges and universities," as used in this clause, means institutions determined by the Secretary of Education to meet the requirements of 34 CFR 608.2. The term also means any nonprofit research institution that was an integral part of such a college or university before November 14, 1986.
"Minority institutions," as used in this clause, means institutions meeting the requirements of section 1046(3) of the Higher Education Act of 1965 (20 U.S.C. 1135d-5(3)). The term also includes Hispanic-serving institutions as defined in section 316(b)(1) of such Act (20 U.S.C. 1059c(b)(1)).
(b) Except for company or division-wide commercial items subcontracting plans, the term "small disadvantaged business," when used in the FAR 52.219-9 clause, includes historically black colleges and universities and minority institutions, in addition to small disadvantaged business concerns.
(c) Work under the contract or its subcontracts shall be credited toward meeting the small disadvantaged business concern goal required by paragraph (d) of the FAR 52.219-9 clause when:
(1) It is performed on Indian lands or in joint venture with an Indian tribe or a tribally-owned corporation, and
(2) It meets the requirements of 10 U.S.C. 2323a.
(d) Subcontracts awarded to workshops approved by the Committee for Purchase from People Who are Blind or Severely Disabled (41 U.S.C. 46-48), may be counted toward the Contractor's small business subcontracting goal.
(e) A mentor firm, under the Pilot Mentor-Protege Program established under Section 831 of Pub. L. 101-510, as amended, may count toward its small disadvantaged business goal, subcontracts awarded--
(1) Protege firms which are qualified organizations employing the severely handicapped; and
(2) Former protege firms that meet the criteria in Section 831(g)(4) of Pub. L. 101-510.
(f) The master plan approval referred to in paragraph (f) of the FAR

52.219-9 clause is approval by the Contractor's cognizant contract administration activity.

(g) In those subcontracting plans which specifically identify small, small disadvantaged, and women-owned small businesses, the Contractor shall notify the Administrative Contracting Officer of any substitutions of firms that are not small, small disadvantaged, or women-owned small businesses for the firms listed in the subcontracting plan. Notifications shall be in writing and shall occur within a reasonable period of time after award of the subcontract. Contractor-specified formats shall be acceptable.

(End of clause)

99 52.223-7004 DRUG-FREE WORK FORCE (SEP 1988)

(a) Definitions.

(1) "Employee in a sensitive position," as used in this clause, means an employee who has been granted access to classified information; or employees in other positions that the Contractor determines involve national security, health or safety, or functions other than the foregoing requiring a high degree of trust and confidence.

(2) "Illegal drugs," as used in this clause, means controlled substances included in Schedules I and II, as defined by section 802(6) of Title 21 of the United States Code, the possession of which is unlawful under Chapter 13 of that Title. The term "illegal drugs" does not mean the use of a controlled substance pursuant to a valid prescription or other uses authorized by law.

(b) The Contractor agrees to institute and maintain a program for achieving the objective of a drug-free work force. While this clause defines criteria for such a program, contractors are encouraged to implement alternative approaches comparable to the criteria in paragraph (c) that are designed to achieve the objectives of this clause.

(c) Contractor programs shall include the following, or appropriate alternatives:

(1) Employee assistance programs emphasizing high level direction, education, counseling, rehabilitation, and coordination with available community resources;

(2) Supervisory training to assist in identifying and addressing illegal drug use by Contractor employees;

(3) Provision for self-referrals as well as supervisory referrals to treatment with maximum respect for individual confidentiality consistent with safety and security issues;

(4) Provision for identifying illegal drug users, including testing on a controlled and carefully monitored basis. Employee drug testing programs shall be established taking account of the following:

(i) The Contractor shall establish a program that provides for testing for the use of illegal drugs by employees in sensitive positions. The extent of and criteria for such testing shall be determined by the Contractor based on considerations that include the nature of the work being performed under the contract, the employee's duties, the efficient use of Contractor resources, and the risks to health, safety, or national security that could result from the failure of an employee adequately to discharge his or her position.

(ii) In addition, the Contractor may establish a program for employee drug testing--

(A) When there is a reasonable suspicion that an employee uses illegal drugs; or

(B) When an employee has been involved in an accident or unsafe practice;

(C) As part of or as a follow-up to counseling or rehabilitation for illegal drug use;

(D) As part of a voluntary employee drug testing program.

(iii) The Contractor may establish a program to test applicants for employment for illegal drug use.

(iv) For the purpose of administering this clause, testing for illegal drugs may be limited to those substances for which testing is prescribed by section 2.1 of Subpart B of the "Mandatory Guidelines for Federal Workplace Drug Testing Programs" (53 FR 11980 (April 11 1988)), issued by the Department of Health and Human Services.

(d) Contractors shall adopt appropriate personnel procedures to deal with employees who are found to be using drugs illegally. Contractors shall not allow any employee to remain on duty or perform in a sensitive position

who is found to use illegal drugs until such time as the Contractor, in accordance with procedures established by the Contractor, determines that the employee may perform in such a position.

(e) The provisions of this clause pertaining to drug testing programs shall not apply to the extent they are inconsistent with state or local law, or with an existing collective bargaining agreement; provided that with respect to the latter, the Contractor agrees that those issues that are in conflict will be a subject of negotiation at the next collective bargaining session.

(End of clause)

APPLIES TO MILITARY ORDERS ONLY

100 52.223-7006 PROHIBITION ON STORAGE AND DISPOSAL OF TOXIC AND HAZARDOUS MATERIALS (APR 1993)

(a) Definitions. As used in this clause--

(1) "Storage" means a non-transitory, semi-permanent or permanent holding, placement, or leaving of material. It does not include a temporary accumulation of a limited quantity of a material used in or a waste generated or resulting from authorized activities, such as servicing, maintenance, or repair of Department of Defense (DoD) items, equipment, or facilities.

(2) "Toxic or hazardous materials" means:

(i) Materials referred to in section 101(14) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 (42 U.S.C. 9601(14)) and materials designated under section 102 of CERCLA (42 U.S.C. 9602)(40 CFR Part 302);

(ii) Materials that are of an explosive, flammable, or pyrotechnic nature; or

(iii) Materials otherwise identified by the Secretary of Defense as specified in DoD regulations.

(b) In accordance with 10 U.S.C. 2692, the Contractor is prohibited from storing or disposing of non-DoD-owned toxic or hazardous materials on a DoD installation, except to the extent authorized by a statutory exception to 10 U.S.C. 2692 or as authorized by the Secretary of Defense or his designee.

(End of clause)

101 52.225-7016 RESTRICTION ON ACQUISITION OF BALL AND ROLLER BEARINGS (JUN 1997)

(a) Definitions.

As used in this clause--

(1) "Bearing components" means the bearing element, retainer, inner race, or outer race.

(2) "Miniature and instrument ball bearings" means all rolling contact ball bearings with a basic outside diameter (exclusive of flange diameters) of 30 millimeters or less, regardless of material, tolerance, performance, or quality characteristics.

(b) The Contractor agrees that, except as provided in paragraph (c) of this clause, all ball and roller bearings and ball and roller bearing components (including miniature and instrument ball bearings) delivered under this contract, either as end items or components of end items, shall be wholly manufactured in the United States or Canada. Unless otherwise specified, raw materials, such as performed bar, tube, or rod stock and lubricants, need not be mined or produced in the United States or Canada.

(c)(1) The restriction in paragraph (b) of this clause does not apply to the extent that--

(i) The end items or components containing ball or roller bearings are commercial items; or

(ii) The ball or roller bearings are commercial items manufactured in a qualifying country listed in subsection 225.872-1 of the Defense Federal Acquisition Regulation Supplement.

(2) The commercial item exception in paragraph (c)(1) of this clause does not include items designed or developed under a Government contract or contracts where the end item is bearings and bearing components.

(d) The restriction in paragraph (b) of this clause may be waived upon request from the Contractor in accordance with subsection 225.7019-3 of the Defense Federal Acquisition Regulation Supplement. If the restriction is waived for miniature and instrument ball bearings, the Contractor agrees to acquire a like quantity and type of domestic manufacture for

nongovernmental use.

(e) The Contractor agrees to retain records showing compliance with this restriction until 3 years after final payment and to make records available upon request of the Contracting Office.

(f) The Contractor agrees to insert this clause, including this paragraph (f), in every subcontract and purchase order issued in performance of this contract, unless items acquired are--

(1) Commercial items other than ball or roller bearings; or

(2) Items that do not contain ball or roller bearings.

(End of clause)

102 52.225-7036 NORTH AMERICAN FREE TRADE AGREEMENT IMPLEMENTATION ACT (JAN 1994)

(a) Definitions.

(1) "Components," "domestic end product," "end product," "nonqualifying country," "qualifying country," and "qualifying country end product" have the meanings given in the Buy American Act and Balance of Payments Program clause of this contract.

(2) "North American Free Trade Agreement (NAFTA) country" means Canada or Mexico.

(3) "NAFTA country end product" means an article that--

(i) Is wholly the growth, product, or manufacture of a NAFTA country; or

(ii) Has, in the case of an article which consists in whole or in part of materials from another country or instrumentality, been substantially transformed in a NAFTA country into a new and different article of commerce with a name, character, or use distinct from that of the article or articles from which it was so transformed. The term includes services (except transportation services) incidental to its supply, provided that the value of those incidental services does not exceed the value of the product itself. It does not include service contracts as such.

(4) "Non-NAFTA country end product" means any end product which is not a U.S. made end product or a NAFTA country end product.

(5) "United States" means the United States, its designated possessions, Puerto Rico, and any other place subject to its jurisdiction, but does not include leased bases or trust territories.

(6) "U.S. made end product" means an article which is--

(i) Wholly the growth, product or manufacture of the United States, or

(ii) In the case of an article which consists in whole or in part of materials from another country or instrumentality, has been substantially transformed in the United States into a new and distinct article of commerce with a name, character, or use distinct from that of the article or articles from which it was so transformed.

(b) This clause implements the North American Free Trade Agreement Implementation Act of 1993 by providing a preference for U.S. made end products and NAFTA country end products over non-NAFTA country end products, except non-NAFTA country end products which are qualifying country end products.

(c) The Contractor agrees to deliver under this contract only U.S. made end products unless, in its offer, it specified delivery of qualifying country, NAFTA country, or non-NAFTA country end products in the Buy American Act--North American Free Trade Agreement Implementation Act--Balance of Payments Program Certificate provision. An offer certifying that a qualifying country end product or a NAFTA country end product will be supplied requires the Contractor to supply a qualifying country end product or a NAFTA country end product, whichever is certified, or, at the Contractor's option, a U.S. made end product.

(d) The offered price of end products listed and certified under paragraphs (c)(2)(i) and (iv) of the Buy American Act--North American Free Trade Agreement Implementation Act--Balance of Payments Program Certificate provision of the solicitation must include all applicable duty. The offered price of qualifying country end products or NAFTA country end products for line items subject to the North American Free Trade Agreement Implementation Act, should not include custom fees or duty.

(End of clause)

103 52.227-7030 TECHNICAL DATA--WITHHOLDING OF PAYMENT (OCT 1988)

(a) If technical data specified to be delivered under this contract, is not delivered within the time specified by this contract or is deficient upon delivery (including having restrictive markings not identified in the list described in the clause at 252.227-7013(k) of this contract), the Contracting Officer may until such data is accepted by the Government, withhold payment to the Contractor of ten percent (10%) of the total contract price or amount unless a lesser withholding is specified in the contract. Payments shall not be withheld nor any other action taken pursuant to this paragraph when the Contractor's failure to make timely delivery or to deliver such data without deficiencies arises out of causes beyond the control and without the fault or negligence of the Contractor.

(b) The withholding of any amount or subsequent payment to the Contractor shall not be construed as a waiver of any rights accruing to the Government under this contract.

(End of clause)

104 52.227-7033 RIGHTS IN SHOP DRAWINGS (APR 1966)

(a) Shop drawings for construction means drawings, submitted to the Government by the Construction Contractor, subcontractor or any lower-tier subcontractor pursuant to a construction contract, showing in detail (i) the proposed fabrication and assembly of structural elements and (ii) the installation (i.e., form, fit, and attachment details) of materials or equipment. The Government may duplicate, use, and disclose in any manner and for any purpose shop drawings delivered under this contract.

(b) This clause, including this paragraph (b), shall be included in all subcontracts hereunder at any tier.

(End of clause)

105 52.231-7000 SUPPLEMENTAL COST PRINCIPLES (DEC 1991)

When the allowability of costs under this contract is determined in accordance with Part 31 of the Federal Acquisition Regulation (FAR), allowability shall also be determined in accordance with Part 231 of the Defense FAR Supplement, in effect on the date of this contract.

(End of clause)

106 52.232-7006 REDUCTION OR SUSPENSION OF CONTRACT PAYMENTS UPON FINDING OF FRAUD (AUG 1992)

(a) 10 U.S.C. 2307(e) permits the head of the agency to reduce or suspend further payments to the Contractor upon a written determination by the agency head that substantial evidence exists that the Contractor's request for advance, partial, or progress payments is based on fraud. The provisions of 10 U.S.C. 2307(e) are in addition to any other rights or remedies provided the Government by law or under contract.

(b) Actions taken by the Government in accordance with 10 U.S.C. 2307(e) shall not constitute an excusable delay under the Default clause of this contract or otherwise relieve the Contractor of its obligations to perform under this contract.

(End of clause)

107 52.236-7000 MODIFICATION PROPOSALS--PRICE BREAKDOWN (DEC 1991)

(a) The Contractor shall furnish a price breakdown, itemized as required and within the time specified by the Contracting Officer, with any proposal for a contract modification.

(b) The price breakdown--

(1) Must include sufficient detail to permit an analysis of profit, and of all costs for--

(i) Material;

(ii) Labor;

(iii) Equipment;

(iv) Subcontracts; and

(v) Overhead; and

(2) Must cover all work involved in the modification, whether the work

was deleted, added, or changed.

(c) The Contractor shall provide similar price breakdowns to support any amounts claimed for subcontracts.

(d) The Contractor's proposal shall include a justification for any time extension proposed.

(End of clause)

108 52.236-7005 AIRFIELD SAFETY PRECAUTIONS (DEC 1991)

(a) Definitions. As used in this clause--

(1) "Landing areas" means--

(i) The primary surfaces, comprising the surface of the runway, runway shoulders, and lateral safety zones. The length of each primary surface is the same as the runway length. The width of each primary surface is 2,000 feet (1,000 feet on each side of the runway centerline);

(ii) The clear zone beyond the ends of each runway, i.e., the extension of the primary surface for a distance of 1,000 feet beyond each end of each runway;

(iii) All taxiways, plus the lateral clearance zones along each side for the length of the taxiways (the outer edge of each lateral clearance zone is laterally 250 feet from the far or opposite edge of the taxiway, e.g., a 75-foot-wide taxiway would have a combined width of taxiway and lateral clearance zones of 425 feet); and

(iv) All aircraft parking aprons, plus the area 125 feet in width extending beyond each edge all around the aprons.

(2) "Safety precaution areas" means those portions of approach-departure clearance zones and transitional zones where placement of objects incident to contract performance might result in vertical projections at or above the approach-departure clearance, or the transitional surface.

(i) The approach-departure clearance surface is an extension of the primary surface and the clear zone at each end of each runway, for a distance of 50,000 feet, first along an inclined (glide angle) and then along a horizontal plane, both flaring symmetrically about the runway centerline extended.

(A) The inclined plane (glide angle) begins in the clear zone 200 feet past the end of the runway (and primary surface) at the same elevation as the end of the runway. It continues upward at a slope of 50:1 (1 foot vertically for each 50 feet horizontally) to an elevation of 500 feet above the established airfield elevation. At that point the plane becomes horizontal, continuing at that same uniform elevation to a point 50,000 feet longitudinally from the beginning of the inclined plane (glide angle) and ending there.

(B) The width of the surface at the beginning of the inclined plane (glide angle) is the same as the width of the clear zone. It then flares uniformly, reaching the maximum width of 16,000 feet at the end.

(ii) The approach-departure clearance zone is the ground area under the approach-departure clearance surface.

(iii) The transitional surface is a sideways extension of all primary surfaces, clear zones, and approach-departure clearance surfaces along inclined planes.

(A) The inclined plane in each case begins at the edge of the surface.

(B) The slope of the incline plane is 7:1 (1 foot vertically for each 7 feet horizontally). It continues to the point of intersection with the--

(1) Inner horizontal surface (which is the horizontal plane 150 feet above the established airfield elevation); or

(2) Outer horizontal surface (which is the horizontal plane 500 feet above the established airfield elevation), whichever is applicable.

(iv) The "transitional zone" is the ground area under the transitional surface. (It adjoins the primary surface, clear zone, and approach-departure clearance zone.)

(b) General. (1) The Contractor shall comply with the requirements of this clause while--

(i) Operating all ground equipment (mobile or stationary);

(ii) Placing all materials; and

(iii) Performing all work, upon and around all airfields.

(2) The requirements of this clause are in addition to any other safety requirements of this contract.

(c) The Contractor shall--

(1) Report to the Contracting Officer before initiating any work;

(2) Notify the Contracting Officer of proposed changes to locations and operations;

(3) Not permit either its equipment or personnel to use any runway for purposes other than aircraft operation without permission of the Contracting Officer, unless the runway is--

(i) Closed by order of the Contracting Officer; and

(ii) Marked as provided in paragraph (d)(2) of this clause;

(4) Keep all paved surfaces, such as runways, taxiways, and hardstands, clean at all times and, specifically, free from small stones which might damage aircraft propellers or jet aircraft;

(5) Operate mobile equipment according to the safety provisions of this clause, while actually performing work on the airfield. At all other times, the Contractor shall remove all mobile equipment to locations--

(i) Approved by the Contracting Officer;

(ii) At a distance of at least 750 feet from the runway centerline, plus any additional distance; and

(iii) Necessary to ensure compliance with the other provisions of this clause; and

(6) Not open a trench unless material is on hand and ready for placing in the trench. As soon as practicable after material has been placed and work approved, the Contractor shall backfill and compact trenches as required by the contract. Meanwhile, all hazardous conditions shall be marked and lighted in accordance with the other provisions of this clause.

(d) Landing areas. The Contractor shall--

(1) Place nothing upon the landing areas without the authorization of the Contracting Officer;

(2) Outline those landing areas hazardous to aircraft, using (unless otherwise authorized by the Contracting Officer) red flags by day, and electric, battery-operated low-intensity red flasher lights by night;

(3) Obtain, at an airfield where flying is controlled, additional permission from the control tower operator every time before entering any landing area, unless the landing area is marked as hazardous in accordance with paragraph (d)(2) of this clause;

(4) Identify all vehicles it operates in landing areas by means of a flag on a staff attached to, and flying above, the vehicle. The flag shall be three feet square, and consist of a checkered pattern of international orange and white squares of 1 foot on each side (except that the flag may vary up to ten percent from each of these dimensions);

(5) Mark all other equipment and materials in the landing areas, using the same marking devices as in paragraph (d)(2) of this clause; and

(6) Perform work so as to leave that portion of the landing area which is available to aircraft free from hazards, holes, piles of material, and projecting shoulders that might damage an airplane tire.

(e) Safety precaution areas. The Contractor shall--

(1) Place nothing upon the safety precaution areas without authorization of the Contracting Officer;

(2) Mark all equipment and materials in safety precaution areas, using (unless otherwise authorized by the Contracting Officer) red flags by day, and electric, battery-operated, low-intensity red flasher lights by night; and

(3) Provide all objects placed in safety precaution areas with a red light or red lantern at night, if the objects project above the approach-departure clearance surface or above the transitional surface.

(End of clause)

APPLIES TO LARGE BUSINESS ONLY

109 52.242-7004 MATERIAL MANAGEMENT AND ACCOUNTING SYSTEM (SEP 1996)

(a) Definitions. As used in this clause--

(1) "Material management and accounting system" means the Contractor's system or systems for planning, controlling, and accounting for the acquisition, use, issuing, and disposition of material. Material management and accounting systems may be manual or automated. They may be stand-alone systems or they may be integrated with planning, engineering, estimating, purchasing, inventory, accounting, or other systems.

(2) "Valid time-phased requirements" means material which is--
(i) Needed to fulfill the production plan, including reasonable quantities for scrap, shrinkage, yield, etc.; and
(ii) Charged/billed to contracts or other cost objectives in a manner consistent with the need to fulfill the production plan.
(3) "Contractor" means a business unit as defined in section 31.001 of the Federal Acquisition Regulation (FAR).
(b) General. The Contractor agrees to--
(1) Maintain a material management and accounting system (MMAS) that--
(i) Reasonably forecasts material requirements;
(ii) Ensures that costs of purchased and fabricated material charged or allocated to a contract are based on valid time-phased requirements; and
(iii) Maintains a consistent, equitable, and unbiased logic for costing of material transactions.
(2) Assess its MMAS and take reasonable action to comply with the MMAS standards in paragraph (f) of this clause.
(c) Applicability. Paragraphs (d) and (e) of this clause apply only if the Contractor--
(1) Is a large business; and
(2) Received, in its fiscal year preceding award of this contract, Department of Defense prime contracts or subcontracts, and their modifications totaling--
(i) $70 million or more; or
(ii) $30 million or more (but less than $70 million), and is notified in writing by the Contracting Officer that paragraphs (d) and (e) apply.
(d) Disclosure, demonstration, and maintenance requirements. (1) The Contractor shall--
(i) Disclose its MMAS to the Administrative Contracting Officer in writing; and
(ii) If requested by the Administrative Contracting Officer, demonstrate that the MMAS conforms to the standards in paragraph (f) of this clause.
(2) An MMAS disclosure is adequate when the Contractor has provided the Administrative Contracting Officer with documentation which--
(i) Accurately describes those policies, procedures, and practices that the Contractor currently uses in its MMAS; and
(ii) Provides sufficient detail for the Government to reasonably make an informed judgment regarding the adequacy of the MMAS.
(3) An MMAS demonstration is adequate when the Contractor has provided the Administrative Contracting Officer--
(i) Sufficient evidence to demonstrate the degree of compliance of its MMAS with the standards at paragraph (f) of this clause; and
(ii) Identification of any significant deficiencies, the estimated cost impact of the deficiency, and a comprehensive corrective action plan.
(4) The Contractor shall disclose significant changes in its MMAS to the Administrative Contracting Officer within 30 days of implementation.
(5) If the Contractor desires the Government to protect such information as privileged or confidential, the Contractor shall--
(i) Notify the Government representative to whom the information is submitted, i.e., the ACO, or the auditor; and
(ii) Ensure an appropriate legend is on the face of the document(s) at the time of submission.
(e) Deficiencies. (1) If the Contractor receives a report which identifies deficiencies in its MMAS, the Contractor agrees to respond as follows--
(i) If the Contractor agrees with the report findings and recommendations, the Contractor shall--
(A) Within 30 days, state its agreement in writing; and
(B) Within 60 days, correct the deficiencies or submit a corrective action plan.
(ii) If the Contractor disagrees with the report findings and recommendations, the Contractor shall, within 30 days, state its rationale for each area of disagreement.
(2) The Administrative Contracting Officer shall evaluate the Contractor's response and notify the Contractor of the--
(i) Determination concerning remaining deficiencies;
(ii) Adequacy of any proposed or completed corrective action plan; and

(iii) Need for any new or revised corrective action plan.

(f) MMAS standards. MMAS systems shall have adequate internal accounting and administrative controls to ensure system and data integrity, and comply with the following:

(1) Have an adequate system description including policies, procedures, and operating instructions which comply with the Federal Acquisition Regulation and Defense FAR Supplement;

(2) Ensure that costs of purchased and fabricated material charged or allocated to a contract are based on valid time-phased requirements as impacted by minimum/economic order quantity restrictions--

(i) A 98 percent bill of material accuracy and a 95 percent master production schedule accuracy are desirable as a goal in order to ensure that requirements are both valid and appropriately time-phased.

(ii) If systems have accuracy levels below these, the Contractor shall demonstrate that--

(A) There is no material harm to the Government due to lower accuracy levels; and

(B) The cost to meet the accuracy goals is excessive in relation to the impact on the Government;

(3) Provide a mechanism to identify, report, and resolve system control weaknesses and manual override. Systems should identify operational exceptions such as excess/residual inventory as soon as known;

(4) Provide audit trails and maintain records (manual and those in machine readable form) necessary to evaluate system logic and to verify through transaction testing that the system is operating as desired;

(5) Establish and maintain adequate levels of record accuracy, and include reconciliation of recorded inventory quantities to physical inventory by part number on a periodic basis. A 95 percent accuracy level is desirable. If systems have an accuracy level below 95 percent, the Contractor shall demonstrate that--

(i) There is no material harm to the Government due to lower accuracy levels; and

(ii) The cost to meet the accuracy goal is excessive in relation to the impact on the Government;

(6) Provide detailed descriptions of circumstances which will result in manual or system generated transfers of parts;

(7) Maintain a consistent, equitable, and unbiased logic for costing of material transactions--

(i) The Contractor shall maintain and disclose written policies describing the transfer methodology and the loan/pay-back technique.

(ii) The costing methodology may be standard or actual cost, or any of the inventory costing methods in 48 CFR 9904.411-50(b). Consistency shall be maintained across all contract and customer types, and from accounting period to accounting period for initial charging and transfer charging.

(iii) The system should transfer parts and associated costs within the same billing period. In the few instances where this may not be appropriate, the Contractor may accomplish the material transaction using a loan/pay-back technique. The "loan/pay-back technique" means that the physical part is moved temporarily from the contract, but the cost of the part remains on the contract. The procedures for the loan/pay-back technique must be approved by the Administrative Contracting Officer. When the technique is used, the Contractor shall have controls to ensure--

(A) Parts are paid back expeditiously;

(B) Procedures and controls are in place to correct any overbilling that might occur;

(C) Monthly, at a minimum, identification of the borrowing contract and the date the part was borrowed; and

(D) The cost of the replacement part is charged to the borrowing contract;

(8) Where allocations from common inventory accounts are used, have controls (in addition to those in paragraphs (b)(2) and (7) of this clause) to ensure that--

(i) Reallocations and any credit due are processed no less frequently than the routine billing cycle;

(ii) Inventories retained for requirements which are not under contract are not allocated to contracts; and

(iii) Algorithms are maintained based on valid and current data;

(9) Notwithstanding FAR 45.505-3(f)(1)(ii), have adequate controls to ensure that physically commingled inventories that may include material

for which costs are charged or allocated to fixed-price, cost-reimbursement, and commercial contracts do not compromise requirements of any of the standards in paragraphs (f)(1) through (8) of this clause. Government furnished material shall not be--

(i) Physically commingled with other material; or

(ii) Used on commercial work; and

(10) Be subjected to periodic internal audits to ensure compliance with established policies and procedures.

(End of clause)

110 52.243-7001 PRICING OF CONTRACT MODIFICATIONS (DEC 1991)

When costs are a factor in any price adjustment under this contract, the contract cost principles and procedures in FAR Part 31 and DFARS Part 231, in effect on the date of this contract, apply.

(End of clause)

111 52.247-7024 NOTIFICATION OF TRANSPORTATION OF SUPPLIES BY SEA (NOV 1995)

(a) The Contractor has indicated by the response to the solicitation provision, Representation of Extent of Transportation by Sea, that it did not anticipate transporting by sea any supplies. If, however, after the award of this contract, the Contractor learns that supplies, as defined in the Transportation of Supplies by Sea clause of this contract, will be transported by sea, the Contractor--

(1) Shall notify the Contracting Officer of that fact; and

(2) Hereby agrees to comply with all the terms and conditions of the Transportation of Supplies by Sea clause of this contract.

(b) The Contractor shall include this clause, including this paragraph (b), revised as necessary to reflect the relationship of the contracting parties, in all subcontracts hereunder, except (effective May 1, 1996) subcontracts for the acquisition of commercial items or components.

(End of clause)

112 52.215-4011 A PRICE REDUCTION FOR DEFECTIVE COST OR PRICING DATA--MODIFICATIONS (OCT 1997)

(a) This clause shall become operative only for any modification to this contract involving a pricing adjustment expected to exceed the threshold for submission of cost or pricing data at FAR 15.403-4, except that this clause does not apply to any modification if an exception under FAR 15.403-1 applies.

(b) If any price, including profit or fee, negotiated in connection with any modification under this clause, or any cost reimbursable under this contract, was increased by any significant amount because (1) the Contractor or a subcontractor furnished cost or pricing data that were not complete, accurate, and current as certified in its Certificate of Current Cost or Pricing Data, (2) a subcontractor or prospective subcontractor furnished the Contractor cost or pricing data that were not complete, accurate, and current as certified in the Contractor's Certificate of Current Cost or Pricing Data, or (3) any of these parties furnished data of any description that were not accurate, the price or cost shall be reduced accordingly and the contract shall be modified to reflect the reduction. This right to a price reduction is limited to that resulting from defects in data relating to modifications for which this clause becomes operative under paragraph (a) of this clause.

(c) Any reduction in the contract price under paragraph (b) of this clause due to defective data from a prospective subcontractor that was not subsequently awarded the subcontract shall be limited to the amount, plus applicable overhead and profit markup, by which--

(1) The actual subcontract; or

(2) The actual cost to the Contractor, if there was no subcontract, was less than the prospective subcontract cost estimate submitted by the Contractor; provided, that the actual subcontract price was not itself affected by defective cost or pricing data.

(d)(1) If the Contracting Officer determines under paragraph (b) of this clause that a price or cost reduction should be made, the Contractor agrees not to raise the following matters as a defense:

(i) The Contractor or subcontractor was a sole source supplier or otherwise was in a superior bargaining position and thus the price of the contract would not have been modified even if accurate, complete, and current cost or pricing data had been submitted.

(ii) The Contracting Officer should have known that the cost or pricing data in issue were defective even though the Contractor or subcontractor took no affirmative action to bring the character of the data to the attention of the Contracting Officer.

(iii) The contract was based on an agreement about the total cost of the contract and there was no agreement about the cost of each item procured under the contract.

(iv) The Contractor or subcontractor did not submit a Certificate of Current Cost or Pricing Data.

(2)(i) Except as prohibited by subdivision (d)(2)(ii) of this clause, an offset in an amount determined appropriate by the Contracting Officer based upon the facts shall be allowed against the amount of a contract price reduction if--

(A) The Contractor certifies to the Contracting Officer that, to the best of the Contractor's knowledge and belief, the Contractor is entitled to the offset in the amount requested; and

(B) The Contractor proves that the cost or pricing data were available before the "as of" date specified on its Certificate of Current Cost or Pricing Data, and that the data were not submitted before such date.

(ii) An offset shall not be allowed if--

(A) The understated data was known by the Contractor to be understated before the "as of" date specified on its

(B) The Government proves that the facts demonstrate that the contract price would not have increased in the amount to be offset even if the available data had been submitted before the "as of" date specified on its Certificate of Current Cost or Pricing Data.

(e) If any reduction in the contract price under this clause reduces the price of items for which payment was made prior to the date of the modification reflecting the price reduction, the Contractor shall be liable to and shall pay the United States at the time such overpayment is repaid--

(1) Simple interest on the amount of such overpayment to be computed from the date(s) of overpayment to the Contractor to the date the Government is repaid by the Contractor at the applicable underpayment rate effective for each quarter prescribed by the Secretary of the Treasury under 26 U.S.C. 6621(a)(2); and

(2) A penalty equal to the amount of the overpayment, if the Contractor or subcontractor knowingly submitted cost or pricing data that were incomplete, inaccurate, or noncurrent.

(End of clause)

113 52.215-4013 A SUBCONTRACTOR COST OR PRICING DATA--MODIFICATIONS (OCT 1997)

(a) The requirements of paragraphs (b) and (c) of this clause shall-

(1) Become operative only for any modification to this contract involving a pricing adjustment expected to exceed the threshold for submission of cost or pricing data at FAR 15.403-4; and

(2) Be limited to such modifications.

(b) Before awarding any subcontract expected to exceed the threshold for submission of cost or pricing data at FAR 15.403-4, on the date of agreement on price or the date of award, whichever is later; or before pricing any subcontract modification involving a pricing adjustment expected to exceed the threshold for submission of cost or pricing data at FAR 15.403-4, the Contractor shall require the subcontractor to submit cost or pricing data (actually or by specific identification in writing), unless an exception under FAR 15.403-1 applies.

(c) The Contractor shall require the subcontractor to certify in substantially the form prescribed in FAR 15.406-2 that, to the best of its knowledge and belief, the data submitted under paragraph (b) of this clause were accurate, complete, and current as of the date of agreement on the negotiated price of the subcontract or subcontract modification.

(d) The Contractor shall insert the substance of this clause, including this paragraph (d), in each subcontract that exceeds the threshold for submission of cost or pricing data at FAR 15.403-4 on the date of agreement on price or the date of award, whichever is later.

(End of clause)

114 52.215-4021 A REQUIREMENTS FOR COST OR PRICING DATA OR INFORMATION OTHER THAN COSTS OR PRICING DATA--MODIFICATIONS (OCT 1997) (FAR 52.215-0021)

(a) Exceptions from cost or pricing data.

(1) In lieu of submitting cost or pricing data for modifications under this contract, for price adjustments expected to exceed the threshold set forth at FAR 15.403-4 on the date of the agreement on price or the date of the award, whichever is later, the Contractor may submit a written request for exception by submitting the information described in the following subparagraphs. The Contracting Officer may require additional supporting information, but only to the extent necessary to determine whether an exception should be granted, and whether the price is fair and reasonable--

(i) Identification of the law or regulation establishing the price offered. If the price is controlled under law by periodic rulings, reviews, or similar actions of a governmental body, attach a copy of the controlling document, unless it was previously submitted to the contracting office.

(ii) Information on modifications of contracts or subcontracts for commercial items. (A) If--

(1) the original contract or subcontract was granted an exception from cost or pricing data requirements because the price agreed upon was based on adequate price competition, or prices set by law or regulation, or was a contract or subcontract for the acquisition of a commercial item; and

(2) The modification (to the contract or subcontract) is not exempted based on one of these exceptions, then the Contractor may provide information to establish that the modification would not change the contract or subcontract from a contract or subcontract for the acquisition of a commercial item to a contract or subcontract for the acquisition of an item other than a commercial item.

(B) For a commercial item exception, the Contractor shall provide, at a minimum, information on prices at which the same item or similar items have previously been sold that is adequate for evaluating the reasonableness of the price of the modification. Such information may include:

(1) For catalog items, a copy of or identification of the catalog and its date, or the appropriate pages for the offered items, or a statement that the catalog is on file in the buying office to which the proposal is being submitted. Provide a copy or describe current discount policies and price lists (published or unpublished), e.g., wholesale, original equipment manufacturer, or reseller. Also explain the basis of each offered price and its relationship to the established catalog price, including how the proposed price relates to the price of recent sales in quantities similar to the proposed quantities.

(2) For market-priced items, the source and date or period of the market quotation or other basis for market price, the base amount, and applicable discounts. In addition, describe the nature of the market.

(3) For items included on an active Federal Supply Service Multiple Award Schedule contract, proof that an exception has been granted for the schedule item.

(2) The Contractor grants the Contracting Officer or an authorized representative the right to examine, at any time before award, books, records, documents, or other directly pertinent records to verify any request for an exception under this clause, and the reasonableness of price. For items priced using catalog or market prices, or law or regulation, access does not extend to cost or profit information or other data relevant solely to the Contractor's determination of the prices to be offered in the catalog or marketplace.

(b) Requirements for cost or pricing data. If the Contractor is not granted an exception from the requirement to submit cost or pricing data, the following applies:

(1) The Contractor shall submit cost or pricing data and supporting attachments in accordance with Table 15-2 of FAR 15.408.

(2) As soon as practical after agreement on price, but before award

(except for unpriced actions), the Contractor shall submit a Certificate of Current Cost or Pricing Data, as prescribed by FAR 15.406-2.

(End of clause.)

115 52.7243-4002 a DFARS 252.243-7002 CERTIFICATION OF REQUESTS FOR EQUITABLE ADJUSTMENT (JULY 1997)

(a) In accordance with 10 U.S.C. 2410(a), any request for equitable adjustment to contract terms that exceeds the simplified acquisition threshold shall bear, at the time of submission, the following certificate executed by an individual authorized to certify the request on behalf of the Contractor:

I certify that the request is made in good faith, and that the supporting data are accurate and complete to the best of my knowledge and belief.

_____

(Official's Name)

_____

(Title)

(b) The certificate in paragraph (a) of this clause requires full disclosure of all relevant facts, including--

(1) Cost or pricing data if required in accordance with FAR 15.804-2; and

(2) Actual cost data and data to support any estimated costs, even if cost of pricing data are not required.

(c) The certification requirement in paragraph (a) of this clause does not apply to--(1) Requests for routine contract payments; for example, requests for payment for accepted supplies and services, routine vouchers under a cost-reimbursement type contract, or progress payment invoices; or

(2) Final adjustments under an incentive provision of the contract.

(d) The amount requested shall accurately reflect the contract adjustment for which the Contractor believes the Government is liable. The request shall include only costs for performing the change, and shall not include any costs that already have been reimbursed or that have been separately claimed. All indirect costs included in the request shall be properly allocable to the change in accordance with applicable acquisition regulations.

(End of clause)

END OF SECTION 00700

TABLE OF CONTENTS
SECTION 00800
SPECIAL CONTRACT REQUIREMENTS


| | | |
|---|---|---|
| 1 | 52.236-14 | AVAILABILITY AND USE OF UTILITY SERVICES (APR 1984) |
| 2 | 52.246-21 | WARRANTY OF CONSTRUCTION (MAR 1994) |
| 3 | 52.223-7001 | HAZARD WARNING LABELS (DEC 1991) |
| 4 | 52.223-7005 | HAZARDOUS WASTE LIABILITY (OCT 1992) |
| 5 | 52.236-7002 | OBSTRUCTION OF NAVIGABLE WATERWAYS (DEC 1991) |
| 6 | 52.242-7000 | POSTAWARD CONFERENCE (DEC 1991) |
| 7 | 52.217-9000 | ADJUSTMENTS TO CONTRACTOR S COEFFICIENT FOR OPTION YEARS (JOB ORDER CONTRACTS) (JUL 1997) |
| 8 | 52.232-5000 | PAYMENT FOR MATERIALS DELIVERED OFF-SITE (MAR 1995)--EFARS |
| 9 | 52.2-4001 | SCOPE OF WORK (LRD)(NOV 1997) |
| 10 | 52.2-4003 | ORDERING OFFICERS (LRD)(NOV 1997) |
| 11 | 52.2-4004 | IDENTIFICATION OF CORRESPONDENCE (LRD)(NOV 1997) |
| 12 | 52.2-4005 | CONTRACT ADMINISTRATION (LRD)(NOV 1997) |
| 13 | 52.2-4006 | DESIGNATED BILLING OFFICE (LRD)(NOV 1997) |
| 14 | 52.2-4007 | LIQUIDATED DAMAGES--CONSTRUCTION (FAR 52.212-5) (APR 1984) |
| 15 | 52.2-4009 | DESIGNATION OF TECHNICAL REPRESENTATIVE (LRD)(NOV 1997) |
| 16 | 52.2-4010 | PAYMENT (LRD)(NOV 1997) |
| 17 | 52.2-4011 | PERFORMANCE (LRD)(NOV 1997) |
| 18 | 52.2-4013 | MOBILIZATION (LRD)(NOV 1997) |
| 19 | 52.2-4014 | PRE-FINAL AND FINAL INSPECTION (LRD)(NOV 1997) |
| 20 | 52.2-4015 | ACCEPTANCE OF WORK (LRD)(NOV 1997) |
| 21 | 52.2-4016 | COMMENCEMENT, PROSECUTION, AND COMPLETION OF WORK (FAR 52.212-3) |
| 22 | 52.2-4017 | MINIMUM CONTRACT VALUE (LRD)(NOV 1997) |
| 23 | 52.2-4018 | WORK BY THE GOVERNMENT (LRD)(NOV 1997) |
| 24 | 52.2-4019 | NON-PREPRICED WORK (LRD)(NOV 1997) |
| 25 | 52.2-4021 | NORMAL ORDERING PROCEDURES (LRD)(NOV 1997) |
| 26 | 52.2-4023 | QUALITY OF SUBMISSIONS (LRD)(NOV 1997) |
| 27 | 52.2-4024 | TIME ALLOWED FOR COMPLETION OF DELIVERY ORDERS (LRD)(NOV 1997) |
| 28 | 52.2-4025 | GOVERNMENT-FURNISHED EQUIPMENT/MATERIALS (LRD)(NOV 1997) |
| 29 | 52.2-4026 | SECURITY REQUIREMENTS (LRD)(NOV 1997) |
| 30 | 52.2-4027 | SCHEDULING WORK (LRD)(NOV 1997) |
| 31 | 52.2-4028 | RECORD DRAWINGS (LRD)(NOV 1997) |
| 32 | 52.2-4029 | ENVIRONMENTAL PROTECTION (LRD)(NOV 1997) |
| 33 | 52.2-4030 | CONSTRUCTION SITE MAINTENANCE (LRD)(NOV 1997) |
| 34 | 52.2-4031 | NOISE CONTROL (LRD)(NOV 1997) |
| 35 | 52.2-4032 | EQUIPMENT ON THE SITE (LRD)(NOV 1997) |
| 36 | 52.2-4033 | TRUCKING (LRD)(NOV 1997) |
| 37 | 52.2-4034 | TOILET FACILITIES (LRD)(NOV 1997) |
| 38 | 52.2-4036 | SAFETY ASSURANCE (LRD) (NOV 1997) |
| 39 | 52.2-4038 | PRESERVING HISTORICAL AND ARCHAEOLOGICAL FINDS (LRD) (NOV 1997) |
| 40 | 52.2-4039 | ASBESTOS REMOVAL FOR DISPOSAL (LRD) (NOV 1997) |
| 41 | 52.2-4040 | CONTRACTOR STAFF (LRD) (NOV 1997) |
| 42 | 52.2-4041 | GOVERNMENT-FURNISHED UTILITIES (LRD) (NOV 1997) |
| 43 | 52.2-4042 | ADP SUPPORT REQUIREMENTS (LRD) (NOV 1997) |
| 44 | 52.2-4043 | GOVERNMENT-FURNISHED SOFTWARE (LRD) (NOV 1997) |
| 45 | 52.2-4044 | WASTE AND EXCESS QUANTITIES INCLUDED IN THE COMPLETED-IN-PLACE CONSTRUCTION QUANTITIES (LRD) (NOV 1997) |
| 46 | 52.2-4045 | FINAL CLEANUP COSTS INCLUDED WITH CONTRACT COEFFICIENT (LRD) (NOV 1997) |
| 47 | 52.2-4046 | PRICE ADJUSTMENT MODIFIERS (LRD) (NOV 1997) |
| 48 | 52.2-4047 | FIRE PREVENTION AND PROTECTION (LRD) (NOV 1997) |
| 49 | 52.2-4048 | CONTRACTOR ACCESS (LRD) (NOV 1997) |
| 50 | 52.2-4051 | CONTRACTOR QUALITY CONTROL (LRD) (NOV 1997) |
| 51 | 52.2-4052 | LEGAL PUBLIC HOLIDAYS (LRD) (NOV 1997) |
| 52 | 52.2-4053 | SALVAGEABLE AND REPAIRABLE MATERIALS (LRD) (NOV 1997) |
| 53 | 52.2-4054 | DEVIATION FROM PROPOSED LIST OF SUBCONTRACTORS (LRD) (NOV 1997) |
| 54 | 52.2-4055 | OPERATION AND MAINTENANCE MANUALS (LRD) (NOV 1997) |
| 55 | 52.2-4056 | MODIFICATIONS TO THE UNIT PRICE BOOK (UPB) (LRD) (NOV 1997) |
| 56 | 52.2-4058 | OPTIONS (LRD) (NOV 1997) |
| 57 | 52.2-4060 | CONSTRUCTION HAZARD COMMUNICATION (LRD) (NOV 1997) |
| 58 | 52.2-4061 | PAYMENT OFFICE (LRD)(NOV 1997) |
| 59 | 52.2-4062 | CONTRACTING OFFICER'S REPRESENTATIVE (LRD)(NOV 1997) |
| 60 | 52.2-4064 | EQUIPMENT WARRANTY IDENTIFICATION TAGS (LRD)(NOV 1997) |
| 61 | 52.2-4072 | PRECONSTRUCTION CONFERENCE (NOV 1997) |
| 62 | 52.2-4074 | AWARD OF TASK ORDERS (LRD)(NOV 1997) |
| 63 | 52.49-4113 | BASIS FOR SETTLEMENT OF PROPOSALS (EFARS 52.249-5000) (MAR 1995) |
| 64 | 52.231-4005 | EQUIPMENT OWNERSHIP AND OPERATING EXPENSE SCHEDULE (MAR 1995) |

| | | |
|---|---|---|
| | | (EFARS 52.231-5000) |
| 65 | 52.231-4005 I | EQUIPMENT OWNERSHIP AND OPERATING EXPENSE SCHEDULE (MAR 1995) (EFARS 52.231-5000) |
| 66 | 52.232-4001 I | EFARS 52.232-5002 - CONTINUING CONTRACTS (MAR 1995) |
| 67 | 52.236-4004 I | PHYSICAL DATA (APR 1984) |
| 68 | 52.1000-4200 | CONTRACTING OFFICER FOR CONTRACTS (MAR 1991) (LRD) |
| 69 | 52.1000-4210 | REQUIRED INSURANCE (APR 1984) (FAR 28.307-2) |
| 70 | | AWARD OF TASK ORDERS (DEC 1997)(LRD) |

SECTION 00800

SPECIAL CONTRACT REQUIREMENTS

1 52.236-14 AVAILABILITY AND USE OF UTILITY SERVICES (APR 1984)

(a) The Government shall make all reasonably required amounts of utilities available to the Contractor from existing outlets and supplies, as specified in the contract. Unless otherwise provided in the contract, the amount of each utility service consumed shall be charged to or paid for by the Contractor at prevailing rates charged to the Government or, where the utility is produced by the Government, at reasonable rates determined by the Contracting Officer. The Contractor shall carefully conserve any utilities furnished without charge.

(b) The Contractor, at its expense and in a workmanlike manner satisfactory to the Contracting Officer, shall install and maintain all necessary temporary connections and distribution lines, and all meters required to measure the amount of each utility used for the purpose of determining charges. Before final acceptance of the work by the Government, the Contractor shall remove all the temporary connections, distribution lines, meters, and associated paraphernalia.

(End of clause)
(R 7-603.30 1967 APR)
(R 7-2102.4 1976 OCT)

2 52.246-21 WARRANTY OF CONSTRUCTION (MAR 1994)

(a) In addition to any other warranties in this contract, the Contractor warrants, except as provided in paragraph (i) of this clause, that work performed under this contract conforms to the contract requirements and is free of any defect in equipment, material, or design furnished, or workmanship performed by the Contractor or any subcontractor or supplier at any tier.

(b) This warranty shall continue for a period of 1 year from the date of final acceptance of the work. If the Government takes possession of any part of the work before final acceptance, this warranty shall continue for a period of 1 year from the date the Government takes possession.

(c) The Contractor shall remedy at the Contractor's expense any failure to conform, or any defect. In addition, the Contractor shall remedy at the Contractor's expense any damage to Government-owned or controlled real or personal property, when that damage is the result of--

(1) The Contractor's failure to conform to contract requirements; or

(2) Any defect of equipment, material, workmanship, or design furnished.

(d) The Contractor shall restore any work damaged in fulfilling the terms and conditions of this clause. The Contractor's warranty with respect to work repaired or replaced will run for 1 year from the date of repair or replacement.

(e) The Contracting Officer shall notify the Contractor, in writing, within a reasonable time after the discovery of any failure, defect, or damage.

(f) If the Contractor fails to remedy any failure, defect, or damage within a reasonable time after receipt of notice, the Government shall have the right to replace, repair, or otherwise remedy the failure, defect, or damage at the Contractor's expense.

(g) With respect to all warranties, express or implied, from subcontractors, manufacturers, or suppliers for work performed and materials furnished under this contract, the Contractor shall--

(1) Obtain all warranties that would be given in normal commercial practice;

(2) Require all warranties to be executed, in writing, for the benefit of the Government, if directed by the Contracting Officer; and

(3) Enforce all warranties for the benefit of the Government, if directed by the Contracting Officer.

(h) In the event the Contractor's warranty under paragraph (b) of this clause has expired, the Government may bring suit at its expense to enforce a subcontractor's, manufacturer's, or supplier's warranty.

(i) Unless a defect is caused by the negligence of the Contractor or subcontractor or supplier at any tier, the Contractor shall not be

liable for the repair of any defects of material or design furnished by the Government nor for the repair of any damage that results from any defect in Government-furnished material or design.

(j) This warranty shall not limit the Government's rights under the Inspection and Acceptance clause of this contract with respect to latent defects, gross mistakes, or fraud.

(End of clause)

(R 7-604.4 1976 JUL)

3 52.223-7001 HAZARD WARNING LABELS (DEC 1991)

(a) "Hazardous material," as used in this clause, is defined in the Hazardous Material Identification and Material Safety Data clause of this contract.

(b) The Contractor shall label the item package (unit container) of any hazardous material to be delivered under this contract in accordance with the Hazard Communication Standard (29 CFR 1910.1200 et seq.). The Standard requires that the hazard warning label conform to the requirements of the standard unless the material is otherwise subject to the labeling requirements of one of the following statutes:

(1) Federal Insecticide, Fungicide and Rodenticide Act;
(2) Federal Food, Drug and Cosmetics Act;
(3) Consumer Product Safety Act;
(4) Federal Hazardous Substances Act; or
(5) Federal Alcohol Administration Act.

(c) The Offeror shall list which hazardous material listed in the Hazardous Material Identification and Material Safety Data clause of this contract will be labeled in accordance with one of the Acts in paragraphs (b)(1) through (5) of this clause instead of the Hazard Communication Standard. Any hazardous material not listed will be interpreted to mean that a label is required in accordance with the Hazard Communication Standard.

| Material (if none, insert "none.") | Act |
|---|---|
| __none____ | _____ |
| _____ | _____ |

(d) The apparently successful Offeror agrees to submit, before award, a copy of the hazard warning label for all hazardous materials not listed in paragraph (c) of this clause. The Offeror shall submit the label with the Material Safety Data Sheet being furnished under the Hazardous Material Identification and Material Safety Data clause of this contract.

(e) The Contractor shall also comply with MIL-STD-129, Marking for Shipment and Storage (including revisions adopted during the term of this contract).

(End of clause)

4 52.223-7005 HAZARDOUS WASTE LIABILITY (OCT 1992)

(a) Definitions.

As used in this clause--

(1) "Hazardous waste" has the meaning given that term by section 1004(5) of the Solid Waste Disposal Act (42 U.S.C. 6903(5)), except that such term also includes polychlorinated biphenyls (PCB).

(2) "Polychlorinated biphenyls" (PCB) has the meaning given that term under section 6(e) of the Toxic Substances Control Act (15 U.S.C. 2605(e)).

(b) Upon receipt of hazardous waste properly characterized pursuant to applicable laws and regulations, the Contractor agrees that it shall reimburse the Government for any penalties assessed against, all liabilities incurred by, costs incurred by, and damages suffered by, the Government that are caused by--

(1) The Contractor's breach of any terms of the contract; or

(2) Any negligent or willful act or omission of the Contractor or employees of the Contractor, in the performance of the contract.

(c) Not later than 30 days after the award date of the contract, the Contractor shall demonstrate the ability to reimburse the Government as

provided in paragraph (b) of this clause, by providing evidence to the Contracting Officer that--

(1) The facility has liability insurance meeting the requirements of 40 CFR 264.147; or

(2) The facility meets the financial assurance requirements of 40 CFR 264.147 for sudden and nonsudden accidental occurrences.

(d) This clause does not apply to--

(1) Performance of remedial action or corrective action under--

(i) The Defense Environmental Restoration Program;

(ii) Other programs or activities of the Department of Defense; or

(iii) Authorized State hazardous waste programs;

(2) Disposal of hazardous waste when the generation of such waste is incidental to the performance of the contract; or

(3) Disposal of ammunition or solid rocket motors.

(e) The Contractor shall include this clause, including this paragraph (e), in each subcontract under which the subcontractor receives hazardous waste from a defense facility.

(End of clause)

5 52.236-7002 OBSTRUCTION OF NAVIGABLE WATERWAYS (DEC 1991)

(a) The Contractor shall--

(1) Promptly recover and remove any material, plant, machinery, or appliance which the Contractor loses, dumps, throws overboard, sinks, or misplaces, and which, in the opinion of the Contracting Officer, may be dangerous to or obstruct navigation;

(2) Give immediate notice, with description and locations of any such obstructions, to the Contracting Officer; and

(3) When required by the Contracting Officer, mark or buoy such obstructions until the same are removed.

(b) The Contracting Officer may--

(1) Remove the obstructions by contract or otherwise should the Contractor refuse, neglect, or delay compliance with paragraph (a) of this clause; and

(2) Deduct the cost of removal from any monies due or to become due to the Contractor; or

(3) Recover the cost of removal under the Contractor's bond.

(c) The Contractor's liability for the removal of a vessel wrecked or sunk without fault or negligence is limited to that provided in sections 15, 19, and 20 of the River and Harbor Act of March 3, 1899 (33 U.S.C. 410 et seq.).

(End of clause)

6 52.242-7000 POSTAWARD CONFERENCE (DEC 1991)

The Contractor agrees to attend any postaward conference convened by the contracting activity or contract administration office in accordance with Federal Acquisition Regulation Subpart 42.5.

(End of clause)

7 52.217-9000 ADJUSTMENTS TO CONTRACTOR S COEFFICIENT FOR OPTION YEARS (JOB ORDER CONTRACTS) (JUL 1997)

"Pricing" of option periods, to include consideration of any adjustments shall be performed by an economic price adjustment for those periods, as follows:

An economic adjustment will be applied to the contract coefficient(s) addressing changes in the cost of labor, equipment and material in the Unit Price Book (UPB) (this includes consideration of Davis Bacon issues). This allows for economic increase or decrease of the prices in the Unit Price Book (UPB) and serves to adjust line item prices by the percentage increase or decrease of the economic trend in the construction market. The economic price adjustment will be based on the Building Cost Index (BCI) found in the Market Trend pages of the Engineering News Record (ENR). The economic adjustment is not applied to the cost items comprising the coefficient. No upward adjustment shall apply to delivery orders awarded prior to the effective date of the adjustment, regardless of the date of commencement of

work thereunder.

The adjustment will be made in accordance with the following equation. The resulting revised coefficient(s) shall be applied throughout the option year.

N = C + i

Where: N = New Coefficient
C = Base Year Coefficient
i = Change Factor (% increase or decrease from base to option year)

The Index Factor, i, shall be computed according to the following equation:

$$i = \frac{BCIN}{BCIC} - 1$$

Where:

BCIN is the Building Cost Index, published in the ENR, for the month prior to the effective date of the option period.

BCIC is the Building Cost Index, as published in the ENR, on the date of the award of the contract. The BCIC is _____ based on the award date of _____

If the BCI or the ENR ceases to be published, the parties shall agree on substitute indices.

EXAMPLE: For the base year of a contract the coefficient is 1.10. The cost to the government for a line item whose cost is $100.00 is 1.10 x $100.00 = $110.00.

OPTION YEAR 1. For the first option year the coefficient will be adjusted as follows:

$$i = \frac{BCIN}{BCIC} - 1 = \frac{3111.86}{3071.10} - 1 = 1.0133 - 1 = -.0133$$

The new coefficient would be calculated as follows:

N = C + i = 1.10 + 0.0133 = 1.1133

The above line item under the option period would be 1.1133 x $100.00 = $111.33.

OPTION YEAR 2. For the second option year, if the BCI for the month prior to the effective date of the option period was 3002.99, the coefficient will be adjusted as follows:

$$i = \frac{BCIN}{BCIC} - 1 = \frac{3062.99}{3071.10} - 1 = .9974 - 1 = -0.0026$$

The new coefficient would be calculated as follows:

N = C + i = 1.10 - 0.0026 = 1.0974

The above line item under the second option period would be 1.0974 x $100.00 = $109.74

Note 1. Round calculations for the Change Factor (i) to the nearest ten thousandth.

Note 2. ENR indices for calculation of coefficients for the option years are taken from the McGraw Hill publication, ENR, published during the month prior to the effective date of the option. The ENR Index for the base year (contract award) is the most recent ENR index published for the month prior to initial contract award.

(End of clause)

8 52.232-5000 PAYMENT FOR MATERIALS DELIVERED OFF-SITE (MAR 1995)--EFARS

(a) Pursuant to FAR clause 52.232-5, Payments Under Fixed Priced Construction Contracts, materials delivered to the contractor at locations other than the site of the work may be taken into consideration in making payments if included in payment estimates and if all the conditions of the General Provisions are fulfilled. Payment for items delivered to locations other than the work site will be limited to: (1) materials required by the technical provisions; or (2) materials that have been fabricated to the point where they are identifiable to an item of work required under this contract.

(b) Such payment will be made only after receipt of paid or receipted invoices or invoices with canceled check showing title to the items in the prime contractor and including the value of material and labor incorporated into the item. In addition to petroleum products, payment for materials delivered off-site is limited to the following items: N/A

(End of clause)

9 52.2-4001 SCOPE OF WORK (LRD)(NOV 1997)

The contractor shall provide, upon receipt of a delivery order, all work materials, supplies, parts (to include system components), plant, supervision, labor, and equipment, except when specified as Government-furnished, to repair or construct real property facilities and structures within a six state area including Arkansas, Missouri, Louisiana, Oklahoma, Texas, and New Mexico as specified in strict 00900, Attachment 3, Map of the FTC and related services as specified in accordance with all terms, conditions, special contract requirements, specifications, drawings, attachments, and exhibits contained in the contract or incorporated by reference as follows:

(a) Contractor's work responsibility shall include all contractor planning, programming, administration, and management necessary to provide all repair or construction and related services as specified. The work shall be conducted by the Contractor in strict accordance with the contract and all applicable Federal, State of Arkansas and local laws, regulations, codes, or directives. The Contractor shall ensure that all work provided meets, or exceeds, critical reliability rates or tolerances specified or included in applicable documents. Contractor shall provide related services such as preparing and submitting required reports, performing administrative work, and submitting necessary information as specified under this contract and within individual delivery orders.

(b) The following documents shall be used in the execution of work under the contract:

(1) Unit Price Book (UPB)

(A) The UPB contains pricing information (i.e., Government Estimate) for the description of work to be accomplished and for the unit of measure specified.

(B) The UPB consists of Divisions 1 through 16 which are applicable to Division 1 through 19 of the JOC Technical Specifications.

(2) Job Order Contract Technical Specifications

The intent of these specifications is to furnish concise industrial and/or commercial standards for maintenance and repair of Government facilities.

2. SAMPLE CALCULATION. The following sample calculation illustrates the use of the UPB.

PARKING APRON DEMOLITION AND REPAIR

(a) Demolition. $\frac{11 \times 15}{9} = 18$ SY

$\frac{11 \times 15 \times .5}{27} = \frac{83}{27} = 3$ CY

(b) Repair.

(1) Base - $\frac{11 \times 15 \times .17}{27} = 1$ CY

(2) Conc - $\frac{11 \times 15 \times .5}{27} = 3$ CY

(3) Mesh - $11 \times 15 = 165$ SF

(4) Formwork - 26 LF

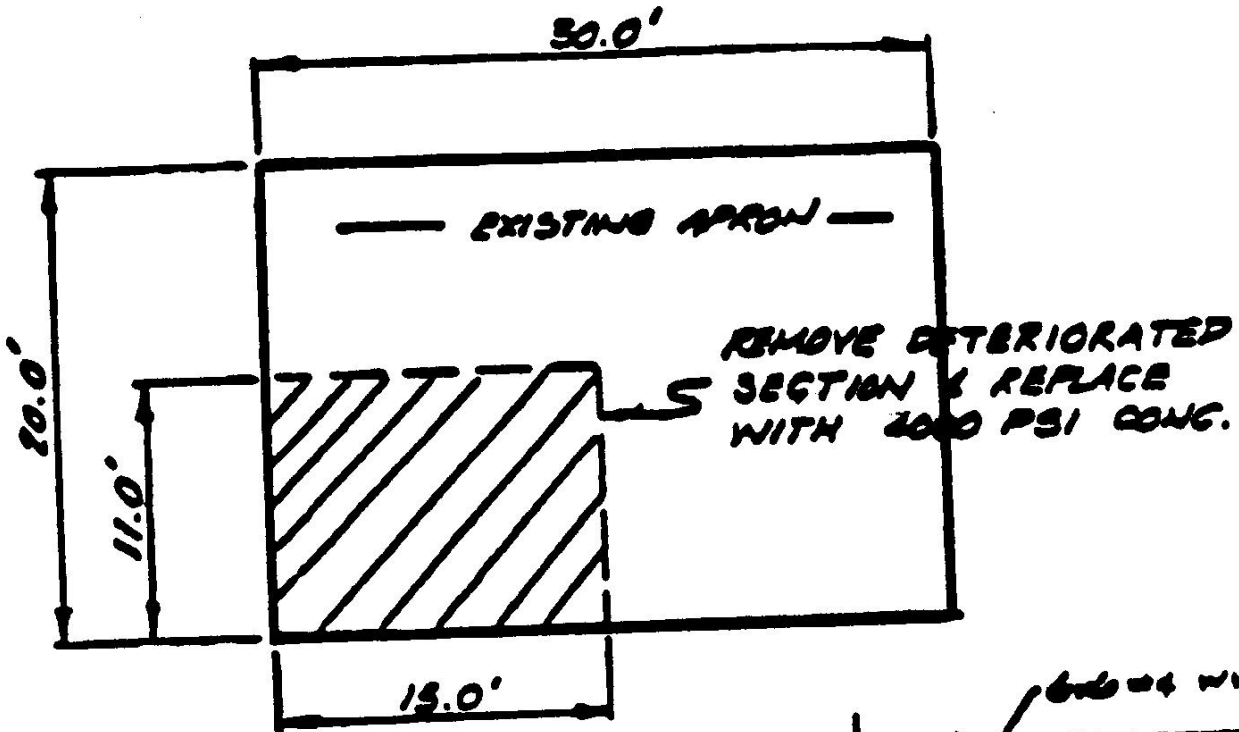
PARKING APRON DEMOLITION AND REPAIR

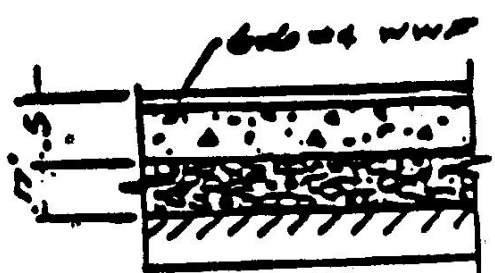
DEMOLITION

| LINE ITEM NO. | UPB NO. | DESCRIPTION | QUANTITY | UNIT PRICE | TOTAL |
|---|---|---|---|---|---|
| 0001 | 02112-6005 | Saw-Cut Pavement | 26 LF at | $0.15/LF = | $ 3.90 |
| 0002 | 02112-1201 | Concrete Pavement with Mesh | 18 SY at | 2.05/SY = | 36.90 |
| 0003 | 02111-1403 | Rubbish Hauling (2 miles) (Machine Loaded) | 4 CY at | 10.31/CY = | 41.24 |
| REPAIR | | | | | |
| 0004 | 02619-1001 | Gravel Surfacing | 1 CY at | 23.51/CY = | 23.51 |
| 0005 | 02222-4202 | Compaction | 1 CY at | 1.48/CY = | 1.48 |
| 0006 | 03110-1611 | Formwork | 26 LF at | 0.90/LF = | 23.40 |
| 0007 | 03220-1004 | Welded Wire | 165 SF at | 0.30/SF = | 49.50 |
| 0008 | 03311-1164 | Concrete (3,000 PSI) | 3 CY at | 34.64/CY = | 103.92 |
| 0009 | 03311-3005 | Mod for (4,000 PSI) | 3 CY at | 1.61/CY = | 4.83 |
| 0010 | 03311-4101 | Screed Concrete | 165 SF at | 0.16/SF = | 26.40 |
| 0011 | 03305-1004 | Curing Compound | 1.65 CSF at | 4.02/CSF = | 6.63 |
| | | | TOTAL DIRECT COST | = | 321.71 |
| | | | *COEFFICIENT | | X 1.25 |
| | | | TOTAL PRICE | = | 402.13 |

*Assumes Contractor coefficient of 1.25 for normal working hours

# PARKING APRON DEMOLITION & REPAIR



(c) The intent of these specifications is to furnish concise industrial and/or commercial standards for maintenance and repair of Government facilities.

(2) Unit Price Book (UPB), volume II, Parts 1 and 2

(A) The UPB, Volume II, contains pricing information for the description of work to be accomplished and for the unit of measure specified.

(B) The UPB, Volume II, consists of Divisions 1 through 19 which are applicable to Division 1 throu 19 of the JOC Technical Specifications, Volume I.

(C) Demolition price is included in the last column of each line item.

(3) Abbreviations - A list of abbreviations to be used in the UPB, Volume II, is provided.

10 52.2-4003 ORDERING OFFICERS (LRD)(NOV 1997)

The Contractor will be provided written notice if Ordering Officer authority is given to anyone other than a Contracting Officer. Such notice will identify the Ordering Officer and limitations.

11 52.2-4004 IDENTIFICATION OF CORRESPONDENCE (LRD)(NOV 1997)

All correspondence submitted by the Contractor under this contract shall reference the date and contract number. Delivery order number and/or modification number shall be stated if applicable.

12 52.2-4005 CONTRACT ADMINISTRATION (LRD)(NOV 1997)

Administration of the task orders under this contract will be performed by the Contracting Officer's Representative located near the work site. Overall administration of the contract will be performed by the Contracting Officer, Contracting Division, U.S. Army, Corps of Engineers, Little Rock District, telephone (501) 324-5721. No changes, deviations, or waivers shall be effective without a modification of the contract executed by the Contracting Officer authorizing such changes, deviations, or waivers.

13 52.2-4006 DESIGNATED BILLING OFFICE (LRD)(NOV 1997)

Unless directed otherwise in the delivery order, the original and three copies of invoices shall be submitted directly to the payment office shown in block 27 of the Standard Form, SF 1442. One additional copy shall be submitted directly to the Contracting Officer's Representative (COR) responsible for the task order, for a total of four copies. All invoices shall reflect the contract number and the applicable task order number. Each invoice shall be certified by the Contractor as being true, complete, accurate, and due for payment. Any delay due to submission of incorrect invoices by the Contractor shall be cause to adjust any period related to any discounts offered. The original copy, submitted to the paying office, shall govern computation of any discount period.

14 52.2-4007 LIQUIDATED DAMAGES--CONSTRUCTION (FAR 52.212-5) (APR 1984)

(a) If the Contractor fails to complete the work within the time specified in each task order, or any extension, the Contractor shall pay to the Government as liquidated damages, the sum of $49.00 for each day of delay.

(b) If the Government terminates the Contractor's right to proceed, the resulting damage will consist of liquidated damages until such reasonable time as may be required for final completion of the work together with any increased costs occasioned the Government in completing the work.

(c) If the Government does not terminate the Contractor's right to proceed, the resulting damage will consist of liquidated damages until the work is completed or accepted.

(End of clause)
(R 7-602.5 1969 AUG)
(R 1-18.110(a))
(R 7-603.39 1965 JAN)
(R 1-8.709-1)

15 52.2-4009 DESIGNATION OF TECHNICAL REPRESENTATIVE (LRD)(NOV 1997)

The Ordering Officer or his authorized representative is designated as the Technical Representative of the Contracting Officer for the purpose of technical surveillance of workmanship and inspection of materials for work being performed under this contract. No inspector is authorized to change any provision of the specifications or permit deviations from such specifications without written authorization of the Contracting Officer nor shall the presence or absence of an inspector relieve the Contractor from any requirement of the contract.

16 52.2-4010 PAYMENT (LRD)(NOV 1997)

Payment will be made in accordance with Section 00700, Contract Clause 52.232-0005, Payments under Fixed-Price Construction Contracts. Payment for those delivery orders less than 60 days in performance time will be in one final payment. Delivery orders with a performance time longer than 60 days will allow the contractor the opportunity to submit monthly invoices for partial payments.

17 52.2-4011 PERFORMANCE (LRD)(NOV 1997)

(a) This is an indefinite delivery, indefinite quantity contract for the maintenance, repair and/or construction of items specified, with an estimated maximum contract amount of $15,000,000, effective from date of award until 31 May 1999. This contract also provides for four one year option periods to be exercised at the discretion of the Government.
(b) Delivery or performance shall be specified in each individual delivery order issued hereunder. Individual order performance time will be negotiated in accordance with Section 00800, ORDERING PROCEDURES.
(c) Final acceptance of work shall be issued as stated in Section 00700, Clause 52.246-0012.
(d) Payment shall be made in accordance with Section 00700, Clause No. 52.232-0005 for each delivery order.

18 52.2-4013 MOBILIZATION (LRD)(NOV 1997)

The Contractor shall commence any mobilization and familiarization activities prior to actual work on individual delivery orders as soon after contract award as practicable. However, WITHIN 14 CALENDAR DAYS after contract award, the Contractor shall be fully operational and capable of starting work on any required delivery order. This mobilization shall include:
(a) Meet with the Government representative to establish the agenda for the pre-construction conference.
(b) Have all critical staff members available for work on the installation.
(c) Be fully operational and capable of immediately starting work on any required delivery order.

19 52.2-4014 PRE-FINAL AND FINAL INSPECTION (LRD)(NOV 1997)

(a) The Contractor shall conduct a pre-final inspection prior to requesting a final inspection. Any discrepancies noted shall be corrected prior to any final inspection.
(b) When the Contractor is ready for final inspection, a request for final inspection shall be submitted in writing to the Ordering Officer. The final inspection shall normally be requested one day

before the desired date or as otherwise negotiated with the Ordering Officer

(c) The final inspection will be performed with the Contractor by the Government. Any discrepancies noted will be corrected within the time specified by the Ordering Officer prior to payment.

(d) Prior to performance of final inspection the Contractor shall submit and have approval by the Government of all submittals, as-built drawings and O&M manuals.

20 52.2-4015 ACCEPTANCE OF WORK (LRD)(NOV 1997)

(a) Prior to final acceptance of the job the Contractor shall insure the following:

(1) Final payrolls are on file.

(2) All payrolls are complete.

(3) Contractors Standard 1-year warranty (Section 00700, Clause No. 52.246-0021) is submitted.

(4) All product warranties (Section 00700, Clause No. 52.246-0021) are submitted.

(5) All Government property accounted for or restitution made.

(b) Final acceptance will not be made prior to the Contracting Officer receiving all submissions required. Failure to submit required items could result in withholding of payment of funds on the task order.

21 52.2-4016 COMMENCEMENT, PROSECUTION, AND COMPLETION OF WORK (FAR 52.212-3)

(APR 1984)

(a) The Contractor shall be required to receive task orders pursuant to the clause entitled "Ordering" (FAR 52.216-18). The basic contract period for issuance of delivery orders is from date of award to 31 May 1999, with four option periods, if exercised, extending the contract to 31 May 2003.

(b) The Contractor shall be required to (1) commence work under this contract as stated in Section 00800, ORDERING PROCEDURES, (2) prosecute the work diligently, and (3) complete the entire work ready for use not later than the time stated on the task order. The time stated for completion shall include final cleanup of the premises.

End of Clause

22 52.2-4017 MINIMUM CONTRACT VALUE (LRD)(NOV 1997)

(a) The guaranteed minimum quantity of work which will be required under this contract, and which will be initiated by one or more delivery orders, will not be less than $60,000 for the basic contract period and $30,000 for each of the four option periods, if exercised. The maximum contract value is $15,000,000. Individual task orders under this contract shall not exceed $2,000,000. The contractor is not responsible for performing work less than $2,000 for Arkansas or $25,000 for Missouri, Louisiana, Oklahoma, Texas, and New Mexico.

(b) If the Government's requirement for services set forth in the solicitation does not result in order in the amount described "estimated maximum," the event shall not constitute the basis for an equitable price adjustment under this contract.

23 52.2-4018 WORK BY THE GOVERNMENT (LRD)(NOV 1997)

(a) The Government reserves the right to undertake performance by Government forces or other Contractors, the same type or similar work as contracted for herein, as the Government deems necessary or desirable, and to do so will not breach or otherwise violate this contract.

(b) The Government reserves the right to unilaterally withdraw a proposed job order before or after receipt of the Contractor's proposal.

24 52.2-4019 NON-PREPRICED WORK (LRD)(NOV 1997)

Items of work not covered by this contract, but within its scope and general intent, may be negotiated by the Contracting Officer or his designated representative and added at any time during the contract term. Added items of work shall be incorporated into and made a part of the task order and shall be performed at the negotiated price multiplied by the profit and overhead factor for non-prepriced work for that state. Repetitive items may be negotiated in accordance with the JOC Guidebook (July 1997) and incorporated by modification to the contract, executed by the Contracting Officer.

25 52.2-4021 NORMAL ORDERING PROCEDURES (LRD)(NOV 1997)

(a) As the need exists for performance under the terms of this contract the Contracting Officer or his authorized representative will notify the Contractor, in writing, of an existing requirement.

(b) Upon receipt of this notification, the Contractor shall respond to the needs of the Government within 3 working days for work in Arkansas and 5 working days for work outside of Arkansas by visiting the proposed worksite in the company of the Contracting Officer or his authorized representative or establishing verbal contact with either to further define the scope of the requirement. Per Section 00700, Clause No. 52.216-0019, DELIVERY ORDER LIMITATIONS, if the Contractor objects to providing the services requested on a delivery order he must submit in writing within 2 days of the site visit an explanation of objection.

(c) Upon establishment of the scope of the individual requirement, the Contractor shall then be requested in writing by the Contracting Officer's Representative (COR) to prepare his proposal for accomplishment of the task.

(1) The Unit Price Book (UPB) shall serve as the basis for establishing the value of the work to be performed on a unit price basis for prepriced work.

(2) Non-prepriced work to be included in an individual requirement must be proposed by the Contractor using an acceptable proposal format to be agreed upon by the Government and the Contractor as stated in Section 00800, Clause No. 52.002-4019, NON-PREPRICED WORK.

(3) The Contractor's proposal shall be supported by necessary documentation to indicate that adequate engineering and planning to accomplish the requirement has been done to include requested installation drawings. Example of documentation that might reasonably be expected would include drawings, calculations, catalog cuts, specifications, submittal data, documentation of unavailable materials or equipment, etc.

(4) Time for submittal of the contractor's proposal for individual requirements will be as agreed upon by the Government and the Contractor.

(d) Upon receipt of the Contractor's proposal, the Government will review the proposal for completeness. The Government will negotiate with the Contractor direct costs for all non-prepriced items, performance times and quantities.

(e) Delivery orders will then be issued using a DD Form 1155. Each delivery order will include the following information:

(1) Date of the delivery order.

(2) Contract number and delivery order number.

(3) Item number and description, quantity and unit prices for prepriced and non-prepriced items and total negotiated price.

(4) Delivery order price, delivery or performance data.

(5) Accounting and appropriation data.

(6) Any other pertinent data.

(f) It should be realized by the Contractor that unforeseen circumstances may prohibit the Government from issuing an individual delivery order even after the receipt of the Contractor's delivery order proposal. If such circumstances arise, the Government is not obligated to reimburse the Contractor for any costs incurred in the preparation of the delivery order proposal.

26 52.2-4023 QUALITY OF SUBMISSIONS (LRD)(NOV 1997)

(a) All drawings, diagrams, layouts, illustrations and descriptive literature shall be submitted in "Draftsman Quality" form.
(b) All schedules, performance and test data and similar materials shall be submitted in a professional manner.
(c) All submissions shall contain the following: project title, building number, and scale if applicable.
(d) Five copies will be required on shop drawings and related material submissions.

27 52.2-4024 TIME ALLOWED FOR COMPLETION OF DELIVERY ORDERS (LRD)(NOV 1997)

(This formula is for information only and will be used by the Government as a guideline for estimating Delivery Order completion time, along with other factors. Performance time will be negotiated for each Delivery Order.)
The Government has established the following requirements pertaining to the timely completion of delivery orders. The performance period for any delivery order begins upon issuance of the delivery order. A delivery order is considered complete upon final acceptance.
(a) The maximum number of days allowed for completion of each delivery order will be computed by the Government in accordance with equation below. The number of days thus computed will be converted into the corresponding completion date and recorded onto each delivery order during its preparation. The Contractor shall plan, perform, and manage all work so as to comply with such completion dates without resorting to the other than normal working hours coefficient nor any other additional cost to the Government.
Equation (All days are calendar days in equation):

$$\text{Days Max} = 5 + (.000273 \times A) + B + C + D$$

Where: Days Max = Maximum number of days allowed for completion of the delivery order. Round fractions of days up to the next whole number.
A = The delivery order price in dollars.
B = The number of Unit Price Book (UPB) divisions from which the Contractor has drawn line items in pricing the project except that
C = 14 days IF the project requires new concrete or masonry construction, or new plaster or drywall installation; if no such work is required then C = 0.
D = Any number of extra days so determined by the Government (prior to the issuance of the delivery order) to be necessary for the proper execution of the work when extraordinary circumstances are present. Under most normal circumstances E = 0. Extraordinary circumstances which may prompt the Government to allow extra days include the following:
-testing and evaluation of worksite conditions require extra days,
-documented unavailability of materials or equipment,
-the existence of Government activities which may delay work in or around the worksite. Documentation shall be included in the Contractor's proposal
-full compliance with any applicable law, regulation, or safety requirement will require extra days beyond the number of days allowed by other elements of the equation,
-extensive utilities coordination is required,
-the Contracting Officer or his representative has determined that allowing extra days will be in the best interest of the Government.
(b) Notwithstanding the timely completion standards stated above in paragraph (a), the Ordering Officer may:
(1) In accordance with FAR 52.249-10, allow completion time extension for any delivery order issued when factors beyond the control of the Contractor delay work on the delivery order.
(2) Seek to negotiate a completion time that would be sooner than that established by equation for emergency or time critical work. Since the Government cannot predict and the Contractor cannot plan for such work, the use of the other than normal working hours coefficient and the transfer of Contractor resources from less urgent work (with provision for completion time extension on such less urgent work) may be negotiable items in such instances.
(c) Some delivery orders may require phased completion times. For such delivery orders, completion times for individual phases will be determined by mutual agreement during project proposal negotiations;

nevertheless, the computation of the maximum number of days allowed for completion of the entire delivery order will remain in accordance with paragraph (a) above.

28 52.2-4025 GOVERNMENT-FURNISHED EQUIPMENT/MATERIALS (LRD)(NOV 1997)

(a) The Contractor, with his own forces, shall transport all government-furnished equipment/materials, if any, described on the delivery order. The equipment/materials shall be transported from the Government storage area to the worksite indicated on the delivery order. As unit prices include equipment/materials, work utilizing GFE/GFM shall be accomplished by use of the price for labor and equipment provided in the Unit Price Book for the GFE/GFM.

(b) The UPB lists the price for labor, equipment and materials. Costs for materials provided by the Government will be removed from the applicable line item.

(c) The Contractor assumes the risk and responsibility for the loss or damage to Government-furnished property.

(d) The Contractor shall follow the instructions of the contracting Officer/Ordering Officer regarding the disposition of all Government-furnished property not consumed in performance of a delivery order.

29 52.2-4026 SECURITY REQUIREMENTS (LRD)(NOV 1997)

The Contractor shall comply with security regulations imposed by the Security Office/Law Enforcement Branch, and/or the agency occupying the space where work is to be performed.

(a) Security Awareness - During the time that the Contractor performs work on a military installation, he is expected to be aware that work may be located within controlled access and restricted areas. Specific security requirements will be noted during a pre-construction conference. The Contractor will exercise care to prevent unauthorized intrusions by locking gates, closing and locking doors/windows, and performing similar actions. In the event that a breach of security occurs notwithstanding the Contractor's efforts to prevent it, he shall immediately notify the Security Office of the Installation to report the occurrence and explain the nature of the violation.

(b) Security Requirements for Contractors -

(1) All prime contractors and subcontractors performing services or duties at military installations shall comply with security rules and regulations generally applicable to all persons entering the installation. Additional requirements shall be applicable to Contractor personnel on military installations or in secured areas as follows:

(i) Contractors shall register vehicles, used in performance of the contract. An affidavit will be signed by the Contractor stating that he has and will continue to maintain liability insurance on each vehicle in an amount not lower than the minimum limits prescribed by the financial responsibility or the compulsory law of the state in which work is being performed

(ii) Contractor employees desiring to operate their private owned vehicle (POV) on the Installation will be required to provide proof of insurance and to register POV.

(iii) All Contractor personnel will be required to be badged prior to the beginning of any contractor services in accordance with installation procedures.

(3) Vehicle Identification - Contractor-owned vehicles and POV, used by the Contractor in the performance of this contract, shall be equipped with signs stating the firm's name on both sides of the vehicle. Lettering or identifying signs shall be a minimum of 2 inches in height. Vehicle identification shall be accomplished within 7 working days following contract start date. These signs may be permanently affixed to the vehicle or may be the magnetic type.

(4) Employee Identification - The Contractor shall be responsible for providing positive identification of each employee. Prior to beginning work or receiving a Notice to Proceed, the Contractor shall identify with the COR points of contact who shall be responsible for identifying employees, subcontractors, vendors and delivery personnel. Any delays caused by improper identification of employees

shall be at the Contractor's expense and no time extensions shall be allowed for such delays.

(5) Notice to Contractors - All personnel are hereby notified that any NON-U.S. Citizen must meet the security requirement of the agency or installation.

(6) Employment Restrictions - The Contractor shall not employ any alien who does not have a valid U.S. Immigration Alien Registration Card.

30 52.2-4027 SCHEDULING WORK (LRD)(NOV 1997)

(a) Before commencement of work under an individual delivery order, the Contractor shall confer with the Ordering Officer or the Contracting Officer's Representative (COR) and agree on a sequence of procedure; means of access to premises and building; space for storage of materials and equipment; delivery of materials and use of approaches; use of corridors, stairways, elevators, and similar means of communications and the location of partitions, eating spaces, and restrooms for Contractor's employees and the like. At the discretion of the Ordering Officer or the COR, a pre-construction conference may be scheduled.

(b) Furniture and portable office equipment, etc., in the immediate area will be moved by the Contractor and replaced to original position. If the work required by the work order will not allow furniture and portable office equipment to be replaced to its original location, new locations will be designated by the Ordering Officer or the COR for replacement by the Contractor.

(c) Delivery of materials and equipment shall be made with a minimum of interference to Government operations and personnel.

(d) The work shall, so far as practicable, be done in definite sections or divisions and confined to limited areas which shall be completed before work in other sections or divisions is begun.

(e) The Contractor shall take all precautions to ensure that no damage will result from his operations to private or public property. All damages shall be repaired or replaced by the Contractor at no cost to the Government.

(f) Except in extraordinary circumstances work shall be performed in a manner which will allow the passage of traffic, especially emergency vehicle at all times. When a thoroughfare must be blocked, the COR will be given written notice not less than 10 working days prior to scheduled closing so that notification can be made. The Contractor shall be responsible for providing all necessary traffic control, such as street blockades, traffic cones, flagmen, etc., as required for each specific delivery order at no additional cost to the Government. Proposed traffic control methods shall be submitted to the Ordering Officer for final approval. Traffic control blockades, signs and devices shall conform with the requirements of the Manual on Uniform Traffic Control Devices for Streets and Highways, published by the National Advisory Committee (NAC) on Uniform Traffic Control Devices. The Contractor shall avoid completely closing a street to traffic.

(g) At the beginning of each working day the Contractor shall notify the COR of the location/locations of work to be accomplished that day.

(h) Delivery of Materials - It is the responsibility of the Contractor or subcontractor to inform their vendors or truck drivers of the prime contractor's name, contract number and worksite.

(i) Notice of Possible Delays - Training exercises may be conducted during the time the Contractor is working on an installation. While it is not the policy to interfere with a Contractor during these training exercises, delay may occur. These delays may involve Contractor personnel being withdrawn from an area being denied access for a period of time. The length of time and frequency these delays will be held to a minimum. No claim shall be submitted for less than 5 man-hours per month. Claims may be submitted under the Changes Clause of the contract.

31 52.2-4028 RECORD DRAWINGS (LRD)(NOV 1997)

During the progress of the job, the Contractor shall keep a careful record at jobsite of all changes and corrections from the layouts shown on the drawings. The Contractor shall enter in red ink all such changes and corrections on contract or record drawings promptly. Each sheet of the

corrected set shall be stamped with the markings: RECORD DRAWINGS AS-BUILT". The record drawings shall indicate, in addition to all changes and corrections, the actual location of all sub-surface utility lines. In order that the location of these lines and appurtenances may be determined in the event the surface openings or indicators become covered over or obscured, the record drawings shall show, by offset dimensions to two permanently fixed surface features, the end of each run including each change in direction. Valve, splice box, and similar appurtenances shall be located by dimensioning along the utility run from a reference point. The average depth below the surface of each run shall also be recorded. At the time of beneficial occupancy of each structure or facility involved under the contract, the Contractor shall submit to the Contracting Officer's Representative (COR) as-built prints showing the aforementioned data. Within 21 days of the date set for project completion, the Contractor shall submit the final recording drawings to the COR for review and approval. Reproducible, professional drafting quality, 24" x 36" mylar, minimum thickness 0.003", double mat, using ink, lead for mylar drawings, or plotter, drawings shall be prepared from and submitted with the final record drawings by the Contractor when (1) reproducible design drawings are furnished by the Government, or (2) detailed working drawings are developed by the Contractor. If the Contractor fails to maintain the record drawings as required herein, the Ordering Officer will consider the satisfactory progress has not been achieved for the period in question, thereby requiring the retainage of 10 percent of any progress payments. developed by the Contract

32 52.2-4029 ENVIRONMENTAL PROTECTION (LRD)(NOV 1997)

The Contractor shall comply with Federal, State, and Installation regulations and standards regarding environmental pollution. Environmental protection matters shall be coordinated with the Environmental Division. Fines levied by the State or Federal Government to the property owner due to negligences or fault of the Contractor shall be paid by the Contractor.

(a) Solid, Liquid and Gaseous Contaminants - Contractor shall be responsible for the proper disposal of all solid, liquid, and gaseous contaminants including asbestos in accordance with all Federal, State and local codes and regulations.

(b) Disposal of Scrap and Debris - All scrap and debris caused by the operations under this contract shall be removed at the end of each working day.

(c) Salvaged Material - All saleable material such as aluminum, steel, iron, copper wire, steel banding straps, and lumber greater than 6 feet in length shall, at the discretion of the COR, be turned in for salvage. Questions concerning the turn-in shall be directed to the COR.

(d) All non-usable construction rubble (large reinforced concrete chunks, etc.) shall be taken to a location designated by the COR or deposited at a disposal site located outside the Installation or work area. The disposal site shall be a site permitted and approved for disposal of waste material by the state and local Government having jurisdiction of the disposal site. The Contractor shall provide refuse containers and shall be responsible for disposal of the refuse place in the containers.

(e) The Contractor shall dispose of all hazardous or contaminated materials at a disposal site permitted and approved for disposal of the materials by the State or local Government having jurisdiction of the disposal site.

(f) Burning of Materials and Debris - No materials or debris will be burned on the Installation or on government property.

(g) The Contractor shall coordinate all activities which may require environmental documentation or state environmental permits at least 30 days prior to start of work.

33 52.2-4030 CONSTRUCTION SITE MAINTENANCE (LRD)(NOV 1997)

(a) The Contractor shall conduct and schedule his work in a manner to cause minimum disruption to the existing facilities and operation.

(b) Existing building(s) shall be maintained weatherproof at all times. During the work (from Notice to Proceed to Acceptance by the Government)

the Contractor shall be responsible for maintaining personnel, furnishings, and facilities from the water damage, dust, dirt, etc., resulting from work of this contract. The Contractor shall restore any damage to the original state at no additional expense to the Government. The Contractor will not be held responsible for pre-existing leaks or leaks which develop during the work of this contract that are determined to be unrelated to Contractor's operations.

(c) Security of buildings will be maintained by the Contractor.

(d) The Contractor shall store all supplies and equipment at a location designated by/coordinated with the Contracting Officer's Representative (COR) so as to preclude mechanical and climatic damage; the site shall be maintained in a neat and orderly manner.

(e) Contractor shall post at the worksite a neatly lettered sign on durable material not less than 17 inches wide and 11 inches high with the following:

(1) Contractor Identification.

(2) COR's name and telephone extension.

(f) Safety Hazards - The Contractor shall not permit employees to place materials, tools, machines, and other equipment in an unsafe position. Signs shall be provided and placed by the Contractor to mark areas which are slippery and/or unsafe due to the cleaning and working operations. Contract employees shall be required to interrupt performance of their work, if necessary, to allow passage of traffic through corridors.

(g) The Contractor shall provide signs, barriers, and barricades to provide a safe working area for building occupants and workmen. A plan for signs, barriers and barricades shall be submitted to the COR for approval prior to beginning work on a delivery order for which signs, barriers and barricades are required to define the working area.

34 52.2-4031 NOISE CONTROL (LRD)(NOV 1997)

The Contractor shall comply with all applicable state and local laws, ordinances, and regulations relative to noise control.

35 52.2-4032 EQUIPMENT ON THE SITE (LRD)(NOV 1997)

The Contractor shall cover equipment that is to remain in place within the area of contract operations and protect it against damage or loss, store equipment that is removed in performance of work where directed or reuse in work as required by drawings and specifications. Equipment temporarily removed shall be protected, cleaned and replaced equal to its condition prior to starting work. Security for equipment or material that is to be reused and is removed for temporary storage shall be the sole responsibility of the Contractor.

36 52.2-4033 TRUCKING (LRD)(NOV 1997)

The Contractor shall load all trucks leaving the site with loose debris in a manner that will prevent dropping or spilling of materials. All vehicles transporting hot-mix mixtures, sand, base course material, surfacing aggregates or dirt for work performance under this contract traveling in excess of 35 mph or as posted, whichever is less, on Government property shall have the materials covered with a tarpaulin canvas or shall be loaded a minimum of 6 inches below the top of the sideboards to avoid spillage of materials. The Contractor shall be responsible for cleaning up any materials that drop or spill from vehicles.

37 52.2-4034 TOILET FACILITIES (LRD)(NOV 1997)

Contractor's personnel may be permitted to use toilet facilities on the premises subject to regulation and control of the Contracting Officer's Representative (COR). In the event none are available, the Contractor shall, at his own expense, provide portable facilities, as required. Toilet facilities desired at the Contractor's work site shall be provided at the expense of the Contractor.

38 52.2-4036 SAFETY ASSURANCE (LRD) (NOV 1997)

(a) Preconstruction Safety Meeting - Representatives of the Contractor shall meet with the Safety Officer and COR prior to the start of repair, alteration or construction activities for the purpose of reviewing the Contractor's safety and health programs and discussing implementation of all safety and health provisions pertinent to the work to be performed under the contract. The Contractor shall be prepared to discuss, in detail, the measures he/she intends to take in order to control any unsafe or unhealthy conditions associated with the work to be performed under the contract. This meeting may be held in conjunction with the preconstruction conference, if so directed by the Contracting Officer or his/her designated representative. The conduct of this meeting is not contingent upon a general preconstruction meeting. The level of detail for the safety meeting is dependent upon the nature of the work and the potential inherent hazards. The Contractor's principal on-site representative(s), the general superintendent and his/her representative(s) shall attend this meeting.

(1) Safety - The Contractor and his employees shall comply with the requirements of U.S. Army Corps of Engineers Safety and Health Requirements Manual EM 385-1-1 while performing work. The Contractor shall also be expected to comply with the Occupational Safety and Health Act of 1970 (OSHA) Standards and changes thereto. It is emphasized that the OSHA Standards are subject to change, and such changes may affect the Contractor in performance of the contract. It is the responsibility of the Contractor to acquaint himself with all changes to OSHA Standards and the effective date of the changes. Copies of the OSHA Standards may be obtained from the Department of Labor.

(i) Safety Program - Upon commencement of work under this contract, the Contractor shall establish a safety program for employees performing work under this contract and provide a copy to the Contracting Officer for review and approval.

(ii) Poster Displays - The Contract shall comply with requirements for displaying posters furnished by the Government which pertain to fire prevention, health and sanitation measures, accident prevention and similar purposes pertinent to Army activities.

(iii) Safety Inspections - The Government reserves the right to conduct unannounced safety inspection at any time.

(2) Accident Reporting - Applicable to accidents occurring on government property. All accidents will be reported by phone and completion of proper forms to the COR and the Safety Officer (if applicable).

(b) Compliance with Regulations - All work, including the handling of hazardous materials or the disturbance or dismantling of structures containing hazardous materials shall comply with the applicable requirements of 29 CFR 1926/1910. Work involving the disturbance or dismantling of asbestos or asbestos containing materials; the demolition of structures containing asbestos; and/or the disposal and removal of asbestos, shall also comply with the requirements of 40 CFR, Part 61, Subparts A and B, ETL 1110-1-118 and DA Circular 49-83-4. All work shall comply with Act 394 of 1985 Asbestos Licensing Act, State of Arkansas and health requirements. Where there is a conflict between applicable regulations, the most stringent shall apply.

(c) Contractor Responsibility - The Contractor shall assume full responsibility and liability for compliance with all applicable regulations pertaining to the health and safety of personnel during the execution of work, and shall hold the Government harmless for any action on his part or that of his employees or subcontractors, which results in illness, injury, or death. AR 385-40 requires that accidents and injuries be reported within 1 calendar day to the COR.

(d) Inspections, Tests, and Reports - The required inspections, tests, and reports made by the Contractor, subcontractors, specially trained technicians, equipment manufacturers, and others as required by a delivery order, shall be furnished in accordance with the terms of the delivery order.

(e) Materials and Equipment - Special facilities, devices, equipment, clothing, and similar items used by the Contractor in the execution of work shall comply with the applicable regulations.

39 52.2-4038 PRESERVING HISTORICAL AND ARCHAEOLOGICAL FINDS (LRD) (NOV 1997)

(a) The Contractor shall be required to obtain archaeological clearance prior to conducting any ground disturbing action in areas where archaeological resources exist. This will include all areas except improved roads, grounds, and similar areas. Any failure to do so, which results in damage to cultural resources, may result in claims for costs of mitigating damage being assessed against the Contractor.

(b) Recording and Preserving Historical and Archaeological Finds - All items having any apparent historical or archaeological interest which are discovered in the course of any construction activities shall be carefully preserved. The Contractor shall leave the archaeological find undisturbed and shall immediately report the find to the Contracting Officer so that the proper authorities may be notified.

40 52.2-4039 ASBESTOS REMOVAL FOR DISPOSAL (LRD) (NOV 1997)

(a) The Contractor shall obtain permits from the state and coordinate all asbestos removal projects with the COR prior to any asbestos removal operations.

(b) Permits and Notifications - The Contractor shall obtain and submit necessary permits in conjunction with asbestos removal, hauling, and disposition.

41 52.2-4040 CONTRACTOR STAFF (LRD) (NOV 1997)

(a) The contractor shall be required to maintain a technical and administrative staff to respond to the requirements set forth in this contract. The Contractor must have personnel available within 24 hrs. of notification to conduct negotiations at the Federal Building located in Little Rock. Visits may be made to the Contractor's facilities on an announced or unannounced basis.

(b) Contractor Personnel - The Contractor shall be responsible for selecting personnel who are well qualified to perform the required work, for supervising techniques used in their work, and for keeping them informed of all improvements, changes, and methods of operations. In addition:

(1) All personnel employed by the Contractor or any representatives of the Contractor entering a Government installation/Government property shall conform to all security regulations which may be in effect during the contract period and shall be subject to such checks as may be deemed necessary to assure that no violations occur. No employee or representative will be permitted on an Installation/Government property when such check reveals that their presence would be detrimental to the physical or operational security of the Installation.

(2) Where removal is due solely to misconduct or security on the part of the employee, replacement will be at Contractor's expense and not chargeable to Government. The Contractor shall take appropriate personnel action, as required, in event employees become involved with civilian or military authorities as a result of misconduct.

(3) Status of Personnel - Persons performing under this contract shall remain employees of the Contractor and not the Government.

(4) Loitering - Upon completion of their duties, Contractor employees shall depart the facility and shall not loiter in the vicinity or elsewhere on Government property.

(5) Use of Alcoholic Beverage/Drugs - The Contractor shall not allow any employee to perform work under this contract who is under the influence of alcohol or drugs.

(6) Government Responsibility - The Government will not be liable for loss or damage to the Contractor's supplies, material or equipment or for the Contractor's employees' personal belongings.

(7) Report Damage - If Government property or equipment is damaged by the Contractor or contract employees, a full written report on the facts and extent of such damage shall be submitted to the Contracting Officer within 24 hours of occurrence.

(8) Removal of Contractor Employees - The Contracting Officer may require the Contractor to remove any employee from Government property for reasons of misconduct, security, or any employee determined by the Contracting Officer to be objectionable. In such cases, the

Contracting Officer will advise the Contractor of the reason(s) for requiring the employee's removal. Removal from the jobsite of such person(s) shall not relieve the Contractor's requirement to provide sufficient personnel to perform services in accordance with the terms of the contract.

(9) Regulations - Contractor employees shall observe and comply with regulations concerning fire, safety, sanitation, security, environmental protection and possession of firearms or other lethal weapons while on Government property. Copies of pertinent rules and regulations will be made available to the Contractor, and are set forth in Provision "SAFETY AND HEALTH" in Section 00800.

(10) Contingency Plan - The Contractor shall submit a complete contingency plan to the Contracting Officer on the contract start date and as changes occur for review. The Contingency Plan shall provide for continued performance of the contract should the Contractor experience equipment failure or loss of employees for any reason such as strike or dispute.

(11) The Contractor shall not hire off-duty Government Quality Assurance Evaluators or any other persons whose employment would result in a conflict with policies set forth in DOD Directive 5500.7, "Standards of Conduct for Department of the Army."

(12) The Contractor shall provide a Project Manager who shall conduct overall management coordination and shall be the central point of contact with the Contracting Officer for performance of work under this contract. An alternate Project Manager shall be designated to act for the Project Manager in case of illness or other reasons. The Project Manager (or alternate) must be responsive by telephone/pager 24 hours a day. Notice of change in Project Manager due to working hours, vacation or leave shall be provided to the Contracting Officer 3 working days in advance. The Project Manager shall have full authority to order supplies, hire and fire employees, and to contractually commit the Contractor for prompt action in matters pertaining to Contractor performance. The Contractor shall provide to the Contracting Officer in writing, prior to the contract start date, the name of the Project manager and the name of the Alternate Project Manager, telephone number and address where the Project Manager or Alternate Project Manager can be reached 24 hours per day. The Contracting Officer will not be expected to call a series of numbers to contact the individuals.

(13) Project Manager Presence - Contractor's supervision responsibility includes building security. The Project Manager or his authorized representative shall be present during all hours when employees are working.

(14) The Government will have the right to cause the Contractor to replace any individual functioning as Project Manager, should the individual fail to perform in accordance with the requirements of contract. Any replacement must meet the criteria stated in the Contractor's technical proposal which was evaluated for award of the contract.

(15) Conduct of Personnel on Duty - While on duty personnel employed by the Contractor shall be prohibited from sleeping, using Government telephones, and utilizing Government facilities for recreational activities. Personal items in office areas, such as desk accessories, supplies, pens, pencils, plants and food shall not be disturbed by the Contractor's employees at any time.

(16) Vehicle Operators - Contractor personnel operating a motor vehicle on Government property shall have a valid state driver's license to operate a motor vehicle and shall comply with rules and regulations regarding motor vehicle use and registration.

(17) Management Plan - The Contractor, prior to commencement of work under this contract, shall furnish the Contracting Officer with a copy of the Contractor's organization chart, along with the names, addresses and telephone numbers of the Project Manager and Alternate Project Manager. Revised copies shall be furnished as changes occur.

(18) Contractor-Provided Instruction - The Contractor shall provide instruction for employees to provide performance that meets the requirements of this contract.

(i) Employee Instructions - The Contractor employees, shall be instructed in security, preventive maintenance, conservation of energy and utilities, fire prevention, environmental pollution and care of Government-owned facilities. Technical advice may be provided by the Government agency upon request by the Contractor to the Contracting

Officer.

(ii) Employee Instruction Records - Records of all instruction to employees shall be maintained by the Contractor and made available for Government inspection.

(c) The Government will not exercise any supervision or control over Contractor employees performing work under the contract. Such employees shall be accountable solely to the Contractor, not the Government. The Contractor, in turn, shall be accountable to Government for Contractor employees.

(d) Conduct - Contractor and Contractor's employees shall be subject to the same general rules of conduct that apply to Government civilian employees. The Government reserves the right to refuse access to Government property to any Contractor employee if the Contracting Officer determines it to be in the best interests of the Government (reference DOD Directive 5500.7).

42 52.2-4041 GOVERNMENT-FURNISHED UTILITIES (LRD) (NOV 1997)

The Government will furnish to the Contractor, from existing Government facilities and without cost to the Contractor, water and electrical power supply as set forth below. These utilities may be provided for work performed under any task order. It is the responsibility of the Contractor to be "energy conscious" in the use of these Government-furnished utilities. The Contractor shall observe all energy conservation practices in use of Government-furnished utilities under his control while working on the task order. The Contractor shall instruct his personnel in the prudent use of utilities including, but not limited to, turning off utilities when not needed, keeping windows and doors closed in heated/air conditioned areas, and limiting heating area temperatures to 65 F and cooled areas to 78 F. Exceptions will be made only when necessary for application/installation of contract materials and after receiving permission from the COR.

(a) Energy Conservation - The Contractor shall conserve energy whenever possible.

(b) Conservation of Energy and Utilities -

(1) The Contractor shall comply with published rules and regulations issued by the U.S. Department of Energy, 10 CFR Part 490, Emergency Building Temperature Restriction.

(2) Contractor Personnel Instruction - The Contractor shall comply with the installation Energy Conservation Program.

(3) The Contractor shall operate to preclude the waste of utilities, which shall include but shall not be limited to:

(i) Lights shall be used only in areas where, and at the time when, work is being performed.

(ii) Water faucets or valves shall be turned off after the required usage has been accomplished.

(iii) Government telephones shall not be used.

(c) Water -

(1) The Government will furnish from existing Government facilities and without cost to the Contractor, any adequate water supply source necessary for performance under this contract provided the Government will in no case furnish or install any required supply connections and piping for the purpose of implementing the availability of the water supply. It is the responsibility of the Contractor to determine the extent to which existing Government water supply source is adequate for the needs of this contract.

(2) All taps, connections, and accessory equipment required in making the water supply source available will be accomplished by and at the expense of the Contractor. All work in connection therewith shall be coordinated, scheduled, and performed as directed and approved by the Ordering Officer/COR. Said taps, connections, and accessory equipment shall be maintained by the Contractor in a workmanlike manner in accordance with rules and regulations of the Government installation. Upon completion of the contract the removal of all taps, connections and accessories will be accomplished by and at the expense of the Contractor so as to leave the water supply source or facility in its original condition. Such removal shall also be subject to the direction and approval of the Ordering Officer as provided above.

(e) Electricity -

(1) The Government will furnish all electrical power necessary for performance under this contract; provided, the Government will in no case furnish or install any electrical facility or accessory for the purpose of implementing the availability of electrical power for the purpose of this contract. It is the responsibility of the Contractor to determine the extent to which existing Government electrical facilities are adequate for the needs of this contract.

(2) All taps, connections, and necessary equipment required in making the electrical power available will be accomplished by and at the expense of the Contractor, and all work in connection therewith shall be coordinated, scheduled and performed as directed and approved by the Ordering Officer/COR. Said taps, connections, and accessory equipment equipment shall be maintained by the Contractor in a workmanlike manner in accordance with the rules and regulations of the Government Agency. Upon completion of the contract the removal of all taps, connections and accessories will be accomplished by and at the expense of the Contractor as to leave the electrical power source or facility in its original condition. Such removal shall also be subject to the directions and approval of the Contracting Officer as provided above.

(f) Telephone Service - Telephone service will be the responsibility of the Contractor.

(g) Interruption of Utilities Service - All temporary outages of any utility services required for the performance of work shall be scheduled with the COR no less than 48 hours, except in emergency situations as approved by Ordering Officer, in advance of such outages; the Contractor may request a waiver from this requirement from the COR when the utility outage will be of a very limited nature (e.g., within a few rooms of a building). If during work performance the Contractor has determined that a utilities-related situation involves risk to life or substantial risk to property, utilities shall be immediately disrupted to reduce the emergency and alleviate risk. If such a risk exists, or if such a disruption does occur, the Contractor shall notify the COR at the earliest practical time, and in no case later than 2 hours following the occurrence.

(h) Excavation and Utility Clearance - The Contractor shall be responsible for obtaining excavation and utility clearances, when required, to perform work under an individual task order. The Contractor shall not proceed with the excavation of any kind until he has obtained such clearance.

43 52.2-4042 ADP SUPPORT REQUIREMENTS (LRD) (NOV 1997)

The Contractor shall be required to have an operational computer system with Microsoft Windows 95 for preparing proposals using the JOC Proposal Development System (JOCPDS). The Little Rock District Corps of Engineers will provide, at the beginning of the contract, a class on operation of the JOCPDS program. Contractor personnel will be required to attend the class if they are not familiar with the JOCPDS program.

44 52.2-4043 GOVERNMENT-FURNISHED SOFTWARE (LRD) (NOV 1997)

The Government-furnished software will be provided to the Contractor for use as a tool to assist with expedient preparation of cost proposals in response to Government needs. This software will contain an electronic version (copy) of the Unit Price Book (UPB), Volume II. Once the desired items are selected, the software provides for selection of quantities and based on the selected quantities will extend and total UPB costs for each proposal. The software will also permit introduction of non-prepriced items and the application of the multiplier.

45 52.2-4044 WASTE AND EXCESS QUANTITIES INCLUDED IN THE COMPLETED-IN-PLACE CONSTRUCTION QUANTITIES (LRD) (NOV 1997)

All prices in the Unit Price Book (UPB) are for completed-in-place construction unless explicitly described otherwise. Waste or excess material quantities are incidental costs which are included within the

contract coefficient unless explicitly stated otherwise. Quantities used on individual Job Order proposals shall be taken from field measurements or design plans, as appropriate, without allowance for waste.

46 52.2-4045 FINAL CLEANUP COSTS INCLUDED WITH CONTRACT COEFFICIENT (LRD) (NOV 1997)

The contract percentage factors include the cost of final cleanup on each individual Task Order. Payments will not be made for final cleaning for work on Individual Delivery Orders.

47 52.2-4046 PRICE ADJUSTMENT MODIFIERS (LRD) (NOV 1997)

Volume II of the technical documents presented under this contract contains unit pricing data to be used by the Contractor in development of price proposals for each work order. The price data is presented as basic items and as price adjustment modifiers to the basic item. Price adjustment modifiers provide a method for adding to or deducting from the basic item prices for optional materials, and/or methods of installation. One or more modifiers can be utilized to adjust the basic item price as listed by the appropriate suffix number of basic line (see sample calculation, Section 00800).

48 52.2-4047 FIRE PREVENTION AND PROTECTION (LRD) (NOV 1997)

The Contractor shall comply with all fire prevention measures as set forth by the National Fire Protection Association; other recognized fire prevention agencies; and (if applicable) Installation regulations. Combustible trash will not be destroyed by open fire. Approved types of portable fire extinguishers will be furnished and installed at the construction sites by the Contractor. The Contractor shall obtain permits for any hot work (welding, etc.) before commencing work. The Contractor shall be liable for any fire loss to the Government property attributable to negligence on the part of the Contractor, including failure to comply with fire prevention measures prescribed by terms of this contract.

49 52.2-4048 CONTRACTOR ACCESS (LRD) (NOV 1997)

The area wherein work is to be performed under this contract may be occupied by Government Services during the construction period. The Contractor shall have access to that portion of the area within which work is to be performed. The movement of Contractor personnel, his equipment, materials, and tools shall be confined to this area so as not to interfere with ongoing operations in the work areas.

50 52.2-4051 CONTRACTOR QUALITY CONTROL (LRD) (NOV 1997)

(a) General. The Contractor shall establish and maintain an effective quality control (QC) system in compliance with Contract Clause entitled "Inspection of Construction" located in Section 00700. The quality control system shall consist of plans, procedures, and organization necessary to provide materials, equipment, workmanship, fabrication, construction and operations which comply with contract requirements. The system shall cover construction operations, both onsite and offsite, and shall be keyed to the construction sequence.

(b) Coordination Meeting. Before start of construction the Contractor shall meet with the Contracting Officer (CO) and discuss the Contractor's quality control system. During the meeting, a mutual understanding of the system details shall be developed, including the forms for recording the quality control operations, control activities, testing, administration of the system for both onsite and offsite work, and the interrelationship of the Contractor's management and control with the Government's inspection.

(c) Quality Control Plan. Prior to start of construction, the Contractor shall furnish his quality control plan to the Contracting Officer for acceptance. Construction will be permitted to begin only after acceptance of the quality control plan, or partial acceptance of that portion of the plan applicable to the particular feature of work to

be started. The quality control plan the Contractor proposes to implement shall identify the personnel, procedures, instructions, report forms and a list of the definable features of work. A definable feature of work is a task which is separate and distinct from other tasks and has separate control requirements.

(d) Quality Control Organization. The system must be implemented by the establishment of a quality control organization separate from the Contractor's top management. This organization must consist of at least one full-time person who will be available at all times while work is in progress, with sole responsibility for providing and insuring continuous inspection of the work to ensure compliance with the contract plans and specifications. This organization must be supplemented by additional QC personnel as may be necessary. The Quality Control Organization personnel must be part of the Contractor's staff and not a member of the staff of a subcontractor performing the work. The Contracting Officer reserves the right to have replaced any member of the Quality Control staff who, in the opinion of the Contracting Officer, is not accomplishing assigned duties. The Contractor's inspection system must be documented, as specified herein, and must be submitted to the Contracting Officer for review and approval prior to the start of construction and throughout the life of the contract. The Contractor must notify the Government in writing of any proposed change to his inspection system and changes are subject to disapproval if they would, in the opinion of the Contracting Officer, result in nonconformance with the contract requirements.

(e) Submittals. Submittals shall be submitted as specified. The Contractor's Quality Control organization shall be responsible for certifying that all submittals are in compliance with the contract requirements.

(f) Control. The Contractor's quality control system shall include at least three phases of control for all definable features of work as specified hereinafter.

(1) Preparatory Phase. This phase shall occur prior to beginning any work on any definable feature of work. It shall include a review of contract requirements; a check to assure that all materials and/or equipment have been tested, submitted and approved; a check to assure that provisions have been made to provide required control testing; examination of the work area to ascertain that all preliminary work has been completed; and a physical examination of materials, equipment and sample work to assure that they conform to approved shop drawings or submittal data and that all materials and/or equipment are on hand. The results of the preparatory phase actions shall be documented by separate minutes prepared by the CQC representative and attached to the daily QC report.

(2) Initial Phase. This phase must be accomplished at the beginning of a definable feature of work. This phase shall include a check of preliminary work, verify full compliance, establish level of workmanship, resolve all differences, and check safety to include compliance with hazard analysis. Separate minutes of this phase shall be prepared by the CQC representative and attached to the daily QC report. The initial phase should be repeated for each new crew to work onsite, or if acceptable standards of workmanship are not being met.

(3) Follow-up Phase. Daily checks shall be performed to assure continuing compliance with contract requirements, including control testing, until completion of the particular feature of work. Final follow-up checks shall be conducted and all deficiencies corrected prior to the start of additional features of work.

(g) Tests shall be as specified in the technical portions of the specifications.

(h) Defective Work. The Contractor shall not build upon or conceal defective work.

(i) Completion. At the completion of the work, the Contractor's quality control representative shall conduct a completion inspection and develop a "deficiency list" of items which do not conform to the approved plans and specifications. Such a list of deficiencies shall include the estimated date the deficiencies will be corrected. Payment will be withheld for defective or deficient features until they are satisfactorily corrected.

(j) Documentation. The Contractor shall maintain current records of quality control operations, activities, and tests performed including the work of supplier and subcontractors. These records shall include factual evidence that the required activities or tests have been performed. These records shall cover both conforming and defective or deficient features and shall include a statement that equipment and materials incorporated in

the work comply with the contract. Legible copies of these records shall be furnished to the Contracting Officer daily. The records shall cover work placed during the time period the records are furnished and shall be verified by persons so designated by the Contractor. A suggested QC report format is attached at the end of this Section.

(1) Deficiency Tracking System. The Contractor shall maintain a cumulative list of deficiencies identified for the duration of the project. Deficiencies to be listed include those identified by the Contractor's quality control observations, test failures, Government oral observations and Notifications of Noncompliance. As a minimum, the list shall include the information contained in the DEFICIENCY LIST attached at the end of this Section. A current copy of the list shall be maintained at the project site at all times and shall be made available for review by Government personnel. Copies of updated listings shall be submitted to the Contracting Officer at least every 15 days. Payment will be withheld for deficient work until it has been corrected.

(k) Notification of Noncompliance. Government representatives may notify the Contractor of any noncompliance with contract requirements. The Contractor shall, after receipt of such notice, immediately take corrective action. Such notice, when delivered to the Contractor or his representative at the site of the work, shall be deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to any such stop orders shall be made the subject of claim for extension of time or for excess costs or damages by the Contractor.

(l) Inspection Records. The Contractor must maintain complete inspection records and make them available to the Government. All work must be conducted under the general direction of the Contracting Officer and is subject to Government inspection and testing at all places and at all reasonable times before acceptance to ensure strict compliance with the terms of the Contractor.

(m) Inspection. Government inspections and tests are for the sole benefit of the Government and do not:

--Relieve the Contractor of responsibility for providing adequate quality control measures;

--Relieve the Contractor of responsibility for damage to or loss of the material before acceptance;

--Constitute or imply acceptance; or,

--Affect the continuing rights of the Government after acceptance of the completed work as discussed in the following paragraphs.

The presence of absence of a Government inspector does not relieve the Contractor from any contract requirement, nor is the inspector authorized to change any term or condition of the specifications without the Contracting Officer's written authorization.

The Contractor must promptly furnish, without additional charge, all facilities, labor, and material reasonably needed for performing safe and convenient inspections and tests as may be required by the Contracting Officer. The Government may charge to the Contractor any additional cost of inspection or test where work is not ready at the time specified by the Contractor for inspection or test, or where prior rejection makes reinspection and retest necessary. The Government must perform all inspections and tests in a manner that will not unnecessarily delay the work. Special, full size, and performance tests must be performed as described in the contract.

(n) Acceptance. The Contractor must, without charge, replace or correct work found by the Government not to conform to contract requirements, unless in the public interest the Government consents to accept the work with an adjustment in contract price. The Contractor must promptly segregate and remove rejected material from the premises. If the Contractor does not promptly replace or correct rejected work, the Government may (1) by contract or otherwise, replace or correct the work and charge the cost to the Contractor, or (2) terminate for default the Contractor's right to proceed. If, before acceptance of the entire work, the Government decides to examine already completed work by removing it or tearing it out, the Contractor must defray the expenses of the examination and of reconstruction. However, if the work is found to met contract requirements, the Contracting Officer must make an equitable adjustment for the additional services involved in the examination and reconstruction, including, if completion of the work was thereby delayed,

an extension of time.
Unless otherwise specified in the contract, the Government must accept, as promptly as practicable after completion and inspection, all work required by the contract or that portion of the work the Contracting Officer determines can be accepted separately. Acceptance must be final and conclusive except for latent defects, fraud, gross mistakes amounting to fraud, or the Government's rights under any warranty or guarantee.

51 52.2-4052 LEGAL PUBLIC HOLIDAYS (LRD) (NOV 1997)

The Contractor or employees will not normally be expected to work during legal public holidays. The Government will not pay for services performed on these holidays unless approval has been received from the Contracting Officer. The Contractor shall observe the same holidays observed by the Government which are:

New Year's Day
Martin Luther King's Birthday
Washington's Birthday
Memorial Day
Independence Day
Labor Day
Columbus Day
Veterans Day
Thanksgiving Day
Christmas Day

52 52.2-4053 SALVAGEABLE AND REPAIRABLE MATERIALS (LRD) (NOV 1997)

(a) Materials classified by the Contracting Officer or his designated representative as salvageable shall remain the property of the U.S. Government and shall be delivered as designated by the Contracting Officer's Representative (COR).
(b) Materials not classified as salvageable or repairable by the Contracting Officer shall be disposed of per Provision "ENVIRONMENTAL PROTECTION" in Section 00800.
(c) Prior to commencing any work on a task order, a joint inventory will be conducted by the Contractor, the Contracting Officer or his designated representative, during which salvageable and repairable material will be identified. This joint inventory will in no way limit or preclude the Contracting Officer from designating additional items in the above categories during the life of that task order.

53 RESERVED

54 52.2-4055 OPERATION AND MAINTENANCE MANUALS (LRD) (NOV 1997)

Prior to final acceptance and payment of each Task Order, the Contractor shall submit three copies of all Operation and Maintenance Manuals to the Contracting Officer's Representative (COR) for HVAC systems, electrical controls, etc. Each copy shall be the manufacturer's original data, copies of the original will not be acceptable. The Contractor shall conduct a training session to brief Government personnel on the operation and maintenance procedures of such systems. The Contractor is required to provide three complete tear down/overhaul/repair manuals for the chillers provided. The Contractor is required to provide two complete service literature catalogs for the chiller manufacturer's engineered machinery products.

55 52.2-4056 MODIFICATIONS TO THE UNIT PRICE BOOK (UPB) (LRD) (NOV 1997)

(a) No changes to the item published in the UPB will be made during the contract and option periods.
(b) Negotiated non-prepriced items may be added to the UPB at the negotiated price minus the percentage of inflation of bid coefficient factors from the basic year of the contract.

56 52.2-4058 OPTIONS (LRD) (NOV 1997)

(a) The Government reserves the right to exercise options to extend the term of this contract for an additional 4 option years, each option period being 12 months in duration. Reference FAR Clause 52.0217-0009, located in Section 00700, Option to Extend the Term of the Contract.
(b) In the instance of any modifications initiated on a delivery order, a proposal will be requested and the work will be accomplished using the coefficient(s) initially used on the original delivery order.
(c) Wage rates will remain in effect until Renewal Options are exercised, at which time new wage rates will be incorporated by modification. Any orders issued will go by the wage rates in effect at the time of issuance, which will also apply to any modifications to those delivery orders.

57 52.2-4060 CONSTRUCTION HAZARD COMMUNICATION (LRD) (NOV 1997)

The Contractor is required to comply with the requirements of the OSHA Hazard Communication Standard (29 CFR 1926.59). This standard is designed to inform workers of safe and appropriate methods of working with hazardous substances in the workplace. The standard has five requirements, and every hazardous or potentially hazardous substance used or stored in the work area is subject to all five. They are:
(a) Hazard Evaluation. Any company which produces or imports a chemical or compound must conduct a hazard evaluation of the substance to determine its potential health or physical hazard. The hazard evaluation consists of an investigation of all the available scientific evidence about the substance. The Contractor is required to assure that all producers (manufacturers/distributors) have performed these evaluations and transmit the required information with any hazardous materials being used or stored on the project site. From the hazard evaluation, a substance may be classified as a health hazard, or a physical hazard. These classifications are then further broken down according to type:

| Health Hazards | Physical Hazards |
|---|---|
| Carcinogens | Combustible liquids |
| Irritants | Compressed gases |
| Sensitizers | Explosives |
| Corrosives | Flammables |
| Toxic substances | Organic peroxides |
| Highly toxic substances | Unstable substances |
| Substances harmful to specific organs or parts of the body | Water-reactive substances |

(b) Warning Labels. If a chemical is hazardous or potentially hazardous, the producer or importer must affix a warning label to every container of that chemical before it leaves his facility. The Contractor must assure these labels are attached and legible. The label must identify the chemical, state the hazard, and give the name and address of the producer or importer. If the hazardous substance is transferred to another container, that container must then be labeled, tagged, or marked with the name of the chemical and the appropriate hazard warning. Warning labels should be replaced immediately if they are defaced or removed.
(c) Material Safety Data Sheets. The producer or importer must also supply a material safety data sheet (MSDS). The Contractor must keep these available in the work area where the substance is used, so that the people using the substance can easily review important safety and health information, such as:

- The hazard possible from misuse of the substance
- Precautions necessary for use, handling, and storage
- Emergency procedures for leaks, spills, fire and first aid
- Useful facts about the substance's physical or chemical properties

(d) Work Area Specific Training. Because a hazardous substance may react differently depending on how it is used or the environment of the work area, the Contractor must conduct work area specific training;

special training which takes the Contractor's operation, environment, and work policies into consideration. Work area training presents:

(1) The hazardous substances which are present in the workplace and the hazards they pose.

(2) Ways to protect against those hazards, such as protective equipment, emergency procedures, and safe handling.

(3) Where the MSDS's are kept, and an explanation of the labeling system.

(4) Where the Contractor's written Hazard Communication Program is located.

(e) The written Hazard Communication Program. In accordance with OSHA requirements, the Contractor must prepare a written Hazard Communication Program. This document will be included in the Contractor's Accident Prevention Plan. This document states how the Contractor plans to ensure that hazardous materials are appropriately labeled, how and where MSDS's will be maintained, and how employees will be provided with specific information and training.

58 52.2-4061 PAYMENT OFFICE (LRD)(NOV 1997)

(a) The Payment Office for task orders administered by the U.S. Army, Corps of Engineers, Little Rock District is:

USA Corps of Engineers (M-4)
Finance Center
5720 Integrity Drive
Millington, TN 38054-5005

(b) The Payment Office for task orders administered by others will be stated in the task order.

59 52.2-4062 CONTRACTING OFFICER'S REPRESENTATIVE (LRD)(NOV 1997)

The Contracting Officer's Representative (COR) and/or the Administrative Contracting Officer (ACO) for each task order will be appointed at the time the task order is issued and will only apply to the task order stated in the appointment letter.

60 52.2-4064 EQUIPMENT WARRANTY IDENTIFICATION TAGS (LRD)(NOV 1997)

(a) The Contractor shall provide warranty identification tags on all Contractor and Government furnished equipment which he has installed.

(1) The tags shall be similar in format and size to the exhibits provided by this specification, they shall be suitable for interior and exterior locations, resistant to solvents, abrasion, and to fading caused by sunlight, precipitation, etc. These tags shall have a permanent pressure-sensitive adhesive back, and they shall be installed in a position that is easily (or most easily) noticeable. Contractor furnished equipment that has differing warranties on its components will have each component tagged.

(2) Sample tags shall be submitted for Government review and approval. These tags shall be filled out representative of how the Contractor will complete all other tags.

(3) Tags for Warranted Equipment: The tag for this equipment shall be similar to the following. Exact format and size will be as approved.

---

EQUIPMENT WARRANTY
CONTRACTOR FURNISHED EQUIPMENT

MFG MODEL NO.
SERIAL NO.
CONTRACT NO.
CONTRACTOR NAME
CONTRACTOR WARRANTY EXPIRES
MFG WARRANTY(IES) EXPIRE

---

---

EQUIPMENT WARRANTY
GOVERNMENT FURNISHED EQUIPMENT

MFG MODEL NO.
SERIAL NO.

CONTRACT NO.
DATE EQUIP PLACED IN SERVICE
MFG WARRANTY(IES) EXPIRE

_____

(4) If the manufacturer's name (MFG), model number and serial number are on the manufacturer's equipment data plate and this data plate is easily found and fully legible, this information need not be duplicated on the equipment warranty tag. The Contractor warranty expires (warranty expiration date) and the final manufacturer's warranty expiration date will be determined as specified by paragraph FAR Clause 52.246-0021, "WARRANTY OF CONSTRUCTION" in this section.

(b) Execution. The Contractor will complete the required information on each tag and install these tags on the equipment by the time of and as a condition of final acceptance of the equipment.

(c) Payment. The work outlined above is a subsidiary portion of the contract work, and has a value to the Government approximating 5% of the value of the Contractor furnished equipment. The Contractor will assign a value of that amount in the breakdown for progress payments mentioned in the Contract Clause: PAYMENTS UNDER FIXED-PRICE CONSTRUCTION CONTRACTS.

(d) Equipment Warranty Tag Replacement. As stated in FAR 52.246-0021, "WARRANTY OF CONSTRUCTION" located in this section, the Contractor's warranty with respect to work repaired or replaced shall run for one year from the date of repair or replacement. Such activity shall include an updated warranty identification tag on the repaired or replaced equipment. The tag shall be furnished and installed by the Contractor, and shall be identical to the original tag, except that the Contractor's warranty expiration date will be one year from the date of acceptance of the repair or replacement.

61 52.2-4072 PRECONSTRUCTION CONFERENCE (NOV 1997)

(a) The successful offeror will be notified and required to attend a preconstruction conference. The Contracting Officer's notification will include specific details regarding the date, time, and location of the conference, any need for attendance by subcontractors, and information regarding the items to be discussed.

(b) Individual Task Order Conferences - At the discretion of the COR, a preconstruction conference may be conducted prior to the commencement of work on individual delivery orders.

(End of clause)

62 52.2-4074 AWARD OF TASK ORDERS (LRD)(NOV 1997)

Task orders shall be awarded based on the following considerations:

1. Past Performance - The Contracting Officer shall consider past performance when selecting a contractor for award of a task order. The COR shall evaluate each task order. Task orders of $100,000 and above shall be evaluated on a DD Form 2626, Performance Evaluation (Construction). This report is entered electronically into the DoD database, Construction Contractor Appraisal Support System (CCASS). The COR shall evaluate orders under $100,000 using a local form similar to the DD Form 2626. Performance below satisfactory may result in fewer task orders being awarded to that contractor.

2. Expertise of Work - The Contracting Officer shall consider expertise of work when selecting a contractor for award of a task order.

3. Work at Same Location - The Contracting Officer shall consider location of work when selecting a contractor for award of a task order.

4. Total Awarded Dollars - Total awarded amount of task orders for each contract shall be considered when selecting a contractor for award of a task order.

63 52.49-4113 BASIS FOR SETTLEMENT OF PROPOSALS (EFARS 52.249-5000) (MAR 1995)

"Actual costs will be used to determine equipment cost for a settlement proposal submitted on the total cost basis under FAR 49.206-2(b). In evaluating a termination settlement proposal using the total cost basis, the following principles will be applied to determine allowable equipment costs:

(a) Actual costs for each piece of equipment, or groups of similar serial or series equipment, need not be available in the contractor's accounting records to determine total actual equipment costs.
(b) If equipment cost have been allocated to a contract using predetermined rates, those charges will be adjusted to actual costs.
(c) Recorded job costs adjusted for unallowable and unallowable expenses will be used to determine equipment operating expenses.
(d) Ownership costs (depreciation) will be determined using the contractor's depreciation schedule (subject to the provisions of FAR 31.205-11).
(e) License, taxes, storage and insurance costs are normally recovered as an indirect expense and unless the contractor charges these costs directly to contracts, they will be recovered through the indirect expense rate."

64 RESERVED

65 52.231-4005 I EQUIPMENT OWNERSHIP AND OPERATING EXPENSE SCHEDULE (MAR 1995) (EFARS 52.231-5000)

(a) This clause does not apply to terminations. See 52.231-5001, Basis for Settlement of Proposals, and FAR Part 49.
(b) Allowable cost for construction and marine plant and equipment in sound workable conditions owned or controlled and furnished by a contractor or subcontractor at any tier shall be based on actual cost data for each piece of equipment or groups of similar serial and series for which the Government can determine both ownership and operating costs from the contractor's accounting records. When both ownership and operating cost cannot be determined for any piece of equipment or groups of similar serial or series equipment from the contractor's accounting records, costs for that equipment shall be based upon the applicable provisions of EP 1110-1-8, Construction Equipment Ownership and Operating Expense Schedule, Region applicable to the state in which the work is located.

Working conditions shall be considered to be average for determining equipment rates using the schedule unless specified otherwise by the contracting officer. For equipment not included in the schedule, rates for comparable pieces of equipment may be used or a rate may be developed using the formula provided in the schedule. For forward pricing, the schedule in effect at the time of negotiations shall apply. For retroactive pricing, the schedule in effect at the time the work was performed shall apply.

(c) Equipment rental costs are allowable, subject to the provisions of FAR 31.105(d)(ii) and FAR 31.205-36. Rates for equipment rented from an organization under common control, lease-purchase arrangements, will be determined using the schedule, except that actual rates will be used for equipment leased from an organization under common control that has an established practice of leasing the same or similar equipment to unaffiliated lessees.

(d) When actual equipment costs are proposed and the total amount of the pricing action exceeds the small purchase threshold the contracting officer shall request the contractor to submit either certified cost of pricing data, or partial/limited data, as appropriate. The data shall be submitted on Standard Form 1411, Contract Pricing Proposal Cover Sheet.

(End of clause)

66 52.232-4001 I EFARS 52.232-5002 - CONTINUING CONTRACTS (MAR 1995)

THIS CLAUSE MAY BE APPLICABLE TO INDIVIDUAL TASK ORDERS THAT CROSS FISCAL YEARS.

(a) This is a continuing contract, as authorized by Section 10 of the River and Harbor Act of September 22, 1922 (33 U.S. Code 621). The payment of some portion of the contract price is dependent upon reservations of funds from future appropriations, and from future contribution to the project having one or more non-federal project sponsors. The responsibilities of the Government are limited by this clause notwithstanding any contrary provision of the "Payments to Contractor" clause or any other clause of this contract.

*(b) The sum of $_____ has been reserved for this contract and is available for payments to the contractor during the current fiscal year. It is expected that Congress will make appropriations for future fiscal years from which additional funds together with funds provided by one or more non-federal project sponsors will be reserved for this contract. (The contract amount less estimated earnings accruing in subsequent fiscal years will be inserted at the time of award.)

(c) Failure to make payments in excess of the amount currently reserved, or that may be reserved from time to time, shall not be considered a breach of this contract, and shall not entitle the contractor to a price adjustment under the terms of this contract except as specified provided in paragraphs (f) and (i) below.

(d) The Government may at any time reserve additional funds for payments under the contract if there are funds available for such purpose. The contracting officer will promptly notify the contractor of any additional funds reserved for the contract by issuing an administrative modification to the contract.

(e) If earnings will be such that funds reserved for the contract will be exhausted before the end of any fiscal year, the contractor shall give written notice to the contracting officer of the estimated date of exhaustion and the amount of additional funds which will be needed to meet payments due or to become due under the contract during that fiscal year. This notice shall be given not less than 45 nor more than 60 days prior to the estimated date of exhaustion.

(f) No payments will be made after exhaustion of funds except to the extent that additional funds are reserved for the contract. If and when sufficient additional funds are reserved, the contractor shall be entitled to simple interest on any payment that the contracting officer determines was actually earned under the terms of the contract and would have been made except for exhaustion of funds. Interest shall be computed from the time such payment would otherwise have been made until actually or constructively made, and shall be at the rate established by the Secretary of the Treasury pursuant to Public Law 92-41, 85 STAT 97, as in effect on the first day of the delay in such payment.

(g) Any suspension, delay, or interruption of work arising from

exhaustion or anticipated exhaustion of funds shall not constitute a breach of this contract and shall not entitle the contractor to any price adjustment under the "Suspension of Work" clause or in any other manner under this contract.

(h) An equitable adjustment in performance time shall be made for any increase in the time required for performance of any part of the work arising from exhaustion of funds or the reasonable anticipation of exhaustion of funds.

(i) If, upon the expiration of sixty (60) days after the beginning of the fiscal year following an exhaustion of funds, the Government has failed to reserve sufficient additional funds to cover payments otherwise due, the contractor, by written notice delivered to the contracting officer at any time before such additional funds are reserved, may elect to treat his right to proceed with the work as having been terminated. Such a termination shall be at no cost to the Government, except that, to the extent that additional funds to make payment therefore are allocated to this contract, it may be treated as a termination for the convenience of the Government.

(j) If at any time it becomes apparent that the funds reserved for any fiscal year are in excess of the funds required to meet all payments due or to become due the contractor because of work performed and to be performed under the contract during the fiscal year, the Government reserves the right, after notice to the contractor, to reduce said reservation by the amount of such excess.

*to be filled in when task order is issued if applicable.

67 52.236-4004 I PHYSICAL DATA (APR 1984)

Data and information furnished or referred to below is for the Contractor's information. The Government shall not be responsible for any interpretation of or conclusion drawn from the data or information by the Contractor.

(a) The indications of physical conditions on the drawings and in the specifications are the result of site investigations by surveys and field reconnaissance.

(b) Weather conditions. Information regarding weather conditions is available for examination by the bidders in the Office of the Commander, Little Rock District, Corps of Engineers, 700 West Capitol, Little Rock, Arkansas.

(c) Transportation facilities. It shall be the responsibility of the Contractor to make his own investigation of available roads for transportation, of load limits of bridges on the roads, and of other road conditions which may affect transportation of materials, equipment, and personnel to the site of the work.

(End of clause)

(R 7-603.25 1965 JAN)

68 52.1000-4200 CONTRACTING OFFICER FOR CONTRACTS (MAR 1991) (LRD)

The Contracting Officer who signs this contract will be the primary Contracting Officer on this contract. However, any Contracting Officer assigned to the Little Rock District and acting within his or her authority, may take formal action on this contract when a contract action needs to be taken and the primary Contracting Officer is away from the office.

69 52.1000-4210 REQUIRED INSURANCE (APR 1984) (FAR 28.307-2)

(a) Any successful offeror under this solicitation shall procure and maintain during the entire period of his performance under this contract the following minimum insurance:

(1) Workmen's Compensation in amounts required by applicable jurisdictional statutes. (FAR 28.307-2a)

(2) Employers Liability Insurance of at least $100,000. (FAR 28.307-2a)

(3) Comprehensive general liability insurance for bodily injury in the minimum limits of $500,000 per occurrence. No property damage liability insurance is required. (FAR 28.307-2(b))

(4) Comprehensive vehicle liability insurance covering the operation of all automobiles used in connection with the performance of the contract in the minimum limits of $200,000 per person and $500,000 per occurrence for bodily injury and $20,000 per occurrence for property damage. (FAR 28.3072(c))

(b) In connection with the above, see FAR 52.228-5, INSURANCE--WORK ON A GOVERNMENT INSTALLATION, located in Section 00700, for further instructions and proper procedures relative to the Contractor's insurance requirements.

(End of clause)

70 RESERVED

TABLE OF CONTENTS

SECTION 00900

ATTACHMENTS

1. *Wage Decisions - Index of Applicable Wage Decisions 78 Pages

2. Technical Specifications, Volume I

3. Unit Price Book, Volume II

4. **Amendments

Number Date

*WAGE DECISIONS: Wage decisions applicable on the date offers are received will be inserted by amendment. Wage decisions for specific locations may be viewed at the Little Rock District office.

**AMENDMENTS: Amendments issued to this solicitation affecting the contract will be a part of the resultant contract, and will be listed above at the time of award. Applicable amendments will be physically located after the wage decision.

## STATE OF ARKANSAS

STATE OF **ARKANSAS**

NO MODIFICATIONS DURING PERIOD ENDING
NOVEMBER 14, 1997

**AR** GENERAL DECISION COUNTY **INDEX** - PUBLICATION DATE: 02/14/97

| County | Building | Heavy | Highway | Resident |
|---|---|---|---|---|
| **ARKANSAS**: | | | | |
| | - | HVY-AR44 | - | - |
| | BLD-AR14 | - | - | - |
| | - | HVY-AR45 | - | - |
| | - | HVY-AR43 | - | - |
| | - | - | - | R-AR30 |
| | - | - | HWY-AR7 | - |
| ASHLEY: | | | | |
| | - | - | - | R-AR31 |
| | BLD-AR2 | - | - | - |
| | - | HVY-AR44 | - | - |
| | - | HVY-AR43 | - | - |
| | - | - | HWY-AR7 | - |
| | - | HVY-AR45 | - | - |
| BAXTER: | | | | |
| | - | HVY-AR45 | - | - |
| | - | HVY-AR43 | - | - |
| | - | - | HWY-AR7 | - |
| | - | HVY-AR44 | - | - |
| | BLD-AR12 | - | - | - |
| | - | - | - | R-AR9 |
| BENTON: | | | | |
| | - | - | HWY-AR7 | - |
| | - | HVY-AR45 | - | - |
| | BLD-AR11 | - | - | - |
| | - | HVY-AR43 | - | - |
| | - | - | - | R-AR32 |
| | - | HVY-AR44 | - | - |
| BOONE: | | | | |
| | - | HVY-AR45 | - | - |
| | - | HVY-AR44 | - | - |
| | - | - | HWY-AR7 | - |
| | - | HVY-AR43 | - | - |
| | BLD-AR13 | - | - | - |
| | - | - | - | R-AR9 |
| BRADLEY: | | | | |
| | - | - | HWY-AR7 | - |
| | - | HVY-AR44 | - | - |
| | BLD-AR10 | - | - | - |
| | - | HVY-AR45 | - | - |
| | - | HVY-AR43 | - | - |
| | - | - | - | R-AR41 |

CALHOUN:

| | | | |
|---|---|---|---|
| - | - | - | R-AR41 |
| - | - | HWY-AR7 | - |
| - | HVY-AR44 | - | - |
| - | HVY-AR43 | - | - |
| BLD-AR2 | - | - | - |
| - | HVY-AR45 | - | - |

---

CARROLL:

| | | | |
|---|---|---|---|
| - | - | - | R-AR32 |
| - | - | HWY-AR7 | - |
| - | HVY-AR43 | - | - |
| BLD-AR11 | - | - | - |
| - | HVY-AR44 | - | - |
| - | HVY-AR45 | - | - |

---

CHICOT:

| | | | |
|---|---|---|---|
| - | - | HWY-AR7 | - |
| BLD-AR2 | - | - | - |
| - | HVY-AR45 | - | - |
| - | HVY-AR44 | - | - |
| - | HVY-AR43 | - | - |
| - | - | - | R-AR31 |

---

CLARK:

| | | | |
|---|---|---|---|
| - | - | HWY-AR7 | - |
| - | HVY-AR45 | - | - |
| BLD-AR5 | - | - | - |
| - | - | - | R-AR33 |
| - | HVY-AR43 | - | - |
| - | HVY-AR44 | - | - |

---

CLAY:

| | | | |
|---|---|---|---|
| - | HVY-AR45 | - | - |
| - | - | HWY-AR7 | - |
| - | HVY-AR43 | - | - |
| - | - | - | R-AR9 |
| BLD-AR29 | - | - | - |
| - | HVY-AR44 | - | - |

---

CLEBURNE:

| | | | |
|---|---|---|---|
| BLD-AR13 | - | - | - |
| - | HVY-AR43 | - | - |
| - | - | HWY-AR7 | - |
| - | HVY-AR44 | - | - |
| - | - | - | R-AR9 |
| - | HVY-AR45 | - | - |

---

CLEVELAND:

| | | | |
|---|---|---|---|
| - | HVY-AR44 | - | - |
| - | HVY-AR45 | - | - |
| - | - | - | R-AR41 |
| BLD-AR10 | - | - | - |
| - | - | HWY-AR7 | - |
| - | HVY-AR43 | - | - |

---

COLUMBIA:

| | | | |
|---|---|---|---|
| - | HVY-AR45 | - | - |
| - | - | HWY-AR7 | - |
| BLD-AR22 | - | - | - |
| - | HVY-AR44 | - | - |
| - | HVY-AR43 | - | - |
| - | - | - | R-AR37 |

---

CONWAY:

| | | | |
|---|---|---|---|
| BLD-AR13 | - | - | - |
| - | - | - | R-AR34 |
| - | HVY-AR44 | - | - |
| - | HVY-AR45 | - | - |
| - | - | HWY-AR7 | - |
| - | HVY-AR43 | - | - |

---

CRAIGHEAD:

| | | | |
|---|---|---|---|
| - | HVY-AR45 | - | - |
| - | - | HWY-AR7 | - |
| - | HVY-AR43 | - | - |
| - | - | - | R-AR9 |
| BLD-AR29 | - | - | - |
| - | HVY-AR44 | - | - |

---

CRAWFORD:

| | | | |
|---|---|---|---|
| - | HVY-AR45 | - | - |
| - | - | - | R-AR38 |
| BLD-AR15 | - | - | - |
| - | - | HWY-AR7 | - |
| - | HVY-AR44 | - | - |
| - | HVY-AR43 | - | - |

---

CRITTENDEN:

| | | | |
|---|---|---|---|
| BLD-AR16 | - | - | - |
| - | - | - | R-AR35 |
| - | HVY-AR45 | - | - |
| - | HVY-AR43 | - | - |
| - | - | HWY-AR7 | - |
| - | HVY-AR44 | - | - |

---

CROSS:

| | | | |
|---|---|---|---|
| - | - | - | R-AR36 |
| - | HVY-AR45 | - | - |
| - | HVY-AR44 | - | - |
| - | - | HWY-AR7 | - |
| - | HVY-AR43 | - | - |
| BLD-AR24 | - | - | - |

---

DALLAS:

| | | | |
|---|---|---|---|
| - | HVY-AR43 | - | - |
| - | HVY-AR44 | - | - |
| - | - | HWY-AR7 | - |
| - | - | - | R-AR41 |
| BLD-AR10 | - | - | - |
| - | HVY-AR45 | - | - |

---

DESHA:

| | | | |
|---|---|---|---|
| BLD-AR10 | - | - | - |
| - | HVY-AR44 | - | - |
| - | - | - | R-AR31 |
| - | HVY-AR43 | - | - |
| - | - | HWY-AR7 | - |
| - | HVY-AR45 | - | - |

---

DREW:

| | | | |
|---|---|---|---|
| - | HVY-AR45 | - | - |
| - | - | HWY-AR7 | - |
| - | - | - | R-AR31 |
| - | HVY-AR44 | - | - |
| - | HVY-AR43 | - | - |
| BLD-AR10 | - | - | - |

---

FAULKNER:

| | | | |
|---|---|---|---|
| BLD-AR23 | - | - | - |
| - | HVY-AR45 | - | - |
| - | - | HWY-AR7 | - |
| - | - | - | R-AR34 |
| - | HVY-AR43 | - | - |
| - | HVY-AR46 | - | - |

---

FRANKLIN:

| | | | |
|---|---|---|---|
| - | HVY-AR43 | - | - |
| - | - | - | R-AR38 |
| - | HVY-AR45 | - | - |
| - | - | HWY-AR7 | - |
| - | HVY-AR44 | - | - |
| BLD-AR17 | - | - | - |

---

FULTON:

| | | | |
|---|---|---|---|
| - | - | - | R-AR9 |
| - | - | HWY-AR7 | - |
| BLD-AR12 | - | - | - |
| - | HVY-AR44 | - | - |
| - | HVY-AR43 | - | - |
| - | HVY-AR45 | - | - |

---

GARLAND:

| | | | |
|---|---|---|---|
| - | HVY-AR43 | - | - |
| - | - | - | R-AR33 |
| - | HVY-AR45 | - | - |
| - | HVY-AR44 | - | - |
| BLD-AR5 | - | - | - |
| - | - | HWY-AR7 | - |

---

GRANT:

| | | | |
|---|---|---|---|
| - | HVY-AR44 | - | - |
| - | - | - | R-AR33 |
| - | HVY-AR45 | - | - |
| BLD-AR10 | - | - | - |
| - | - | HWY-AR7 | - |
| - | HVY-AR43 | - | - |

---

GREENE:

| | | | |
|---|---|---|---|
| - | - | HWY-AR7 | - |
| - | HVY-AR44 | - | - |
| - | HVY-AR45 | - | - |
| - | HVY-AR43 | - | - |
| BLD-AR29 | - | - | - |
| - | - | - | R-AR9 |

---

HEMPSTEAD:

| | | | |
|---|---|---|---|
| - | HVY-AR43 | - | - |
| - | - | HWY-AR7 | - |
| BLD-AR20 | - | - | - |
| - | HVY-AR44 | - | - |
| - | - | - | R-AR37 |
| - | HVY-AR45 | - | - |

---

HOT SPRING:

| | | | |
|---|---|---|---|
| - | - | - | R-AR33 |
| - | HVY-AR44 | - | - |
| - | HVY-AR45 | - | - |
| BLD-AR5 | - | - | - |
| - | - | HWY-AR7 | - |
| - | HVY-AR43 | - | - |

---

HOWARD:

| | | | |
|---|---|---|---|
| BLD-AR19 | - | - | - |
| - | - | - | R-AR39 |
| - | HVY-AR44 | - | - |
| - | HVY-AR43 | - | - |
| - | - | HWY-AR7 | - |
| - | HVY-AR45 | - | - |

---

INDEPENDENCE:

| | | | |
|---|---|---|---|
| - | - | - | R-AR9 |
| BLD-AR12 | - | - | - |
| - | - | HWY-AR7 | - |
| - | HVY-AR43 | - | - |
| - | HVY-AR44 | - | - |
| - | HVY-AR45 | - | - |

---

IZARD:

| | | | |
|---|---|---|---|
| - | HVY-AR45 | - | - |
| BLD-AR12 | - | - | - |
| - | - | HWY-AR7 | - |
| - | HVY-AR44 | - | - |
| - | - | - | R-AR9 |
| - | HVY-AR43 | - | - |

---

JACKSON:

| | | | |
|---|---|---|---|
| - | - | - | R-AR36 |
| - | HVY-AR44 | - | - |
| - | HVY-AR43 | - | - |
| - | - | HWY-AR7 | - |
| - | HVY-AR45 | - | - |
| BLD-AR18 | - | - | - |

---

JEFFERSON:

| | | | |
|---|---|---|---|
| BLD-AR8 | - | - | - |
| - | - | HWY-AR7 | - |
| - | HVY-AR45 | - | - |
| - | HVY-AR43 | - | - |
| - | HVY-AR46 | - | - |
| - | - | - | R-AR30 |

---

JOHNSON:

| | | | |
|---|---|---|---|
| BLD-AR17 | - | - | - |
| - | - | - | R-AR38 |
| - | HVY-AR45 | - | - |
| - | - | HWY-AR7 | - |
| - | HVY-AR43 | - | - |
| - | HVY-AR44 | - | - |

---

LAFAYETTE:

| | | | |
|---|---|---|---|
| - | HVY-AR45 | - | - |
| - | HVY-AR44 | - | - |
| - | - | HWY-AR7 | - |
| - | - | - | R-AR37 |
| BLD-AR22 | - | - | - |
| - | HVY-AR43 | - | - |

---

LAWRENCE:

| | | | |
|---|---|---|---|
| - | HVY-AR45 | - | - |
| - | HVY-AR44 | - | - |
| - | - | HWY-AR7 | - |
| BLD-AR24 | - | - | - |
| - | HVY-AR43 | - | - |
| - | - | - | R-AR9 |

---

LEE:

| | | | |
|---|---|---|---|
| - | - | HWY-AR7 | - |
| - | HVY-AR44 | - | - |
| BLD-AR21 | - | - | - |
| - | HVY-AR45 | - | - |
| - | HVY-AR43 | - | - |
| - | - | - | R-AR40 |

---

LINCOLN:

| | | | |
|---|---|---|---|
| BLD-AR10 | - | - | - |
| - | - | - | R-AR31 |
| - | HVY-AR44 | - | - |
| - | HVY-AR43 | - | - |
| - | - | HWY-AR7 | - |
| - | HVY-AR45 | - | - |

---

LITTLE RIVER:

| | | | |
|---|---|---|---|
| - | HVY-AR43 | - | - |
| - | - | - | R-AR37 |
| BLD-AR19 | - | - | - |
| - | - | HWY-AR7 | - |
| - | HVY-AR44 | - | - |
| - | HVY-AR45 | - | - |

---

LOGAN:

| | | | |
|---|---|---|---|
| - | - | - | R-AR38 |
| BLD-AR17 | - | - | - |
| - | - | HWY-AR7 | - |
| - | HVY-AR43 | - | - |
| - | HVY-AR44 | - | - |
| - | HVY-AR45 | - | - |

---

LONOKE:

| | | | |
|---|---|---|---|
| BLD-AR23 | - | - | - |
| - | - | HWY-AR7 | - |
| - | HVY-AR46 | - | - |
| - | HVY-AR45 | - | - |
| - | HVY-AR43 | - | - |
| - | - | - | R-AR30 |

---

MADISON:

| | | | |
|---|---|---|---|
| - | HVY-AR45 | - | - |
| BLD-AR13 | - | - | - |
| - | - | HWY-AR7 | - |
| - | HVY-AR44 | - | - |
| - | - | - | R-AR9 |
| - | HVY-AR43 | - | - |

---

MARION:

| | | | |
|---|---|---|---|
| - | - | HWY-AR7 | - |
| BLD-AR13 | - | - | - |
| - | HVY-AR44 | - | - |
| - | HVY-AR45 | - | - |
| - | - | - | R-AR9 |
| - | HVY-AR43 | - | - |

---

MILLER:

| | | | |
|---|---|---|---|
| - | - | - | R-AR37 |
| BLD-AR25 | - | - | - |
| - | HVY-AR43 | - | - |
| - | HVY-AR44 | - | - |
| - | HVY-AR45 | - | - |
| - | - | HWY-AR7 | - |

---

MISSISSIPPI:

| | | | |
|---|---|---|---|
| BLD-AR24 | - | - | - |
| - | - | - | R-AR35 |
| - | HVY-AR45 | - | - |
| - | HVY-AR43 | - | - |
| - | HVY-AR44 | - | - |
| - | - | HWY-AR7 | - |

---

MONROE:

| | | | |
|---|---|---|---|
| - | - | HWY-AR7 | - |
| BLD-AR21 | - | - | - |
| - | - | - | R-AR40 |
| - | HVY-AR45 | - | - |
| - | HVY-AR43 | - | - |
| - | HVY-AR44 | - | - |

---

MONTGOMERY:

| | | | |
|---|---|---|---|
| - | - | HWY-AR7 | - |
| - | HVY-AR43 | - | - |
| - | HVY-AR44 | - | - |
| BLD-AR17 | - | - | - |
| - | - | - | R-AR39 |
| - | HVY-AR45 | - | - |

---

NEVADA:

| | | | |
|---|---|---|---|
| - | HVY-AR45 | - | - |
| - | HVY-AR44 | - | - |
| - | - | - | R-AR37 |
| - | - | HWY-AR7 | - |
| - | HVY-AR43 | - | - |
| BLD-AR22 | - | - | - |

---

NEWTON:

| | | | |
|---|---|---|---|
| - | - | - | R-AR9 |
| - | HVY-AR45 | - | - |
| - | - | HWY-AR7 | - |
| - | HVY-AR44 | - | - |
| BLD-AR13 | - | - | - |
| - | HVY-AR43 | - | - |

---

OUACHITA:

| | | | |
|---|---|---|---|
| - | - | HWY-AR7 | - |
| - | HVY-AR44 | - | - |
| - | HVY-AR45 | - | - |
| - | - | - | R-AR41 |
| BLD-AR2 | - | - | - |
| - | HVY-AR43 | - | - |

---

PERRY:

| | | | |
|---|---|---|---|
| BLD-AR13 | - | - | - |
| - | HVY-AR45 | - | - |
| - | HVY-AR44 | - | - |
| - | - | HWY-AR7 | - |
| - | HVY-AR43 | - | - |
| - | - | - | R-AR34 |

---

PHILLIPS:

| | | | |
|---|---|---|---|
| - | HVY-AR45 | - | - |
| BLD-AR21 | - | - | - |
| - | - | HWY-AR7 | - |
| - | HVY-AR43 | - | - |
| - | HVY-AR44 | - | - |

| | | | | |
|---|---|---|---|---|
| | - | - | - | R-AR40 |
| PIKE: | | | | |
| | - | HVY-AR45 | - | - |
| | - | - | - | R-AR39 |
| | BLD-AR19 | - | - | - |
| | - | HVY-AR43 | - | - |
| | - | HVY-AR44 | - | - |
| | - | - | HWY-AR7 | - |
| POINSETT: | | | | |
| | - | HVY-AR44 | - | - |
| | - | HVY-AR45 | - | - |
| | - | HVY-AR43 | - | - |
| | - | - | HWY-AR7 | - |
| | - | - | - | R-AR36 |
| | BLD-AR29 | - | - | - |
| POLK: | | | | |
| | - | - | - | R-AR39 |
| | - | HVY-AR45 | - | - |
| | - | HVY-AR43 | - | - |
| | BLD-AR17 | - | - | - |
| | - | - | HWY-AR7 | - |
| | - | HVY-AR44 | - | - |
| POPE: | | | | |
| | - | - | - | R-AR38 |
| | - | HVY-AR43 | - | - |
| | BLD-AR26 | - | - | - |
| | - | HVY-AR45 | - | - |
| | - | HVY-AR44 | - | - |
| | - | - | HWY-AR7 | - |
| PRAIRIE: | | | | |
| | - | - | HWY-AR7 | - |
| | - | HVY-AR43 | - | - |
| | - | HVY-AR44 | - | - |
| | - | HVY-AR45 | - | - |
| | - | - | - | R-AR30 |
| | BLD-AR14 | - | - | - |
| PULASKI: | | | | |
| | BLD-AR1 | - | - | - |
| | - | - | - | R-AR6 |
| | - | HVY-AR43 | - | - |
| | - | HVY-AR45 | - | - |
| | - | HVY-AR46 | - | - |
| | - | - | HWY-AR7 | - |
| RANDOLPH: | | | | |
| | BLD-AR12 | - | - | - |
| | - | - | - | R-AR9 |
| | - | - | HWY-AR7 | - |
| | - | HVY-AR45 | - | - |
| | - | HVY-AR44 | - | - |
| | - | HVY-AR43 | - | - |
| ST FRANCIS: | | | | |
| | - | HVY-AR44 | - | - |
| | BLD-AR21 | - | - | - |
| | - | - | - | R-AR40 |
| | - | HVY-AR43 | - | - |
| | - | - | HWY-AR7 | - |

| | | | |
|---|---|---|---|
| - | HVY-AR45 | - | - |

SALINE:

| | | | |
|---|---|---|---|
| - | HVY-AR43 | - | - |
| - | - | HWY-AR7 | - |
| - | - | - | R-AR42 |
| - | HVY-AR46 | - | - |
| - | HVY-AR45 | - | - |
| BLD-AR27 | - | - | - |

SCOTT:

| | | | |
|---|---|---|---|
| BLD-AR17 | - | - | - |
| - | - | - | R-AR38 |
| - | HVY-AR45 | - | - |
| - | - | HWY-AR7 | - |
| - | HVY-AR44 | - | - |
| - | HVY-AR43 | - | - |

SEARCY:

| | | | |
|---|---|---|---|
| - | - | HWY-AR7 | - |
| BLD-AR13 | - | - | - |
| - | HVY-AR45 | - | - |
| - | HVY-AR43 | - | - |
| - | - | - | R-AR9 |
| - | HVY-AR44 | - | - |

SEBASTIAN:

| | | | |
|---|---|---|---|
| - | - | HWY-AR7 | - |
| BLD-AR3 | - | - | - |
| - | HVY-AR43 | - | - |
| - | HVY-AR44 | - | - |
| - | - | - | R-AR38 |
| - | HVY-AR45 | - | - |

SEVIER:

| | | | |
|---|---|---|---|
| BLD-AR19 | - | - | - |
| - | HVY-AR45 | - | - |
| - | - | HWY-AR7 | - |
| - | HVY-AR43 | - | - |
| - | - | - | R-AR39 |
| - | HVY-AR44 | - | - |

SHARP:

| | | | |
|---|---|---|---|
| - | HVY-AR43 | - | - |
| - | - | - | R-AR9 |
| - | HVY-AR45 | - | - |
| - | HVY-AR44 | - | - |
| - | - | HWY-AR7 | - |
| BLD-AR12 | - | - | - |

STONE:

| | | | |
|---|---|---|---|
| - | HVY-AR44 | - | - |
| - | - | - | R-AR9 |
| - | - | HWY-AR7 | - |
| - | HVY-AR45 | - | - |
| - | HVY-AR43 | - | - |
| BLD-AR12 | - | - | - |

UNION:

| | | | |
|---|---|---|---|
| - | HVY-AR45 | - | - |
| - | HVY-AR43 | - | - |
| - | - | HWY-AR7 | - |
| - | - | - | R-AR41 |
| BLD-AR2 | - | - | - |

| | | | |
|---|---|---|---|
| - | HVY-AR44 | - | - |

VAN BUREN:

| | | | |
|---|---|---|---|
| - | - | - | R-AR34 |
| - | HVY-AR43 | - | - |
| - | HVY-AR45 | - | - |
| BLD-AR13 | - | - | - |
| - | - | HWY-AR7 | - |
| - | HVY-AR44 | - | - |

WASHINGTON:

| | | | |
|---|---|---|---|
| - | HVY-AR43 | - | - |
| - | HVY-AR45 | - | - |
| - | - | - | R-AR32 |
| - | HVY-AR44 | - | - |
| BLD-AR4 | - | - | - |
| - | - | HWY-AR7 | - |

WHITE:

| | | | |
|---|---|---|---|
| BLD-AR28 | - | - | - |
| - | - | - | R-AR34 |
| - | HVY-AR44 | - | - |
| - | HVY-AR43 | - | - |
| - | HVY-AR45 | - | - |
| - | - | HWY-AR7 | - |

WOODRUFF:

| | | | |
|---|---|---|---|
| - | HVY-AR44 | - | - |
| BLD-AR28 | - | - | - |
| - | - | - | R-AR36 |
| - | HVY-AR43 | - | - |
| - | - | HWY-AR7 | - |
| - | HVY-AR45 | - | - |

YELL:

| | | | |
|---|---|---|---|
| - | - | - | R-AR38 |
| - | - | HWY-AR7 | - |
| BLD-AR17 | - | - | - |
| - | HVY-AR44 | - | - |
| - | HVY-AR43 | - | - |
| - | HVY-AR45 | - | - |

-- - -- ----

## STATE OF LOUISIANA

---

STATE OF **LOUISIANA**

MODIFICATIONS AS PUBLISHED IN THE FEDERAL REGISTER ON
NOVEMBER 14, 1997

**LA** 1 MOD-5

**LA** 4 MOD-7

**LA** 5 MOD-12

**LA** 9 MOD-8

**LA** 15 MOD-5

**LA** 16 MOD-1

**LA** 18 MOD-9

**LA** 55 MOD-2

COUNTY **INDEX** MODIFIED

**LA** GENERAL DECISION COUNTY **INDEX** - PUBLICATION DATE: 01/24/97

| County | Building | Heavy | Highway | Resident |
|---|---|---|---|---|
| ACADIA: | | | | |
| | - | - | - | R-LA8 |
| | - | HVY-LA18 | - | - |
| | - | HVY-LA51 | - | - |
| | - | - | HWY-LA32 | - |
| | - | HVY-LA9 | - | - |
| | - | HVY-LA49 | - | - |
| | BLD-LA5 | - | - | - |
| ALLEN: | | | | |
| | - | HVY-LA55 | - | - |
| | BLD-LA5 | - | - | - |
| | - | HVY-LA18 | - | - |
| | - | HVY-LA51 | - | - |
| | - | HVY-LA49 | - | - |
| | - | - | HWY-LA39 | - |
| | - | - | - | R-LA8 |
| ASCENSION: | | | | |
| | - | HVY-LA49 | - | - |
| | BLD-LA6 | - | - | - |
| | - | HVY-LA51 | - | - |
| | - | HVY-LA10 | - | - |
| | - | - | HWY-LA11 | - |
| | - | - | - | R-LA19 |
| | - | HVY-LA18 | - | - |
| ASSUMPTION: | | | | |
| | - | - | HWY-LA33 | - |

| | | | |
|---|---|---|---|
| - | HVY-LA9 | - | - |
| BLD-LA5 | - | - | - |
| - | HVY-LA49 | - | - |
| - | HVY-LA51 | - | - |
| - | - | - | R-LA20 |
| - | HVY-LA18 | - | - |

---

AVOYELLES:

| | | | |
|---|---|---|---|
| BLD-LA5 | - | - | - |
| - | - | HWY-LA39 | - |
| - | HVY-LA18 | - | - |
| - | HVY-LA49 | - | - |
| - | - | - | R-LA21 |
| - | HVY-LA51 | - | - |
| - | HVY-LA9 | - | - |

---

BEAUREGARD:

| | | | |
|---|---|---|---|
| - | - | HWY-LA39 | - |
| - | - | - | R-LA8 |
| - | HVY-LA49 | - | - |
| - | HVY-LA51 | - | - |
| BLD-LA5 | - | - | - |
| - | HVY-LA18 | - | - |
| - | HVY-LA55 | - | - |

---

BIENVILLE:

| | | | |
|---|---|---|---|
| - | HVY-LA51 | - | - |
| - | HVY-LA9 | - | - |
| - | HVY-LA49 | - | - |
| - | HVY-LA18 | - | - |
| BLD-LA5 | - | - | - |
| - | - | - | R-LA22 |
| - | - | HWY-LA33 | - |

---

BOSSIER:

| | | | |
|---|---|---|---|
| - | - | HWY-LA42 | - |
| - | - | - | R-LA2 |
| - | HVY-LA51 | - | - |
| - | HVY-LA18 | - | - |
| - | HVY-LA49 | - | - |
| - | HVY-LA4 | - | - |
| BLD-LA15 | - | - | - |

---

CADDO:

| | | | |
|---|---|---|---|
| - | HVY-LA49 | - | - |
| - | - | HWY-LA34 | - |
| - | HVY-LA51 | - | - |
| - | - | - | R-LA2 |
| BLD-LA15 | - | - | - |
| - | HVY-LA18 | - | - |
| - | HVY-LA4 | - | - |

---

CALCASIEU:

| | | | |
|---|---|---|---|
| - | - | - | R-LA1 |
| - | HVY-LA49 | - | - |
| - | - | HWY-LA45 | - |
| - | HVY-LA4 | - | - |
| - | HVY-LA18 | - | - |
| BLD-LA16 | - | - | - |
| - | HVY-LA51 | - | - |

---

CALDWELL:

| | | | |
|---|---|---|---|
| - | - | - | R-LA21 |
| - | HVY-LA18 | - | - |

| | | | |
|---|---|---|---|
| - | - | HWY-LA33 | - |
| BLD-LA5 | - | - | - |
| - | HVY-LA51 | - | - |
| - | HVY-LA49 | - | - |
| - | HVY-LA9 | - | - |

---

CAMERON:

| | | | |
|---|---|---|---|
| - | HVY-LA18 | - | - |
| - | - | - | R-LA1 |
| - | HVY-LA49 | - | - |
| - | HVY-LA55 | - | - |
| BLD-LA5 | - | - | - |
| - | HVY-LA51 | - | - |
| - | - | HWY-LA39 | - |

---

CATAHOULA:

| | | | |
|---|---|---|---|
| - | - | HWY-LA33 | - |
| - | HVY-LA18 | - | - |
| BLD-LA5 | - | - | - |
| - | HVY-LA9 | - | - |
| - | - | - | R-LA21 |
| - | HVY-LA51 | - | - |
| - | HVY-LA49 | - | - |

---

CLAIBORNE:

| | | | |
|---|---|---|---|
| - | HVY-LA51 | - | - |
| - | - | HWY-LA33 | - |
| - | - | - | R-LA22 |
| - | HVY-LA18 | - | - |
| - | HVY-LA9 | - | - |
| BLD-LA5 | - | - | - |
| - | HVY-LA49 | - | - |

---

CONCORDIA:

| | | | |
|---|---|---|---|
| - | HVY-LA9 | - | - |
| - | HVY-LA51 | - | - |
| - | - | - | R-LA21 |
| - | - | HWY-LA33 | - |
| - | HVY-LA18 | - | - |
| BLD-LA5 | - | - | - |
| - | HVY-LA49 | - | - |

---

DE SOTO:

| | | | |
|---|---|---|---|
| BLD-LA5 | - | - | - |
| - | HVY-LA49 | - | - |
| - | - | HWY-LA33 | - |
| - | HVY-LA51 | - | - |
| - | - | - | R-LA22 |
| - | HVY-LA9 | - | - |
| - | HVY-LA18 | - | - |

---

EAST BATON ROUG:

| | | | |
|---|---|---|---|
| - | HVY-LA10 | - | - |
| - | - | HWY-LA11 | - |
| - | HVY-LA18 | - | - |
| - | - | - | R-LA19 |
| - | HVY-LA49 | - | - |
| - | HVY-LA51 | - | - |
| BLD-LA6 | - | - | - |

---

EAST CARROLL:

| | | | |
|---|---|---|---|
| - | HVY-LA9 | - | - |
| - | - | HWY-LA33 | - |
| - | HVY-LA18 | - | - |

| | | | |
|---|---|---|---|
| - | - | - | R-LA21 |
| - | HVY-LA51 | - | - |
| BLD-LA5 | - | - | - |
| - | HVY-LA49 | - | - |

EAST FELICIANA:

| | | | |
|---|---|---|---|
| - | HVY-LA49 | - | - |
| BLD-LA5 | - | - | - |
| - | HVY-LA9 | - | - |
| - | - | - | R-LA23 |
| - | HVY-LA51 | - | - |
| - | - | HWY-LA33 | - |
| - | HVY-LA18 | - | - |

EVANGELINE:

| | | | |
|---|---|---|---|
| BLD-LA5 | - | - | - |
| - | HVY-LA9 | - | - |
| - | HVY-LA51 | - | - |
| - | HVY-LA49 | - | - |
| - | - | HWY-LA37 | - |
| - | HVY-LA18 | - | - |
| - | - | - | R-LA8 |

FRANKLIN:

| | | | |
|---|---|---|---|
| - | HVY-LA51 | - | - |
| - | - | - | R-LA21 |
| - | HVY-LA9 | - | - |
| - | - | HWY-LA33 | - |
| BLD-LA5 | - | - | - |
| - | HVY-LA18 | - | - |
| - | HVY-LA49 | - | - |

GRANT:

| | | | |
|---|---|---|---|
| - | - | HWY-LA39 | - |
| - | - | - | R-LA22 |
| - | HVY-LA9 | - | - |
| BLD-LA5 | - | - | - |
| - | HVY-LA51 | - | - |
| - | HVY-LA18 | - | - |
| - | HVY-LA49 | - | - |

IBERIA:

| | | | |
|---|---|---|---|
| - | HVY-LA18 | - | - |
| - | - | HWY-LA37 | - |
| - | - | - | R-LA8 |
| - | HVY-LA49 | - | - |
| BLD-LA5 | - | - | - |
| - | HVY-LA51 | - | - |
| - | HVY-LA9 | - | - |

IBERVILLE:

| | | | |
|---|---|---|---|
| BLD-LA5 | - | - | - |
| - | HVY-LA51 | - | - |
| - | HVY-LA49 | - | - |
| - | - | - | R-LA19 |
| - | HVY-LA9 | - | - |
| - | HVY-LA18 | - | - |
| - | - | HWY-LA33 | - |

JACKSON:

| | | | |
|---|---|---|---|
| - | HVY-LA49 | - | - |
| - | - | - | R-LA22 |
| - | HVY-LA18 | - | - |

| | | | |
|---|---|---|---|
| - | HVY-LA9 | - | - |
| BLD-LA5 | - | - | - |
| - | HVY-LA51 | - | - |
| - | - | HWY-LA33 | - |

JEFFERSON:

| | | | |
|---|---|---|---|
| - | HVY-LA51 | - | - |
| BLD-LA14 | - | - | - |
| - | HVY-LA13 | - | - |
| BLD-LA12 | - | - | - |
| - | HVY-LA49 | - | - |
| - | - | HWY-LA40 | - |
| - | - | - | R-LA3 |

JEFFERSON DAVIS:

| | | | |
|---|---|---|---|
| BLD-LA5 | - | - | - |
| - | - | - | R-LA8 |
| - | HVY-LA51 | - | - |
| - | HVY-LA55 | - | - |
| - | - | HWY-LA39 | - |
| - | HVY-LA49 | - | - |
| - | HVY-LA18 | - | - |

LAFAYETTE:

| | | | |
|---|---|---|---|
| - | HVY-LA18 | - | - |
| - | HVY-LA49 | - | - |
| - | HVY-LA51 | - | - |
| BLD-LA50 | - | - | - |
| - | - | - | R-LA24 |
| - | - | HWY-LA36 | - |
| - | HVY-LA53 | - | - |

LAFOURCHE:

| | | | |
|---|---|---|---|
| - | HVY-LA51 | - | - |
| - | - | HWY-LA43 | - |
| BLD-LA5 | - | - | - |
| - | - | - | R-LA3 |
| - | HVY-LA49 | - | - |
| - | HVY-LA54 | - | - |
| - | HVY-LA18 | - | - |

**LA** SALLE:

| | | | |
|---|---|---|---|
| - | - | HWY-LA39 | - |
| BLD-LA5 | - | - | - |
| - | HVY-LA49 | - | - |
| - | HVY-LA9 | - | - |
| - | - | - | R-LA21 |
| - | HVY-LA18 | - | - |
| - | HVY-LA51 | - | - |

LINCOLN:

| | | | |
|---|---|---|---|
| - | HVY-LA9 | - | - |
| BLD-LA5 | - | - | - |
| - | HVY-LA18 | - | - |
| - | - | - | R-LA25 |
| - | HVY-LA49 | - | - |
| - | - | HWY-LA33 | - |
| - | HVY-LA51 | - | - |

LIVINGSTON:

| | | | |
|---|---|---|---|
| - | HVY-LA10 | - | - |
| - | - | HWY-LA11 | - |
| BLD-LA6 | - | - | - |
| - | HVY-LA18 | - | - |

| | | | |
|---|---|---|---|
| - | HVY-LA51 | - | - |
| - | HVY-LA49 | - | - |
| - | - | - | R-LA19 |

MADISON:

| | | | |
|---|---|---|---|
| - | HVY-LA49 | - | - |
| BLD-LA5 | - | - | - |
| - | - | - | R-LA21 |
| - | HVY-LA51 | - | - |
| - | HVY-LA18 | - | - |
| - | HVY-LA9 | - | - |
| - | - | HWY-LA33 | - |

MOREHOUSE:

| | | | |
|---|---|---|---|
| - | - | - | R-LA21 |
| - | HVY-LA51 | - | - |
| - | HVY-LA9 | - | - |
| - | - | HWY-LA33 | - |
| BLD-LA5 | - | - | - |
| - | HVY-LA49 | - | - |
| - | HVY-LA18 | - | - |

NATCHITOCHES:

| | | | |
|---|---|---|---|
| BLD-LA5 | - | - | - |
| - | - | HWY-LA33 | - |
| - | HVY-LA18 | - | - |
| - | HVY-LA49 | - | - |
| - | HVY-LA51 | - | - |
| - | - | - | R-LA22 |
| - | HVY-LA9 | - | - |

ORLEANS:

| | | | |
|---|---|---|---|
| BLD-LA14 | - | - | - |
| - | HVY-LA51 | - | - |
| - | - | - | R-LA3 |
| - | HVY-LA13 | - | - |
| - | - | HWY-LA46 | - |
| BLD-LA12 | - | - | - |
| - | HVY-LA49 | - | - |

OUACHITA:

| | | | |
|---|---|---|---|
| - | - | HWY-LA34 | - |
| - | HVY-LA56 | - | - |
| - | HVY-LA51 | - | - |
| - | - | - | R-LA21 |
| - | HVY-LA18 | - | - |
| BLD-LA5 | - | - | - |
| - | HVY-LA49 | - | - |

PLAQUEMINES:

| | | | |
|---|---|---|---|
| - | HVY-LA18 | - | - |
| - | HVY-LA51 | - | - |
| - | HVY-LA4 | - | - |
| BLD-LA5 | - | - | - |
| - | - | - | R-LA7 |
| - | HVY-LA49 | - | - |
| - | - | HWY-LA40 | - |

POINTE COUPEE:

| | | | |
|---|---|---|---|
| BLD-LA5 | - | - | - |
| - | HVY-LA18 | - | - |
| - | HVY-LA9 | - | - |
| - | HVY-LA51 | - | - |
| - | - | - | R-LA19 |

| | | | |
|---|---|---|---|
| - | - | HWY-LA33 | - |
| - | HVY-LA49 | - | - |

RAPIDES:

| | | | |
|---|---|---|---|
| - | HVY-LA51 | - | - |
| - | - | - | R-LA26 |
| - | - | HWY-LA41 | - |
| BLD-LA17 | - | - | - |
| - | HVY-LA47 | - | - |
| - | HVY-LA18 | - | - |
| - | HVY-LA49 | - | - |

RED RIVER:

| | | | |
|---|---|---|---|
| BLD-LA5 | - | - | - |
| - | HVY-LA18 | - | - |
| - | HVY-LA51 | - | - |
| - | - | HWY-LA33 | - |
| - | HVY-LA9 | - | - |
| - | - | - | R-LA22 |
| - | HVY-LA49 | - | - |

RICHLAND:

| | | | |
|---|---|---|---|
| BLD-LA5 | - | - | - |
| - | HVY-LA18 | - | - |
| - | - | - | R-LA21 |
| - | HVY-LA51 | - | - |
| - | - | HWY-LA33 | - |
| - | HVY-LA49 | - | - |
| - | HVY-LA9 | - | - |

SABINE:

| | | | |
|---|---|---|---|
| - | - | - | R-LA22 |
| - | HVY-LA9 | - | - |
| - | HVY-LA18 | - | - |
| - | - | HWY-LA33 | - |
| - | HVY-LA51 | - | - |
| - | HVY-LA49 | - | - |
| BLD-LA5 | - | - | - |

ST BERNARD:

| | | | |
|---|---|---|---|
| - | - | - | R-LA3 |
| - | HVY-LA13 | - | - |
| - | HVY-LA51 | - | - |
| BLD-LA14 | - | - | - |
| BLD-LA12 | - | - | - |
| - | HVY-LA49 | - | - |
| - | - | HWY-LA46 | - |

ST CHARLES:

| | | | |
|---|---|---|---|
| - | HVY-LA49 | - | - |
| - | HVY-LA13 | - | - |
| - | HVY-LA51 | - | - |
| - | - | HWY-LA43 | - |
| - | - | - | R-LA3 |
| BLD-LA14 | - | - | - |
| BLD-LA12 | - | - | - |

ST HELENA:

| | | | |
|---|---|---|---|
| BLD-LA5 | - | - | - |
| - | HVY-LA49 | - | - |
| - | HVY-LA51 | - | - |
| - | HVY-LA18 | - | - |
| - | - | - | R-LA27 |

| | | | |
|---|---|---|---|
| - | - | HWY-LA33 | - |
| - | HVY-LA9 | - | - |

---

ST JAMES:

| | | | |
|---|---|---|---|
| - | HVY-LA51 | - | - |
| - | - | - | R-LA28 |
| - | - | HWY-LA43 | - |
| - | HVY-LA18 | - | - |
| - | HVY-LA49 | - | - |
| - | HVY-LA9 | - | - |
| BLD-LA5 | - | - | - |

---

ST JOHN THE BAP:

| | | | |
|---|---|---|---|
| BLD-LA12 | - | - | - |
| - | HVY-LA13 | - | - |
| - | HVY-LA51 | - | - |
| BLD-LA14 | - | - | - |
| - | HVY-LA49 | - | - |
| - | - | - | R-LA3 |
| - | - | HWY-LA43 | - |

---

ST LANDRY:

| | | | |
|---|---|---|---|
| - | - | - | R-LA8 |
| - | HVY-LA9 | - | - |
| - | HVY-LA51 | - | - |
| - | HVY-LA18 | - | - |
| - | HVY-LA49 | - | - |
| - | - | HWY-LA44 | - |
| BLD-LA5 | - | - | - |

---

ST MARTIN:

| | | | |
|---|---|---|---|
| BLD-LA50 | - | - | - |
| - | - | - | R-LA29 |
| - | HVY-LA48 | - | - |
| - | - | HWY-LA38 | - |
| - | HVY-LA49 | - | - |
| - | HVY-LA18 | - | - |
| - | HVY-LA51 | - | - |

---

ST MARY:

| | | | |
|---|---|---|---|
| - | - | - | R-LA8 |
| - | HVY-LA51 | - | - |
| - | HVY-LA18 | - | - |
| - | HVY-LA49 | - | - |
| BLD-LA5 | - | - | - |
| - | - | HWY-LA37 | - |
| - | HVY-LA9 | - | - |

---

ST TAMMANY:

| | | | |
|---|---|---|---|
| - | - | HWY-LA43 | - |
| - | HVY-LA49 | - | - |
| BLD-LA14 | - | - | - |
| BLD-LA12 | - | - | - |
| - | HVY-LA51 | - | - |
| - | - | - | R-LA27 |
| - | HVY-LA13 | - | - |

---

TANGIPAHOA:

| | | | |
|---|---|---|---|
| - | HVY-LA18 | - | - |
| - | - | HWY-LA33 | - |
| - | HVY-LA49 | - | - |
| - | - | - | R-LA27 |
| BLD-LA5 | - | - | - |
| - | HVY-LA51 | - | - |

| | | | |
|---|---|---|---|
| - | HVY-LA9 | - | - |

TENSAS:

| | | | |
|---|---|---|---|
| - | - | - | R-LA21 |
| - | HVY-LA51 | - | - |
| - | HVY-LA18 | - | - |
| - | HVY-LA49 | - | - |
| - | - | HWY-LA33 | - |
| BLD-LA5 | - | - | - |
| - | HVY-LA9 | - | - |

TERREBONNE:

| | | | |
|---|---|---|---|
| - | HVY-LA51 | - | - |
| - | - | - | R-LA3 |
| - | - | HWY-LA35 | - |
| - | HVY-LA52 | - | - |
| - | HVY-LA18 | - | - |
| BLD-LA5 | - | - | - |
| - | HVY-LA49 | - | - |

UNION:

| | | | |
|---|---|---|---|
| - | HVY-LA51 | - | - |
| - | HVY-LA9 | - | - |
| - | - | HWY-LA33 | - |
| - | HVY-LA49 | - | - |
| BLD-LA5 | - | - | - |
| - | HVY-LA18 | - | - |
| - | - | - | R-LA21 |

VERMILION:

| | | | |
|---|---|---|---|
| BLD-LA5 | - | - | - |
| - | HVY-LA51 | - | - |
| - | - | HWY-LA37 | - |
| - | HVY-LA18 | - | - |
| - | HVY-LA9 | - | - |
| - | HVY-LA49 | - | - |
| - | - | - | R-LA8 |

VERNON:

| | | | |
|---|---|---|---|
| - | - | - | R-LA8 |
| - | HVY-LA49 | - | - |
| - | HVY-LA9 | - | - |
| - | - | HWY-LA39 | - |
| - | HVY-LA51 | - | - |
| - | HVY-LA18 | - | - |
| BLD-LA5 | - | - | - |

WASHINGTON:

| | | | |
|---|---|---|---|
| - | HVY-LA18 | - | - |
| - | HVY-LA49 | - | - |
| - | - | - | R-LA27 |
| - | - | HWY-LA33 | - |
| BLD-LA5 | - | - | - |
| - | HVY-LA51 | - | - |
| - | HVY-LA9 | - | - |

WEBSTER:

| | | | |
|---|---|---|---|
| - | HVY-LA51 | - | - |
| - | - | - | R-LA30 |
| BLD-LA5 | - | - | - |
| - | HVY-LA9 | - | - |
| - | HVY-LA49 | - | - |
| - | HVY-LA18 | - | - |
| - | - | HWY-LA34 | - |

```
-----------------------------------------------------------------
WEST BATON ROUG:
                    -            -            -            R-LA19
                    -            -            HWY-LA11     -
                    -            HVY-LA10     -            -
                    -            HVY-LA51     -            -
                    -            HVY-LA18     -            -
                    BLD-LA6      -            -            -
                    -            HVY-LA49     -            -
-----------------------------------------------------------------
WEST CARROLL:
                    -            HVY-LA9      -            -
                    -            HVY-LA18     -            -
                    BLD-LA5      -            -            -
                    -            -            HWY-LA33     -
                    -            -            -            R-LA21
                    -            HVY-LA51     -            -
                    -            HVY-LA49     -            -
-----------------------------------------------------------------
WEST FELICIANA:
                    -            HVY-LA51     -            -
                    -            HVY-LA49     -            -
                    -            HVY-LA18     -            -
                    BLD-LA5      -            -            -
                    -            HVY-LA9      -            -
                    -            -            HWY-LA33     -
                    -            -            -            R-LA31
-----------------------------------------------------------------
WINN:
                    BLD-LA5      -            -            -
                    -            HVY-LA18     -            -
                    -            -            HWY-LA33     -
                    -            HVY-LA49     -            -
                    -            HVY-LA9      -            -
                    -            HVY-LA51     -            -
                    -            -            -            R-LA22
-----------------------------------------------------------------
```

---

## STATE OF MISSOURI

STATE OF **MISSOURI**

MODIFICATIONS AS PUBLISHED IN THE FEDERAL REGISTER ON NOVEMBER 14, 1997

**MO** 5 MOD-5

**MO** 43 MOD-5

**MO** 52 MOD-4

**MO** 56 MOD-7

**MO** 64 MOD-6

**MO** 68 MOD-5

**MO** 70 MOD-5

COUNTY **INDEX** MODIFIED

**MO** GENERAL DECISION COUNTY **INDEX** - PUBLICATION DATE: 08/20/97

| County | Building | Heavy | Highway | Resident |
|---|---|---|---|---|
| ADAIR: | | | | |
| | - | HVY-MO1 | HWY-MO1 | - |
| | BLD-MO17 | - | - | - |
| | - | - | - | R-MO21 |
| ANDREW: | | | | |
| | - | - | - | R-MO22 |
| | - | HVY-MO1 | HWY-MO1 | - |
| | BLD-MO41 | - | - | - |
| ATCHISON: | | | | |
| | BLD-MO42 | - | - | - |
| | - | HVY-MO1 | HWY-MO1 | - |
| | - | - | - | R-MO23 |
| AUDRAIN: | | | | |
| | - | HVY-MO1 | HWY-MO1 | - |
| | - | - | - | R-MO24 |
| | BLD-MO43 | - | - | - |
| BARRY: | | | | |
| | BLD-MO47 | - | - | - |
| | - | HVY-MO1 | HWY-MO1 | - |
| BARTON: | | | | |
| | - | - | - | R-MO25 |
| | BLD-MO48 | - | - | - |
| | - | HVY-MO1 | HWY-MO1 | - |
| BATES: | | | | |
| | - | - | - | R-MO26 |

| | | | | |
|---|---|---|---|---|
| | BLD-MO48 | - | - | - |
| | - | HVY-MO1 | HWY-MO1 | - |

BENTON:

| | | | | |
|---|---|---|---|---|
| | - | HVY-MO1 | HWY-MO1 | - |
| | BLD-MO49 | - | - | - |
| | - | - | - | R-MO27 |

BOLLINGER:

| | | | | |
|---|---|---|---|---|
| | BLD-MO51 | - | - | - |
| | - | - | - | R-MO28 |
| | - | HVY-MO1 | HWY-MO1 | - |

BOONE:

| | | | | |
|---|---|---|---|---|
| | - | HVY-MO1 | HWY-MO1 | - |
| | BLD-MO6 | - | - | - |
| | - | - | - | R-MO24 |

BUCHANAN:

| | | | | |
|---|---|---|---|---|
| | - | HVY-MO1 | HWY-MO1 | - |
| | BLD-MO13 | - | - | - |
| | - | - | - | R-MO22 |

BUTLER:

| | | | | |
|---|---|---|---|---|
| | BLD-MO20 | - | - | - |
| | - | - | - | R-MO28 |
| | - | HVY-MO1 | HWY-MO1 | - |

CALDWELL:

| | | | | |
|---|---|---|---|---|
| | - | HVY-MO1 | HWY-MO1 | - |
| | - | - | - | R-MO29 |
| | BLD-MO15 | - | - | - |

CALLAWAY:

| | | | | |
|---|---|---|---|---|
| | - | HVY-MO1 | HWY-MO1 | - |
| | - | - | - | R-MO24 |
| | BLD-MO52 | - | - | - |

CAMDEN:

| | | | | |
|---|---|---|---|---|
| | - | - | - | R-MO27 |
| | - | HVY-MO1 | HWY-MO1 | - |
| | BLD-MO14 | - | - | - |

CAPE GIRARDEAU:

| | | | | |
|---|---|---|---|---|
| | - | - | - | R-MO30 |
| | BLD-MO53 | - | - | - |
| | - | HVY-MO1 | HWY-MO1 | - |

CARROLL:

| | | | | |
|---|---|---|---|---|
| | - | HVY-MO1 | HWY-MO1 | - |
| | - | - | - | R-MO29 |
| | BLD-MO15 | - | - | - |

CARTER:

| | | | | |
|---|---|---|---|---|
| | - | HVY-MO1 | HWY-MO1 | - |
| | - | - | - | R-MO31 |
| | BLD-MO18 | - | - | - |

CASS:

| | | | | |
|---|---|---|---|---|
| | - | HVY-MO1 | HWY-MO1 | - |
| | BLD-MO2 | - | - | - |
| | - | - | - | R-MO9 |

CEDAR:

| | | | |
|---|---|---|---|
| - | - | - | R-MO26 |
| BLD-MO49 | - | - | - |
| - | HVY-MO1 | HWY-MO1 | - |

CHARITON:

| | | | |
|---|---|---|---|
| BLD-MO15 | - | - | - |
| - | - | - | R-MO29 |
| - | HVY-MO1 | HWY-MO1 | - |

CHRISTIAN:

| | | | |
|---|---|---|---|
| - | HVY-MO1 | HWY-MO1 | - |
| - | - | - | R-MO32 |
| BLD-MO4 | - | - | - |

CLARK:

| | | | |
|---|---|---|---|
| - | - | - | R-MO33 |
| BLD-MO19 | - | - | - |
| - | HVY-MO1 | HWY-MO1 | - |

CLAY:

| | | | |
|---|---|---|---|
| BLD-MO2 | - | - | - |
| - | - | - | R-MO9 |
| - | HVY-MO1 | HWY-MO1 | - |

CLINTON:

| | | | |
|---|---|---|---|
| - | - | - | R-MO22 |
| BLD-MO15 | - | - | - |
| - | HVY-MO1 | HWY-MO1 | - |

COLE:

| | | | |
|---|---|---|---|
| BLD-MO7 | - | - | - |
| - | HVY-MO1 | HWY-MO1 | - |
| - | - | - | R-MO24 |

COOPER:

| | | | |
|---|---|---|---|
| BLD-MO6 | - | - | - |
| - | HVY-MO1 | HWY-MO1 | - |
| - | - | - | R-MO24 |

CRAWFORD:

| | | | |
|---|---|---|---|
| BLD-MO51 | - | - | - |
| - | - | - | R-MO34 |
| - | HVY-MO1 | HWY-MO1 | - |

DADE:

| | | | |
|---|---|---|---|
| - | - | - | R-MO25 |
| - | HVY-MO1 | HWY-MO1 | - |
| BLD-MO49 | - | - | - |

DALLAS:

| | | | |
|---|---|---|---|
| - | HVY-MO1 | HWY-MO1 | - |
| - | - | - | R-MO35 |
| BLD-MO14 | - | - | - |

DAVIESS:

| | | | |
|---|---|---|---|
| - | HVY-MO1 | HWY-MO1 | - |
| BLD-MO15 | - | - | - |
| - | - | - | R-MO29 |

DE KALB:

| | | | |
|---|---|---|---|
| - | - | - | R-MO22 |
| BLD-MO15 | - | - | - |
| - | HVY-MO1 | HWY-MO1 | - |

DENT:

| | | | |
|---|---|---|---|
| BLD-MO51 | - | - | - |
| - | HVY-MO1 | HWY-MO1 | - |
| - | - | - | R-MO34 |

---

DOUGLAS:

| | | | |
|---|---|---|---|
| - | HVY-MO1 | HWY-MO1 | - |
| - | - | - | R-MO36 |
| BLD-MO45 | - | - | - |

---

DUNKLIN:

| | | | |
|---|---|---|---|
| - | HVY-MO1 | HWY-MO1 | - |
| - | - | - | R-MO28 |
| BLD-MO44 | - | - | - |

---

FRANKLIN:

| | | | |
|---|---|---|---|
| - | HVY-MO1 | HWY-MO1 | - |
| BLD-MO3 | - | - | - |
| - | - | - | R-MO10 |

---

GASCONADE:

| | | | |
|---|---|---|---|
| - | HVY-MO1 | HWY-MO1 | - |
| BLD-MO56 | - | - | - |

---

GENTRY:

| | | | |
|---|---|---|---|
| BLD-MO15 | - | - | - |
| - | - | - | R-MO23 |
| - | HVY-MO1 | HWY-MO1 | - |

---

GREENE:

| | | | |
|---|---|---|---|
| - | HVY-MO1 | HWY-MO1 | - |
| - | - | - | R-MO32 |
| BLD-MO4 | - | - | - |

---

GRUNDY:

| | | | |
|---|---|---|---|
| BLD-MO15 | - | - | - |
| - | HVY-MO1 | HWY-MO1 | - |
| - | - | - | R-MO23 |

---

HARRISON:

| | | | |
|---|---|---|---|
| - | - | - | R-MO23 |
| - | HVY-MO1 | HWY-MO1 | - |
| BLD-MO15 | - | - | - |

---

HENRY:

| | | | |
|---|---|---|---|
| - | HVY-MO1 | HWY-MO1 | - |
| BLD-MO50 | - | - | - |
| - | - | - | R-MO26 |

---

HICKORY:

| | | | |
|---|---|---|---|
| - | - | - | R-MO27 |
| - | HVY-MO1 | HWY-MO1 | - |
| BLD-MO49 | - | - | - |

---

HOLT:

| | | | |
|---|---|---|---|
| - | - | - | R-MO23 |
| - | HVY-MO1 | HWY-MO1 | - |
| BLD-MO58 | - | - | - |

---

HOWARD:

| | | | |
|---|---|---|---|
| - | - | - | R-MO24 |
| - | HVY-MO1 | HWY-MO1 | - |
| BLD-MO6 | - | - | - |

---

HOWELL:

| | | | |
|---|---|---|---|
| - | - | - | R-MO36 |
| BLD-MO18 | - | - | - |
| - | HVY-MO1 | HWY-MO1 | - |

---

IRON:

| | | | |
|---|---|---|---|
| - | - | - | R-MO34 |
| - | HVY-MO1 | HWY-MO1 | - |
| BLD-MO51 | - | - | - |

---

JACKSON:

| | | | |
|---|---|---|---|
| - | HVY-MO1 | HWY-MO1 | - |
| - | - | - | R-MO9 |
| BLD-MO2 | - | - | - |

---

JASPER:

| | | | |
|---|---|---|---|
| BLD-MO12 | - | - | - |
| - | - | - | R-MO25 |
| - | HVY-MO1 | HWY-MO1 | - |

---

JEFFERSON:

| | | | |
|---|---|---|---|
| - | - | - | R-MO10 |
| - | HVY-MO1 | HWY-MO1 | - |
| BLD-MO3 | - | - | - |

---

JOHNSON:

| | | | |
|---|---|---|---|
| BLD-MO2 | - | - | - |
| - | HVY-MO1 | HWY-MO1 | - |
| - | - | - | R-MO37 |

---

KNOX:

| | | | |
|---|---|---|---|
| - | HVY-MO1 | HWY-MO1 | - |
| BLD-MO59 | - | - | - |
| - | - | - | R-MO33 |

---

LACLEDE:

| | | | |
|---|---|---|---|
| - | - | - | R-MO35 |
| - | HVY-MO1 | HWY-MO1 | - |
| BLD-MO14 | - | - | - |

---

LAFAYETTE:

| | | | |
|---|---|---|---|
| - | HVY-MO1 | HWY-MO1 | - |
| BLD-MO2 | - | - | - |
| - | - | - | R-MO37 |

---

LAWRENCE:

| | | | |
|---|---|---|---|
| - | HVY-MO1 | HWY-MO1 | - |
| BLD-MO60 | - | - | - |
| - | - | - | R-MO25 |

---

LEWIS:

| | | | |
|---|---|---|---|
| BLD-MO16 | - | - | - |
| - | - | - | R-MO33 |
| - | HVY-MO1 | HWY-MO1 | - |

---

LINCOLN:

| | | | |
|---|---|---|---|
| - | - | - | R-MO10 |
| BLD-MO3 | - | - | - |
| - | HVY-MO1 | HWY-MO1 | - |

---

LINN:

| | | | |
|---|---|---|---|
| - | HVY-MO1 | HWY-MO1 | - |
| BLD-MO15 | - | - | - |

| | | | | |
|---|---|---|---|---|
| | - | - | - | R-MO29 |
| LIVINGSTON: | | | | |
| | BLD-MO15 | - | - | - |
| | - | - | - | R-MO29 |
| | - | HVY-MO1 | HWY-MO1 | - |
| MCDONALD: | | | | |
| | - | - | - | R-MO25 |
| | BLD-MO8 | - | - | - |
| | - | HVY-MO1 | HWY-MO1 | - |
| MACON: | | | | |
| | - | - | - | R-MO21 |
| | BLD-MO15 | - | - | - |
| | - | HVY-MO1 | HWY-MO1 | - |
| MADISON: | | | | |
| | - | HVY-MO1 | HWY-MO1 | - |
| | BLD-MO51 | - | - | - |
| | - | - | - | R-MO28 |
| MARIES: | | | | |
| | BLD-MO14 | - | - | - |
| | - | HVY-MO1 | HWY-MO1 | - |
| MARION: | | | | |
| | BLD-MO46 | - | - | - |
| | - | HVY-MO1 | HWY-MO1 | - |
| | - | - | - | R-MO33 |
| MERCER: | | | | |
| | - | - | - | R-MO23 |
| | - | HVY-MO1 | HWY-MO1 | - |
| | BLD-MO15 | - | - | - |
| MILLER: | | | | |
| | BLD-MO14 | - | - | - |
| | - | HVY-MO1 | HWY-MO1 | - |
| | - | - | - | R-MO24 |
| MISSISSIPPI: | | | | |
| | BLD-MO61 | - | - | - |
| | - | HVY-MO1 | HWY-MO1 | - |
| | - | - | - | R-MO28 |
| MONITEAU: | | | | |
| | BLD-MO62 | - | - | - |
| | - | - | - | R-MO24 |
| | - | HVY-MO1 | HWY-MO1 | - |
| MONROE: | | | | |
| | BLD-MO63 | - | - | - |
| | - | HVY-MO1 | HWY-MO1 | - |
| | - | - | - | R-MO38 |
| MONTGOMERY: | | | | |
| | - | - | - | R-MO24 |
| | - | HVY-MO1 | HWY-MO1 | - |
| | BLD-MO64 | - | - | - |
| MORGAN: | | | | |
| | - | - | - | R-MO27 |
| | - | HVY-MO1 | HWY-MO1 | - |

```
                    BLD-MO65      -           -           -
-----------------------------------------------------------------
NEW MADRID:
                    -             HVY-MO1     HWY-MO1     -
                    -             -           -           R-MO28
                    BLD-MO66      -           -           -
-----------------------------------------------------------------
NEWTON:
                    -             HVY-MO1     HWY-MO1     -
                    BLD-MO12      -           -           -
                    -             -           -           R-MO25
-----------------------------------------------------------------
NODAWAY:
                    -             -           -           R-MO23
                    BLD-MO67      -           -           -
                    -             HVY-MO1     HWY-MO1     -
-----------------------------------------------------------------
OREGON:
                    BLD-MO18      -           -           -
                    -             HVY-MO1     HWY-MO1     -
                    -             -           -           R-MO36
-----------------------------------------------------------------
OSAGE:
                    -             HVY-MO1     HWY-MO1     -
                    BLD-MO68      -           -           -
                    -             -           -           R-MO24
-----------------------------------------------------------------
OZARK:
                    -             -           -           R-MO36
                    BLD-MO45      -           -           -
                    -             HVY-MO1     HWY-MO1     -
-----------------------------------------------------------------
PEMISCOT:
                    -             -           -           R-MO28
                    BLD-MO44      -           -           -
                    -             HVY-MO1     HWY-MO1     -
-----------------------------------------------------------------
PERRY:
                    -             HVY-MO1     HWY-MO1     -
                    -             -           -           R-MO28
                    BLD-MO69      -           -           -
-----------------------------------------------------------------
PETTIS:
                    -             -           -           R-MO37
                    BLD-MO11      -           -           -
                    -             HVY-MO1     HWY-MO1     -
-----------------------------------------------------------------
PHELPS:
                    BLD-MO14      -           -           -
                    -             -           -           R-MO39
                    -             HVY-MO1     HWY-MO1     -
-----------------------------------------------------------------
PIKE:
                    -             -           -           R-MO38
                    BLD-MO70      -           -           -
                    -             HVY-MO1     HWY-MO1     -

-----------------------------------------------------------------
PLATTE:
                    BLD-MO2       -           -           -
                    -             HVY-MO1     HWY-MO1     -
                    -             -           -           R-MO9
-----------------------------------------------------------------
POLK:
```

| | | | | |
|---|---|---|---|---|
| | - | HVY-MO1 | HWY-MO1 | - |
| | BLD-MO49 | - | - | - |
| | - | - | - | R-MO32 |

PULASKI:

| | | | | |
|---|---|---|---|---|
| | - | - | - | R-MO39 |
| | - | HVY-MO1 | HWY-MO1 | - |
| | BLD-MO5 | - | - | - |

PUTNAM:

| | | | | |
|---|---|---|---|---|
| | - | - | - | R-MO23 |
| | - | HVY-MO1 | HWY-MO1 | - |
| | BLD-MO15 | - | - | - |

RALLS:

| | | | | |
|---|---|---|---|---|
| | BLD-MO16 | - | - | - |
| | - | HVY-MO1 | HWY-MO1 | - |
| | - | - | - | R-MO38 |

RANDOLPH:

| | | | | |
|---|---|---|---|---|
| | - | HVY-MO1 | HWY-MO1 | - |
| | BLD-MO72 | - | - | - |
| | - | - | - | R-MO24 |

RAY:

| | | | | |
|---|---|---|---|---|
| | - | - | - | R-MO9 |
| | - | HVY-MO1 | HWY-MO1 | - |
| | BLD-MO2 | - | - | - |

REYNOLDS:

| | | | | |
|---|---|---|---|---|
| | BLD-MO51 | - | - | - |
| | - | HVY-MO1 | HWY-MO1 | - |

RIPLEY:

| | | | | |
|---|---|---|---|---|
| | - | - | - | R-MO31 |
| | - | HVY-MO1 | HWY-MO1 | - |
| | BLD-MO18 | - | - | - |

ST CHARLES:

| | | | | |
|---|---|---|---|---|
| | BLD-MO3 | - | - | - |
| | - | HVY-MO1 | HWY-MO1 | - |
| | - | - | - | R-MO10 |

ST CLAIR:

| | | | | |
|---|---|---|---|---|
| | - | HVY-MO1 | HWY-MO1 | - |
| | BLD-MO49 | - | - | - |
| | - | - | - | R-MO26 |

STE GENEVIEVE:

| | | | | |
|---|---|---|---|---|
| | BLD-MO73 | - | - | - |
| | - | - | - | R-MO40 |
| | - | HVY-MO1 | HWY-MO1 | - |

ST FRANCOIS:

| | | | | |
|---|---|---|---|---|
| | BLD-MO71 | - | - | - |
| | - | HVY-MO1 | HWY-MO1 | - |
| | - | - | - | R-MO40 |

ST LOUIS:

| | | | | |
|---|---|---|---|---|
| | BLD-MO3 | - | - | - |
| | - | - | - | R-MO10 |
| | - | HVY-MO1 | HWY-MO1 | - |

SALINE:

| | | | |
|---|---|---|---|
| - | HVY-MO1 | HWY-MO1 | - |
| BLD-MO11 | - | - | - |
| - | - | - | R-MO24 |

SCHUYLER:

| | | | |
|---|---|---|---|
| - | HVY-MO1 | HWY-MO1 | - |
| BLD-MO57 | - | - | - |
| - | - | - | R-MO21 |

SCOTLAND:

| | | | |
|---|---|---|---|
| - | - | - | R-MO21 |
| - | HVY-MO1 | HWY-MO1 | - |
| BLD-MO55 | - | - | - |

SCOTT:

| | | | |
|---|---|---|---|
| BLD-MO61 | - | - | - |
| - | - | - | R-MO28 |
| - | HVY-MO1 | HWY-MO1 | - |

SHANNON:

| | | | |
|---|---|---|---|
| - | HVY-MO1 | HWY-MO1 | - |
| - | - | - | R-MO36 |
| BLD-MO18 | - | - | - |

SHELBY:

| | | | |
|---|---|---|---|
| BLD-MO54 | - | - | - |
| - | HVY-MO1 | HWY-MO1 | - |
| - | - | - | R-MO21 |

STODDARD:

| | | | |
|---|---|---|---|
| BLD-MO44 | - | - | - |
| - | - | - | R-MO28 |
| - | HVY-MO1 | HWY-MO1 | - |

STONE:

| | | | |
|---|---|---|---|
| - | HVY-MO1 | HWY-MO1 | - |
| BLD-MO45 | - | - | - |

SULLIVAN:

| | | | |
|---|---|---|---|
| BLD-MO15 | - | - | - |
| - | HVY-MO1 | HWY-MO1 | - |
| - | - | - | R-MO23 |

TANEY:

| | | | |
|---|---|---|---|
| - | HVY-MO1 | HWY-MO1 | - |
| BLD-MO45 | - | - | - |
| - | - | - | R-MO32 |

TEXAS:

| | | | |
|---|---|---|---|
| - | HVY-MO1 | HWY-MO1 | - |
| BLD-MO14 | - | - | - |
| - | - | - | R-MO36 |

VERNON:

| | | | |
|---|---|---|---|
| - | - | - | R-MO26 |
| BLD-MO48 | - | - | - |
| - | HVY-MO1 | HWY-MO1 | - |

WARREN:

| | | | |
|---|---|---|---|
| - | HVY-MO1 | HWY-MO1 | - |
| - | - | - | R-MO10 |
| BLD-MO3 | - | - | - |

WASHINGTON:

| | | | | |
|---|---|---|---|---|
| | - | HVY-MO1 | HWY-MO1 | - |
| | - | - | - | R-MO34 |
| | BLD-MO51 | - | - | - |

WAYNE:

| | | | | |
|---|---|---|---|---|
| | - | - | - | R-MO28 |
| | BLD-MO18 | - | - | - |
| | - | HVY-MO1 | HWY-MO1 | - |

WEBSTER:

| | | | | |
|---|---|---|---|---|
| | BLD-MO14 | - | - | - |
| | - | HVY-MO1 | HWY-MO1 | - |

WORTH:

| | | | | |
|---|---|---|---|---|
| | - | - | - | R-MO23 |
| | BLD-MO15 | - | - | - |
| | - | HVY-MO1 | HWY-MO1 | - |

WRIGHT:

| | | | | |
|---|---|---|---|---|
| | - | - | - | R-MO36 |
| | BLD-MO14 | - | - | - |
| | - | HVY-MO1 | HWY-MO1 | - |

ST LOUIS CITY:

| | | | | |
|---|---|---|---|---|
| | - | HVY-MO1 | HWY-MO1 | - |
| | BLD-MO3 | - | - | - |
| | - | - | - | R-MO10 |

## STATE OF NEW MEXICO

STATE OF **NEW MEXICO**

NO MODIFICATIONS DURING PERIOD ENDING
NOVEMBER 14, 1997

**NM** GENERAL DECISION COUNTY **INDEX** - PUBLICATION DATE: 02/14/97

| County | Building | Heavy | Highway | Resident |
|---|---|---|---|---|
| BERNALILLO: | | | | |
| | - | - | - | R-NM4 |
| | BLD-NM1 | HVY-NM1 | | |
| - - | | | | |
| | - | - | HWY-NM3 | - |
| CATRON: | | | | |
| | BLD-NM1 | HVY-NM1 | | |
| - - | | | | |
| | - | - | - | R-NM4 |
| | - | - | HWY-NM2 | - |
| CHAVES: | | | | |
| | BLD-NM1 | HVY-NM1 | | |
| - - | | | | |
| | - | - | - | R-NM4 |
| | - | - | HWY-NM2 | - |
| CIBOLA: | | | | |
| | - | - | HWY-NM2 | - |
| | - | - | - | R-NM4 |
| | BLD-NM1 | HVY-NM1 | | |
| - - | | | | |
| COLFAX: | | | | |
| | - | - | HWY-NM2 | - |
| | BLD-NM1 | HVY-NM1 | | |
| - - | | | | |
| | - | - | - | R-NM4 |
| CURRY: | | | | |
| | - | - | - | R-NM4 |
| | - | - | HWY-NM2 | - |
| | BLD-NM1 | HVY-NM1 | | |
| - - | | | | |
| DE BACA: | | | | |
| | BLD-NM1 | HVY-NM1 | | |
| - - | | | | |
| | - | - | HWY-NM2 | - |
| | - | - | - | R-NM4 |
| DONA ANA: | | | | |
| | BLD-NM1 | HVY-NM1 | | |
| - - | | | | |
| | - | - | - | R-NM4 |
| | - | - | HWY-NM3 | - |

```
EDDY:
                    BLD-NM1       HVY-NM1
-           -
                    BLD-NM5       -           -           -
                    -             -           -           R-NM4
                    -             -           HWY-NM2     -
-----------------------------------------------------------------
GRANT:
                    -             -           -           R-NM4
                    -             -           HWY-NM2     -
                    BLD-NM1       HVY-NM1
-           -
-----------------------------------------------------------------
GUADALUPE:
                    -             -           -           R-NM4
                    BLD-NM1       HVY-NM1
-           -
                    -             -           HWY-NM2     -
-----------------------------------------------------------------
HARDING:
                    -             -           -           R-NM4
                    -             -           HWY-NM2     -
                    BLD-NM1       HVY-NM1
-           -
-----------------------------------------------------------------
HIDALGO:
                    -             -           HWY-NM2     -
                    BLD-NM1       HVY-NM1
-           -
                    -             -           -           R-NM4
-----------------------------------------------------------------
LEA:
                    -             -           HWY-NM2     -
                    BLD-NM1       HVY-NM1
-           -
                    BLD-NM5       -           -           -
                    -             -           -           R-NM4
-----------------------------------------------------------------
LINCOLN:
                    -             -           HWY-NM2     -
                    -             -           -           R-NM4
                    BLD-NM1       HVY-NM1
-           -
-----------------------------------------------------------------
LOS ALAMOS:
                    -             -           -           R-NM4
                    BLD-NM1       HVY-NM1
-           -
                    -             -           HWY-NM3     -
-----------------------------------------------------------------
LUNA:
                    -             -           -           R-NM4
                    BLD-NM1       HVY-NM1
-           -
                    -             -           HWY-NM2     -
-----------------------------------------------------------------
MCKINLEY:
                    -             -           -           R-NM4
                    BLD-NM1       HVY-NM1
-           -
                    -             -           -           R-NM6
                    -             -           HWY-NM2     -
-----------------------------------------------------------------
MORA:
```

```
                    BLD-NM1       HVY-NM1
-           -
                    -             -           HWY-NM2     -
                    -             -           -           R-NM4
 ----------------------------------------------------------------
 OTERO:
                    BLD-NM1       HVY-NM1
-           -
                    -             -           HWY-NM2     -
                    -             -           -           R-NM4
 ----------------------------------------------------------------
 QUAY:
                    BLD-NM1       HVY-NM1
-           -
                    -             -           -           R-NM4
                    -             -           HWY-NM2     -
 ----------------------------------------------------------------
 RIO ARRIBA:
                    -             -           -           R-NM4
                    -             -           HWY-NM2     -
                    BLD-NM1       HVY-NM1
-           -
 ----------------------------------------------------------------
 ROOSEVELT:
                    BLD-NM1       HVY-NM1
-           -
                    -             -           HWY-NM2     -
                    -             -           -           R-NM4
 ----------------------------------------------------------------
 SANDOVAL:
                    -             -           -           R-NM4
                    BLD-NM1       HVY-NM1
-           -
                    -             -           HWY-NM2     -
 ----------------------------------------------------------------
 SAN JUAN:
                    -             -           HWY-NM2     -
                    BLD-NM1       HVY-NM1
-           -
                    -             -           -           R-NM6
                    -             -           -           R-NM4
 ----------------------------------------------------------------
 SAN MIGUEL:
                    -             -           -           R-NM4
                    BLD-NM1       HVY-NM1
-           -
                    -             -           HWY-NM2     -
 ----------------------------------------------------------------
 SANTA FE:
                    -             -           HWY-NM3     -
                    -             -           -           R-NM4
                    BLD-NM1       HVY-NM1
-           -
 ----------------------------------------------------------------
 SIERRA:
                    BLD-NM1       HVY-NM1
-           -
                    -             -           HWY-NM2     -
                    -             -           -           R-NM4
 ----------------------------------------------------------------
 SOCORRO:
                    -             -           HWY-NM2     -
                    BLD-NM1       HVY-NM1
-           -
```

```
                        -              -           -            R-NM4
 ------------------------------------------------------------------
 TAOS:
                        BLD-NM1        HVY-NM1
-            -
                        -              -           -            R-NM4
                        -              -           HWY-NM2      -
 ------------------------------------------------------------------
 TORRANCE:
                        -              -           HWY-NM2      -
                        BLD-NM1        HVY-NM1
-            -
                        -              -           -            R-NM4
 ------------------------------------------------------------------
 UNION:
                        -              -           HWY-NM2      -
                        BLD-NM1        HVY-NM1
-            -
                        -              -           -            R-NM4
 ------------------------------------------------------------------
 VALENCIA:
                        -              -           -            R-NM4
                        -              -           HWY-NM2      -
                        BLD-NM1        HVY-NM1
-            -
 ------------------------------------------------------------------
```

---

## STATE OF OKLAHOMA

STATE OF **OKLAHOMA**

NO MODIFICATIONS DURING PERIOD ENDING
NOVEMBER 14, 1997

**OK** GENERAL DECISION COUNTY **INDEX** - PUBLICATION DATE: 02/27/97

| County | Building | Heavy | Highway | Resident |
|---|---|---|---|---|
| ADAIR: | | | | |
| | - | HVY-OK2 | HWY-OK2 | - |
| | - | HVY-OK21 | - | - |
| | - | - | - | R-OK7 |
| | - | HVY-OK25 | - | - |
| | BLD-OK13 | - | - | - |
| | - | HVY-OK22 | - | - |
| ALFALFA: | | | | |
| | BLD-OK14 | - | - | - |
| | - | HVY-OK2 | HWY-OK2 | - |
| | - | HVY-OK21 | - | - |
| | - | - | - | R-OK10 |
| | - | HVY-OK25 | - | - |
| | - | HVY-OK22 | - | - |
| ATOKA: | | | | |
| | - | HVY-OK25 | - | - |
| | - | - | - | R-OK4 |
| | - | HVY-OK2 | HWY-OK2 | - |
| | - | HVY-OK22 | - | - |
| | BLD-OK13 | - | - | - |
| | - | HVY-OK21 | - | - |
| BEAVER: | | | | |
| | - | HVY-OK22 | - | - |
| | - | - | - | R-OK10 |
| | BLD-OK20 | - | - | - |
| | - | HVY-OK25 | - | - |
| | - | HVY-OK21 | - | - |
| | - | HVY-OK2 | HWY-OK2 | - |
| BECKHAM: | | | | |
| | - | HVY-OK2 | HWY-OK2 | - |
| | - | - | - | R-OK10 |
| | BLD-OK14 | - | - | - |
| | - | HVY-OK22 | - | - |
| | - | HVY-OK21 | - | - |
| | - | HVY-OK25 | - | - |
| BLAINE: | | | | |
| | - | HVY-OK25 | - | - |
| | - | HVY-OK2 | HWY-OK2 | - |
| | BLD-OK14 | - | - | - |
| | - | - | - | R-OK10 |
| | - | HVY-OK21 | - | - |
| | - | HVY-OK22 | - | - |

BRYAN:

| | | | |
|---|---|---|---|
| - | - | - | R-OK4 |
| - | HVY-OK25 | - | - |
| - | HVY-OK21 | - | - |
| BLD-OK13 | - | - | - |
| - | HVY-OK22 | - | - |
| - | HVY-OK2 | HWY-OK2 | - |

---

CADDO:

| | | | |
|---|---|---|---|
| - | - | - | R-OK10 |
| - | HVY-OK21 | - | - |
| - | HVY-OK22 | - | - |
| - | HVY-OK25 | - | - |
| BLD-OK14 | - | - | - |
| - | HVY-OK2 | HWY-OK2 | - |

---

CANADIAN:

| | | | |
|---|---|---|---|
| - | HVY-OK41 | - | - |
| - | - | - | R-OK12 |
| - | - | HWY-OK29 | - |
| BLD-OK35 | - | - | - |
| - | HVY-OK27 | - | - |
| - | HVY-OK22 | - | - |
| - | HVY-OK25 | - | - |
| - | HVY-OK28 | - | - |

---

CARTER:

| | | | |
|---|---|---|---|
| - | - | - | R-OK3 |
| - | HVY-OK2 | HWY-OK2 | - |
| - | HVY-OK21 | - | - |
| - | HVY-OK25 | - | - |
| - | HVY-OK22 | - | - |
| BLD-OK14 | - | - | - |

---

CHEROKEE:

| | | | |
|---|---|---|---|
| - | HVY-OK25 | - | - |
| BLD-OK13 | - | - | - |
| - | HVY-OK2 | HWY-OK2 | - |
| - | HVY-OK21 | - | - |
| - | HVY-OK22 | - | - |
| - | - | - | R-OK7 |

---

CHOCTAW:

| | | | |
|---|---|---|---|
| BLD-OK46 | - | - | - |
| - | HVY-OK2 | HWY-OK2 | - |
| - | - | - | R-OK4 |
| - | HVY-OK25 | - | - |
| - | HVY-OK21 | - | - |
| - | HVY-OK22 | - | - |

---

CIMARRON:

| | | | |
|---|---|---|---|
| - | HVY-OK25 | - | - |
| - | HVY-OK21 | - | - |
| - | - | - | R-OK10 |
| - | HVY-OK2 | HWY-OK2 | - |
| BLD-OK20 | - | - | - |
| - | HVY-OK22 | - | - |

---

CLEVELAND:

| | | | |
|---|---|---|---|
| - | HVY-OK41 | - | - |
| - | HVY-OK25 | - | - |
| - | HVY-OK27 | - | - |
| - | - | HWY-OK29 | - |
| BLD-OK36 | - | - | - |

| | | | |
|---|---|---|---|
| - | HVY-OK22 | - | - |
| - | - | - | R-OK12 |
| - | HVY-OK28 | - | - |

COAL:

| | | | |
|---|---|---|---|
| - | - | - | R-OK3 |
| - | HVY-OK25 | - | - |
| - | HVY-OK22 | - | - |
| - | HVY-OK2 | HWY-OK2 | - |
| - | HVY-OK21 | - | - |
| BLD-OK13 | - | - | - |

COMANCHE:

| | | | |
|---|---|---|---|
| - | HVY-OK1 | HWY-OK1 | - |
| - | HVY-OK22 | - | - |
| - | - | - | R-OK8 |
| - | HVY-OK21 | - | - |
| BLD-OK14 | - | - | - |
| - | HVY-OK25 | - | - |

COTTON:

| | | | |
|---|---|---|---|
| BLD-OK14 | - | - | - |
| - | HVY-OK25 | - | - |
| - | HVY-OK22 | - | - |
| - | HVY-OK2 | HWY-OK2 | - |
| - | HVY-OK21 | - | - |
| - | - | - | R-OK19 |

CRAIG:

| | | | |
|---|---|---|---|
| - | - | - | R-OK7 |
| - | HVY-OK21 | - | - |
| BLD-OK13 | - | - | - |
| - | HVY-OK22 | - | - |
| - | HVY-OK2 | HWY-OK2 | - |
| - | HVY-OK25 | - | - |

CREEK:

| | | | |
|---|---|---|---|
| - | HVY-OK25 | - | - |
| - | HVY-OK23 | - | - |
| - | - | HWY-OK26 | - |
| BLD-OK32 | - | - | - |
| - | HVY-OK39 | - | - |
| - | HVY-OK24 | - | - |
| - | HVY-OK22 | - | - |
| - | - | - | R-OK5 |

CUSTER:

| | | | |
|---|---|---|---|
| - | HVY-OK22 | - | - |
| - | HVY-OK21 | - | - |
| - | HVY-OK25 | - | - |
| - | HVY-OK2 | HWY-OK2 | - |
| - | - | - | R-OK10 |
| BLD-OK14 | - | - | - |

DELAWARE:

| | | | |
|---|---|---|---|
| - | HVY-OK2 | HWY-OK2 | - |
| - | HVY-OK25 | - | - |
| - | HVY-OK21 | - | - |
| BLD-OK13 | - | - | - |
| - | - | - | R-OK7 |
| - | HVY-OK22 | - | - |

DEWEY:

| | | | |
|---|---|---|---|
| - | - | - | R-OK10 |

| | | | |
|---|---|---|---|
| BLD-OK14 | - | - | - |
| - | HVY-OK22 | - | - |
| - | HVY-OK21 | - | - |
| - | HVY-OK2 | HWY-OK2 | - |
| - | HVY-OK25 | - | - |

---

ELLIS:

| | | | |
|---|---|---|---|
| BLD-OK14 | - | - | - |
| - | HVY-OK25 | - | - |
| - | HVY-OK2 | HWY-OK2 | - |
| - | HVY-OK21 | - | - |
| - | - | - | R-OK10 |
| - | HVY-OK22 | - | - |

---

GARFIELD:

| | | | |
|---|---|---|---|
| BLD-OK14 | - | - | - |
| - | HVY-OK22 | - | - |
| - | HVY-OK21 | - | - |
| - | HVY-OK1 | HWY-OK1 | - |
| - | - | - | R-OK10 |
| - | HVY-OK25 | - | - |

---

GARVIN:

| | | | |
|---|---|---|---|
| - | HVY-OK2 | HWY-OK2 | - |
| - | HVY-OK25 | - | - |
| - | HVY-OK22 | - | - |
| - | HVY-OK21 | - | - |
| BLD-OK14 | - | - | - |
| - | - | - | R-OK3 |

---

GRADY:

| | | | |
|---|---|---|---|
| - | HVY-OK2 | HWY-OK2 | - |
| - | HVY-OK25 | - | - |
| - | HVY-OK21 | - | - |
| BLD-OK14 | - | - | - |
| - | - | - | R-OK3 |
| - | HVY-OK22 | - | - |

---

GRANT:

| | | | |
|---|---|---|---|
| - | HVY-OK22 | - | - |
| - | HVY-OK21 | - | - |
| - | HVY-OK25 | - | - |
| - | HVY-OK2 | HWY-OK2 | - |
| - | - | - | R-OK10 |
| BLD-OK14 | - | - | - |

---

GREER:

| | | | |
|---|---|---|---|
| BLD-OK14 | - | - | - |
| - | HVY-OK2 | HWY-OK2 | - |
| - | - | - | R-OK19 |
| - | HVY-OK22 | - | - |
| - | HVY-OK25 | - | - |
| - | HVY-OK21 | - | - |

---

HARMON:

| | | | |
|---|---|---|---|
| - | HVY-OK2 | HWY-OK2 | - |
| - | HVY-OK25 | - | - |
| - | - | - | R-OK19 |
| BLD-OK14 | - | - | - |
| - | HVY-OK22 | - | - |
| - | HVY-OK21 | - | - |

---

HARPER:

| | | | |
|---|---|---|---|
| - | HVY-OK21 | - | - |
| BLD-OK14 | - | - | - |
| - | - | - | R-OK10 |
| - | HVY-OK22 | - | - |
| - | HVY-OK2 | HWY-OK2 | - |
| - | HVY-OK25 | - | - |

HASKELL:

| | | | |
|---|---|---|---|
| - | HVY-OK2 | HWY-OK2 | - |
| - | HVY-OK25 | - | - |
| BLD-OK13 | - | - | - |
| - | HVY-OK22 | - | - |
| - | HVY-OK21 | - | - |
| - | - | - | R-OK4 |

HUGHES:

| | | | |
|---|---|---|---|
| - | HVY-OK21 | - | - |
| - | HVY-OK25 | - | - |
| BLD-OK17 | - | - | - |
| - | HVY-OK2 | HWY-OK2 | - |
| - | HVY-OK22 | - | - |
| - | - | - | R-OK5 |

JACKSON:

| | | | |
|---|---|---|---|
| - | HVY-OK2 | HWY-OK2 | - |
| - | HVY-OK22 | - | - |
| - | HVY-OK25 | - | - |
| BLD-OK14 | - | - | - |
| - | HVY-OK21 | - | - |
| - | - | - | R-OK19 |

JEFFERSON:

| | | | |
|---|---|---|---|
| - | HVY-OK25 | - | - |
| - | HVY-OK22 | - | - |
| BLD-OK14 | - | - | - |
| - | HVY-OK21 | - | - |
| - | - | - | R-OK3 |
| - | HVY-OK2 | HWY-OK2 | - |

JOHNSTON:

| | | | |
|---|---|---|---|
| - | HVY-OK2 | HWY-OK2 | - |
| - | - | - | R-OK3 |
| - | HVY-OK25 | - | - |
| BLD-OK14 | - | - | - |
| - | HVY-OK21 | - | - |
| - | HVY-OK22 | - | - |

KAY:

| | | | |
|---|---|---|---|
| - | HVY-OK22 | - | - |
| - | HVY-OK2 | HWY-OK2 | - |
| - | - | - | R-OK10 |
| BLD-OK14 | - | - | - |
| - | HVY-OK21 | - | - |
| - | HVY-OK25 | - | - |

KINGFISHER:

| | | | |
|---|---|---|---|
| - | HVY-OK25 | - | - |
| - | - | - | R-OK10 |
| - | HVY-OK21 | - | - |
| - | HVY-OK2 | HWY-OK2 | - |
| - | HVY-OK22 | - | - |
| BLD-OK14 | - | - | - |

KIOWA:

| | | | |
|---|---|---|---|
| - | HVY-OK25 | - | - |
| BLD-OK14 | - | - | - |
| - | HVY-OK22 | - | - |
| - | - | - | R-OK19 |
| - | HVY-OK2 | HWY-OK2 | - |
| - | HVY-OK21 | - | - |

LATIMER:

| | | | |
|---|---|---|---|
| BLD-OK13 | - | - | - |
| - | HVY-OK21 | - | - |
| - | HVY-OK2 | HWY-OK2 | - |
| - | HVY-OK22 | - | - |
| - | - | - | R-OK4 |
| - | HVY-OK25 | - | - |

LE FLORE:

| | | | |
|---|---|---|---|
| - | HVY-OK2 | HWY-OK2 | - |
| - | HVY-OK22 | - | - |
| - | HVY-OK21 | - | - |
| - | HVY-OK25 | - | - |
| - | - | - | R-OK4 |
| BLD-OK13 | - | - | - |

LINCOLN:

| | | | |
|---|---|---|---|
| - | - | - | R-OK6 |
| - | HVY-OK22 | - | - |
| - | HVY-OK21 | - | - |
| - | HVY-OK25 | - | - |
| BLD-OK17 | - | - | - |
| - | HVY-OK2 | HWY-OK2 | - |

LOGAN:

| | | | |
|---|---|---|---|
| - | HVY-OK25 | - | - |
| - | HVY-OK28 | - | - |
| - | HVY-OK41 | - | - |
| - | HVY-OK22 | - | - |
| - | - | HWY-OK29 | - |
| - | HVY-OK27 | - | - |
| - | - | - | R-OK10 |
| BLD-OK37 | - | - | - |

LOVE:

| | | | |
|---|---|---|---|
| - | HVY-OK22 | - | - |
| - | HVY-OK21 | - | - |
| - | HVY-OK2 | HWY-OK2 | - |
| - | HVY-OK25 | - | - |
| - | - | - | R-OK3 |
| BLD-OK14 | - | - | - |

MCCLAIN:

| | | | |
|---|---|---|---|
| - | HVY-OK28 | - | - |
| - | HVY-OK27 | - | - |
| - | - | HWY-OK29 | - |
| BLD-OK38 | - | - | - |
| - | HVY-OK41 | - | - |
| - | - | - | R-OK3 |
| - | HVY-OK22 | - | - |
| - | HVY-OK25 | - | - |

MCCURTAIN:

| | | | |
|---|---|---|---|
| - | HVY-OK2 | HWY-OK2 | - |
| - | - | - | R-OK4 |
| BLD-OK46 | - | - | - |
| - | HVY-OK21 | - | - |

| | | | |
|---|---|---|---|
| - | HVY-OK25 | - | - |
| - | HVY-OK22 | - | - |

---

MCINTOSH:

| | | | |
|---|---|---|---|
| - | HVY-OK25 | - | - |
| - | HVY-OK2 | HWY-OK2 | - |
| BLD-OK17 | - | - | - |
| - | HVY-OK22 | - | - |
| - | HVY-OK21 | - | - |
| - | - | - | R-OK5 |

---

MAJOR:

| | | | |
|---|---|---|---|
| - | HVY-OK21 | - | - |
| - | HVY-OK2 | HWY-OK2 | - |
| BLD-OK14 | - | - | - |
| - | - | - | R-OK10 |
| - | HVY-OK25 | - | - |
| - | HVY-OK22 | - | - |

---

MARSHALL:

| | | | |
|---|---|---|---|
| - | HVY-OK25 | - | - |
| - | HVY-OK2 | HWY-OK2 | - |
| - | - | - | R-OK3 |
| BLD-OK14 | - | - | - |
| - | HVY-OK21 | - | - |
| - | HVY-OK22 | - | - |

---

MAYES:

| | | | |
|---|---|---|---|
| - | HVY-OK2 | HWY-OK2 | - |
| - | HVY-OK25 | - | - |
| - | - | - | R-OK7 |
| BLD-OK13 | - | - | - |
| - | HVY-OK21 | - | - |
| - | HVY-OK22 | - | - |

---

MURRAY:

| | | | |
|---|---|---|---|
| - | - | - | R-OK3 |
| - | HVY-OK2 | HWY-OK2 | - |
| - | HVY-OK21 | - | - |
| - | HVY-OK22 | - | - |
| - | HVY-OK25 | - | - |
| BLD-OK14 | - | - | - |

---

MUSKOGEE:

| | | | |
|---|---|---|---|
| - | HVY-OK2 | HWY-OK2 | - |
| - | HVY-OK22 | - | - |
| - | - | - | R-OK11 |
| - | HVY-OK25 | - | - |
| - | HVY-OK30 | - | - |
| - | HVY-OK21 | - | - |
| BLD-OK15 | - | - | - |

---

NOBLE:

| | | | |
|---|---|---|---|
| BLD-OK14 | - | - | - |
| - | - | - | R-OK10 |
| - | HVY-OK25 | - | - |
| - | HVY-OK2 | HWY-OK2 | - |
| - | HVY-OK21 | - | - |
| - | HVY-OK22 | - | - |

---

NOWATA:

| | | | |
|---|---|---|---|
| - | HVY-OK21 | - | - |
| BLD-OK13 | - | - | - |

| | | | |
|---|---|---|---|
| - | - | - | R-OK7 |
| - | HVY-OK22 | - | - |
| - | HVY-OK2 | HWY-OK2 | - |
| - | HVY-OK25 | - | - |

OKFUSKEE:

| | | | |
|---|---|---|---|
| - | - | - | R-OK5 |
| - | HVY-OK2 | HWY-OK2 | - |
| BLD-OK17 | - | - | - |
| - | HVY-OK21 | - | - |
| - | HVY-OK25 | - | - |
| - | HVY-OK22 | - | - |

**OKLAHOMA**:

| | | | |
|---|---|---|---|
| - | HVY-OK25 | - | - |
| BLD-OK34 | - | - | - |
| - | HVY-OK43 | - | - |
| - | HVY-OK45 | - | - |
| - | HVY-OK44 | - | - |
| - | HVY-OK22 | - | - |
| - | - | HWY-OK29 | - |
| - | - | - | R-OK12 |

OKMULGEE:

| | | | |
|---|---|---|---|
| BLD-OK17 | - | - | - |
| - | HVY-OK21 | - | - |
| - | - | - | R-OK5 |
| - | HVY-OK25 | - | - |
| - | HVY-OK22 | - | - |
| - | HVY-OK2 | HWY-OK2 | - |

OSAGE:

| | | | |
|---|---|---|---|
| - | HVY-OK25 | - | - |
| - | HVY-OK22 | - | - |
| - | - | - | R-OK5 |
| - | - | HWY-OK26 | - |
| - | HVY-OK24 | - | - |
| BLD-OK32 | - | - | - |
| - | HVY-OK23 | - | - |
| - | HVY-OK39 | - | - |

OTTAWA:

| | | | |
|---|---|---|---|
| - | HVY-OK2 | HWY-OK2 | - |
| BLD-OK13 | - | - | - |
| - | HVY-OK21 | - | - |
| - | - | - | R-OK7 |
| - | HVY-OK25 | - | - |
| - | HVY-OK22 | - | - |

PAWNEE:

| | | | |
|---|---|---|---|
| - | HVY-OK22 | - | - |
| - | HVY-OK2 | HWY-OK2 | - |
| - | - | - | R-OK5 |
| BLD-OK13 | - | - | - |
| - | HVY-OK21 | - | - |
| - | HVY-OK25 | - | - |

PAYNE:

| | | | |
|---|---|---|---|
| - | - | - | R-OK6 |
| - | HVY-OK21 | - | - |
| BLD-OK16 | - | - | - |
| - | HVY-OK2 | HWY-OK2 | - |
| - | HVY-OK25 | - | - |
| - | HVY-OK22 | - | - |

---

PITTSBURG:

| | | | |
|---|---|---|---|
| - | HVY-OK22 | - | - |
| - | HVY-OK2 | HWY-OK2 | - |
| - | HVY-OK25 | - | - |
| - | HVY-OK21 | - | - |
| - | - | - | R-OK4 |
| BLD-OK17 | - | - | - |

---

PONTOTOC:

| | | | |
|---|---|---|---|
| - | HVY-OK25 | - | - |
| - | - | - | R-OK3 |
| - | HVY-OK22 | - | - |
| - | HVY-OK21 | - | - |
| - | HVY-OK2 | HWY-OK2 | - |
| BLD-OK14 | - | - | - |

---

POTTAWATOMIE:

| | | | |
|---|---|---|---|
| - | - | HWY-OK29 | - |
| - | HVY-OK22 | - | - |
| - | HVY-OK25 | - | - |
| BLD-OK38 | - | - | - |
| - | HVY-OK41 | - | - |
| - | HVY-OK27 | - | - |
| - | HVY-OK28 | - | - |
| - | - | - | R-OK6 |

---

PUSHMATAHA:

| | | | |
|---|---|---|---|
| - | - | - | R-OK4 |
| BLD-OK13 | - | - | - |
| - | HVY-OK2 | HWY-OK2 | - |
| - | HVY-OK25 | - | - |
| - | HVY-OK21 | - | - |
| - | HVY-OK22 | - | - |

---

ROGER MILLS:

| | | | |
|---|---|---|---|
| - | - | - | R-OK10 |
| - | HVY-OK21 | - | - |
| - | HVY-OK22 | - | - |
| - | HVY-OK2 | HWY-OK2 | - |
| BLD-OK14 | - | - | - |
| - | HVY-OK25 | - | - |

---

ROGERS:

| | | | |
|---|---|---|---|
| - | HVY-OK39 | - | - |
| - | HVY-OK24 | - | - |
| - | HVY-OK22 | - | - |
| - | - | - | R-OK7 |
| BLD-OK33 | - | - | - |
| - | HVY-OK23 | - | - |
| - | HVY-OK25 | - | - |
| - | - | HWY-OK26 | - |

---

SEMINOLE:

| | | | |
|---|---|---|---|
| BLD-OK17 | - | - | - |
| - | HVY-OK21 | - | - |
| - | HVY-OK22 | - | - |
| - | - | - | R-OK5 |
| - | HVY-OK25 | - | - |
| - | HVY-OK2 | HWY-OK2 | - |

---

SEQUOYAH:

| | | | |
|---|---|---|---|
| BLD-OK13 | - | - | - |
| - | HVY-OK25 | - | - |

| | | | |
|---|---|---|---|
| - | HVY-OK1 | HWY-OK1 | - |
| - | HVY-OK21 | - | - |
| - | HVY-OK22 | - | - |
| - | - | - | R-OK7 |

STEPHENS:

| | | | |
|---|---|---|---|
| - | HVY-OK22 | - | - |
| - | HVY-OK21 | - | - |
| BLD-OK14 | - | - | - |
| - | HVY-OK2 | HWY-OK2 | - |
| - | - | - | R-OK3 |
| - | HVY-OK25 | - | - |

TEXAS:

| | | | |
|---|---|---|---|
| - | HVY-OK22 | - | - |
| - | HVY-OK25 | - | - |
| BLD-OK20 | - | - | - |
| - | HVY-OK21 | - | - |
| - | HVY-OK2 | HWY-OK2 | - |
| - | - | - | R-OK10 |

TILLMAN:

| | | | |
|---|---|---|---|
| - | HVY-OK22 | - | - |
| - | - | - | R-OK19 |
| BLD-OK14 | - | - | - |
| - | HVY-OK21 | - | - |
| - | HVY-OK2 | HWY-OK2 | - |
| - | HVY-OK25 | - | - |

TULSA:

| | | | |
|---|---|---|---|
| - | - | - | R-OK9 |
| - | HVY-OK25 | - | - |
| - | HVY-OK23 | - | - |
| - | - | HWY-OK26 | - |
| - | HVY-OK22 | - | - |
| - | HVY-OK42 | - | - |
| BLD-OK31 | - | - | - |
| - | HVY-OK40 | - | - |

WAGONER:

| | | | |
|---|---|---|---|
| - | HVY-OK24 | - | - |
| BLD-OK33 | - | - | - |
| - | HVY-OK23 | - | - |
| - | - | HWY-OK26 | - |
| - | HVY-OK25 | - | - |
| - | - | - | R-OK7 |
| - | HVY-OK39 | - | - |
| - | HVY-OK22 | - | - |

WASHINGTON:

| | | | |
|---|---|---|---|
| - | HVY-OK22 | - | - |
| - | HVY-OK2 | HWY-OK2 | - |
| - | HVY-OK21 | - | - |
| BLD-OK18 | - | - | - |
| - | - | - | R-OK7 |
| - | HVY-OK25 | - | - |

WASHITA:

| | | | |
|---|---|---|---|
| - | HVY-OK21 | - | - |
| BLD-OK14 | - | - | - |
| - | HVY-OK25 | - | - |
| - | HVY-OK22 | - | - |
| - | HVY-OK2 | HWY-OK2 | - |

```
                    -            -          -          R-OK10
-----------------------------------------------------------------
WOODS:
                    BLD-OK14     -          -          -
                    -            HVY-OK21   -          -
                    -            -          -          R-OK10
                    -            HVY-OK25   -          -
                    -            HVY-OK22   -          -
                    -            HVY-OK2    HWY-OK2    -
-----------------------------------------------------------------
WOODWARD:
                    -            -          -          R-OK10
                    -            HVY-OK22   -          -
                    -            HVY-OK25   -          -
                    -            HVY-OK21   -          -
                    -            HVY-OK2    HWY-OK2    -
                    BLD-OK14     -          -          -
-----------------------------------------------------------------
```

-- - -- ----

## STATE OF TEXAS

---

STATE OF TEXAS

MODIFICATIONS AS PUBLISHED IN THE FEDERAL REGISTER ON
NOVEMBER 14, 1997

TX 1 MOD-2

TX 2 MOD-3

TX 7 MOD-5

TX 8 MOD-1

TX 19 MOD-2

TX 54 MOD-2

TX 81 MOD-3

COUNTY **INDEX** MODIFIED

TX GENERAL DECISION COUNTY **INDEX** - PUBLICATION DATE: 05/30/97

| County | Building | Heavy | Highway | Resident |
|---|---|---|---|---|
| ANDERSON: | | | | |
| | - | HVY-TX47 | HWY-TX47 | - |
| | - | HVY-TX57 | - | - |
| | - | HVY-TX58 | - | - |
| | BLD-TX75 | - | - | - |
| | - | HVY-TX98 | - | - |
| | - | - | - | R-TX74 |
| ANDREWS: | | | | |
| | - | - | - | R-TX107 |
| | - | HVY-TX98 | - | - |
| | - | HVY-TX27 | HWY-TX27 | - |
| | - | HVY-TX57 | - | - |
| | BLD-TX8 | - | - | - |
| | - | HVY-TX58 | - | - |
| ANGELINA: | | | | |
| | - | HVY-TX47 | HWY-TX47 | - |
| | - | HVY-TX58 | - | - |
| | - | HVY-TX57 | - | - |
| | - | - | - | R-TX86 |
| | - | HVY-TX98 | - | - |
| | BLD-TX85 | - | - | - |
| ARANSAS: | | | | |
| | - | HVY-TX98 | - | - |
| | BLD-TX70 | - | - | R-TX70 |
| | - | HVY-TX38 | HWY-TX38 | - |
| | - | HVY-TX57 | - | - |
| | - | HVY-TX58 | - | - |
| ARCHER: | | | | |

| | | | |
|---|---|---|---|
| - | HVY-TX27 | HWY-TX27 | - |
| - | HVY-TX57 | - | - |
| BLD-TX49 | - | - | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX98 | - | - |
| - | - | - | R-TX78 |

---

ARMSTRONG:

| | | | |
|---|---|---|---|
| - | HVY-TX98 | - | - |
| - | - | - | R-TX94 |
| - | HVY-TX58 | - | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX27 | HWY-TX27 | - |
| BLD-TX1 | - | - | - |

---

ATASCOSA:

| | | | |
|---|---|---|---|
| - | HVY-TX58 | - | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX38 | HWY-TX38 | - |
| - | - | - | R-TX97 |
| BLD-TX73 | - | - | - |
| - | HVY-TX98 | - | - |

---

AUSTIN:

| | | | |
|---|---|---|---|
| BLD-TX91 | - | - | R-TX91 |
| - | HVY-TX98 | - | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX38 | HWY-TX38 | - |

---

BAILEY:

| | | | |
|---|---|---|---|
| - | HVY-TX57 | - | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX27 | HWY-TX27 | - |
| - | - | - | R-TX84 |
| - | HVY-TX98 | - | - |

---

BANDERA:

| | | | |
|---|---|---|---|
| - | HVY-TX98 | - | - |
| - | - | - | R-TX71 |
| BLD-TX67 | - | - | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX38 | HWY-TX38 | - |

---

BASTROP:

| | | | |
|---|---|---|---|
| - | HVY-TX38 | HWY-TX38 | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX58 | - | - |
| - | - | - | R-TX20 |
| BLD-TX114 | - | - | - |
| - | HVY-TX98 | - | - |

---

BAYLOR:

| | | | |
|---|---|---|---|
| - | - | - | R-TX78 |
| - | HVY-TX98 | - | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX57 | - | - |
| BLD-TX49 | - | - | - |
| - | HVY-TX27 | HWY-TX27 | - |

---

BEE:

| | | | |
|---|---|---|---|
| - | HVY-TX38 | HWY-TX38 | - |
| - | HVY-TX57 | - | - |

| | | | |
|---|---|---|---|
| - | HVY-TX58 | - | - |
| BLD-TX70 | - | - | R-TX70 |
| - | HVY-TX98 | - | - |

---

BELL:

| | | | |
|---|---|---|---|
| - | HVY-TX106 | - | - |
| - | HVY-TX98 | - | - |
| - | HVY-TX58 | - | - |
| BLD-TX51 | - | - | - |
| - | - | - | R-TX40 |
| - | HVY-TX57 | - | - |
| - | HVY-TX43 | HWY-TX43 | - |
| - | HVY-TX41 | - | - |

---

BEXAR:

| | | | |
|---|---|---|---|
| BLD-TX3 | - | - | - |
| - | HVY-TX43 | HWY-TX43 | - |
| - | HVY-TX58 | - | - |
| - | - | - | R-TX22 |
| - | HVY-TX57 | - | - |
| - | HVY-TX98 | - | - |
| - | HVY-TX106 | - | - |

---

BLANCO:

| | | | |
|---|---|---|---|
| BLD-TX90 | - | - | - |
| - | HVY-TX98 | - | - |
| - | - | - | R-TX20 |
| - | HVY-TX58 | - | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX38 | HWY-TX38 | - |

---

BORDEN:

| | | | |
|---|---|---|---|
| - | HVY-TX57 | - | - |
| - | HVY-TX58 | - | - |
| - | - | - | R-TX44 |
| - | HVY-TX27 | HWY-TX27 | - |
| - | HVY-TX98 | - | - |
| BLD-TX87 | - | - | - |

---

BOSQUE:

| | | | |
|---|---|---|---|
| BLD-TX83 | - | - | - |
| - | HVY-TX98 | - | - |
| - | HVY-TX47 | HWY-TX47 | - |
| - | HVY-TX57 | - | - |
| - | - | - | R-TX40 |
| - | HVY-TX41 | - | - |
| - | HVY-TX58 | - | - |

---

BOWIE:

| | | | |
|---|---|---|---|
| - | HVY-TX58 | - | - |
| BLD-TX4 | - | - | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX30 | HWY-TX30 | - |
| - | HVY-TX106 | - | - |
| - | HVY-TX98 | - | - |
| - | - | - | R-TX72 |

---

BRAZORIA:

| | | | |
|---|---|---|---|
| - | HVY-TX106 | - | - |
| - | HVY-TX82 | - | - |
| - | HVY-TX98 | - | - |
| - | - | - | R-TX120 |
| - | HVY-TX58 | - | - |
| - | - | HWY-TX48 | - |

| | | | |
|---|---|---|---|
| - | HVY-TX56 | - | - |
| - | HVY-TX57 | - | - |
| BLD-TX55 | - | - | - |

---

BRAZOS:

| | | | |
|---|---|---|---|
| BLD-TX5 | - | - | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX43 | HWY-TX43 | - |
| - | - | - | R-TX111 |
| - | HVY-TX98 | - | - |
| - | HVY-TX106 | - | - |

---

BREWSTER:

| | | | |
|---|---|---|---|
| BLD-TX89 | - | - | - |
| - | HVY-TX98 | - | - |
| - | - | - | R-TX65 |
| - | HVY-TX58 | - | - |
| - | HVY-TX27 | HWY-TX27 | - |
| - | HVY-TX57 | - | - |

---

BRISCOE:

| | | | |
|---|---|---|---|
| - | HVY-TX57 | - | - |
| - | HVY-TX27 | HWY-TX27 | - |
| | | | |
| BLD-TX1 | - | - | - |
| - | HVY-TX58 | - | - |
| - | - | - | R-TX94 |
| - | HVY-TX98 | - | - |

---

BROOKS:

| | | | |
|---|---|---|---|
| - | HVY-TX98 | - | - |
| BLD-TX70 | - | - | R-TX70 |
| - | HVY-TX58 | - | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX38 | HWY-TX38 | - |

---

BROWN:

| | | | |
|---|---|---|---|
| - | HVY-TX58 | - | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX27 | HWY-TX27 | - |
| - | HVY-TX98 | - | - |
| - | - | - | R-TX80 |
| BLD-TX79 | - | - | - |

---

BURLESON:

| | | | |
|---|---|---|---|
| - | HVY-TX98 | - | - |
| BLD-TX91 | - | - | R-TX91 |
| - | HVY-TX58 | - | - |
| - | HVY-TX47 | HWY-TX47 | - |
| - | HVY-TX57 | - | - |

---

BURNET:

| | | | |
|---|---|---|---|
| - | HVY-TX58 | - | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX38 | HWY-TX38 | - |
| - | - | - | R-TX20 |
| BLD-TX102 | - | - | - |
| - | HVY-TX98 | - | - |

---

CALDWELL:

| | | | |
|---|---|---|---|
| BLD-TX100 | - | - | - |
| - | HVY-TX98 | - | - |
| - | HVY-TX57 | - | - |

| | | | |
|---|---|---|---|
| - | - | - | R-TX20 |
| - | HVY-TX38 | HWY-TX38 | - |
| - | HVY-TX58 | - | - |

CALHOUN:

| | | | |
|---|---|---|---|
| - | HVY-TX57 | - | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX38 | HWY-TX38 | - |
| - | HVY-TX98 | - | - |
| BLD-TX96 | - | - | R-TX96 |

CALLAHAN:

| | | | |
|---|---|---|---|
| - | - | - | R-TX76 |
| - | HVY-TX98 | - | - |
| - | HVY-TX27 | HWY-TX27 | - |
| - | HVY-TX57 | - | - |
| BLD-TX17 | - | - | - |
| - | HVY-TX58 | - | - |

CAMERON:

| | | | |
|---|---|---|---|
| - | HVY-TX29 | HWY-TX29 | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX58 | - | - |
| BLD-TX6 | - | - | R-TX6 |
| - | HVY-TX98 | - | - |
| - | HVY-TX106 | - | - |

CAMP:

| | | | |
|---|---|---|---|
| - | - | - | R-TX72 |
| - | HVY-TX98 | - | - |
| BLD-TX69 | - | - | - |
| - | HVY-TX47 | HWY-TX47 | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX58 | - | - |

CARSON:

| | | | |
|---|---|---|---|
| BLD-TX1 | - | - | - |
| - | HVY-TX27 | HWY-TX27 | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX58 | - | - |
| - | - | - | R-TX94 |
| - | HVY-TX98 | - | - |

CASS:

| | | | |
|---|---|---|---|
| - | HVY-TX98 | - | - |
| - | - | - | R-TX72 |
| BLD-TX69 | - | - | - |
| - | HVY-TX47 | HWY-TX47 | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX57 | - | - |

CASTRO:

| | | | |
|---|---|---|---|
| - | HVY-TX57 | - | - |
| - | HVY-TX58 | - | - |
| BLD-TX1 | - | - | - |
| - | HVY-TX27 | HWY-TX27 | - |
| - | HVY-TX98 | - | - |
| - | - | - | R-TX94 |

CHAMBERS:

| | | | |
|---|---|---|---|
| - | - | - | R-TX120 |
| - | HVY-TX98 | - | - |
| - | HVY-TX57 | - | - |

| | | | |
|---|---|---|---|
| - | HVY-TX58 | - | - |
| - | HVY-TX47 | HWY-TX47 | - |

CHEROKEE:

| | | | |
|---|---|---|---|
| - | HVY-TX47 | HWY-TX47 | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX98 | - | - |
| BLD-TX75 | - | - | - |
| - | - | - | R-TX74 |

CHILDRESS:

| | | | |
|---|---|---|---|
| - | - | - | R-TX94 |
| - | HVY-TX98 | - | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX58 | - | - |
| BLD-TX1 | - | - | - |
| - | HVY-TX27 | HWY-TX27 | - |

CLAY:

| | | | |
|---|---|---|---|
| - | HVY-TX57 | - | - |
| - | HVY-TX27 | HWY-TX27 | - |
| - | HVY-TX58 | - | - |
| BLD-TX49 | - | - | - |
| - | HVY-TX98 | - | - |
| - | - | - | R-TX78 |

COCHRAN:

| | | | |
|---|---|---|---|
| - | HVY-TX98 | - | - |
| - | - | - | R-TX84 |
| BLD-TX101 | - | - | - |
| - | HVY-TX27 | HWY-TX27 | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX58 | - | - |

COKE:

| | | | |
|---|---|---|---|
| - | - | - | R-TX44 |
| - | HVY-TX58 | - | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX27 | HWY-TX27 | - |
| BLD-TX53 | - | - | - |
| - | HVY-TX98 | - | - |

COLEMAN:

| | | | |
|---|---|---|---|
| - | HVY-TX98 | - | - |
| BLD-TX79 | - | - | - |
| - | - | - | R-TX80 |
| - | HVY-TX27 | HWY-TX27 | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX57 | - | - |

COLLIN:

| | | | |
|---|---|---|---|
| - | - | - | R-TX25 |
| - | HVY-TX45 | HWY-TX45 | - |
| - | HVY-TX37 | - | - |
| - | HVY-TX35 | - | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX57 | - | - |
| BLD-TX59 | - | - | - |
| - | HVY-TX98 | - | - |
| - | HVY-TX106 | - | - |

COLLINGSWORTH:

| | | | |
|---|---|---|---|
| - | HVY-TX98 | - | - |

| | | | |
|---|---|---|---|
| - | - | - | R-TX94 |
| - | HVY-TX58 | - | - |
| - | HVY-TX27 | HWY-TX27 | - |
| - | HVY-TX57 | - | - |
| BLD-TX1 | - | - | - |

---

COLORADO:

| | | | |
|---|---|---|---|
| - | HVY-TX58 | - | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX38 | HWY-TX38 | - |
| BLD-TX91 | - | - | R-TX91 |
| - | HVY-TX98 | - | - |

---

COMAL:

| | | | |
|---|---|---|---|
| - | HVY-TX106 | - | - |
| BLD-TX73 | - | - | - |
| - | HVY-TX98 | - | - |
| - | - | - | R-TX22 |
| - | HVY-TX58 | - | - |
| - | HVY-TX43 | HWY-TX43 | - |
| - | HVY-TX57 | - | - |

---

COMANCHE:

| | | | |
|---|---|---|---|
| - | HVY-TX57 | - | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX27 | HWY-TX27 | - |
| - | - | - | R-TX80 |
| BLD-TX79 | - | - | - |
| - | HVY-TX98 | - | - |

---

CONCHO:

| | | | |
|---|---|---|---|
| - | HVY-TX98 | - | - |
| - | - | - | R-TX44 |
| - | HVY-TX57 | - | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX27 | HWY-TX27 | - |

---

COOKE:

| | | | |
|---|---|---|---|
| - | HVY-TX27 | HWY-TX27 | - |
| - | HVY-TX57 | - | - |
| - | - | - | R-TX24 |
| - | HVY-TX58 | - | - |
| BLD-TX113 | - | - | - |
| - | HVY-TX98 | - | - |

---

CORYELL:

| | | | |
|---|---|---|---|
| - | HVY-TX98 | - | - |
| - | HVY-TX106 | - | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX43 | HWY-TX43 | - |
| BLD-TX51 | - | - | - |
| - | - | - | R-TX40 |
| - | HVY-TX58 | - | - |
| - | HVY-TX41 | - | - |

---

COTTLE:

| | | | |
|---|---|---|---|
| - | HVY-TX58 | - | - |
| - | HVY-TX27 | HWY-TX27 | - |
| BLD-TX49 | - | - | - |
| - | HVY-TX57 | - | - |
| - | - | - | R-TX78 |
| - | HVY-TX98 | - | - |

---

CRANE:

| | | | |
|---|---|---|---|
| BLD-TX92 | - | - | - |
| - | - | - | R-TX107 |
| - | HVY-TX98 | - | - |
| - | HVY-TX27 | HWY-TX27 | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX58 | - | - |

---

CROCKETT:

| | | | |
|---|---|---|---|
| - | HVY-TX57 | - | - |
| - | HVY-TX58 | - | - |
| - | - | - | R-TX52 |
| - | HVY-TX27 | HWY-TX27 | - |
| BLD-TX90 | - | - | - |
| - | HVY-TX98 | - | - |

---

CROSBY:

| | | | |
|---|---|---|---|
| - | - | - | R-TX84 |
| BLD-TX101 | - | - | - |
| - | HVY-TX98 | - | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX27 | HWY-TX27 | - |
| - | HVY-TX57 | - | - |

---

CULBERSON:

| | | | |
|---|---|---|---|
| - | HVY-TX57 | - | - |
| - | HVY-TX27 | HWY-TX27 | - |
| - | HVY-TX58 | - | - |
| BLD-TX89 | - | - | - |
| - | HVY-TX98 | - | - |
| - | - | - | R-TX65 |

---

DALLAM:

| | | | |
|---|---|---|---|
| - | - | - | R-TX94 |
| - | HVY-TX98 | - | - |
| - | HVY-TX58 | - | - |
| BLD-TX1 | - | - | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX27 | HWY-TX27 | - |

---

DALLAS:

| | | | |
|---|---|---|---|
| - | HVY-TX45 | HWY-TX45 | - |
| - | - | - | R-TX25 |
| - | HVY-TX34 | - | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX35 | - | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX98 | - | - |
| BLD-TX60 | - | - | - |
| - | HVY-TX106 | - | - |

---

DAWSON:

| | | | |
|---|---|---|---|
| - | - | - | R-TX84 |
| - | HVY-TX98 | - | - |
| BLD-TX87 | - | - | - |
| - | HVY-TX27 | HWY-TX27 | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX57 | - | - |

---

DEAF SMITH:

| | | | |
|---|---|---|---|
| BLD-TX1 | - | - | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX27 | HWY-TX27 | - |

| | | | | |
|---|---|---|---|---|
| | - | HVY-TX98 | - | - |
| | - | - | - | R-TX94 |

DELTA:

| | | | | |
|---|---|---|---|---|
| | - | - | - | R-TX72 |
| | BLD-TX69 | - | - | - |
| | - | HVY-TX98 | - | - |
| | - | HVY-TX58 | - | - |
| | - | HVY-TX57 | - | - |
| | - | HVY-TX47 | HWY-TX47 | - |

DENTON:

| | | | | |
|---|---|---|---|---|
| | - | HVY-TX35 | - | - |
| | - | HVY-TX58 | - | - |
| | - | - | - | R-TX25 |
| | - | HVY-TX45 | HWY-TX45 | - |
| | - | HVY-TX33 | - | - |
| | - | HVY-TX57 | - | - |
| | BLD-TX59 | - | - | - |
| | - | HVY-TX106 | - | - |
| | - | HVY-TX98 | - | - |

DE WITT:

| | | | | |
|---|---|---|---|---|
| | - | HVY-TX98 | - | - |
| | - | - | - | R-TX99 |
| | BLD-TX73 | - | - | - |
| | - | HVY-TX58 | - | - |
| | - | HVY-TX57 | - | - |
| | - | HVY-TX38 | HWY-TX38 | - |

DICKENS:

| | | | | |
|---|---|---|---|---|
| | - | HVY-TX58 | - | - |
| | BLD-TX49 | - | - | - |
| | - | HVY-TX27 | HWY-TX27 | - |
| | - | HVY-TX57 | - | - |
| | - | HVY-TX98 | - | - |
| | - | - | - | R-TX84 |

DIMMIT:

| | | | | |
|---|---|---|---|---|
| | - | - | - | R-TX71 |
| | - | HVY-TX98 | - | - |
| | BLD-TX66 | - | - | - |
| | - | HVY-TX57 | - | - |
| | - | HVY-TX58 | - | - |
| | - | HVY-TX38 | HWY-TX38 | - |

DONLEY:

| | | | | |
|---|---|---|---|---|
| | - | HVY-TX57 | - | - |
| | - | HVY-TX58 | - | - |
| | - | HVY-TX27 | HWY-TX27 | - |
| | BLD-TX1 | - | - | - |
| | - | HVY-TX98 | - | - |
| | - | - | - | R-TX94 |

DUVAL:

| | | | | |
|---|---|---|---|---|
| | BLD-TX70 | - | - | R-TX70 |
| | - | HVY-TX98 | - | - |
| | - | HVY-TX38 | HWY-TX38 | - |
| | - | HVY-TX58 | - | - |
| | - | HVY-TX57 | - | - |

EASTLAND:

| | | | | |
|---|---|---|---|---|
| | - | HVY-TX57 | - | - |
| | - | HVY-TX58 | - | - |

| | | | |
|---|---|---|---|
| - | HVY-TX27 | HWY-TX27 | - |
| - | - | - | R-TX76 |
| BLD-TX79 | - | - | - |
| - | HVY-TX98 | - | - |

---

ECTOR:

| | | | |
|---|---|---|---|
| - | - | - | R-TX107 |
| - | HVY-TX98 | - | - |
| - | HVY-TX106 | - | - |
| - | HVY-TX28 | HWY-TX28 | - |
| - | HVY-TX58 | - | - |
| BLD-TX8 | - | - | - |
| - | HVY-TX57 | - | - |

---

EDWARDS:

| | | | |
|---|---|---|---|
| - | HVY-TX57 | - | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX27 | HWY-TX27 | - |
| - | - | - | R-TX71 |
| BLD-TX67 | - | - | - |
| - | HVY-TX98 | - | - |

---

ELLIS:

| | | | |
|---|---|---|---|
| BLD-TX60 | - | - | - |
| - | HVY-TX98 | - | - |
| - | HVY-TX106 | - | - |
| - | - | - | R-TX25 |
| - | HVY-TX35 | - | - |
| - | HVY-TX45 | HWY-TX45 | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX37 | - | - |
| - | HVY-TX57 | - | - |

---

EL PASO:

| | | | |
|---|---|---|---|
| - | HVY-TX32 | - | - |
| BLD-TX9 | - | - | - |
| - | - | HWY-TX31 | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX57 | - | - |
| - | - | - | R-TX65 |
| - | HVY-TX106 | - | - |
| - | HVY-TX64 | - | - |
| - | HVY-TX98 | - | - |

---

ERATH:

| | | | |
|---|---|---|---|
| - | - | - | R-TX76 |
| - | HVY-TX98 | - | - |
| BLD-TX79 | - | - | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX47 | HWY-TX47 | - |

---

FALLS:

| | | | |
|---|---|---|---|
| - | HVY-TX47 | HWY-TX47 | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX58 | - | - |
| - | - | - | R-TX40 |
| - | HVY-TX41 | - | - |
| - | HVY-TX98 | - | - |
| BLD-TX83 | - | - | - |

---

FANNIN:

| | | | |
|---|---|---|---|
| BLD-TX62 | - | - | - |
| - | - | - | R-TX72 |
| - | HVY-TX98 | - | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX47 | HWY-TX47 | - |
| - | HVY-TX58 | - | - |

---

FAYETTE:

| | | | |
|---|---|---|---|
| - | HVY-TX38 | HWY-TX38 | - |
| - | HVY-TX58 | - | - |
| - | - | - | R-TX20 |
| - | HVY-TX57 | - | - |
| BLD-TX102 | - | - | - |
| - | HVY-TX98 | - | - |

---

FISHER:

| | | | |
|---|---|---|---|
| - | HVY-TX98 | - | - |
| - | - | - | R-TX76 |
| BLD-TX17 | - | - | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX27 | HWY-TX27 | - |
| - | HVY-TX58 | - | - |

---

FLOYD:

| | | | |
|---|---|---|---|
| - | HVY-TX27 | HWY-TX27 | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX98 | - | - |
| - | - | - | R-TX84 |
| BLD-TX101 | - | - | - |

---

FOARD:

| | | | |
|---|---|---|---|
| - | - | - | R-TX78 |
| - | HVY-TX98 | - | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX27 | HWY-TX27 | - |
| - | HVY-TX58 | - | - |
| BLD-TX49 | - | - | - |

---

FORT BEND:

| | | | |
|---|---|---|---|
| - | HVY-TX57 | - | - |
| - | HVY-TX58 | - | - |
| - | - | HWY-TX48 | - |
| BLD-TX117 | - | - | - |
| - | HVY-TX106 | - | - |
| - | HVY-TX105 | - | - |
| - | HVY-TX98 | - | - |
| - | HVY-TX82 | - | - |
| - | - | - | R-TX120 |

---

FRANKLIN:

| | | | |
|---|---|---|---|
| BLD-TX69 | - | - | - |
| - | HVY-TX98 | - | - |
| - | - | - | R-TX72 |
| - | HVY-TX47 | HWY-TX47 | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX58 | - | - |

---

FREESTONE:

| | | | |
|---|---|---|---|
| - | - | - | R-TX40 |
| - | HVY-TX41 | - | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX47 | HWY-TX47 | - |

| | | | | |
|---|---|---|---|---|
| | BLD-TX83 | - | - | - |
| | - | HVY-TX98 | - | - |

---

FRIO:

| | | | | |
|---|---|---|---|---|
| | BLD-TX67 | - | - | - |
| | - | HVY-TX98 | - | - |
| | - | - | - | R-TX97 |
| | - | HVY-TX58 | - | - |
| | - | HVY-TX38 | HWY-TX38 | - |
| | - | HVY-TX57 | - | - |

---

GAINES:

| | | | | |
|---|---|---|---|---|
| | - | HVY-TX27 | HWY-TX27 | - |
| | - | HVY-TX58 | - | - |
| | - | HVY-TX57 | - | - |
| | - | - | - | R-TX84 |
| | BLD-TX101 | - | - | - |
| | - | HVY-TX98 | - | - |

---

GALVESTON:

| | | | | |
|---|---|---|---|---|
| | - | HVY-TX98 | - | - |
| | - | - | - | R-TX120 |
| | - | HVY-TX82 | - | - |
| | - | HVY-TX105 | - | - |
| | - | HVY-TX106 | - | - |
| | - | HVY-TX57 | - | - |
| | BLD-TX10 | - | - | - |
| | - | HVY-TX58 | - | - |
| | - | - | HWY-TX48 | - |

---

GARZA:

| | | | | |
|---|---|---|---|---|
| | - | HVY-TX58 | - | - |
| | - | HVY-TX57 | - | - |
| | - | HVY-TX27 | HWY-TX27 | - |
| | - | HVY-TX98 | - | - |
| | BLD-TX101 | - | - | - |
| | - | - | - | R-TX84 |

---

GILLESPIE:

| | | | | |
|---|---|---|---|---|
| | BLD-TX90 | - | - | - |
| | - | HVY-TX98 | - | - |
| | - | HVY-TX38 | HWY-TX38 | - |
| | - | - | - | R-TX44 |
| | - | HVY-TX57 | - | - |
| | - | HVY-TX58 | - | - |

---

GLASSCOCK:

| | | | | |
|---|---|---|---|---|
| | - | HVY-TX27 | HWY-TX27 | - |
| | BLD-TX13 | - | - | - |
| | - | - | - | R-TX52 |
| | - | HVY-TX58 | - | - |
| | - | HVY-TX57 | - | - |
| | - | HVY-TX98 | - | - |

---

GOLIAD:

| | | | | |
|---|---|---|---|---|
| | - | HVY-TX98 | - | - |
| | BLD-TX73 | - | - | - |
| | - | - | - | R-TX115 |
| | - | HVY-TX58 | - | - |
| | - | HVY-TX38 | HWY-TX38 | - |
| | - | HVY-TX57 | - | - |

---

GONZALES:

| | | | | |
|---|---|---|---|---|
| | - | HVY-TX57 | - | - |

| | | | |
|---|---|---|---|
| - | HVY-TX38 | HWY-TX38 | - |
| - | HVY-TX58 | - | - |
| - | - | - | R-TX116 |
| BLD-TX73 | - | - | - |
| - | HVY-TX98 | - | - |

GRAY:

| | | | |
|---|---|---|---|
| - | - | - | R-TX94 |
| - | HVY-TX98 | - | - |
| - | HVY-TX27 | HWY-TX27 | - |
| - | HVY-TX58 | - | - |
| BLD-TX1 | - | - | - |
| - | HVY-TX57 | - | - |

GRAYSON:

| | | | |
|---|---|---|---|
| BLD-TX7 | - | - | - |
| - | - | - | R-TX24 |
| - | HVY-TX45 | HWY-TX45 | - |
| - | HVY-TX36 | - | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX106 | - | - |
| - | HVY-TX112 | - | - |
| - | HVY-TX98 | - | - |

GREGG:

| | | | |
|---|---|---|---|
| - | - | - | R-TX74 |
| - | HVY-TX98 | - | - |
| - | HVY-TX106 | - | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX30 | HWY-TX30 | - |
| BLD-TX11 | - | - | - |
| - | HVY-TX57 | - | - |

GRIMES:

| | | | |
|---|---|---|---|
| - | HVY-TX57 | - | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX47 | HWY-TX47 | - |
| BLD-TX91 | - | - | R-TX91 |
| - | HVY-TX98 | - | - |

GUADALUPE:

| | | | |
|---|---|---|---|
| BLD-TX73 | - | - | - |
| - | HVY-TX106 | - | - |
| - | HVY-TX98 | - | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX58 | - | - |
| - | - | - | R-TX22 |
| - | HVY-TX43 | HWY-TX43 | - |

HALE:

| | | | |
|---|---|---|---|
| - | HVY-TX58 | - | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX27 | HWY-TX27 | - |
| - | - | - | R-TX84 |
| - | HVY-TX98 | - | - |
| BLD-TX101 | - | - | - |

HALL:

| | | | |
|---|---|---|---|
| - | HVY-TX98 | - | - |
| - | - | - | R-TX94 |
| - | HVY-TX58 | - | - |
| - | HVY-TX27 | HWY-TX27 | - |

| | | | |
|---|---|---|---|
| BLD-TX1 | - | - | - |
| - | HVY-TX57 | - | - |

---

HAMILTON:

| | | | |
|---|---|---|---|
| - | HVY-TX57 | - | - |
| - | HVY-TX41 | - | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX47 | HWY-TX47 | - |
| BLD-TX79 | - | - | - |
| - | - | - | R-TX80 |
| - | HVY-TX98 | - | - |

---

HANSFORD:

| | | | |
|---|---|---|---|
| - | - | - | R-TX94 |
| - | HVY-TX98 | - | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX27 | HWY-TX27 | - |
| BLD-TX1 | - | - | - |
| - | HVY-TX57 | - | - |

---

HARDEMAN:

| | | | |
|---|---|---|---|
| BLD-TX49 | - | - | - |
| - | HVY-TX27 | HWY-TX27 | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX58 | - | - |
| - | - | - | R-TX78 |
| - | HVY-TX98 | - | - |

---

HARDIN:

| | | | |
|---|---|---|---|
| - | HVY-TX98 | - | - |
| - | HVY-TX109 | - | - |
| - | HVY-TX106 | - | - |
| - | HVY-TX58 | - | - |
| BLD-TX14 | - | - | - |
| - | - | - | R-TX23 |
| - | - | HWY-TX48 | - |
| - | HVY-TX57 | - | - |

---

HARRIS:

| | | | |
|---|---|---|---|
| BLD-TX10 | - | - | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX54 | - | - |
| - | HVY-TX58 | - | - |
| - | - | HWY-TX48 | - |
| - | HVY-TX106 | - | - |
| - | HVY-TX82 | - | - |
| - | HVY-TX98 | - | - |
| - | - | - | R-TX119 |

---

HARRISON:

| | | | |
|---|---|---|---|
| - | HVY-TX106 | - | - |
| - | HVY-TX98 | - | - |
| - | - | - | R-TX72 |
| - | HVY-TX30 | HWY-TX30 | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX57 | - | - |
| BLD-TX12 | - | - | - |

---

HARTLEY:

| | | | |
|---|---|---|---|
| - | HVY-TX58 | - | - |
| BLD-TX1 | - | - | - |
| - | HVY-TX27 | HWY-TX27 | - |
| - | HVY-TX57 | - | - |
| - | - | - | R-TX94 |

| | | | |
|---|---|---|---|
| - | HVY-TX98 | - | - |

HASKELL:

| | | | |
|---|---|---|---|
| - | - | - | R-TX78 |
| - | HVY-TX98 | - | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX27 | HWY-TX27 | - |
| BLD-TX49 | - | - | - |
| - | HVY-TX58 | - | - |

HAYS:

| | | | |
|---|---|---|---|
| - | HVY-TX57 | - | - |
| - | - | - | R-TX20 |
| - | HVY-TX43 | HWY-TX43 | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX106 | - | - |
| - | HVY-TX98 | - | - |
| BLD-TX100 | - | - | - |

HEMPHILL:

| | | | |
|---|---|---|---|
| - | - | - | R-TX94 |
| - | HVY-TX98 | - | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX27 | HWY-TX27 | - |
| BLD-TX1 | - | - | - |

HENDERSON:

| | | | |
|---|---|---|---|
| - | HVY-TX58 | - | - |
| - | HVY-TX47 | HWY-TX47 | - |
| - | HVY-TX57 | - | - |
| BLD-TX75 | - | - | - |
| - | - | - | R-TX74 |
| - | HVY-TX98 | - | - |

HIDALGO:

| | | | |
|---|---|---|---|
| - | HVY-TX106 | - | - |
| - | HVY-TX98 | - | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX29 | HWY-TX29 | - |
| BLD-TX6 | - | - | R-TX6 |

HILL:

| | | | |
|---|---|---|---|
| - | HVY-TX58 | - | - |
| - | HVY-TX47 | HWY-TX47 | - |
| - | HVY-TX57 | - | - |
| - | - | - | R-TX40 |
| - | HVY-TX41 | - | - |
| - | HVY-TX98 | - | - |
| BLD-TX83 | - | - | - |

HOCKLEY:

| | | | |
|---|---|---|---|
| - | - | - | R-TX84 |
| - | HVY-TX98 | - | - |
| BLD-TX101 | - | - | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX27 | HWY-TX27 | - |
| - | HVY-TX58 | - | - |

HOOD:

| | | | |
|---|---|---|---|
| - | HVY-TX58 | - | - |
| - | HVY-TX57 | - | - |

```
                    -            HVY-TX47   HWY-TX47    -
                    BLD-TX7      -          -           -
                    -            -          -           R-TX95
                    -            HVY-TX98   -           -
-----------------------------------------------------------------
HOPKINS:
                    BLD-TX77     -          -           -
                    -            -          -           R-TX72
                    -            HVY-TX98   -           -
                    -            HVY-TX47   HWY-TX47    -
                    -            HVY-TX58   -           -
                    -            HVY-TX57   -           -
-----------------------------------------------------------------
HOUSTON:
                    -            HVY-TX58   -           -
                    -            HVY-TX57   -           -
                    -            HVY-TX47   HWY-TX47    -
                    -            HVY-TX98   -           -

                    -            -          -           R-TX74
                    BLD-TX83     -          -           -
-----------------------------------------------------------------
HOWARD:
                    -            HVY-TX98   -           -
                    -            HVY-TX27   HWY-TX27    -
                    -            HVY-TX58   -           -
                    BLD-TX13     -          -           -
                    -            -          -           R-TX52
                    -            HVY-TX57   -           -
-----------------------------------------------------------------
HUDSPETH:
                    -            HVY-TX57   -           -
                    -            HVY-TX58   -           -
                    -            HVY-TX27   HWY-TX27    -
                    -            -          -           R-TX65
                    -            HVY-TX98   -           -
                    BLD-TX89     -          -           -
-----------------------------------------------------------------
HUNT:
                    -            HVY-TX98   -           -
                    BLD-TX62     -          -           -
                    -            HVY-TX47   HWY-TX47    -
                    -            -          -           R-TX24
                    -            HVY-TX58   -           -
                    -            HVY-TX57   -           -
-----------------------------------------------------------------
HUTCHINSON:
                    -            HVY-TX58   -           -
                    -            HVY-TX27   HWY-TX27    -
                    -            HVY-TX57   -           -
                    BLD-TX1      -          -           -
                    -            -          -           R-TX94
                    -            HVY-TX98   -           -
-----------------------------------------------------------------
IRION:
                    BLD-TX90     -          -           -
                    -            HVY-TX98   -           -
                    -            -          -           R-TX44
                    -            HVY-TX27   HWY-TX27    -
                    -            HVY-TX57   -           -
                    -            HVY-TX58   -           -
-----------------------------------------------------------------
JACK:
                    -            HVY-TX57   -           -
```

| | | | |
|---|---|---|---|
| BLD-TX49 | - | - | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX47 | HWY-TX47 | - |
| - | - | - | R-TX95 |
| - | HVY-TX98 | - | - |

---

JACKSON:

| | | | |
|---|---|---|---|
| BLD-TX73 | - | - | - |
| - | HVY-TX98 | - | - |
| - | - | - | R-TX116 |
| - | HVY-TX57 | - | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX38 | HWY-TX38 | - |

---

JASPER:

| | | | |
|---|---|---|---|
| - | HVY-TX57 | - | - |
| - | HVY-TX47 | HWY-TX47 | - |
| - | HVY-TX58 | - | - |
| - | - | - | R-TX86 |
| - | HVY-TX98 | - | - |
| BLD-TX85 | - | - | - |

---

JEFF DAVIS:

| | | | |
|---|---|---|---|
| - | - | - | R-TX65 |
| BLD-TX89 | - | - | - |
| - | HVY-TX98 | - | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX27 | HWY-TX27 | - |

---

JEFFERSON:

| | | | |
|---|---|---|---|
| - | - | HWY-TX48 | - |
| BLD-TX14 | - | - | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX98 | - | - |
| - | HVY-TX106 | - | - |
| - | HVY-TX103 | - | - |
| - | HVY-TX104 | - | - |

---

JIM HOGG:

| | | | |
|---|---|---|---|
| - | - | - | R-TX71 |
| - | HVY-TX98 | - | - |
| BLD-TX66 | - | - | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX38 | HWY-TX38 | - |

---

JIM WELLS:

| | | | |
|---|---|---|---|
| - | HVY-TX38 | HWY-TX38 | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX98 | - | - |
| BLD-TX70 | - | - | R-TX70 |

---

JOHNSON:

| | | | |
|---|---|---|---|
| - | HVY-TX106 | - | - |
| - | HVY-TX98 | - | - |
| BLD-TX61 | - | - | - |
| - | HVY-TX58 | - | - |
| - | - | - | R-TX26 |
| - | HVY-TX46 | - | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX45 | HWY-TX45 | - |

---

JONES:

| | | | |
|---|---|---|---|
| - | HVY-TX57 | - | - |
| BLD-TX17 | - | - | - |
| - | HVY-TX27 | HWY-TX27 | - |
| - | HVY-TX58 | - | - |
| - | - | - | R-TX76 |
| - | HVY-TX98 | - | - |

---

KARNES:

| | | | |
|---|---|---|---|
| - | HVY-TX98 | - | - |
| BLD-TX73 | - | - | - |
| - | - | - | R-TX116 |
| - | HVY-TX38 | HWY-TX38 | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX58 | - | - |

---

KAUFMAN:

| | | | |
|---|---|---|---|
| - | HVY-TX37 | - | - |
| - | HVY-TX35 | - | - |
| - | - | - | R-TX25 |
| - | HVY-TX58 | - | - |
| - | HVY-TX45 | HWY-TX45 | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX106 | - | - |
| - | HVY-TX98 | - | - |
| BLD-TX60 | - | - | - |

---

KENDALL:

| | | | |
|---|---|---|---|
| - | HVY-TX98 | - | - |
| - | - | - | R-TX97 |
| BLD-TX67 | - | - | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX38 | HWY-TX38 | - |
| - | HVY-TX57 | - | - |

---

KENEDY:

| | | | |
|---|---|---|---|
| - | HVY-TX38 | HWY-TX38 | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX98 | - | - |
| BLD-TX70 | - | - | R-TX70 |

---

KENT:

| | | | |
|---|---|---|---|
| - | HVY-TX98 | - | - |
| - | - | - | R-TX78 |
| - | HVY-TX27 | HWY-TX27 | - |
| BLD-TX49 | - | - | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX58 | - | - |

---

KERR:

| | | | |
|---|---|---|---|
| - | HVY-TX58 | - | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX38 | HWY-TX38 | - |
| - | HVY-TX98 | - | - |
| BLD-TX67 | - | - | - |
| - | - | - | R-TX71 |

---

KIMBLE:

| | | | |
|---|---|---|---|
| - | HVY-TX98 | - | - |
| BLD-TX90 | - | - | - |
| - | - | - | R-TX44 |
| - | HVY-TX27 | HWY-TX27 | - |

| | | | |
|---|---|---|---|
| - | HVY-TX57 | - | - |
| - | HVY-TX58 | - | - |

---

KING:

| | | | |
|---|---|---|---|
| - | HVY-TX58 | - | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX27 | HWY-TX27 | - |
| BLD-TX49 | - | - | - |
| - | - | - | R-TX78 |
| - | HVY-TX98 | - | - |

---

KINNEY:

| | | | |
|---|---|---|---|
| - | - | - | R-TX71 |
| BLD-TX67 | - | - | - |
| - | HVY-TX98 | - | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX27 | HWY-TX27 | - |
| - | HVY-TX57 | - | - |

---

KLEBERG:

| | | | |
|---|---|---|---|
| - | HVY-TX57 | - | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX38 | HWY-TX38 | - |
| - | HVY-TX98 | - | - |
| BLD-TX70 | - | - | R-TX70 |

---

KNOX:

| | | | |
|---|---|---|---|
| - | - | - | R-TX78 |
| - | HVY-TX98 | - | - |
| BLD-TX49 | - | - | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX27 | HWY-TX27 | - |

---

LAMAR:

| | | | |
|---|---|---|---|
| - | HVY-TX57 | - | - |
| - | HVY-TX47 | HWY-TX47 | - |
| - | HVY-TX58 | - | - |
| - | - | - | R-TX72 |
| BLD-TX69 | - | - | - |
| - | HVY-TX98 | - | - |

---

LAMB:

| | | | |
|---|---|---|---|
| - | HVY-TX98 | - | - |
| - | - | - | R-TX84 |
| BLD-TX101 | - | - | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX27 | HWY-TX27 | - |

---

LAMPASAS:

| | | | |
|---|---|---|---|
| - | HVY-TX27 | HWY-TX27 | - |
| - | HVY-TX41 | - | - |
| - | - | - | R-TX40 |
| - | HVY-TX58 | - | - |
| - | HVY-TX57 | - | - |
| BLD-TX102 | - | - | - |
| - | HVY-TX98 | - | - |

---

**LA** SALLE:

| | | | |
|---|---|---|---|
| - | - | - | R-TX71 |
| BLD-TX66 | - | - | - |

| | | | |
|---|---|---|---|
| - | HVY-TX98 | - | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX38 | HWY-TX38 | - |

---

LAVACA:

| | | | |
|---|---|---|---|
| - | HVY-TX38 | HWY-TX38 | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX58 | - | - |
| - | - | - | R-TX116 |
| BLD-TX73 | - | - | - |
| - | HVY-TX98 | - | - |

---

LEE:

| | | | |
|---|---|---|---|
| BLD-TX73 | - | - | - |
| - | HVY-TX98 | - | - |
| - | HVY-TX58 | - | - |
| - | - | - | R-TX20 |
| - | HVY-TX38 | HWY-TX38 | - |
| - | HVY-TX57 | - | - |

---

LEON:

| | | | |
|---|---|---|---|
| - | - | - | R-TX40 |
| - | HVY-TX57 | - | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX41 | - | - |
| - | HVY-TX47 | HWY-TX47 | - |
| - | HVY-TX98 | - | - |
| BLD-TX83 | - | - | - |

---

LIBERTY:

| | | | |
|---|---|---|---|
| - | HVY-TX106 | - | - |
| - | HVY-TX98 | - | - |
| - | HVY-TX109 | - | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX57 | - | - |
| - | - | HWY-TX48 | - |

---

LIMESTONE:

| | | | |
|---|---|---|---|
| - | HVY-TX58 | - | - |
| - | HVY-TX47 | HWY-TX47 | - |
| - | - | - | R-TX40 |
| - | HVY-TX57 | - | - |
| - | HVY-TX41 | - | - |
| - | HVY-TX98 | - | - |
| BLD-TX83 | - | - | - |

---

LIPSCOMB:

| | | | |
|---|---|---|---|
| - | HVY-TX98 | - | - |
| - | - | - | R-TX94 |
| - | HVY-TX57 | - | - |
| BLD-TX1 | - | - | - |
| - | HVY-TX27 | HWY-TX27 | - |
| - | HVY-TX58 | - | - |

---

LIVE OAK:

| | | | |
|---|---|---|---|
| - | HVY-TX58 | - | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX38 | HWY-TX38 | - |
| - | HVY-TX98 | - | - |
| BLD-TX70 | - | - | R-TX70 |

---

LLANO:

| | | | |
|---|---|---|---|
| - | HVY-TX98 | - | - |

| | | | |
|---|---|---|---|
| BLD-TX90 | - | - | - |
| - | HVY-TX38 | HWY-TX38 | - |
| - | - | - | R-TX20 |
| - | HVY-TX58 | - | - |
| - | HVY-TX57 | - | - |

---

LOVING:

| | | | |
|---|---|---|---|
| - | HVY-TX57 | - | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX27 | HWY-TX27 | - |
| - | - | - | R-TX107 |
| BLD-TX92 | - | - | - |
| - | HVY-TX98 | - | - |

---

LUBBOCK:

| | | | |
|---|---|---|---|
| - | HVY-TX98 | - | - |
| - | - | - | R-TX84 |
| - | HVY-TX106 | - | - |
| - | HVY-TX28 | HWY-TX28 | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX57 | - | - |
| BLD-TX15 | - | - | - |

---

LYNN:

| | | | |
|---|---|---|---|
| - | HVY-TX57 | - | - |
| - | HVY-TX27 | HWY-TX27 | - |
| - | HVY-TX58 | - | - |
| BLD-TX101 | - | - | - |
| - | - | - | R-TX84 |
| - | HVY-TX98 | - | - |

---

MCCULLOCH:

| | | | |
|---|---|---|---|
| BLD-TX79 | - | - | - |
| - | - | - | R-TX80 |
| - | HVY-TX98 | - | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX27 | HWY-TX27 | - |
| - | HVY-TX57 | - | - |

---

MCLENNAN:

| | | | |
|---|---|---|---|
| BLD-TX2 | - | - | - |
| - | HVY-TX41 | - | - |
| - | HVY-TX43 | HWY-TX43 | - |
| - | HVY-TX58 | - | - |
| - | - | - | R-TX40 |
| - | HVY-TX57 | - | - |
| - | HVY-TX98 | - | - |
| - | HVY-TX106 | - | - |

---

MCMULLEN:

| | | | |
|---|---|---|---|
| BLD-TX70 | - | - | R-TX70 |
| - | HVY-TX98 | - | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX38 | HWY-TX38 | - |

---

MADISON:

| | | | |
|---|---|---|---|
| - | HVY-TX58 | - | - |
| - | HVY-TX47 | HWY-TX47 | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX98 | - | - |
| - | - | - | R-TX111 |
| BLD-TX83 | - | - | - |

---

MARION:

| | | | |
|---|---|---|---|
| - | HVY-TX98 | - | - |
| - | - | - | R-TX72 |
| - | HVY-TX58 | - | - |
| - | HVY-TX57 | - | - |
| BLD-TX12 | - | - | - |
| - | HVY-TX47 | HWY-TX47 | - |

---

MARTIN:

| | | | |
|---|---|---|---|
| - | HVY-TX57 | - | - |
| - | HVY-TX27 | HWY-TX27 | - |
| - | HVY-TX58 | - | - |
| - | - | - | R-TX44 |
| - | HVY-TX98 | - | - |
| BLD-TX87 | - | - | - |

---

MASON:

| | | | |
|---|---|---|---|
| - | - | - | R-TX80 |
| - | HVY-TX98 | - | - |
| BLD-TX90 | - | - | - |
| - | HVY-TX38 | HWY-TX38 | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX57 | - | - |

---

MATAGORDA:

| | | | |
|---|---|---|---|
| - | HVY-TX57 | - | - |
| - | - | - | R-TX50 |
| - | HVY-TX58 | - | - |
| - | HVY-TX38 | HWY-TX38 | - |
| - | HVY-TX98 | - | - |
| - | HVY-TX110 | - | - |
| BLD-TX93 | - | - | - |
| - | HVY-TX82 | - | - |

---

MAVERICK:

| | | | |
|---|---|---|---|
| - | - | - | R-TX71 |
| - | HVY-TX98 | - | - |
| BLD-TX66 | - | - | - |
| - | HVY-TX38 | HWY-TX38 | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX58 | - | - |

---

MEDINA:

| | | | |
|---|---|---|---|
| - | HVY-TX57 | - | - |
| - | HVY-TX38 | HWY-TX38 | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX98 | - | - |
| BLD-TX67 | - | - | - |
| - | - | - | R-TX97 |

---

MENARD:

| | | | |
|---|---|---|---|
| - | HVY-TX98 | - | - |
| BLD-TX90 | - | - | - |
| - | - | - | R-TX44 |
| - | HVY-TX27 | HWY-TX27 | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX58 | - | - |

---

MIDLAND:

| | | | |
|---|---|---|---|
| - | HVY-TX58 | - | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX28 | HWY-TX28 | - |
| BLD-TX8 | - | - | - |

| | | | |
|---|---|---|---|
| - | HVY-TX98 | - | - |
| - | - | - | R-TX107 |
| - | HVY-TX106 | - | - |

MILAM:

| | | | |
|---|---|---|---|
| - | HVY-TX98 | - | - |
| BLD-TX102 | - | - | - |
| - | HVY-TX41 | - | - |
| - | HVY-TX47 | HWY-TX47 | - |
| - | - | - | R-TX40 |
| - | HVY-TX57 | - | - |
| - | HVY-TX58 | - | - |

MILLS:

| | | | |
|---|---|---|---|
| - | HVY-TX57 | - | - |
| - | HVY-TX27 | HWY-TX27 | - |
| - | HVY-TX41 | - | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX98 | - | - |
| - | - | - | R-TX80 |
| BLD-TX79 | - | - | - |

MITCHELL:

| | | | |
|---|---|---|---|
| BLD-TX87 | - | - | - |
| - | HVY-TX98 | - | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX27 | HWY-TX27 | - |
| - | - | - | R-TX44 |
| - | HVY-TX57 | - | - |

MONTAGUE:

| | | | |
|---|---|---|---|
| - | HVY-TX27 | HWY-TX27 | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX58 | - | - |
| - | - | - | R-TX78 |
| - | HVY-TX98 | - | - |

MONTGOMERY:

| | | | |
|---|---|---|---|
| - | HVY-TX106 | - | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX110 | - | - |
| - | HVY-TX82 | - | - |
| - | - | - | R-TX120 |
| - | HVY-TX98 | - | - |
| - | - | HWY-TX48 | - |
| - | HVY-TX57 | - | - |

MOORE:

| | | | |
|---|---|---|---|
| - | HVY-TX27 | HWY-TX27 | - |
| - | HVY-TX57 | - | - |
| BLD-TX1 | - | - | - |
| - | - | - | R-TX94 |
| - | HVY-TX98 | - | - |
| - | HVY-TX58 | - | - |

MORRIS:

| | | | |
|---|---|---|---|
| - | HVY-TX58 | - | - |
| - | - | - | R-TX72 |
| - | HVY-TX98 | - | - |
| BLD-TX69 | - | - | - |
| - | HVY-TX47 | HWY-TX47 | - |
| - | HVY-TX57 | - | - |

MOTLEY:

| | | | |
|---|---|---|---|
| - | HVY-TX57 | - | - |
| - | HVY-TX27 | HWY-TX27 | - |
| BLD-TX49 | - | - | - |
| - | - | - | R-TX78 |
| - | HVY-TX98 | - | - |
| - | HVY-TX58 | - | - |

NACOGDOCHES:

| | | | |
|---|---|---|---|
| - | - | - | R-TX86 |
| BLD-TX85 | - | - | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX98 | - | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX47 | HWY-TX47 | - |

NAVARRO:

| | | | |
|---|---|---|---|
| - | HVY-TX47 | HWY-TX47 | - |
| - | HVY-TX41 | - | - |
| - | - | - | R-TX40 |
| - | HVY-TX57 | - | - |
| - | HVY-TX98 | - | - |
| - | HVY-TX58 | - | - |
| BLD-TX83 | - | - | - |

NEWTON:

| | | | |
|---|---|---|---|
| - | HVY-TX58 | - | - |
| - | - | - | R-TX86 |
| - | HVY-TX98 | - | - |
| BLD-TX85 | - | - | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX47 | HWY-TX47 | - |

NOLAN:

| | | | |
|---|---|---|---|
| - | HVY-TX27 | HWY-TX27 | - |
| BLD-TX17 | - | - | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX98 | - | - |
| - | - | - | R-TX76 |

NUECES:

| | | | |
|---|---|---|---|
| - | HVY-TX58 | - | - |
| - | HVY-TX106 | - | - |
| BLD-TX63 | - | - | - |
| - | HVY-TX98 | - | - |
| - | HVY-TX57 | - | - |
| - | - | - | R-TX21 |
| - | HVY-TX39 | - | - |
| - | HVY-TX29 | HWY-TX29 | - |

OCHILTREE:

| | | | |
|---|---|---|---|
| - | HVY-TX57 | - | - |
| - | HVY-TX27 | HWY-TX27 | - |
| BLD-TX1 | - | - | - |
| - | HVY-TX98 | - | - |
| - | HVY-TX58 | - | - |
| - | - | - | R-TX94 |

OLDHAM:

| | | | |
|---|---|---|---|
| - | - | - | R-TX94 |
| - | HVY-TX98 | - | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX27 | HWY-TX27 | - |

| | | | |
|---|---|---|---|
| - | HVY-TX57 | - | - |
| BLD-TX1 | - | - | - |

---

ORANGE:

| | | | |
|---|---|---|---|
| BLD-TX14 | - | - | - |
| - | - | HWY-TX48 | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX103 | - | - |
| - | HVY-TX98 | - | - |
| - | HVY-TX104 | - | - |
| - | HVY-TX106 | - | - |
| - | HVY-TX58 | - | - |

---

PALO PINTO:

| | | | |
|---|---|---|---|
| - | HVY-TX58 | - | - |
| - | HVY-TX98 | - | - |
| - | - | - | R-TX95 |
| BLD-TX7 | - | - | - |
| - | HVY-TX47 | HWY-TX47 | - |
| - | HVY-TX57 | - | - |

---

PANOLA:

| | | | |
|---|---|---|---|
| - | HVY-TX47 | HWY-TX47 | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX98 | - | - |
| - | HVY-TX58 | - | - |
| BLD-TX85 | - | - | - |
| - | - | - | R-TX86 |

---

PARKER:

| | | | |
|---|---|---|---|
| - | HVY-TX98 | - | - |
| BLD-TX61 | - | - | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX106 | - | - |
| - | HVY-TX46 | - | - |
| - | HVY-TX45 | HWY-TX45 | - |
| - | HVY-TX57 | - | - |
| - | - | - | R-TX26 |

---

PARMER:

| | | | |
|---|---|---|---|
| - | HVY-TX27 | HWY-TX27 | - |
| - | HVY-TX57 | - | - |
| BLD-TX1 | - | - | - |
| - | - | - | R-TX94 |
| - | HVY-TX98 | - | - |
| - | HVY-TX58 | - | - |

---

PECOS:

| | | | |
|---|---|---|---|
| - | HVY-TX98 | - | - |
| - | - | - | R-TX65 |
| BLD-TX89 | - | - | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX27 | HWY-TX27 | - |
| - | HVY-TX57 | - | - |

---

POLK:

| | | | |
|---|---|---|---|
| - | HVY-TX57 | - | - |
| - | HVY-TX47 | HWY-TX47 | - |
| - | - | - | R-TX86 |
| BLD-TX85 | - | - | - |
| - | HVY-TX98 | - | - |
| - | HVY-TX58 | - | - |

---

POTTER:

| | | | |
|---|---|---|---|
| - | HVY-TX98 | - | - |
| - | HVY-TX106 | - | - |
| - | HVY-TX58 | - | - |
| - | - | - | R-TX94 |
| BLD-TX81 | - | - | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX28 | HWY-TX28 | - |

---

PRESIDIO:

| | | | |
|---|---|---|---|
| - | HVY-TX27 | HWY-TX27 | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX58 | - | - |
| BLD-TX89 | - | - | - |
| - | - | - | R-TX65 |
| - | HVY-TX98 | - | - |

---

RAINS:

| | | | |
|---|---|---|---|
| - | HVY-TX98 | - | - |
| BLD-TX77 | - | - | - |
| - | HVY-TX58 | - | - |
| - | - | - | R-TX74 |
| - | HVY-TX47 | HWY-TX47 | - |
| - | HVY-TX57 | - | - |

---

RANDALL:

| | | | |
|---|---|---|---|
| - | HVY-TX28 | HWY-TX28 | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX98 | - | - |
| BLD-TX81 | - | - | - |
| - | - | - | R-TX94 |
| - | HVY-TX58 | - | - |
| - | HVY-TX106 | - | - |

---

REAGAN:

| | | | |
|---|---|---|---|
| - | HVY-TX98 | - | - |
| - | HVY-TX58 | - | - |
| BLD-TX13 | - | - | - |
| - | HVY-TX27 | HWY-TX27 | - |
| - | - | - | R-TX44 |
| - | HVY-TX57 | - | - |

---

REAL:

| | | | |
|---|---|---|---|
| - | HVY-TX27 | HWY-TX27 | - |
| - | HVY-TX57 | - | - |
| BLD-TX67 | - | - | - |
| - | HVY-TX98 | - | - |
| - | HVY-TX58 | - | - |
| - | - | - | R-TX71 |

---

RED RIVER:

| | | | |
|---|---|---|---|
| - | - | - | R-TX72 |
| BLD-TX69 | - | - | - |
| - | HVY-TX98 | - | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX47 | HWY-TX47 | - |
| - | HVY-TX57 | - | - |

---

REEVES:

| | | | |
|---|---|---|---|
| - | HVY-TX57 | - | - |
| - | HVY-TX27 | HWY-TX27 | - |
| - | HVY-TX58 | - | - |
| BLD-TX89 | - | - | - |
| - | - | - | R-TX107 |

| | | | |
|---|---|---|---|
| - | HVY-TX98 | - | - |

REFUGIO:

| | | | |
|---|---|---|---|
| BLD-TX70 | - | - | R-TX70 |
| BLD-TX73 | - | - | - |
| - | HVY-TX98 | - | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX38 | HWY-TX38 | - |
| - | HVY-TX57 | - | - |

ROBERTS:

| | | | |
|---|---|---|---|
| - | HVY-TX57 | - | - |
| BLD-TX1 | - | - | - |
| - | HVY-TX27 | HWY-TX27 | - |
| - | - | - | R-TX94 |
| - | HVY-TX98 | - | - |
| - | HVY-TX58 | - | - |

ROBERTSON:

| | | | |
|---|---|---|---|
| - | HVY-TX58 | - | - |
| - | HVY-TX98 | - | - |
| BLD-TX83 | - | - | - |
| - | HVY-TX41 | - | - |
| - | - | - | R-TX40 |
| - | HVY-TX57 | - | - |
| - | HVY-TX47 | HWY-TX47 | - |

ROCKWALL:

| | | | |
|---|---|---|---|
| - | HVY-TX57 | - | - |
| - | HVY-TX45 | HWY-TX45 | - |
| - | HVY-TX37 | - | - |
| - | HVY-TX35 | - | - |
| - | - | - | R-TX25 |
| - | HVY-TX106 | - | - |
| - | HVY-TX98 | - | - |
| BLD-TX60 | - | - | - |
| - | HVY-TX58 | - | - |

RUNNELS:

| | | | |
|---|---|---|---|
| - | HVY-TX98 | - | - |
| - | HVY-TX58 | - | - |
| BLD-TX13 | - | - | - |
| - | HVY-TX27 | HWY-TX27 | - |
| - | HVY-TX57 | - | - |
| - | - | - | R-TX44 |

RUSK:

| | | | |
|---|---|---|---|
| - | HVY-TX47 | HWY-TX47 | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX98 | - | - |
| - | HVY-TX58 | - | - |
| BLD-TX85 | - | - | - |
| - | - | - | R-TX86 |

SABINE:

| | | | |
|---|---|---|---|
| - | - | - | R-TX86 |
| BLD-TX85 | - | - | - |
| - | HVY-TX98 | - | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX47 | HWY-TX47 | - |

SAN AUGUSTINE:

| | | | |
|---|---|---|---|
| - | HVY-TX57 | - | - |

| | | | |
|---|---|---|---|
| - | HVY-TX47 | HWY-TX47 | - |
| - | HVY-TX58 | - | - |
| - | - | - | R-TX86 |
| - | HVY-TX98 | - | - |
| BLD-TX85 | - | - | - |

---

SAN JACINTO:

| | | | |
|---|---|---|---|
| - | HVY-TX98 | - | - |
| BLD-TX85 | - | - | - |
| - | HVY-TX58 | - | - |
| - | - | - | R-TX86 |
| - | HVY-TX57 | - | - |
| - | HVY-TX47 | HWY-TX47 | - |

---

SAN PATRICIO:

| | | | |
|---|---|---|---|
| - | - | - | R-TX21 |
| - | HVY-TX57 | - | - |
| - | HVY-TX39 | - | - |
| - | HVY-TX29 | HWY-TX29 | - |
| - | HVY-TX98 | - | - |
| BLD-TX63 | - | - | - |
| - | HVY-TX106 | - | - |
| - | HVY-TX58 | - | - |

---

SAN SABA:

| | | | |
|---|---|---|---|
| - | - | - | R-TX80 |
| - | HVY-TX98 | - | - |
| - | HVY-TX58 | - | - |
| BLD-TX79 | - | - | - |
| - | HVY-TX27 | HWY-TX27 | - |
| - | HVY-TX57 | - | - |

---

SCHLEICHER:

| | | | |
|---|---|---|---|
| - | HVY-TX27 | HWY-TX27 | - |
| - | - | - | R-TX44 |
| - | HVY-TX57 | - | - |
| - | HVY-TX98 | - | - |
| - | HVY-TX58 | - | - |
| BLD-TX90 | - | - | - |

---

SCURRY:

| | | | |
|---|---|---|---|
| - | HVY-TX98 | - | - |
| - | HVY-TX58 | - | - |
| BLD-TX87 | - | - | - |
| - | HVY-TX57 | - | - |
| - | - | - | R-TX44 |
| - | HVY-TX27 | HWY-TX27 | - |

---

SHACKELFORD:

| | | | |
|---|---|---|---|
| - | HVY-TX57 | - | - |
| - | HVY-TX27 | HWY-TX27 | - |
| BLD-TX49 | - | - | - |
| - | - | - | R-TX74 |
| - | HVY-TX98 | - | - |
| - | HVY-TX58 | - | - |

---

SHELBY:

| | | | |
|---|---|---|---|
| - | HVY-TX98 | - | - |
| - | - | - | R-TX86 |
| - | HVY-TX58 | - | - |
| BLD-TX85 | - | - | - |
| - | HVY-TX47 | HWY-TX47 | - |
| - | HVY-TX57 | - | - |

---

SHERMAN:

| | | | |
|---|---|---|---|
| BLD-TX1 | - | - | - |
| - | HVY-TX27 | HWY-TX27 | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX98 | - | - |
| - | - | - | R-TX94 |

---

SMITH:

| | | | |
|---|---|---|---|
| - | HVY-TX106 | - | - |
| - | - | - | R-TX74 |
| - | HVY-TX98 | - | - |
| - | HVY-TX58 | - | - |
| BLD-TX16 | - | - | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX30 | HWY-TX30 | - |

---

SOMERVELL:

| | | | |
|---|---|---|---|
| - | HVY-TX57 | - | - |
| - | HVY-TX47 | HWY-TX47 | - |
| - | - | - | R-TX95 |
| - | HVY-TX58 | - | - |
| BLD-TX79 | - | - | - |
| - | HVY-TX98 | - | - |

---

STARR:

| | | | |
|---|---|---|---|
| - | HVY-TX98 | - | - |
| - | HVY-TX58 | - | - |
| BLD-TX70 | - | - | R-TX70 |
| - | HVY-TX57 | - | - |
| - | HVY-TX38 | HWY-TX38 | - |

---

STEPHENS:

| | | | |
|---|---|---|---|
| - | HVY-TX27 | HWY-TX27 | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX98 | - | - |
| - | - | - | R-TX76 |
| BLD-TX79 | - | - | - |
| - | HVY-TX58 | - | - |

---

STERLING:

| | | | |
|---|---|---|---|
| - | HVY-TX98 | - | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX57 | - | - |
| - | - | - | R-TX44 |
| - | HVY-TX27 | HWY-TX27 | - |
| BLD-TX13 | - | - | - |

---

STONEWALL:

| | | | |
|---|---|---|---|
| - | HVY-TX27 | HWY-TX27 | - |
| - | HVY-TX57 | - | - |
| BLD-TX49 | - | - | - |
| - | HVY-TX98 | - | - |
| - | - | - | R-TX84 |
| - | HVY-TX58 | - | - |

---

SUTTON:

| | | | |
|---|---|---|---|
| - | HVY-TX98 | - | - |
| - | HVY-TX58 | - | - |
| BLD-TX90 | - | - | - |
| - | HVY-TX57 | - | - |
| - | - | - | R-TX44 |

| | | | |
|---|---|---|---|
| - | HVY-TX27 | HWY-TX27 | - |

---

SWISHER:

| | | | |
|---|---|---|---|
| - | HVY-TX27 | HWY-TX27 | - |
| - | HVY-TX57 | - | - |
| BLD-TX1 | - | - | - |
| - | - | - | R-TX94 |
| - | HVY-TX98 | - | - |
| - | HVY-TX58 | - | - |

---

TARRANT:

| | | | |
|---|---|---|---|
| BLD-TX61 | - | - | - |
| - | HVY-TX106 | - | - |
| - | HVY-TX98 | - | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX45 | HWY-TX45 | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX46 | - | - |
| - | - | - | R-TX26 |

---

TAYLOR:

| | | | |
|---|---|---|---|
| - | HVY-TX57 | - | - |
| - | HVY-TX28 | HWY-TX28 | - |
| BLD-TX17 | - | - | - |
| - | HVY-TX106 | - | - |
| - | HVY-TX98 | - | - |
| - | HVY-TX58 | - | - |
| - | - | - | R-TX76 |

---

TERRELL:

| | | | |
|---|---|---|---|
| - | HVY-TX98 | - | - |
| - | - | - | R-TX65 |
| - | HVY-TX58 | - | - |
| - | HVY-TX27 | HWY-TX27 | - |
| - | HVY-TX57 | - | - |
| BLD-TX9 | - | - | - |

---

TERRY:

| | | | |
|---|---|---|---|
| - | HVY-TX27 | HWY-TX27 | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX98 | - | - |
| BLD-TX101 | - | - | - |
| - | HVY-TX58 | - | - |
| - | - | - | R-TX84 |

---

THROCKMORTON:

| | | | |
|---|---|---|---|
| - | - | - | R-TX78 |
| - | HVY-TX98 | - | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX27 | HWY-TX27 | - |
| BLD-TX49 | - | - | - |
| - | HVY-TX57 | - | - |

---

TITUS:

| | | | |
|---|---|---|---|
| - | HVY-TX57 | - | - |
| - | HVY-TX47 | HWY-TX47 | - |
| - | - | - | R-TX72 |
| - | HVY-TX98 | - | - |
| - | HVY-TX58 | - | - |
| BLD-TX69 | - | - | - |

---

TOM GREEN:

| | | | |
|---|---|---|---|
| - | HVY-TX106 | - | - |
| - | HVY-TX58 | - | - |

| | | | |
|---|---|---|---|
| - | HVY-TX98 | - | - |
| BLD-TX53 | - | - | - |
| - | HVY-TX28 | HWY-TX28 | - |
| - | - | - | R-TX52 |
| - | HVY-TX57 | - | - |

TRAVIS:

| | | | |
|---|---|---|---|
| - | HVY-TX43 | HWY-TX43 | - |
| - | - | - | R-TX20 |
| BLD-TX18 | - | - | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX98 | - | - |
| - | HVY-TX106 | - | - |

TRINITY:

| | | | |
|---|---|---|---|
| BLD-TX85 | - | - | - |
| - | HVY-TX98 | - | - |
| - | HVY-TX58 | - | - |
| - | - | - | R-TX86 |
| - | HVY-TX57 | - | - |
| - | HVY-TX47 | HWY-TX47 | - |

TYLER:

| | | | |
|---|---|---|---|
| - | HVY-TX47 | HWY-TX47 | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX98 | - | - |
| - | - | - | R-TX86 |
| BLD-TX85 | - | - | - |
| - | HVY-TX58 | - | - |

UPSHUR:

| | | | |
|---|---|---|---|
| - | HVY-TX58 | - | - |
| - | - | - | R-TX74 |
| - | HVY-TX98 | - | - |
| - | HVY-TX47 | HWY-TX47 | - |
| BLD-TX11 | - | - | - |
| - | HVY-TX57 | - | - |

UPTON:

| | | | |
|---|---|---|---|
| - | HVY-TX57 | - | - |
| - | HVY-TX27 | HWY-TX27 | - |
| BLD-TX90 | - | - | - |
| - | - | - | R-TX107 |
| - | HVY-TX58 | - | - |
| - | HVY-TX98 | - | - |

UVALDE:

| | | | |
|---|---|---|---|
| - | - | - | R-TX71 |
| - | HVY-TX58 | - | - |
| - | HVY-TX98 | - | - |
| BLD-TX67 | - | - | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX38 | HWY-TX38 | - |

VAL VERDE:

| | | | |
|---|---|---|---|
| - | HVY-TX57 | - | - |
| - | HVY-TX27 | HWY-TX27 | - |
| BLD-TX42 | - | - | - |
| - | - | - | R-TX71 |
| - | HVY-TX98 | - | - |
| - | HVY-TX58 | - | - |

VAN ZANDT:

| | | | |
|---|---|---|---|
| - | - | - | R-TX74 |
| - | HVY-TX98 | - | - |
| - | HVY-TX58 | - | - |
| BLD-TX75 | - | - | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX47 | HWY-TX47 | - |

---

VICTORIA:

| | | | |
|---|---|---|---|
| - | HVY-TX57 | - | - |
| - | HVY-TX29 | HWY-TX29 | - |
| - | - | - | R-TX116 |
| - | HVY-TX98 | - | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX106 | - | - |
| BLD-TX73 | - | - | - |

---

WALKER:

| | | | |
|---|---|---|---|
| - | HVY-TX58 | - | - |
| - | HVY-TX98 | - | - |
| BLD-TX88 | - | - | - |
| - | HVY-TX57 | - | - |
| - | - | - | R-TX50 |
| - | HVY-TX47 | HWY-TX47 | - |

---

WALLER:

| | | | |
|---|---|---|---|
| - | HVY-TX57 | - | - |
| - | - | HWY-TX48 | - |
| - | HVY-TX58 | - | - |
| - | HVY-TX98 | - | - |
| - | HVY-TX110 | - | - |
| - | - | - | R-TX120 |
| BLD-TX108 | - | - | - |
| - | HVY-TX82 | - | - |
| - | HVY-TX106 | - | - |

---

WARD:

| | | | |
|---|---|---|---|
| - | HVY-TX98 | - | - |
| - | HVY-TX58 | - | - |
| - | - | - | R-TX107 |
| BLD-TX90 | - | - | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX27 | HWY-TX27 | - |

---

WASHINGTON:

| | | | |
|---|---|---|---|
| - | HVY-TX47 | HWY-TX47 | - |
| - | HVY-TX57 | - | - |
| - | HVY-TX58 | - | - |
| - | - | - | R-TX111 |
| - | HVY-TX98 | - | - |

---

WEBB:

| | | | |
|---|---|---|---|
| BLD-TX118 | - | - | - |
| - | HVY-TX106 | - | - |
| - | HVY-TX98 | - | - |
| - | - | - | R-TX71 |
| - | HVY-TX58 | - | - |
| - | HVY-TX29 | HWY-TX29 | - |
| - | HVY-TX57 | - | - |

---

WHARTON:

| | | | |
|---|---|---|---|
| - | - | - | R-TX50 |
| - | HVY-TX57 | - | - |
| - | HVY-TX38 | HWY-TX38 | - |

| | | | | |
|---|---|---|---|---|
| | - | HVY-TX58 | - | - |
| | - | HVY-TX98 | - | - |
| | - | HVY-TX82 | - | - |
| | - | HVY-TX110 | - | - |
| | BLD-TX93 | - | - | - |

WHEELER:

| | | | | |
|---|---|---|---|---|
| | - | HVY-TX58 | - | - |
| | - | HVY-TX98 | - | - |
| | - | - | - | R-TX94 |
| | BLD-TX1 | - | - | - |
| | - | HVY-TX57 | - | - |
| | - | HVY-TX27 | HWY-TX27 | - |

WICHITA:

| | | | | |
|---|---|---|---|---|
| | - | HVY-TX45 | HWY-TX45 | - |
| | - | HVY-TX57 | - | - |
| | BLD-TX19 | - | - | - |
| | - | HVY-TX106 | - | - |
| | - | HVY-TX98 | - | - |
| | - | - | - | R-TX68 |
| | - | HVY-TX58 | - | - |

WILBARGER:

| | | | | |
|---|---|---|---|---|
| | - | - | - | R-TX78 |
| | - | HVY-TX98 | - | - |
| | - | HVY-TX58 | - | - |
| | - | HVY-TX57 | - | - |
| | - | HVY-TX27 | HWY-TX27 | - |
| | BLD-TX49 | - | - | - |

WILLACY:

| | | | | |
|---|---|---|---|---|
| | - | HVY-TX38 | HWY-TX38 | - |
| | - | HVY-TX57 | - | - |
| | - | HVY-TX98 | - | - |
| | - | HVY-TX58 | - | - |
| | BLD-TX70 | - | - | R-TX70 |

WILLIAMSON:

| | | | | |
|---|---|---|---|---|
| | - | HVY-TX58 | - | - |
| | - | HVY-TX106 | - | - |
| | BLD-TX100 | - | - | - |
| | - | HVY-TX98 | - | - |
| | - | - | - | R-TX20 |
| | - | | | |

TABLE OF CONTENTS

DIVISION 1 - GENERAL REQUIREMENTS
SECTION 01000 GENERAL REQUIREMENTS SECTION 01015 - CONDITIONS
SECTION 01200 - WARRANTY OF CONSTRUCTION ZERO ACCIDENTS

SECTION 01330 - SUBMITTAL PROCEDURES

SECTION 01410 - ENVIRONMENT PROTECTION
SECTION 01415 - METRIC MEASUREMENTS
SECTION 01440 - CONTRACTOR QUALITY CONTROL

SECTION 01500 - TEMPORARY CONSTRUCTION FACILITIES

SECTION 01720 - AS-BUILT DRAWINGS

DIVISION 2 - SITE WORK
SECTION 02012 - STANDARD PENETRATION TESTS
SECTION 02075 - CONCRETE CORE DRILLING
SECTION 02080 - ASBESTOS REMOVAL AND DISPOSAL
SECTION 02110 - CLEARING AND GRUBBING
SECTION 02210 - SITE GRADING
SECTION 02211 - ROCK REMOVAL
SECTION 02215 - FINISH GRADING FOR STRUCTURES AND SLABS
SECTION 02220 - SITE EXCAVATION AND FILL
SECTION 02221 - EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS
SECTION 02222 - STRUCTURAL EXCAVATION AND BACKFILL
SECTION 02224 - PIPE SLEEVES FOR UTILITY LINES
SECTION 02227 - FIELD TESTS
SECTION 02240 - SOIL STABILIZATION - CRUSHED ROCK SUBGRADE
SECTION 02243 - SOIL STABILIZATION - HYDRATED LIME
SECTION 02250 - SOIL STABILIZATION - VIBROFLOTATION
SECTION 02251 - SOIL STERILIZATION
SECTION 02270 - SEDIMENT CONTROL
SECTION 02272 - GABIONS
SECTION 02274 - RIPRAP
SECTION 02275 - SOIL - CEMENT SURFACING
SECTION 02450 - RAILROADS
SECTION 02511 - PORTLAND CEMENT CONCRETE OVERLAYS
SECTION 02512 - STEEL REINFORCED PORTLAND CEMENT CONCRETE OVERLAYS
SECTION 02513 - FIBROUS REINFORCED PORTLAND CEMENT CONCRETE OVERLAYS
SECTION 02514 - ASPHALTIC CONCRETE OVERLAYS
SECTION 02515 - CRUSHED STONE PAVING
SECTION 02520 - PORTLAND CEMENT CONCRETE SIDEWALKS
SECTION 02521 - ASPHALT CONCRETE SIDEWALKS
SECTION 02522 - MISCELLANEOUS SIDEWALKS
SECTION 02523 - PRECAST SIDEWALKS AND PAVERS
SECTION 02525 - CONCRETE CURBS AND GUTTERS
SECTION 02570 - PORTLAND CEMENT CONCRETE
SECTION 02575 - BRIDGE DECK ASPHALT CONCRETE WEARING SURFACES



TABLE OF CONTENTS (cont'd)

DIVISION 2 - SITE WORK (cont'd)
SECTION 02576 - CRACK SEALING OF ASPHALT CONCRETE PAVEMENTS
SECTION 02577 - PATCHING OF ASPHALT CONCRETE PAVEMENTS
SECTION 02578 - SPRAY APPLICATIONS, SEAL COATS AND SURFACE TREATMENTS
SECTION 02579 - SLURRY SEALS
SECTION 02580 - ASPHALT CURBS
SECTION 02581 - COLD MILLING OF BITUMINOUS PAVEMENTS
SECTION 02582 - BITUMINOUS REJUVENATION
SECTION 02583 - COLD MIX RECYCLING
SECTION 02584 - CENTRAL PLANT HOT-MIX RECYCLING
SECTION 02590 - PAVEMENT MARKINGS
SECTION 02661 - WATER LINES
SECTION 02665 - WATER RESERVOIRS AND TANKS
SECTION 02666 - CHILLED WATER LINES
SECTION 02670 - WELL REPAIR
SECTION 02672 - WATER WELLS
SECTION 02685 - GAS DISTRIBUTION LINES
SECTION 02710 - FOUNDATION DRAINAGE SYSTEMS
SECTION 02712 - UNDERSLAB DRAINAGE
SECTION 02720 - STORM DRAINS
SECTION 02724 - FORCE MAINS AND INVERTED SIPHONS
SECTION 02725 - SAND DRAINS
SECTION 02726 - WASTEWATER COLLECTION
SECTION 02727 - EROSION CONTROL
SECTION 02730 - SEWER LINE MANHOLES
SECTION 02735 - SEWER LINE GROUTING
SECTION 02737 - SEWER LINE CLEANING
SECTION 02740 - SEPTIC TANKS AND GREASE TRAPS
SECTION 02742 - SIPHON TANK AND SIPHONS
SECTION 02744 - GREASE INTERCEPTORS
SECTION 02745 - IMHOFF TANKS
SECTION 02766 - SEWER LINE PIPE LINING
SECTION 02774 - SEWAGE TREATMENT LAGOONS
SECTION 02830 - FENCES AND GATES
SECTION 02831 - STEEL CHAIN-LINK FENCING
SECTION 02832 - STEEL ROD AND BAR FENCING
SECTION 02833 - WROUGHT IRON ROD AND BAR FENCING
SECTION 02834 - PRE-CAST CONCRETE AND MASONRY FENCING
SECTION 02835 - PERMANENT WOOD FENCING
SECTION 02836 - SNOW AND OTHER TEMPORARY FENCING
SECTION 02837 - FARM-TYPE WIRE FENCING
SECTION 02840 - ELECTRICAL TRAFFIC CONTROL SIGNALS
SECTION 02850 - TRAFFIC SIGNS
SECTION 02860 - PLAYING FIELDS
SECTION 02861 - RECREATIONAL FACILITIES
SECTION 02921 - TOPSOIL
SECTION 02933 - SODDING AND SEEDING
SECTION 02940 - LANDSCAPE IRRIGATION SYSTEM
SECTION 02950 - PLANTINGS





DIVISION 3 - CONCRETE
SECTION 03105 - CONCRETE FORMWORK

SECTION 03205 - CONCRETE REINFORCEMENT
SECTION 03255 - CONCRETE ACCESSORIES
SECTION 03305 - CAST-IN-PLACE CONCRETE
SECTION 03320 - CONCRETE TOPPING
SECTION 03351 - EXPOSED AGGREGATE CONCRETE
SECTION 03352 - RUSTICATED CONCRETE FINISHES
SECTION 03353 - SOLID BOARD CONCRETE FINISHES
SECTION 03354 - FLEXURAL CONCRETE
SECTION 03362 - SPECIALLY PLACED CONCRETE
SECTION 03363 - SECOND-POUR CONCRETE
SECTION 03375 - CONCRETE CURING
SECTION 03480 - MISCELLANEOUS PRECAST ITEMS
SECTION 03510 - GYPSUM CONCRETE DECKS
SECTION 03520 - INSULATING CONCRETE ROOF DECKS
SECTION 03521 - PRECAST LIGHTWEIGHT ROOF SLABS
SECTION 03530 - CEMENTITIOUS WOOD FIBER ROOF DECK SYSTEMS
SECTION 03605 - GROUT
SECTION 03705 - CONCRETE RESTORATION AND CLEANING
SECTION 03720 - BRIDGE PIERS, ABUTMENTS, AND ANCHORS
SECTION 03730 - CONCRETE BRIDGE COMPONENTS

DIVISION 4 - MASONRY
SECTION 04202 - UNIT MASONRY
SECTION 04205 - SCAFFOLDING - TUBULAR STEEL
SECTION 04210 - BRICKWORK
SECTION 04215 - EXPOSED AGGREGATE SURFACE CONCRETE WALLS
SECTION 04251 - TERRA COTTA
SECTION 04405 - STONEWORK
SECTION 04505 - MASONRY RESTORATION

DIVISION 5 - METALS
SECTION 05120 - STRUCTURAL STEEL
SECTION 05121 - STEEL BRIDGE COMPONENTS
SECTION 05160 - STEEL TRUSSES
SECTION 05205 - STEEL JOISTS
SECTION 05305 - STEEL DECK
SECTION 05501 - ANCHOR BOLTS AND EXPANSION ANCHORS
SECTION 05510 - METAL STAIRS
SECTION 05520 - PIPE AND TUBE RAILINGS
SECTION 05530 - GRATING
SECTION 05540 - CASTINGS
SECTION 05550 - MISCELLANEOUS METAL BRIDGE COMPONENTS
SECTION 05720 - ORNAMENTAL HANDRAIL AND RAILINGS
SECTION 05730 - ORNAMENTAL SHEET METAL
SECTION 05805 - EXPANSION CONTROL
SECTION 05830 - BRIDGE EXPANSION DEVICES, BEARINGS, AND ANCHORS
SECTION 05920 - WATER TREATMENT PLANT DEBRIS RACKS





DIVISION 6 - WOOD AND PLASTICS
SECTION 06111 - LIGHT WOODEN STRUCTURES FRAMING
SECTION 06115 - SHEATHING, SIDING, AND SUBFLOORING
SECTION 06135 - WOOD TRUSSES

SECTION 06145 - TIMBER BRIDGE COMPONENTS
SECTION 06220 - MILLWORK
SECTION 06410 - CABINETS
SECTION 06420 - WOOD PANELING

DIVISION 7 - THERMAL AND MOISTURE PROTECTION
SECTION 07110 - BITUMINOUS WATERPROOFING
SECTION 07111 - BITUMINOUS MEMBRANE WATERPROOFING
SECTION 07115 - PLASTIC SHEET WATERPROOFING
SECTION 07120 - FLUID-APPLIED WATERPROOFING
SECTION 07125 - METAL WATERPROOFING
SECTION 07130 - BENTONITE CLAY WATERPROOFING
SECTION 07160 - BITUMINOUS DAMPPROOFING
SECTION 07170 - SILICONE DAMPPROOFING
SECTION 07175 - WATER-REPELLENT COATING DAMPPROOFING
SECTION 07180 - CEMENTITIOUS DAMPPROOFING
SECTION 07192 - BITUMINOUS VAPOR BARRIER FOR ROOFS
SECTION 07193 - LAMINATED SHEET VAPOR BARRIER FOR ROOFS
SECTION 07194 - POLYVINYL SHEET VAPOR BARRIER FOR ROOFS
SECTION 07196 - BITUMINOUS VAPOR BARRIERS
SECTION 07197 - LAMINATED SHEET VAPOR BARRIERS
SECTION 07198 - PLASTIC SHEET VAPOR BARRIERS
SECTION 07210 - BATT AND BLANKET BUILDING INSULATION
SECTION 07211 - LOOSE OR GRANULAR FILL INSULATION
SECTION 07212 - RIGID INSULATION
SECTION 07213 - PERIMETER INSULATION
SECTION 07215 - SPRAYED-ON INSULATION
SECTION 07223 - ROOF INSULATION AND UNDERLAYMENT CELLULAR GLASS
SECTION 07224 - ROOF INSULATION AND UNDERLAYMENT MINERAL FIBER
SECTION 07225 - ROOF INSULATION AND UNDERLAYMENT COMPOSITE BOARD
SECTION 07226 - ROOF INSULATION AND UNDERLAYMENT EXPANDED PERLITE BOARD
SECTION 07227 - ROOF INSULATION AND UNDERLAYMENT FIBERBOARD
SECTION 07256 - SPRAYED-ON FIREPROOFING
SECTION 07311 - ASPHALT SHINGLES
SECTION 07314 - SLATE SHINGLES
SECTION 07321 - CLAY ROOFING TILES
SECTION 07322 - CONCRETE ROOFING TILES
SECTION 07410 - PREFORMED ROOFING AND SIDING
SECTION 07463 - ASBESTOS CEMENT ROOFING AND SIDING
SECTION 07510 - BUILT-UP ROOFING
SECTION 07530 - SINGLE PLY ROOFING
SECTION 07550 - INVERTED ROOF SYSTEMS
SECTION 07572 - WOOD TRAFFIC TOPPING
SECTION 07573 - COMPOSITION TRAFFIC TOPPING
SECTION 07574 - PRECAST CONCRETE OR TILE TRAFFIC TOPPING
SECTION 07605 - SHEET METAL
SECTION 07705 - ROOF ACCESSORIES
SECTION 07811 - PLASTIC SKYLIGHTS
SECTION 07812 - METAL-FRAMED SKYLIGHTS
SECTION 07920 - SEALANTS





DIVISION 8 - DOORS AND WINDOWS
SECTION 08110 - HOLLOW METAL DOORS AND FRAMES
SECTION 08120 - ALUMINUM DOORS AND FRAMES
SECTION 08210 - WOOD DOORS
SECTION 08311 - ALUMINUM AND WOOD SLIDING GLASS DOORS
SECTION 08312 - SLIDING FIRE DOORS

SECTION 08330 - COILING (ROLLING) DOORS
SECTION 08350 - FOLDING DOORS
SECTION 08353 - ACCORDION FOLDING DOORS
SECTION 08355 - FLEXIBLE DOORS
SECTION 08360 - OVERHEAD DOORS
SECTION 08380 - SOUND RETARDANT DOORS
SECTION 08386 - ALUMINUM SAFETY GLASS DOORS
SECTION 08387 - WOOD SAFETY GLASS DOORS
SECTION 08390 - SCREEN AND STORM DOORS
SECTION 08412 - ENTRANCES
SECTION 08470 - REVOLVING DOORS
SECTION 08510 - METAL WINDOWS
SECTION 08520 - ALUMINUM WINDOWS
SECTION 08610 - WOOD WINDOWS
SECTION 08710 - FINISH HARDWARE
SECTION 08810 - GLASS AND GLAZING
SECTION 08920 - ALUMINUM WINDOW WALLS/CURTAIN WALLS

DIVISION 9 - FINISHES
SECTION 09210 - PLASTER REPAIRS
SECTION 09260 - GYPSUM DRYWALL AND METAL STUDS
SECTION 09315 - TILE FLOORING
SECTION 09320 - CERAMIC WALL TILE
SECTION 09405 - TERRAZZO
SECTION 09510 - ACOUSTICAL CEILINGS
SECTION 09530 - ACOUSTICAL INSULATION AND BARRIERS
SECTION 09535 - SOUND ABSORBING PANELS
SECTION 09560 - WOOD STRIP FLOORING
SECTION 09566 - WOOD BLOCK INDUSTRIAL FLOORING
SECTION 09570 - WOOD PARQUET FLOORING
SECTION 09596 - GYMNASIUM FLOORING
SECTION 09598 - SOFTWOOD FLOORING
SECTION 09651 - RESILIENT FLOORING - CEMENTITIOUS UNDERLAYMENT
SECTION 09655 - RESILIENT FLOORING
SECTION 09670 - FLUID-APPLIED RESILIENT FLOORING
SECTION 09675 - CONDUCTIVE VINYL TILE FLOORING
SECTION 09685 - CARPETING
SECTION 09710 - MAGNESIUM OXYCHLORIDE FLOORING
SECTION 09720 - EPOXY FLOORING
SECTION 09731 - CONDUCTIVE ELASTOMERIC LIQUID FLOORING
SECTION 09740 - HEAVY-DUTY CONCRETE FLOOR TOPPING
SECTION 09741 - ARMORED FLOORING
SECTION 09750 - BRICK FLOORING
SECTION 09751 - LIGHT-DUTY BRICK FLOORING
SECTION 09791 - STANDARD FLOOR TREATMENT
SECTION 09792 - FLOOR TREATMENT NON-SLIP COATINGS ON CONCRETE FLOORS
SECTION 09793 - FLOOR TREATMENT - REFINISHING WOOD FLOORS





DIVISION 9 - FINISHES (cont'd)
SECTION 09910 - EXTERIOR PAINTING
SECTION 09920 - INTERIOR PAINTING
SECTION 09941 - PAINTING OF WATER STORAGE TANK INTERIOR SURFACES
SECTION 09942 - PAINTING OF WATER STORAGE TANK EXTERIOR SURFACES
SECTION 09952 - WALL COVERINGS

DIVISION 10 - SPECIALTIES

SECTION 10155 - COMPARTMENTS AND CUBICLES FOR SHOWER AND TOILET ROOMS
SECTION 10275 - ACCESS AND PEDESTAL FLOORS
SECTION 10290 - PEST CONTROL
SECTION 10351 - FLAGPOLES
SECTION 10410 - DIRECTORY AND BULLETIN BOARDS
SECTION 10440 - SIGNS
SECTION 10505 - METAL LOCKERS
SECTION 10520 - FIRE EXTINGUISHERS, CABINETS, AND ACCESSORIES
SECTION 10550 - POSTAL SPECIALTIES
SECTION 10605 - WIRE MESH PARTITIONS
SECTION 10615 - DEMOUNTABLE PARTITIONS
SECTION 10618 - SECURITY SCREENS
SECTION 10630 - MOVABLE METAL PARTITIONS
SECTION 10671 - METAL STORAGE SHELVING
SECTION 10805 - TOILET ACCESSORIES
SECTION 10900 - WARDROBES
SECTION 10900 - WARDROBES

DIVISION 11 - EQUIPMENT
SECTION 11161 - PLATFORM AND DOCK LEVELERS
SECTION 11162 - PLATFORM AND DOCK LIFTS
SECTION 11164 - PLATFORM AND DOCK ENCLOSURES
SECTION 11165 - PLATFORM AND DOCK BUMPERS
SECTION 11166 - PLATFORM AND DOCK WARNING DEVICES
SECTION 11167 - PLATFORM AND DOCK GUARDRAILS AND POSTS
SECTION 11220 - MIXING CHAMBERS AND EQUIPMENT
SECTION 11221 - FLOCCULATORS AND SCRAPERS
SECTION 11225 - CLARIFIERS
SECTION 11230 - AERATION EQUIPMENT
SECTION 11239 - CHEMICAL BYPASS FEEDERS
SECTION 11240 - CHEMICAL STORAGE EQUIPMENT
SECTION 11241 - WATER TREATMENT PLANT SCALES AND WEIGHING EQUIPMENT
SECTION 11250 - ION EXCHANGE EQUIPMENT
SECTION 11255 - SOFTENING EQUIPMENT
SECTION 11260 - CHLORINE CONTACT TANKS
SECTION 11261 - DISINFECTION EQUIPMENT
SECTION 11262 - GASEOUS CHEMICAL METERING EQUIPMENT
SECTION 11304 - SEWAGE EJECTORS, SUBMERSIBLE
SECTION 11320 - CENTRIFUGES
SECTION 11325 - GRIT CHAMBERS
SECTION 11326 - MICRO-SCREENS
SECTION 11330 - COMMINUTORS AND BAR SCREENS
SECTION 11335 - ROTATING BIOLOGICAL FILTERS
SECTION 11340 - VACUUM FILTERS
SECTION 11350 - SLUDGE DRYING BEDS





DIVISION 11 - EQUIPMENT (cont'd)
SECTION 11365 - TRICKLING FILTER
SECTION 11375 - AERATION TANKS
SECTION 11376 - SURFACE AERATORS
SECTION 11380 - SLUDGE DIGESTERS
SECTION 11395 - TERTIARY SAND FILTERS
SECTION 11402 - FOOD SERVICE EQUIPMENT
SECTION 11452 - REFRIGERATORS
SECTION 11453 - DISHWASHERS
SECTION 11454 - GARBAGE DISPOSERS

SECTION 11455 - RANGES AND OVENS
SECTION 11456 - CLOTHES DRYERS
SECTION 11457 - CLOTHES WASHERS
SECTION 11460 - UNIT KITCHENS
SECTION 11490 - GYMNASIUM EQUIPMENT
SECTION 11496 - TARGET FIRING RANGES (EXTERIOR)
SECTION 11498 - FIXED WOOD BLEACHERS (EXTERIOR)
SECTION 11499 - DEMOUNTABLE BLEACHERS (EXTERIOR)
SECTION 11501 - PAINT SPRAY BOOTH
SECTION 11851 - BRIDGE-ATTACHED LAND AND MARINE TRAFFIC CONTROLS

DIVISION 12 - FURNISHINGS (NOT USED)

DIVISION 13 - SPECIAL CONSTRUCTION
SECTION 13121 - PRE-ENGINEERED STRUCTURES
SECTION 13152 - SWIMMING POOL ACCESSORIES
SECTION 13182 - SLUDGE INCINERATORS
SECTION 13205 - SETTLING CHAMBER
SECTION 13221 - WATER TREATMENT PLANT FILTERS
SECTION 13222 - PRESSURE FILTERS
SECTION 13227 - BACKWASH TANKS
SECTION 13320 - SEWAGE TREATMENT PLANT, ELECTRICAL CONTROLS AND INSTRUMENTATION
SECTION 13321 - WATER TREATMENT PLANT, ELECTRICAL CONTROLS AND INSTRUMENTATION
SECTION 13322 - FLOW MEASUREMENT DEVICES
SECTION 13600 - SOLAR WATER HEATING EQUIPMENT
SECTION 13955 - VEHICLE BARRIERS

DIVISION 14 - CONVEYING SYSTEMS
SECTION 14245 - PASSENGER ELEVATORS
SECTION 14250 - FREIGHT ELEVATORS
SECTION 14400 - LIFTS
SECTION 14410 - PERSONNEL LIFTS
SECTION 14420 - CHAIR LIFTS
SECTION 14450 - VEHICULAR LIFTS
SECTION 14510 - AUTOMATIC CART TRANSPORTATION SYSTEMS
SECTION 14560 - TRASH CHUTES
SECTION 14570 - WATER TREATMENT PLANT TRAVELING SCREENS
SECTION 14579 - PNEUMATIC TUBE SYSTEM
SECTION 14580 - PNEUMATIC MESSAGE SYSTEMS
SECTION 14583 - PNEUMATIC TRASH AND LINEN CHUTES
SECTION 14602 - CRANES AND HOISTS
SECTION 14650 - ASH HOISTS





DIVISION 15 - MECHANICAL
SECTION 15060 - MECHANICAL PIPING
SECTION 15100 - VALVES
SECTION 15120 - PIPING ACCESSORIES
SECTION 15160 - PUMPS
SECTION 15261 - INSULATION FOR ABOVEGROUND PIPE
SECTION 15262 - INSULATION FOR UNDERGROUND PIPE
SECTION 15281 - BOILER FIREBOX INSULATION
SECTION 15290 - DUCTWORK INSULATION
SECTION 15301 - FIRE PROTECTION SYSTEMS
SECTION 15401 - INTERIOR PLUMBING
SECTION 15451 - STEEL TANKS
SECTION 15452 - PLASTIC TANKS

SECTION 15475 - POOL EQUIPMENT
SECTION 15481 - COMPRESSED AIR EQUIPMENT
SECTION 15556 - FIRE TUBE BOILERS
SECTION 15557 - WATER TUBE BOILERS
SECTION 15558 - HIGH TEMPERATURE WATER BOILERS
SECTION 15559 - CAST-IRON BOILERS AND FIREBOXES
SECTION 15560 - CLEANING OF BOILERS
SECTION 15565 - FIREBRICK FIREBOXES FOR BOILERS
SECTION 15566 - FIREBRICK FOR INSULATION OF BOILER FIREBOXES
SECTION 15571 - OIL-FIRED AND GAS-FIRED BURNERS FOR BOILERS
SECTION 15572 - COAL-FIRING SYSTEMS FOR BOILERS
SECTION 15573 - DRAFT CONTROL EQUIPMENT
SECTION 15576 - BREECHING
SECTION 15577 - STACKS
SECTION 15580 - BOILER FEEDWATER EQUIPMENT
SECTION 15581 - GAS METERS AND REGULATORS
SECTION 15590 - FUEL HANDLING SYSTEMS
SECTION 15610 - WARM AIR FURNACES
SECTION 15621 - GAS UNIT HEATERS
SECTION 15622 - OIL UNIT HEATERS
SECTION 15661 - AIR-COOLED CONDENSING UNITS
SECTION 15670 - CONDENSERS
SECTION 15680 - REFRIGERANT EQUIPMENT
SECTION 15683 - REFRIGERATION SPECIALTIES
SECTION 15711 - NATURAL DRAFT COOLING TOWERS
SECTION 15712 - FORCED DRAFT AND INDUCED DRAFT COOLING TOWERS
SECTION 15751 - COILS
SECTION 15760 - STEAM AND HOT WATER UNIT HEATERS
SECTION 15765 - CLEANING OF HEAT EXCHANGERS
SECTION 15781 - PACKAGED HEATING AND COOLING UNITS
SECTION 15782 - PACKAGED HEAT PUMPS
SECTION 15800 - HUMIDITY CONTROL EQUIPMENT
SECTION 15830 - RADIATORS
SECTION 15840 - INDUCTION UNITS
SECTION 15855 - AIR HANDLING UNITS
SECTION 15860 - CENTRIFUGAL FANS
SECTION 15865 - AXIAL FLOW FANS
SECTION 15871 - POWER ROOF VENTILATORS
SECTION 15881 - DIFFUSERS, REGISTERS, GRILLES, AND LOUVERS





DIVISION 15 - MECHANICAL (cont'd)
SECTION 15886 - AIR CLEANING DEVICES
SECTION 15887 - TAILPIPE EXHAUST EQUIPMENT
SECTION 15890 - DUCTWORK AND ACCESSORIES
SECTION 15915 - CONTROL AND FIRE DAMPERS
SECTION 15920 - SOUND ATTENUATORS
SECTION 15951 - CONTROL DEVICES FOR MECHANICAL EQUIPMENT
SECTION 15990 - TESTING AND BALANCING OF HVAC SYSTEMS

DIVISION 16 - ELECTRICAL
SECTION 16051 - WIRING SYSTEMS EQUIPMENT
SECTION 16211 - MOTOR GENERATOR SETS
SECTION 16310 - ELECTRICAL DISTRIBUTION SYSTEM SUBSTATION EQUIPMENT
SECTION 16320 - TRANSFORMERS
SECTION 16321 - ELECTRICAL DISTRIBUTION TRANSFORMERS

SECTION 16350 - HIGH-VOLTAGE DISCONNECTING DEVICES
SECTION 16370 - OVERHEAD ELECTRICAL DISTRIBUTION SYSTEMS
SECTION 16375 - UNDERGROUND ELECTRICAL DISTRIBUTION SYSTEMS
SECTION 16390 - ELECTRICAL DISTRIBUTION SYSTEM GROUNDING
SECTION 16411 - ELECTRICAL DISTRIBUTION SYSTEM CAPACITOR BANKS
SECTION 16415 - ELECTRICAL DISTRIBUTION SYSTEM VOLTAGE REGULATORS
SECTION 16440 - INTERIOR LOW-VOLTAGE DISCONNECTING DEVICES
SECTION 16470 - PANELBOARDS AND LOAD CENTERS
SECTION 16480 - ELECTRIC MOTORS
SECTION 16495 - RECREATIONAL VEHICLE (RV) OUTLETS
SECTION 16501 - POLES FOR STREET AND AREA LIGHTING SYSTEMS
SECTION 16502 - BALLASTS AND TRANSFORMERS
SECTION 16503 - STREET AND AREA LIGHTING CONTROLS
SECTION 16510 - LUMINAIRES
SECTION 16611 - UNINTERRUPTIBLE POWER SYSTEM (UPS)
SECTION 16640 - CATHODIC PROTECTION OF STEEL WATER TANKS
SECTION 16641 - CATHODIC PROTECTION SYSTEM FOR UNDERGROUND UTILITIES
SECTION 16670 - LIGHTNING ARRESTERS
SECTION 16721 - FIRE ALARM AND DETECTION EQUIPMENT
SECTION 16730 - CLOCK AND PROGRAM SYSTEMS
SECTION 16770 - PUBLIC ADDRESS EQUIPMENT
SECTION 16795 - FIBER OPTIC CABLE TRANSMISSION SYSTEM
SECTION 16865 - INSTITUTIONAL ELECTRIC HEATING EQUIPMENT
SECTION 16870 - ELECTRIC UNIT HEATERS
SECTION 16901 - CENTRAL MONITORING, CONTROL, AND INSTRUMENTATION

SECTION 19120 - DEMOLITION

- - o O o - -

| UPB CSI | SPEC CSI | Description - UNIT PRICE BOOK SPECIFICATIONS REFERENCE |
|---|---|---|
| 01000 | 01000 | GENERAL REQUIREMENTS |
| 01000 | 01015 | CONDITIONS |
| 01000 | 01200 | WARRANTY OF CONSTRUCTION ZERO ACCIDENTS |
| 01000 | 01240 | COST AND PERFORMANCE REPORT |
| 01000 | 01320 | PROJECT SCHEDULE |
| 01000 | 01330 | SUBMITTAL PROCEDURES |
| 01000 | 01351 | SAFETY, HEALTH, AND EMERGENCY RESPONSE (HTRW/UST) |
| 01000 | 01410 | ENVIRONMENT PROTECTION |
| 01000 | 01415 | METRIC MEASUREMENTS |
| 01000 | 01440 | CONTRACTOR QUALITY CONTROL |
| 01000 | 01445 | CONTRACTOR QUALITY CONTROL SYSTEM FOR BUILT-UP ROOFING |
| 01000 | 01450 | CHEMICAL DATA QUALITY CONTROL |
| 01500 | 01500 | TEMPORARY CONSTRUCTION FACILITIES |
| 01000 | 01560 | ENVIRONMENTAL PROTECTION |
| 01000 | 01565 | STORM WATER POLLUTION PREVENTION PLAN |
| 01000 | 01720 | AS-BUILT DRAWINGS |
| | | |
| 02000 | 02000 | SITE WORK |
| 02010 | 02010 | SUBSURFACE INVESTIGATION |
| 02011 | 02012 | STANDARD PENETRATION TESTS |
| 02112 | 02075 | CONCRETE CORE DRILLING |
| 02113 | 02080 | ASBESTOS REMOVAL AND DISPOSAL |
| 02100 | 02100 | SITE PREPARATION |
| 02102 | 02110 | CLEARING AND GRUBBING |
| 02200 | 02200 | EARTHWORK |
| 02210 | 02210 | SITE GRADING |
| 02211 | 02211 | ROCK REMOVAL |
| 02245 | 02215 | FINISH GRADING FOR STRUCTURES AND SLABS |
| 02226 | 02220 | SITE EXCAVATION AND FILL |
| 02221 | 02221 | EXCAVATION, TRENCHING AND BACKFILLING FOR UTILITY SYSTEMS |
| 02222 | 02222 | STRUCTURAL EXCAVATION AND BACKFILL |
| 02224 | 02224 | PIPE SLEEVES FOR UTILITY LINES |
| 02231 | 02227 | FIELD TESTS |
| 02240 | 02240 | SOIL STABILIZATION-CRUSHED ROCK SUBGRADE |
| 02241 | 02243 | SOIL STABILIZATION-HYDRATED LIME |
| 02243 | 02250 | SOIL STABILIZATION-VIBROFLOTATION |
| 02244 | 02251 | SOIL STERILIZATION |
| ***** | 02270 | SEDIMENT CONTROL |
| 02262 | 02272 | GABIONS |
| 02261 | 02274 | RIPRAP |
| 02263 | 02275 | SOIL-CEMENT SURFACING |
| 02850 | 02450 | RAILROADS |
| 02600 | 02500 | PAVING AND SURFACING |
| 02614 | 02511 | PORTLAND CEMENT CONCRETE OVERLAYS |
| 02614 | 02512 | STEEL REINFORCED PORTLAND CEMENT CONCRETE OVERLAYS |
| 02614 | 02513 | FIBEROUS REINFORCED PORTLAND CEMENT CONCRETE OVERLAYS |
| 02616 | 02514 | ASPHALTIC CONCRETE OVERLAYS |

| | | |
|---|---|---|
| 02611 | 02515 | CRUSHED STONE PAVING |
| 02630 | 02520 | PORTLAND CEMENT CONCRETE SIDEWALK |
| 02630 | 02521 | ASPHALT CONCRETE SIDEWALKS |
| 02630 | 02522 | MISCELLANEOUS SIDEWALKS |
| 02630 | 02523 | PRECAST SIDEWALKS & PAVERS |
| 02620 | 02525 | CONCRETE CURBS AND GUTTERS |
| 02616 | 02570 | PORTLAND CEMENT CONCRETE |
| 02612 | 02575 | BRIDGE DECK ASPHALT CONCRETE WEARING SURFACES |
| 02612 | 02575 | BRIDGE DECK ASPHALT CONCRETE WEARING SURFACES |
| 02616 | 02575 | BRIDGE DECK ASPHALT CONCRETE WEARING SURFACES |
| 02618 | 02575 | BRIDGE DECK ASPHALT CONCRETE WEARING SURFACES |
| 02720 | 02575 | BRIDGE DECK ASPHALT CONCRETE WEARING SURFACES |
| 02721 | 02575 | BRIDGE DECK ASPHALT CONCRETE WEARING SURFACES |
| 02722 | 02575 | BRIDGE DECK ASPHALT CONCRETE WEARING SURFACES |
| 02725 | 02575 | BRIDGE DECK ASPHALT CONCRETE WEARING SURFACES |
| 02617 | 02576 | CRACK SEALING OF ASPHALT CONCRETE PAVEMENTS |
| 02616 | 02577 | PATCHING OF ASPHALT CONCRETE PAVEMENTS |
| 02610 | 02578 | SPRAY APPLICATIONS, SEAL COATS AND SURFACE TREATMENTS |
| 02617 | 02579 | SLURRY SEALS |
| 02620 | 02580 | ASPHALT CURBS |
| 02613 | 02581 | COLD MILLING OF BITUMINOUS PAVEMENTS |
| 02613 | 02582 | BITUMINOUS REJUVENATION |
| ***** | 02583 | COLD MIX RECYCLING |
| ***** | 02584 | CENTRAL PLANT HOT-MIX RECYCLING |
| 02618 | 02590 | PAVEMENT MARKINGS |
| 02550 | 02660 | WATER DISTRIBUTION |
| 02555 | 02661 | WATER LINES |
| 15176 | 02665 | WATER RESERVOIRS AND TANKS |
| 02559 | 02666 | CHILLED WATER LINES |
| 02580 | 02670 | WELL REPAIR |
| 02580 | 02672 | WATER WELLS |
| 02550 | 02680 | FUEL DISTRIBUTION |
| 02551 | 02685 | GAS DISTRIBUTION LINES |
| 02500 | 02700 | SEWERAGE AND DRAINAGE |
| 02511 | 02710 | FOUNDATION DRAINAGE SYSTEMS |
| 02512 | 02712 | UNDERSLAB DRAINAGE |
| 02520 | 02720 | STORM DRAINS |
| ***** | 02724 | FORCE MAINS AND INVERTED SIPHONS |
| 02531 | 02725 | SAND DRAINS |
| 02560 | 02726 | WASTEWATER COLLECTION |
| 02540 | 02727 | EROSION CONTROL |
| 02560 | 02730 | SEWER LINE MANHOLES |
| 03600 | 02735 | SEWER LINE GROUTING |
| 02450 | 02737 | SEWER LINE CLEANING |
| 02560 | 02740 | SEPTIC TANK AND GREASE TRAP |
| 15380 | 02742 | SIPHON TANK AND SIPHONS |
| 15320 | 02744 | GREASE INTERCEPTORS |
| 02560 | 02745 | IMHOFF TANK |
| 02450 | 02760 | RESTORATION OF UNDERGROUND |
| 02450 | 02760 | PIPELINES |

| | | |
|---|---|---|
| 02560 | 02766 | SEWER LINE PIPE LINING |
| 02550 | 02770 | PONDS AND RESERVOIRS |
| 02590 | 02774 | SEWAGE TREATMENT LAGOONS |
| 02700 | 02800 | SITE IMPROVEMENTS |
| 02710 | 02830 | FENCES AND GATES |
| 02711 | 02831 | STEEL CHAIN-LINK FENCING |
| 02712 | 02832 | STEEL ROD AND BAR FENCING |
| 02712 | 02833 | WROUGHT IRON ROD AND BAR FENCING |
| 02725 | 02834 | PRE-CAST CONCRETE AND MASONRY FENCING |
| 18028 | 02835 | PERMANENT WOOD FENCING |
| 18028 | 02836 | SNOW AND OTHER TEMPORARY FENCING |
| 02712 | 02837 | FARM-TYPE WIRE FENCING |
| ***** | 02840 | ELECTRICAL TRAFFIC CONTROL SIGNAL |
| 02722 | 02850 | TRAFFIC SIGNS |
| 02730 | 02860 | PLAYING FIELDS |
| 02731 | 02861 | RECREATIONAL FACILITIES |
| 02800 | 02900 | LANDSCAPING |
| 02820 | 02921 | TOPSOIL |
| 02810 | 02933 | SODDING AND SEEDING |
| 02440 | 02940 | LANDSCAPE IRRIGATION SYSTEM |
| 02830 | 02950 | PLANTINGS |
| 03000 | 03000 | CONCRETE |
| 03100 | 03100 | CONCRETE FORMWORK |
| 03110 | 03105 | CONCRETE FORMWORK |
| 03200 | 03200 | CONCRETE REINFORCEMENT |
| 03210 | 03205 | CONCRETE REINFORCEMENT |
| 03220 | 03205 | CONCRETE REINFORCEMENT |
| 03250 | 03250 | CONCRETE ACCESSORIES |
| 03251 | 03255 | CONCRETE ACCESSORIES |
| 03253 | 03255 | CONCRETE ACCESSORIES |
| 03300 | 03300 | CAST-IN-PLACE CONCRETE |
| 03302 | 03305 | CAST-IN-PLACE CONCRETE |
| 03311 | 03305 | CAST-IN-PLACE CONCRETE |
| 03320 | 03320 | CONCRETE TOPPING |
| 03351 | 03351 | EXPOSED AGGREGATE CONCRETE |
| 03352 | 03352 | RUSTICATED CONCRETE FINISHES |
| 03353 | 03353 | SOLID BOARD CONCRETE FINISH |
| 03354 | 03354 | FLEXURAL CONCRETE |
| 03362 | 03362 | SPECIALLY PLACED CONCRETE |
| 03363 | 03363 | SECOND POUR CONCRETE |
| 03300 | 03370 | CONCRETE CURING |
| 03305 | 03375 | CONCRETE CURING |
| 03400 | 03400 | PRECAST CONCRETE |
| 03414 | 03480 | MISCELLANEOUS PRECAST ITEMS |
| 03500 | 03500 | CEMENTITIOUS DECKS |
| 03510 | 03510 | GYPSUM CONCRETE DECKS |
| 03520 | 03520 | INSULATING CONCRETE ROOF DECK |
| 03520 | 03521 | PRECAST LIGHTWEIGHT ROOF SLABS |
| 03530 | 03530 | CEMENTITIOUS WOOD FIBER ROOF DECK SYSTEM |
| 03600 | 03600 | GROUT |

| | | |
|---|---|---|
| 03610 | 03605 | GROUT |
| 03620 | 03605 | GROUT |
| 03700 | 03700 | CONCRETE RESTORATION AND CLEANING |
| 03710 | 03705 | CONCRETE RESTORATION AND CLEANING |
| 03720 | 03705 | CONCRETE RESTORATION AND CLEANING |
| 03730 | 03705 | CONCRETE RESTORATION AND CLEANING |
| 02102 | 03720 | BRIDGE PIERS, ABUTMENTS & ANCHORS |
| 02300 | 03720 | BRIDGE PIERS, ABUTMENTS & ANCHORS |
| 02313 | 03720 | BRIDGE PIERS, ABUTMENTS & ANCHORS |
| 02316 | 03720 | BRIDGE PIERS, ABUTMENTS & ANCHORS |
| 02317 | 03720 | BRIDGE PIERS, ABUTMENTS & ANCHORS |
| 02318 | 03720 | BRIDGE PIERS, ABUTMENTS & ANCHORS |
| 02411 | 03720 | BRIDGE PIERS, ABUTMENTS & ANCHORS |
| 02412 | 03720 | BRIDGE PIERS, ABUTMENTS & ANCHORS |
| 02413 | 03720 | BRIDGE PIERS, ABUTMENTS & ANCHORS |
| 02530 | 03720 | BRIDGE PIERS, ABUTMENTS & ANCHORS |
| 02618 | 03720 | BRIDGE PIERS, ABUTMENTS & ANCHORS |
| 02720 | 03720 | BRIDGE PIERS, ABUTMENTS & ANCHORS |
| 02721 | 03720 | BRIDGE PIERS, ABUTMENTS & ANCHORS |
| 03100 | 03720 | BRIDGE PIERS, ABUTMENTS & ANCHORS |
| 03200 | 03720 | BRIDGE PIERS, ABUTMENTS & ANCHORS |
| 03400 | 03720 | BRIDGE PIERS, ABUTMENTS & ANCHORS |
| 06310 | 03720 | BRIDGE PIERS, ABUTMENTS & ANCHORS |
| 06311 | 03720 | BRIDGE PIERS, ABUTMENTS & ANCHORS |
| 02617 | 03730 | CONCRETE BRIDGE COMPONENTS |
| 02618 | 03730 | CONCRETE BRIDGE COMPONENTS |
| 02720 | 03730 | CONCRETE BRIDGE COMPONENTS |
| 02721 | 03730 | CONCRETE BRIDGE COMPONENTS |
| 02722 | 03730 | CONCRETE BRIDGE COMPONENTS |
| 02725 | 03730 | CONCRETE BRIDGE COMPONENTS |
| 03110 | 03730 | CONCRETE BRIDGE COMPONENTS |
| 03210 | 03730 | CONCRETE BRIDGE COMPONENTS |
| 03220 | 03730 | CONCRETE BRIDGE COMPONENTS |
| 03300 | 03730 | CONCRETE BRIDGE COMPONENTS |
| 03610 | 03730 | CONCRETE BRIDGE COMPONENTS |
| 03710 | 03730 | CONCRETE BRIDGE COMPONENTS |
| 03720 | 03730 | CONCRETE BRIDGE COMPONENTS |
| 04000 | 04000 | MASONRY |
| 04200 | 04200 | UNIT MASONRY |
| 04210 | 04202 | UNIT MASONRY |
| 04220 | 04202 | UNIT MASONRY |
| 04221 | 04202 | UNIT MASONRY |
| 04240 | 04202 | UNIT MASONRY |
| 04286 | 04202 | UNIT MASONRY |
| 04205 | 04205 | SCAFFOLDING-TUBULAR STEEL |
| 04210 | 04210 | BRICKWORK |
| 04222 | 04215 | EXPOSED AGGREGATE SURFACE CONCRETE WALLS |
| 04251 | 04251 | TERRA COTTA |
| 04400 | 04400 | STONE |
| 04410 | 04405 | STONEWORK |

| | | |
|---|---|---|
| 04420 | 04405 | STONEWORK |
| 04422 | 04405 | STONEWORK |
| 04423 | 04405 | STONEWORK |
| 04424 | 04405 | STONEWORK |
| 04500 | 04500 | MASONRY RESTORATION AND CLEANING |
| 04510 | 04505 | MASONRY RESTORATION |
| 04520 | 04505 | MASONRY RESTORATION |
| 05000 | 05000 | METALS |
| 05100 | 05100 | STRUCTURAL METAL FRAMING |
| 05120 | 05120 | STRUCTURAL STEEL |
| 02618 | 05121 | STEEL BRIDGE COMPONENTS |
| 02720 | 05121 | STEEL BRIDGE COMPONENTS |
| 02721 | 05121 | STEEL BRIDGE COMPONENTS |
| 02722 | 05121 | STEEL BRIDGE COMPONENTS |
| 02725 | 05121 | STEEL BRIDGE COMPONENTS |
| 05120 | 05121 | STEEL BRIDGE COMPONENTS |
| 05502 | 05121 | STEEL BRIDGE COMPONENTS |
| 05510 | 05121 | STEEL BRIDGE COMPONENTS |
| 05540 | 05121 | STEEL BRIDGE COMPONENTS |
| 05120 | 05160 | STEEL TRUSSES |
| 05200 | 05200 | METAL JOISTS |
| 05211 | 05205 | METAL JOIST |
| 05300 | 05300 | METAL DECKING |
| 05310 | 05305 | STEEL DECK |
| 05500 | 05500 | METAL FABRICATIONS |
| 05501 | 05501 | ANCHOR BOLTS & EXPANSION ANCHORS |
| 05502 | 05501 | ANCHOR BOLTS & EXPANSION ANCHORS |
| 05510 | 05510 | METAL STAIRS |
| 05521 | 05520 | PIPE AND TUBE RAILINGS |
| 05530 | 05530 | GRATING |
| 05540 | 05540 | CASTINGS |
| 02618 | 05550 | MISC. METAL BRIDGE COMPONENTS |
| 02720 | 05550 | MISC. METAL BRIDGE COMPONENTS |
| 02721 | 05550 | MISC. METAL BRIDGE COMPONENTS |
| 02722 | 05550 | MISC. METAL BRIDGE COMPONENTS |
| 02725 | 05550 | MISC. METAL BRIDGE COMPONENTS |
| 05120 | 05550 | MISC. METAL BRIDGE COMPONENTS |
| 05130 | 05550 | MISC. METAL BRIDGE COMPONENTS |
| 05501 | 05550 | MISC. METAL BRIDGE COMPONENTS |
| 05502 | 05550 | MISC. METAL BRIDGE COMPONENTS |
| 05510 | 05550 | MISC. METAL BRIDGE COMPONENTS |
| 05521 | 05550 | MISC. METAL BRIDGE COMPONENTS |
| 05530 | 05550 | MISC. METAL BRIDGE COMPONENTS |
| 05700 | 05700 | ORNAMENTAL METAL |
| 05720 | 05720 | ORNAMENTAL HANDRAIL AND RAILINGS |
| 05730 | 05730 | ORNAMENTAL SHEET METAL |
| 05800 | 05800 | EXPANSION CONTROL |
| 05805 | 05805 | EXPANSION CONTROL |
| 02617 | 05830 | BRIDGE EXPANSION DEVICES, BEARINGS AND ANCHORS |
| 02618 | 05830 | BRIDGE EXPANSION DEVICES, BEARINGS AND ANCHORS |

| | | |
|---|---|---|
| 02720 | 05830 | BRIDGE EXPANSION DEVICES, BEARINGS AND ANCHORS |
| 02721 | 05830 | BRIDGE EXPANSION DEVICES, BEARINGS AND ANCHORS |
| 02722 | 05830 | BRIDGE EXPANSION DEVICES, BEARINGS AND ANCHORS |
| 02725 | 05830 | BRIDGE EXPANSION DEVICES, BEARINGS AND ANCHORS |
| 03251 | 05830 | BRIDGE EXPANSION DEVICES, BEARINGS AND ANCHORS |
| 05540 | 05830 | BRIDGE EXPANSION DEVICES, BEARINGS AND ANCHORS |
| 05100 | 05900 | HYDRAULIC STRUCTURES |
| 02318 | 05920 | WATER TREATMENT PLANT DEBRIS RACK |
| 02530 | 05920 | WATER TREATMENT PLANT DEBRIS RACK |
| 05120 | 05920 | WATER TREATMENT PLANT DEBRIS RACK |
| 06000 | 06000 | WOOD AND PLASTICS |
| 06100 | 06100 | ROUGH CARPENTRY |
| 06111 | 06111 | LIGHT WOODEN STRUCTURES FRAMING |
| 06113 | 06115 | SHEATHING SIDING AND SUBFLOORING |
| 06130 | 06130 | HEAVY TIMBER CONSTRUCTION |
| 06111 | 06135 | WOOD TRUSSES |
| 06120 | 06135 | WOOD TRUSSES |
| 06130 | 06135 | WOOD TRUSSES |
| 06170 | 06135 | WOOD TRUSSES |
| 06311 | 06135 | WOOD TRUSSES |
| 02618 | 06145 | TIMBER BRIDGE COMPONENTS |
| 02720 | 06145 | TIMBER BRIDGE COMPONENTS |
| 02721 | 06145 | TIMBER BRIDGE COMPONENTS |
| 02722 | 06145 | TIMBER BRIDGE COMPONENTS |
| 02725 | 06145 | TIMBER BRIDGE COMPONENTS |
| 06110 | 06145 | TIMBER BRIDGE COMPONENTS |
| 06130 | 06145 | TIMBER BRIDGE COMPONENTS |
| 06311 | 06145 | TIMBER BRIDGE COMPONENTS |
| 06710 | 06145 | TIMBER BRIDGE COMPONENTS |
| 06720 | 06145 | TIMBER BRIDGE COMPONENTS |
| 06200 | 06200 | FINISH CARPENTRY |
| 06220 | 06220 | MILLWORK |
| 06400 | 06400 | ARCHITECTURAL WOODWORK |
| 06410 | 06410 | CABINETS |
| 06420 | 06420 | WOOD PANELING |
| 07000 | 07000 | THERMAL AND MOISTURE PROTECTION |
| 07100 | 07100 | WATERPROOFING |
| 07113 | 07110 | BITUMINOUS WATERPROOFING |
| 07112 | 07111 | BITUMINOUS MEMBRANE WATERPROOFING |
| 07111 | 07115 | PLASTIC SHEET WATERPROOFING |
| 07120 | 07120 | FLUID-APPLIED WATERPROOFING |
| 07140 | 07125 | METAL WATERPROOFING |
| 07130 | 07130 | BENTONITE CLAY WATERPROOFING |
| 07140 | 07140 | METAL OXIDE WATERPROOFING |
| 07160 | 07160 | BITUMINOUS DAMPPROOFING |
| 07170 | 07170 | SILICONE DAMPPROOFING |
| 02110 | 07170 | SILICONE DAMPPROOFING |
| ***** | 07175 | WATER-REPELLENT COATING DAMPPROOFING |
| 07180 | 07180 | CEMENTITIOUS DAMPPROOFING |
| 07100 | 07190 | VAPOR AND AIR RETARDERS |

| | | |
|---|---|---|
| 07310 | 07192 | BITUMINOUS VAPOR BARRIER FOR ROOFS |
| ***** | 07193 | LAMINATED SHEET VAPOR BARRIER FOR ROOFS |
| ***** | 07194 | POLYVINYL SHEET VAPOR BARRIER FOR ROOFS |
| ***** | 07196 | BITUMINOUS VAPOR BARRIERS |
| ***** | 07197 | LAMINATED SHEET VAPOR BARRIERS |
| 07111 | 07198 | PLASTIC SHEET VAPOR BARRIERS |
| 07200 | 07200 | INSULATION |
| 07210 | 07210 | BATT AND BLANKET BUILDING INSULATION |
| 07211 | 07211 | LOOSE OR GRANULAR FILL INSULATION |
| 07212 | 07212 | RIGID INSULATION |
| 07213 | 07213 | PERIMETER INSULATION |
| 07215 | 07215 | SPRAYED ON INSULATION |
| 07213 | 07223 | ROOF INSULATION AND UNDERLAYMENT-CELLULAR GLASS |
| 07240 | 07223 | ROOF INSULATION AND UNDERLAYMENT- CELLULAR GLASS |
| 07213 | 07224 | ROOF INSULATION AND UNDERLAYMENT- MINERAL FIBER |
| 07240 | 07224 | ROOF INSULATION AND UNDERLAYMENT-MINERAL FIBER |
| 07213 | 07225 | ROOF INSULATION AND UNDERLAYMENT-COMPOSITE BOARD |
| 07240 | 07225 | ROOF INSULATION AND UNDERLAYMENT-COMPOSITE BOARD |
| 07213 | 07226 | ROOF INSULATION AND UNDERLAYMENT-EXPANDED PERLINTE BOARD |
| 07240 | 07226 | ROOF INSULATION AND UNDERLAYMENT- EXPANDED PERLITE BOARD |
| 07213 | 07227 | ROOF INSULATION AND UNDERLAYMENT- FIBERBOARD |
| 07240 | 07227 | ROOF INSULATION AND UNDERLAYMENT- FIBERBOARD |
| 09800 | 07250 | FIREPROOFING |
| 09841 | 07256 | SPRAYED-ON FIREPROOFING |
| 07300 | 07300 | SHINGLES AND ROOFING TILES |
| 02110 | 07311 | ASPHALT SHINGLES |
| 02110 | 07312 | ASBESTOS-CEMENT SHINGLES |
| 02110 | 07313 | WOOD SHINGLES AND SHAKES |
| 02110 | 07314 | SLATE SHINGLES |
| 02110 | 07321 | CLAY ROOFING TILES |
| 02110 | 07322 | CONCRETE ROOFING TILES |
| 07400 | 07400 | PREFORMED ROOFING AND CLADDING/SIDING |
| 07410 | 07410 | PREFORMED ROOFING AND SIDING |
| 07420 | 07410 | PREFORMED ROOFING AND SIDING |
| 07520 | 07463 | ASBESTOS CEMENT ROOFING & SIDING |
| 07500 | 07500 | MEMBRANE ROOFING |
| 07510 | 07510 | BUILT-UP ROOFING |
| 07520 | 07530 | SINGLE PLY ROOFING |
| 07530 | 07530 | SINGLE PLY ROOFING |
| 07540 | 07530 | SINGLE PLY ROOFING |
| 07550 | 07550 | INVERTED ROOF SYSTEMS |
| 07500 | 07570 | TRAFFIC TOPPING |
| 07510 | 07572 | WOOD TRAFFIC TOPPING |
| 07510 | 07573 | COMPOSITION TRAFFIC TOPPING |
| 18075 | 07574 | PRECAST CONCRETE OR TILE TRAFFIC TOPPING |
| 07600 | 07600 | FLASHING AND SHEET METAL |
| 07610 | 07605 | SHEET METAL |
| 07620 | 07605 | SHEET METAL |
| 07631 | 07605 | SHEET METAL |
| 07650 | 07605 | SHEET METAL |

| | | |
|---|---|---|
| 07660 | 07605 | SHEET METAL |
| 07670 | 07605 | SHEET METAL |
| 07800 | 07700 | ROOF SPECIALTIES AND ACCESSORIES |
| 07830 | 07705 | ROOF ACCESSORIES |
| 07840 | 07705 | ROOF ACCESSORIES |
| 07800 | 07800 | SKYLIGHTS |
| 07811 | 07811 | PLASTIC SKYLIGHTS |
| 07812 | 07812 | METAL-FRAMED SKYLIGHTS |
| 07900 | 07900 | JOINT SEALERS |
| 07910 | 07920 | SEALANTS |
| 07920 | 07920 | SEALANTS |
| 08000 | 08000 | DOORS AND WINDOWS |
| 08100 | 08100 | METAL DOORS AND FRAMES |
| 08110 | 08110 | HOLLOW METAL DOORS AND FRAMES |
| 08120 | 08120 | ALUMINUM DOORS AND FRAMES |
| 08200 | 08200 | WOOD AND PLASTIC DOORS |
| 08210 | 08210 | WOOD DOORS |
| 08300 | 08300 | SPECIAL DOORS |
| 08370 | 08311 | DOORS |
| 08370 | 08311 | ALUMINUM AND WOOD SLIDING GLASS |
| 08310 | 08312 | SLIDING FIRE DOORS |
| 08330 | 08330 | COILING (ROLLING) DOORS |
| 08340 | 08330 | COILING (ROLLING) DOORS |
| 08350 | 08350 | FOLDING DOORS |
| 08353 | 08353 | ACCORDION FOLDING DOORS |
| 08355 | 08355 | FLEXIBLE DOORS |
| 08362 | 08360 | OVERHEAD DOORS |
| 08385 | 08380 | SOUND RETARDANT DOORS |
| 08420 | 08386 | ALUMINUM SAFETY GLASS DOORS |
| ***** | 08387 | WOOD SAFETY GLASS DOORS |
| 08390 | 08390 | SCREEN AND STORM DOORS |
| 08400 | 08400 | ENTRANCES AND STOREFRONTS |
| 08420 | 08412 | ENTRANCES |
| 08450 | 08470 | REVOLVING DOORS |
| 08500 | 08500 | METAL WINDOWS |
| 08510 | 08510 | METAL WINDOWS |
| 08520 | 08520 | ALUMINUM WINDOWS |
| 08600 | 08600 | WOOD AND PLASTIC WINDOWS |
| 08610 | 08610 | WOOD WINDOWS |
| 08700 | 08700 | HARDWARE |
| 08710 | 08710 | FINISH HARDWARE |
| 08800 | 08800 | GLAZING |
| 08810 | 08810 | GLASS AND GLAZING |
| 08811 | 08810 | GLASS AND GLAZING |
| 08812 | 08810 | GLASS AND GLAZING |
| 08813 | 08810 | GLASS AND GLAZING |
| 08814 | 08810 | GLASS AND GLAZING |
| 08815 | 08810 | GLASS AND GLAZING |
| 08816 | 08810 | GLASS AND GLAZING |
| 08817 | 08810 | GLASS AND GLAZING |

| | | |
|---|---|---|
| 08821 | 08810 | GLASS AND GLAZING |
| 08822 | 08810 | GLASS AND GLAZING |
| 08823 | 08810 | GLASS AND GLAZING |
| 08830 | 08810 | GLASS AND GLAZING |
| 08850 | 08810 | GLASS AND GLAZING |
| 08900 | 08900 | GLAZED CURTAIN WALLS |
| 08912 | 08920 | ALUMINUM WINDOW WALLS/CURTAINWALLS |
| 09000 | 09000 | FINISHES |
| 09100 | 09200 | LATH AND PLASTER |
| 09110 | 09210 | PLASTER REPAIRS |
| 09150 | 09210 | PLASTER REPAIRS |
| 09180 | 09210 | PLASTER REPAIRS |
| 09195 | 09210 | PLASTER REPAIRS |
| 09260 | 09210 | PLASTER REPAIRS |
| 09280 | 09210 | PLASTER REPAIRS |
| 09200 | 09210 | PLASTER REPAIRS |
| ***** | 09260 | GYPSUM DRYWALL AND METAL STUDS |
| 09300 | 09300 | TILE |
| 09320 | 09315 | TILE FLOORING |
| 09310 | 09320 | CERAMIC WALL TILE |
| 09320 | 09320 | CERAMIC WALL TILE |
| 09400 | 09400 | TERRAZZO |
| 09400 | 09405 | TERRAZZO |
| 09410 | 09405 | TERRAZZO |
| 09420 | 09405 | TERRAZZO |
| 09430 | 09405 | TERRAZZO |
| 18094 | 09405 | TERRAZZO |
| 09500 | 09500 | ACOUSTICAL TREATMENT |
| 09510 | 09510 | ACOUSTICAL CEILINGS |
| 09530 | 09530 | ACOUSTICAL INSULATION AND BARRIER |
| 09535 | 09535 | SOUND ABSORBING PANELS |
| 09550 | 09550 | WOOD FLOORING |
| 09560 | 09560 | WOOD STRIP FLOORING |
| 09600 | 09566 | WOOD BLOCK INDUSTRIAL FLOORING |
| 09570 | 09570 | WOOD PARQUET FLOORING |
| 09590 | 09596 | GYMNASIUM FLOORING |
| 09560 | 09598 | SOFTWOOD FLOORING |
| 09650 | 09650 | RESILIENT FLOORING |
| 09651 | 09651 | RESILIENT FLOORING-CEMENTITIOUS UNDERLAYMENT |
| 09660 | 09655 | RESILIENT FLOORING |
| 09670 | 09670 | FLUID-APPLIED RESILIENT FLOORING |
| 09675 | 09675 | CONDUCTIVE VINYL TILE FLOORING |
| 09680 | 09680 | CARPET |
| 09681 | 09685 | CARPETING |
| 09682 | 09685 | CARPETING |
| 09700 | 09700 | SPECIAL FLOORING |
| ***** | 09710 | MAGNESIUM OXYCHLORIDE FLOORING |
| 09720 | 09720 | EPOXY FLOORING |
| 09670 | 09731 | FLOORING |
| 09675 | 09731 | CONDUCTIVE ELASTOMERIC LIQUID |

| | | |
|---|---|---|
| 09740 | 09740 | HEAVY-DUTY CONCRETE FLOOR TOPPING |
| 09741 | 09741 | ARMORED FLOORING |
| 09750 | 09750 | BRICK FLOORING |
| 09750 | 09751 | LIGHT-DUTY BRICK FLOORING |
| 09760 | 09780 | FLOOR TREATMENT |
| 19760 | 09791 | STANDARD FLOOR TREATMENT ON CONCRETE FLOORS |
| ***** | 09792 | FLOOR TREATMENT NON-SLIP COATINGS |
| ***** | 09793 | FLOOR TREATMENT-REFINISHED WOOD FLOORS |
| 09900 | 09900 | PAINTING |
| 09910 | 09910 | EXTERIOR PAINTING |
| 09920 | 09920 | INTERIOR PAINTING |
| ***** | 09941 | PAINTING OF WATER STORAGE TANK INTERIOR SURFACES |
| ***** | 09942 | PAINTING OF WATER STORAGE TANK EXTERIOR SURFACES |
| 09952 | 09952 | WALL COVERINGS |
| 09953 | 09952 | WALL COVERINGS |
| 09955 | 09952 | WALL COVERINGS |
| 09960 | 09952 | WALL COVERINGS |
| 10000 | 10000 | SPECIALTIES |
| 10150 | 10150 | COMPARTMENTS AND CUBICLES |
| 10161 | 10155 | COMPARTMENTS AND CUBICLES FOR SHOWERS AND TOILET ROOMS |
| 10162 | 10155 | COMPARTMENTS AND CUBICLES FOR SHOWERS AND TOILET ROOMS |
| 10170 | 10155 | COMPARTMENTS AND CUBICLES FOR SHOWERS AND TOILET ROOMS |
| 13150 | 10270 | ACCESS FLOORING |
| 13150 | 10275 | ACCESS AND PEDESTAL FLOORS |
| 10290 | 10290 | PEST CONTROL |
| 10290 | 10291 | PEST CONTROL |
| 10350 | 10350 | FLAGPOLES |
| 10350 | 10351 | FLAGPOLES |
| 10400 | 10400 | IDENTIFYING DEVICES |
| 10410 | 10410 | DIRECTORY AND BULLETIN BOARDS |
| 10440 | 10440 | SIGNS |
| 10500 | 10500 | LOCKERS |
| 10501 | 10505 | METAL LOCKERS |
| 10502 | 10505 | METAL LOCKERS |
| 10503 | 10505 | METAL LOCKERS |
| 10520 | 10520 | FIRE PROTECTION SPECIALTIES |
| 10521 | 10520 | FIRE EXTINGUISHERS, CABINETS AND ACCESSORIES |
| 10522 | 10520 | FIRE EXTINGUISHERS, CABINETS AND ACCESSORIES |
| 10550 | 10550 | POSTAL SPECIALTIES |
| 10551 | 10550 | POSTAL SPECIALTIES |
| 10552 | 10550 | POSTAL SPECIALTIES |
| 10600 | 10600 | PARTITIONS |
| 10618 | 10605 | WIRE MESH PARTITIONS |
| 10610 | 10615 | DEMOUNTABLE PARTITIONS |
| ***** | 10630 | MOVEABLE METAL PARTITIONS |
| 10671 | 10671 | METAL STORAGE SHELVING |
| 10800 | 10800 | TOILET AND BATH ACCESSORIES |
| 10810 | 10805 | TOILET ACCESSORIES |
| 10820 | 10805 | TOILET ACCESSORIES |
| 10830 | 10805 | TOILET ACCESSORIES |

| | | |
|---|---|---|
| 10840 | 10805 | TOILET ACCESSORIES |
| 10850 | 10805 | TOILET ACCESSORIES |
| 10860 | 10805 | TOILET ACCESSORIES |
| 10870 | 10805 | TOILET ACCESSORIES |
| 10880 | 10805 | TOILET ACCESSORIES |
| ***** | 10900 | WARDRODES |
| 11000 | 11000 | EQUIPMENT |
| 11870 | 11160 | LOADING DOCK EQUIPMENT |
| 11871 | 11161 | PLATFORM AND DOCK LEVELERS |
| 11871 | 11162 | PLATFORM AND DOCK LIFTS |
| 14403 | 11162 | PLATFORM AND DOCK LIFTS |
| 11874 | 11164 | PLATFORM AND DOCK ENCLOSURES |
| 11875 | 11165 | PLATFORM AND DOCK BUMPERS |
| ***** | 11166 | PLATFORM AND DOCK WARNING DEVICES |
| ***** | 11167 | PLATFORM AND DOCK GUARDRAILS AND POSTS |
| 15200 | 11200 | WATER SUPPLY AND TREATMENT EQUIPMENT |
| ***** | 11220 | MIXING CHAMBERS AND EQUIPMENT |
| ***** | 11221 | FLOCCULATORS AND SCRAPERS |
| ***** | 11225 | CLARIFIERS |
| 15390 | 11230 | AERATION EQUIPMENT |
| 15262 | 11239 | CHEMICAL BYPASS FEEDERS |
| ***** | 11240 | CHEMICAL STORAGE EQUIPMENT |
| ***** | 11241 | WATER TREATMENT PLANT SCALES AND WEIGHING EQUIPMENT |
| ***** | 11250 | ION EXCHANGE EQUIPMENT |
| 15253 | 11255 | SOFTENING EQUIPMENT |
| 15261 | 11260 | CHLORINE CONTACT TANK |
| 15261 | 11261 | DISINFECTION EQUIPMENT |
| 15270 | 11262 | GASEOUS CHEMICAL METERING EQUIPMENT |
| 15300 | 11300 | FLUID WASTE TREATMENT AND DISPOSAL EQUIPMENT |
| 15310 | 11304 | SEWAGE EJECTORS, SUBMERSIBLE |
| ***** | 11320 | CENTRIFUGE |
| ***** | 11325 | GRIT CHAMBERS |
| ***** | 11326 | MICRO-SCREENS |
| ***** | 11330 | COMMUNITORS AND BAR SCREENS |
| ***** | 11335 | ROTATING BIOLOGICAL FILTERS |
| ***** | 11340 | VACUUM FILTER |
| ***** | 11350 | SLUDGE DRYING BED |
| ***** | 11365 | TRICKLING FILTER |
| ***** | 11375 | AERATION TANK |
| 15390 | 11376 | SURFACE AERATORS |
| ***** | 11380 | SLUDGE DIGESTER |
| ***** | 11395 | TERTIARY SAND FILTERS |
| 11400 | 11400 | FOOD SERVICE EQUIPMENT |
| 11420 | 11402 | FOOD SERVICE EQUIPMENT |
| 11430 | 11402 | FOOD SERVICE EQUIPMENT |
| 11435 | 11402 | FOOD SERVICE EQUIPMENT |
| 11440 | 11402 | FOOD SERVICE EQUIPMENT |
| 11450 | 11402 | FOOD SERVICE EQUIPMENT |
| 11460 | 11402 | FOOD SERVICE EQUIPMENT |
| 11470 | 11402 | FOOD SERVICE EQUIPMENT |

| | | |
|---|---|---|
| 11471 | 11402 | FOOD SERVICE EQUIPMENT |
| 11900 | 11450 | RESIDENTIAL EQUIPMENT |
| 11910 | 11452 | REFRIGERATORS |
| 11910 | 11453 | DISHWASHERS |
| 11910 | 11454 | GARBAGE DISPOSERS |
| 11910 | 11455 | RANGES AND OVENS |
| ***** | 11456 | CLOTHES DRYER |
| ***** | 11457 | CLOTHES WASHER |
| 11415 | 11460 | UNIT KITCHENS |
| 11500 | 11480 | ATHLETIC,RECREATIONAL AND THERAPEUTIC EQUIPMENT |
| 11510 | 11490 | GYMNASIUM EQUIPMENT |
| ***** | 11496 | TARGET FIRING RANGES(EXTERIOR) |
| 02730 | 11498 | FIXED WOOD BLEACHERS(EXTERIOR) |
| 02730 | 11499 | DEMOUNTABLE BLEACHERS(EXTERIOR) |
| 11500 | 11500 | INDUSTRIAL AND PROCESS EQUIPMENT |
| 11551 | 11501 | PAINT SPRAY BOOTH |
| ***** | 11850 | NAVIGATION EQUIPMENT |
| 02722 | 11851 | BRIDGE-ATTACHED LAND AND MARINE TRAFFIC CONTROLS |
| 06111 | 11851 | BRIDGE-ATTACHED LAND AND MARINE TRAFFIC CONTROLS |
| 16120 | 11851 | BRIDGE-ATTACHED LAND AND MARINE TRAFFIC CONTROLS |
| 13000 | 13000 | SPECIAL CONSTRUCTION |
| 13600 | 13120 | PRE-ENGINEERED STRUCTURES |
| 13602 | 13121 | PRE-ENGINEERED STRUCTURES |
| 13850 | 13150 | POOLS |
| 13850 | 13152 | SWIMMING POOL ACCESSORIES |
| ***** | 13180 | SITE CONSTRUCTED INCINERATORS |
| ***** | 13182 | SLUDGE INCINERATORS |
| ***** | 13205 | SETTLING CHAMBER |
| 15200 | 13220 | FILTER UNDERDRAINS AND MEDIA |
| 15251 | 13221 | WATER TREATMENT PLANT FILTERS |
| 15251 | 13222 | PRESSURE FILTERS |
| 15251 | 13227 | BACKWASH TANKS |
| 16900 | 13300 | UTILITY CONTROL SYSTEMS |
| 16900 | 13320 | SEWAGE TREATMENT PLANT, ELECTRICAL CONTROLS AND INSTRUMENTATION |
| 16900 | 13321 | WATER TREATMENT PLANT ELECTRICAL CONTROLS & INSTRUMENTATION |
| 15270 | 13322 | FLOW MEASUREMENT DEVICES |
| 15790 | 13600 | SOLAR WATER HEATING EQUIPMENT |
| ***** | 13955 | VEHICLE BARRIERS |
| 14000 | 14000 | CONVEYING SYSTEMS |
| 14200 | 14200 | ELEVATORS |
| ***** | 14245 | PASSENGER ELEVATORS |
| ***** | 14250 | FREIGHT ELEVATORS |
| 14400 | 14400 | LIFTS |
| 14405 | 14400 | LIFTS |
| 14401 | 14410 | PERSONEL LIFTS |
| 14402 | 14420 | CHAIR LIFTS |
| 14403 | 14450 | VEHICULAR LIFTS |
| 14500 | 14500 | MATERIAL HANDLING SYSTEMS |
| 14501 | 14510 | AUTOMATIC CART TRANSPORTATION SYSTEMS |

| | | |
|---|---|---|
| 14564 | 14560 | TRASH CHUTES |
| 02318 | 14570 | WATER TREATMENT PLANT TRAVELING SCREENS |
| 02530 | 14570 | WATER TREATMENT PLANT TRAVELING SCREENS |
| 05120 | 14570 | WATER TREATMENT PLANT TRAVELING SCREENS |
| 15061 | 14570 | WATER TREATMENT PLANT TRAVELING SCREENS |
| 15066 | 14570 | WATER TREATMENT PLANT TRAVELING SCREENS |
| 15094 | 14570 | WATER TREATMENT PLANT TRAVELING SCREENS |
| 15100 | 14570 | WATER TREATMENT PLANT TRAVELING SCREENS |
| 15141 | 14570 | WATER TREATMENT PLANT TRAVELING SCREENS |
| 15930 | 14570 | WATER TREATMENT PLANT TRAVELING SCREENS |
| 16900 | 14570 | WATER TREATMENT PLANT TRAVELING SCREENS |
| 14750 | 14579 | PNEUMATIC TUBE SYSTEM |
| 14710 | 14580 | PNEUMATIC MESSAGE SYSTEMS |
| 14750 | 14583 | PNEUMATIC TRASH AND LINEN CHUTES |
| 14300 | 14600 | HOISTS AND CRANES |
| 14301 | 14602 | CRANES AND HOISTS |
| 14302 | 14602 | CRANES AND HOISTS |
| 14303 | 14602 | CRANES AND HOISTS |
| 14404 | 14650 | ASH HOIST |
| 15000 | 15000 | MECHANICAL |
| | | |
| 15050 | 15050 | BASIC MECHANICAL MATERIALS AND METHODS |
| 15061 | 15060 | MECHANICAL PIPING |
| 15062 | 15060 | MECHANICAL PIPING |
| 15063 | 15060 | MECHANICAL PIPING |
| 15064 | 15060 | MECHANICAL PIPING |
| 15065 | 15060 | MECHANICAL PIPING |
| 15066 | 15060 | MECHANICAL PIPING |
| 15715 | 15060 | MECHANICAL PIPING |
| 15086 | 15100 | VALVES |
| 15100 | 15100 | VALVES |
| 15101 | 15100 | VALVES |
| 15103 | 15100 | VALVES |
| 15104 | 15100 | VALVES |
| 15105 | 15100 | VALVES |
| 15109 | 15100 | VALVES |
| 15111 | 15100 | VALVES |
| 15112 | 15100 | VALVES |
| 15115 | 15100 | VALVES |
| 15121 | 15100 | VALVES |
| 15122 | 15100 | VALVES |
| 15124 | 15100 | VALVES |
| 15938 | 15100 | VALVES |
| 18151 | 15100 | VALVES |
| 15080 | 15120 | MECHANICAL PIPING ACCESSORIES |
| 15083 | 15120 | MECHANICAL PIPING ACCESSORIES |
| 15087 | 15120 | MECHANICAL PIPING ACCESSORIES |
| 15094 | 15120 | MECHANICAL PIPING ACCESSORIES |
| 15125 | 15120 | MECHANICAL PIPING ACCESSORIES |
| 15161 | 15120 | MECHANICAL PIPING ACCESSORIES |

| | | |
|---|---|---|
| 15162 | 15120 | MECHANICAL PIPING ACCESSORIES |
| 15140 | 15160 | PUMPS |
| 15141 | 15160 | PUMPS |
| 15142 | 15160 | PUMPS |
| 15143 | 15160 | PUMPS |
| 15145 | 15160 | PUMPS |
| 15146 | 15160 | PUMPS |
| 15147 | 15160 | PUMPS |
| 15151 | 15160 | PUMPS |
| 15180 | 15250 | MECHANICAL INSULATION |
| 15182 | 15261 | INSULATION FOR ABOVE-GROUND PIPE |
| 15183 | 15261 | INSULATION FOR ABOVE-GROUND PIPE |
| 15185 | 15261 | INSULATION FOR ABOVE-GROUND PIPE |
| 15188 | 15261 | INSULATION FOR ABOVE-GROUND PIPE |
| 02559 | 15262 | INSULATION FOR UNDERGROUND PIPE |
| 15715 | 15262 | INSULATION FOR UNDERGROUND PIPE |
| ***** | 15281 | BOILER FIREBOX INSULATION |
| 15190 | 15290 | DUCTWORK INSULATION |
| 15500 | 15300 | FIRE PROTECTION |
| 15504 | 15301 | FIRE PROTECTION SYSTEM |
| 15508 | 15301 | FIRE PROTECTION SYSTEM |
| 15510 | 15301 | FIRE PROTECTION SYSTEM |
| 15522 | 15301 | FIRE PROTECTION SYSTEM |
| 15530 | 15301 | FIRE PROTECTION SYSTEM |
| 15532 | 15301 | FIRE PROTECTION SYSTEM |
| 15534 | 15301 | FIRE PROTECTION SYSTEM |
| 15400 | 15400 | PLUMBING |
| 15421 | 15401 | INTERIOR PLUMBING |
| 15424 | 15401 | INTERIOR PLUMBING |
| 15455 | 15401 | INTERIOR PLUMBING |
| 15457 | 15401 | INTERIOR PLUMBING |
| 15458 | 15401 | INTERIOR PLUMBING |
| 15601 | 15401 | INTERIOR PLUMBING |
| 15176 | 15451 | STEEL TANKS |
| 15177 | 15452 | PLASTIC TANKS |
| 15470 | 15475 | POOL EQUIPMENT |
| 15471 | 15475 | POOL EQUIPMENT |
| 15472 | 15475 | POOL EQUIPMENT |
| 15475 | 15475 | POOL EQUIPMENT |
| 15915 | 15481 | COMPRESSED AIR EQUIPMENT |
| 15600 | 15550 | HEAT GENERATION |
| 15622 | 15556 | FIRE TUBE BOILERS |
| 15624 | 15557 | WATER TUBE BOILERS |
| ***** | 15558 | HIGH TEMPERATURE WATER BOILERS |
| ***** | 15559 | CAST-IRON BOILERS AND FIREBOXES |
| ***** | 15560 | CLEANING OF BOILERS |
| ***** | 15565 | FIREBRICK FIREBOXES FOR BOILERS |
| ***** | 15566 | FIREBRICK FOR INSULATION OF BOILER FIREBOXES |
| ***** | 15571 | OIL-FIRED AND GAS-FIRED BURNERS FOR BOILERS |
| ***** | 15572 | COAL-FIRING SYSTEMS FOR BOILERS |

| | | |
|---|---|---|
| 15639 | 15573 | DRAFT CONTROL EQUIPMENT |
| 04210 | 15576 | BREECHING |
| 04551 | 15576 | BREECHING |
| 15855 | 15576 | BREECHING |
| 15855 | 15577 | STACKS |
| ***** | 15580 | BOILER FEEDWATER EQUIPMENT |
| 02553 | 15581 | GAS METERS AND REGULATORS |
| 15428 | 15590 | FUEL HANDLING SYSTEMS |
| 15605 | 15590 | FUEL HANDLING SYSTEMS |
| 15810 | 15610 | WARM AIR FURNACES |
| 18157 | 15610 | WARM AIR FURNACES |
| 18157 | 15621 | GAS UNIT HEATERS |
| 18157 | 15622 | OIL UNIT HEATERS |
| 15650 | 15650 | REFRIGERATION |
| ***** | 15661 | AIR COOLED CONDENSING UNITS |
| 15695 | 15670 | CONDENSERS |
| 15655 | 15680 | REFRIGERANT EQUIPMENT |
| 15661 | 15680 | REFRIGERANT EQUIPMENT |
| 15662 | 15680 | REFRIGERANT EQUIPMENT |
| 15670 | 15680 | REFRIGERANT EQUIPMENT |
| 15671 | 15680 | REFRIGERANT EQUIPMENT |
| 15672 | 15680 | REFRIGERANT EQUIPMENT |
| 15674 | 15680 | REFRIGERANT EQUIPMENT |
| 15699 | 15683 | REFRIGERATION SPECIALTIES |
| 15680 | 15711 | NATURAL DRAFT COOLING TOWERS |
| 15681 | 15711 | NATURAL DRAFT COOLING TOWERS |
| 15680 | 15712 | FORCED DRAFT AND INDUCED DRAFT COOLING TOWERS |
| 15681 | 15712 | FORCED DRAFT & INDUCED DRAFT COOLING TOWERS |
| 15700 | 15750 | HEAT TRANSFER |
| 15750 | 15751 | COILS |
| 15816 | 15751 | COILS |
| 15760 | 15760 | STEAM AND HOT WATER UNIT HEATERS |
| 18157 | 15765 | CLEANING OF HEAT EXCHANGERS |
| 15770 | 15781 | PACKAGED HEATING & COOLING UNITS |
| 15773 | 15781 | PACKAGED HEATING & COOLING UNITS |
| 15772 | 15782 | PACKAGED HEAT PUMPS |
| 15781 | 15800 | HUMIDITY CONTROL EQUIPMENT |
| 15785 | 15800 | HUMIDITY CONTROL EQUIPMENT |
| 15752 | 15830 | RADIATORS |
| 15753 | 15830 | RADIATORS |
| 15741 | 15840 | INDUCTION UNITS |
| 15800 | 15850 | AIR HANDLING |
| 15834 | 15855 | AIR HANDLING UNITS |
| 15821 | 15860 | CENTRIFUGAL FANS |
| 15831 | 15860 | CENTRIFUGAL FANS |
| 15824 | 15865 | AXIAL FLOW FANS |
| 15826 | 15865 | AXIAL FLOW FANS |
| 15827 | 15865 | AXIAL FLOW FANS |
| 15830 | 15871 | POWER ROOF VENTILATORS |
| 15832 | 15871 | POWER ROOF VENTILATORS |

| | | |
|---|---|---|
| 15800 | 15880 | AIR DISTRIBUTION |
| 15867 | 15881 | DIFFUSERS AND REGISTERS |
| 15871 | 15881 | DIFFUSERS AND REGISTERS |
| 15872 | 15881 | DIFFUSERS AND REGISTERS |
| 15880 | 15886 | AIR CLEANING DEVICES |
| 15881 | 15886 | AIR CLEANING DEVICES |
| 15883 | 15886 | AIR CLEANING DEVICES |
| 15884 | 15886 | AIR CLEANING DEVICES |
| 15888 | 15886 | AIR CLEANING DEVICES |
| 15851 | 15887 | TAILPIPE EXHAUST EQUIPMENT |
| 15840 | 15890 | DUCTWORK AND ACCESSORIES |
| 15848 | 15890 | DUCTWORK AND ACCESSORIES |
| 15849 | 15890 | DUCTWORK AND ACCESSORIES |
| 15860 | 15890 | DUCTWORK AND ACCESSORIES |
| 15866 | 15890 | DUCTWORK AND ACCESSORIES |
| 15868 | 15890 | DUCTWORK AND ACCESSORIES |
| 15861 | 15915 | CONTROL AND FIRE DAMPERS |
| 15864 | 15915 | CONTROL AND FIRE DAMPERS |
| 15937 | 15915 | CONTROL AND FIRE DAMPERS |
| 15890 | 15920 | SOUND ATTENUATORS |
| 15900 | 15950 | CONTROLS |
| 15930 | 15951 | CONTROL DEVICES FOR MECH. EQUIP. |
| 15931 | 15951 | CONTROL DEVICES FOR MECH. EQUIP. |
| 15932 | 15951 | CONTROL DEVICES FOR MECH. EQUIP. |
| 15934 | 15951 | CONTROL DEVICES FOR MECH. EQUIP. |
| 15938 | 15951 | CONTROL DEVICES FOR MECH. EQUIP. |
| 15939 | 15951 | CONTROL DEVICES FOR MECH. EQUIP. |
| 15010 | 15990 | TESTING AND BALANCING OF HVAC SYSTEMS |
| 15043 | 15990 | TESTING AND BALANCING OF HVAC SYSTEMS |
| 16000 | 16000 | ELECTRICAL |
| 16050 | 16050 | BASIC ELECTRICAL MATERIALS AND METHODS |
| 16050 | 16051 | WIRING SYSTEMS EQUIPMENT |
| 16110 | 16051 | WIRING SYSTEMS EQUIPMENT |
| 16112 | 16051 | WIRING SYSTEMS EQUIPMENT |
| 16120 | 16051 | WIRING SYSTEMS EQUIPMENT |
| 16121 | 16051 | WIRING SYSTEMS EQUIPMENT |
| 16140 | 16051 | WIRING SYSTEMS EQUIPMENT |
| 16200 | 16200 | POWER GENERATION |
| 16211 | 16211 | MOTOR GENERATOR SETS |
| 16300 | 16300 | HIGH VOLTAGE DISTRIBUTION (ABOVE 600-VOLT) |
| 16310 | 16310 | SUBSTATION EQUIPMENT |
| 16310 | 16310 | ELECTRICAL DISTRIBUTION SYSTEM |
| 16311 | 16310 | ELECTRICAL DISTRIBUTION SYSTEM |
| 16311 | 16310 | ELECTRICAL DISTRIBUTION SYSTEM |
| 16312 | 16310 | ELECTRICAL DISTRIBUTION SYSTEM SUBSTATION EQUIPMENT |
| 16320 | 16310 | ELECTRICAL DISTRIBUTION SYSTEM SUBSTATION EQUIPMENT |
| 16330 | 16310 | ELECTRICAL DISTRIBUTION SYSTEM SUBSTATION EQUIPMENT |
| 16413 | 16310 | ELECTRICAL DISTRIBUTION SYSTEM SUBSTATION EQUIPMENT |
| 16470 | 16310 | ELECTRICAL DISTRIBUTION SYSTEM SUBSTATION EQUIPMENT |
| 16622 | 16310 | ELECTRICAL DISTRIBUTION SYSTEM SUBSTATION EQUIPMENT |

| | | |
|---|---|---|
| 16311 | 16320 | TRANSFORMERS |
| 16312 | 16320 | TRANSFORMERS |
| 16330 | 16320 | TRANSFORMERS |
| 16460 | 16320 | TRANSFORMERS |
| 16470 | 16320 | TRANSFORMERS |
| 16923 | 16320 | TRANSFORMERS |
| 16330 | 16321 | ELECTRICAL DISTRIBUTION TRANSFMRS |
| 16460 | 16321 | ELECTRICAL DISTRIBUTION TRANSFMRS |
| 16470 | 16350 | HIGH VOLTAGE DISCONNECTING DEVICES |
| 16471 | 16350 | DISCONNECTING DEVICES |
| 16110 | 16370 | OVERHEAD ELECT DISTRIBUTION SYS. |
| 16111 | 16370 | OVERHEAD ELECT DISTRIBUTION SYS. |
| 16114 | 16370 | OVERHEAD ELECT DISTRIBUTION SYS. |
| 16413 | 16370 | OVERHEAD ELECT DISTRIBUTION SYS. |
| 16451 | 16370 | OVERHEAD ELECT DISTRIBUTION SYS. |
| 16411 | 16375 | UNDERGROUND ELECTRICAL DISTRIBUTION SYSTEM |
| 16450 | 16390 | ELECTRICAL DISTRIBUTION SYS GND'G |
| 16453 | 16390 | ELECTRICAL DISTRIBUTION SYS GND'G |
| 16454 | 16390 | ELECTRICAL DISTRIBUTION SYS GND'G |
| 16400 | 16400 | SERVICE AND DISTRIBUTION (600-VOLT AND BELOW) |
| 16312 | 16411 | ELECTRICAL DISTRIBUTION SYSTEM CAPACITOR BANKS |
| ***** | 16415 | ELECTRICAL DISTRIBUTION SYSTEM VOLTAGE REGULATORS |
| 16140 | 16440 | INTERIOR LOW-VOLTAGE DISCONNECTION DEVICES |
| 16170 | 16440 | INTERIOR LOW-VOLTAGE DISCONNECTION DEVICES |
| 16312 | 16440 | INTERIOR LOW-VOLTAGE DISCONNECTION DEVICES |
| 16330 | 16440 | INTERIOR LOW-VOLTAGE DISCONNECTION DEVICES |
| 16470 | 16440 | INTERIOR LOW-VOLTAGE DISCONNECTION DEVICES |
| 16311 | 16470 | PANELBOARDS AND LOAD CENTERS |
| 16470 | 16470 | PANELBOARDS AND LOAD CENTERS |
| 16471 | 16470 | PANELBOARDS AND LOAD CENTERS |
| 16920 | 16470 | PANELBOARDS AND LOAD CENTERS |
| 16921 | 16470 | PANELBOARDS AND LOAD CENTERS |
| 16922 | 16470 | PANELBOARDS AND LOAD CENTERS |
| 16150 | 16480 | ELECTRIC MOTORS |
| 16151 | 16480 | ELECTRIC MOTORS |
| 16152 | 16480 | ELECTRIC MOTORS |
| 16140 | 16495 | RECREATIONAL VEHICLE (RV) OUTLETS |
| 16500 | 16500 | LIGHTING |
| 16413 | 16501 | POLES FOR STREET AND AREA LIGHTING SYSTEMS |
| 16470 | 16501 | POLES FOR STREET AND AREA LIGHTING SYSTEMS |
| 16570 | 16501 | POLES FOR STREET AND AREA LIGHTING SYSTEMS |
| 16500 | 16502 | BALLASTS AND TRANSFORMERS |
| 16900 | 16503 | STREET AND AREA LIGHTING CONTROLS |
| 16930 | 16503 | STREET AND AREA LIGHTING CONTROLS |
| 16520 | 16510 | LUMINAIRES |
| 16521 | 16510 | LUMINAIRES |
| 16522 | 16510 | LUMINAIRES |
| 16523 | 16510 | LUMINAIRES |
| 16524 | 16510 | LUMINAIRES |
| 16525 | 16510 | LUMINAIRES |

| | | |
|---|---|---|
| 16600 | 16600 | SPECIAL SYSTEMS |
| ***** | 16611 | UNINTERRUPTIBLE POWER SYSTEM (UPS) |
| 16640 | 16640 | CATHODIC PROTECTION OF STEEL WATER TANKS |
| 16640 | 16641 | CATHODIC PROTECTION SYSTEMS FOR UNDERGROUND UTILITIES |
| 16450 | 16670 | LIGHTNING ARRESTORS |
| 16700 | 16700 | COMMUNICATIONS |
| 16721 | 16721 | FIRE ALARM AND DETECTION EQUIP. |
| 16730 | 16730 | CLOCK AND PROGRAM SYSTEMS |
| 16760 | 16770 | PUBLIC ADDRESS EQUIPMENT |
| 16770 | 16770 | PUBLIC ADDRESS EQUIPMENT |
| 16795 | 16795 | FIBER OPTIC CABLE TRANSMISSION SYSTEM |
| 15700 | 16850 | ELECTRIC RESISTANCE HEATING |
| 15753 | 16865 | INSTITUTIONAL ELECTRIC HEATING EQUIPMENT |
| 15760 | 16865 | INSTITUTIONAL ELECTRIC HEATING EQUIPMENT |
| 15760 | 16870 | ELECTRIC UNIT HEATERS |
| 15761 | 16870 | ELECTRIC UNIT HEATERS |
| 16900 | 16900 | CONTROLS |
| 13947 | 16901 | CENTRAL MONITORING, CONTROL, AND INSTRUMENTATION |
| 16720 | 16901 | CENTRAL MONITORING, CONTROL, AND INSTRUMENTATION |
| 16721 | 16901 | CENTRAL MONITORING, CONTROL, AND INSTRUMENTATION |
| 16900 | 16901 | CENTRAL MONITORING, CONTROL, AND INSTRUMENTATION |
| ----- | 17000 | NOT USED |
| ----- | 18000 | NOT USED |
| 02110 | 19000 | DEMOLITION |
| 02110 | 19100 | DEMOLITION |
| 02110 | 19120 | DEMOLITION |
| 02112 | 19120 | DEMOLITION |

# TABLE OF CONTENTS

**TABLE OF CONTENTS** ..... **1**

**READ ME FIRST** ..... **3**

DO'S ..... 3
DON'TS ..... 3
COMPARISON ..... 3
REQUIREMENTS ..... 3

**WINDOW CONTROLS** ..... **5**

LAYOUT ..... 5
OBJECTS ..... 5
MOVING ..... 6

**USER SETTINGS** ..... **7**

DATA LOCATION ..... 7
FACTORS ..... 8
CONTRACTORS ..... 8
ADDITIONAL USER SETTINGS ..... 9

**PROJECTS** ..... **11**

CREATE ..... 11
OPEN ..... 12
CLOSE ..... 12
DELETE ..... 13

**MANAGING PROJECTS** ..... **15**

INFORMATION ..... 15
JOINT SCOPE ..... 16
REQUEST FOR PROPOSAL ..... 17
PROPOSAL REVIEW ..... 18
FULL JOC SPECIFICATIONS ..... 20
OWNER ESTIMATE SPECS / CONTRACTOR PROPOSAL SPECS ..... 21
WORD SEARCH SPECIFICATIONS ..... 21

**ESTIMATES & PROPOSALS** ..... **23**

OPENING AN ESTIMATE ..... 23
ADDING TASKS ..... 24
MODIFYING TASKS ..... 27
DELETING TASKS ..... 27
SHOW TOTAL ..... 28
REPRICE ESTIMATE ..... 28
DISPLAY FULL DESCRIPTION ..... 29
CSI ORDER ..... 29

**UNIT PRICE BOOKS** ..... **30**

UNIT PRICE BOOK ..... 30
NON-PREPRICED BOOK ..... 35

**TRANSMITTALS** ..... **39**

PROPOSAL TO DISK (USED BY THE CONTRACTOR ONLY) ..... 39
VALIDATE PROPOSALS ..... 40

**OTHER USEFUL UTILITIES ..... 42**

DUPLICATE PROJECT ..... 42
MERGE INFORMATION ..... 43
COMPARISON ..... 44
VIEW TEXT FILE ..... 45
BACKUP DATA ..... 46
RESTORE DATA ..... 47
REINDEX DATA BASES ..... 48
PACK DATA BASES ..... 49
MODIFY REPORT ..... 49
RESET WINDOWS ..... 49

**REPORTING ..... 50**

PRINTER SETUP ..... 50
REPORT ..... 52
SAMPLE REPORTS ..... 55

**INSTALLATION PROCEDURE ..... 83**

GETTING THE PDS392 INSTALLATION PROGRAM RUNNING ..... 83
SETTING UP A WINDOWS® ICON AFTER INSTALLING PDS 3.9.2 ..... 84

**DATA DICTIONARY ..... 87**

# Read Me First

## Do's

PDS 3.9.2 has been revised to fix numerous problems with the previous release using Microsoft® Foxpro. Some new features include:

- JOC Specifications On-line
- Expanded On-line Help
- Use PDS through Windows 95®
- More reports and better printer control
- Expanded display size

Simply put, you can now use PDS as you would most other DOS applications in DOS, Windows 3.11® and Windows 95®.

## Don'ts

- Avoid some common problems with PDS by:
- Not turning your computer off or resetting it while PDS or Any application is running.
- Not turning your computer off or resetting it while Windows is running.
- Exiting from PDS properly (File/Exit, Edit/Exit or CTRL-F12)
- Not Leaving PDS running while your away from your computer for more than a reasonable amount of time especially if you operate in a client/server environment.
- Not running DOS Shell! (PDS will not work in this environment)

## Comparison

The functionality of PDS 3.9.2 is essentially the same as that for PDS 3.9.1. Some menus have added features that were not available before this release. Other items have been added to help expedite the process of JOC. The Specifications have been put On-line with a word search. The end user now has the ability to change reports and print selected pages of long reports.

As before, there are two versions of the software – Owner and Contractor. There are two differences between the versions. One, the owner has access to the Labor, Material and Equipment costs for UPB items and the contractor does not. Two, the contractor can not change coefficients (factors). The Factors are for the Contractor's version are created/maintained by the owner through the program and are kept in the file PDS.OVL. Copy this file from the owners machine and place it in the PDS392\Data directory.

## Requirements

### 1.1 Equipment Environment

The minimum system requirements for PDS 3.9.2 are as follows:

MS-DOS 6.22 compatible micro-computer (486 66MHz or better recommended) with minimum of 512K conventional memory available
At Least 4 MB RAM
At Least 15 MB Hard Disk Drive for PDS (Optional software may require more HD space)
1.44 MB 3.5 inch floppy drive
Video Graphics Adapter
VGA Color Display
Keyboard
Mouse
Dot Matrix or Laser Jet Printer for project reports

Optional Requirements:
Network (Optional)
Windows for Workgroups or Windows 95 (Optional)
Modem (Optional, to retrieve contractor files)

## 1.2. Support Software

The following support software is required to execute the JOCUPB Application:

MS-DOS version 6.22 or higher required
JOCPDS Application Executable (PDS 3.9.2)
Government Optional Requirements:
Word Processing Application (WordPerfect 5.2) for Specifications (Optional)
FoxPro for Database additions or updates (Optional)

## 1.3. Database Files

### General Characteristics

Under the FoxPro standard, database files contain all non-index data associated with a record except data associated with memo fields. Memo fields are large fields, capable of accepting very long (larger than 256 characters) strings and binary data. Data associated with memo fields is kept in a separate file. In FoxPro the memo files have the same name as the database file and a different extension. FoxPro uses the extension “FPT” for memo files

.

# Window Controls

PDS 3.9.2 is a DOS based program but works like Windows®. This chapter will help you to understand some general window concepts that are used.

## Layout

The background screen on PDS is considered the desktop. Above the desktop is a menu bar. You add, change and delete data by using the menu bar, which, opens various windows. The windows will appear on the desktop. It is the manipulation of these windows and the objects on these windows that allow you to store or change data.

The windows can also cause some confusion. Since you can have more than one window on the desktop at a time, you may "lose" a window by covering it with another. Imagine the desktop to be just like the top of your desk. The windows are like sheets of paper on the desk. If you pull out another sheet of paper, you may cover the sheet already on your desk. This does not mean the other sheet of paper was removed from the desk -- it is hidden behind the new sheet of paper. To see the original sheet of paper just move the sheet you just placed on the desk.

Windows are no different. You will hide windows as you open new ones. To see the hidden windows, simply move the windows that are on top. You can also click on a back window to bring it forward (if any part of the window is visible). In addition to moving windows you can Maximize, Reduce and Minimize some of the windows. Maximized means to fill the desktop with the current window; Reduce means to reduce the window back to its original size; and Minimize means to reduce the window to a single bar and title on the desktop. Only windows with the dashed box in the upper right corner can manipulated in this way. The following instructions explain how to do all three.

| | |
|---|---|
| Maximize | Click once on the dashed box when the window is normal size |
| Reduce | Click once on the dashed box when the window is maximized |
| Minimize | Click twice on the title of the window |

## Objects

Each window will have Objects. These objects are used to enter data (fields), make choices (radio buttons, check boxes, and drop down boxes) and cause an action (push buttons). Each of these objects are explained below:

| Type | Graphic | Description |
|---|---|---|
| Field | JOC Coordinator: George Washington | Used to enter text or numeric data. Often preceded with a description of the field. Click once in the field or tab to the field. Type once the cursor is blinking in the field. You may have to use the Home key to move the cursor to the start of the field. |
| Radio Button | (•) Contractor's Proposal<br>( ) Owner's Estimate | Used to select between given options. Only one choice in the list can be selected. Click once on the option of your choice. The dot will move to that option. |
| Check Box | [X] Proposal Review | Used to turn on or off a choice. May be alone or with other check boxes. Each check box is independent of others. Click once in the brackets to turn on or off the "X". |

| | | |
|---|---|---|
| Drop Down Box | | Used like a radio button to choose between given options. Only one choice in the list can be selected. Click and hold the button down on the box to display the list. Drag to the item in the list and release the button. The list will disappear. To get the list to stay open until a choice is made, tab to the box and press the space bar. |
| Push Button | | Used to cause an action (Save, Open, Cancel, Delete…). Click once on the word to activate. |
| Push Button (Invisible) | | A form of push button. Used to open or create files. Associated with transmittal or backup files. Click once in the center of the box to activate. |

## Moving

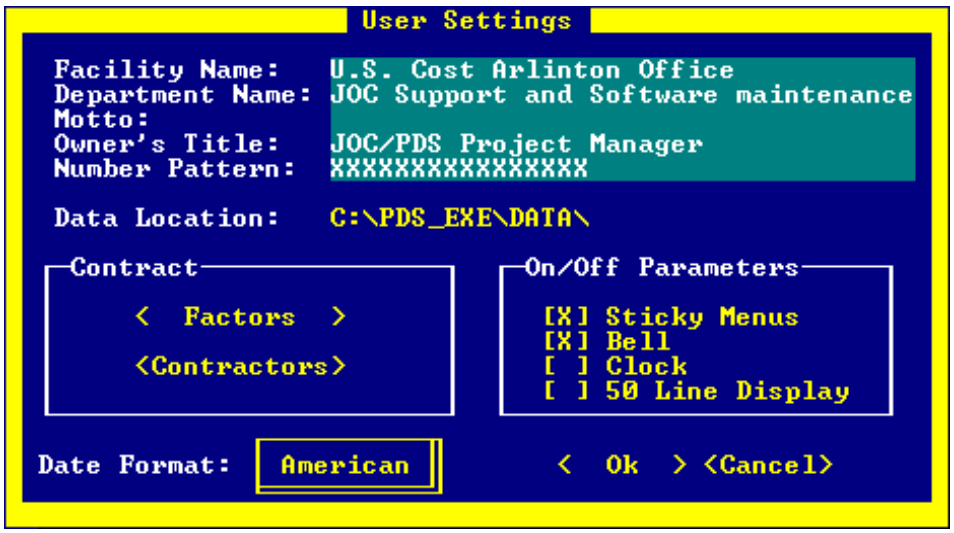
There are two types of windows. One type you can move and resize and the other you can't. This sections explains how to move and resize windows.

Moving a window is quite simple. Click on the title bar of the window (the top bar of the window where the text is located). While holding your mouse button down, drag the window to a new location. It is possible to move the window almost completely off of the desktop.

Re-sizing a window is almost as easy. Click on the "dot" at the bottom right corner of the window. While holding your mouse button down, drag the corner to a new location. Only the corner will move causing the window to shrink or grow. Release the mouse button when the window is the size you want.

Getting the windows in a proper position may take several combinations of both moving and resizing. Once you have windows in place, select the <Cancel> button. This will save the new position for future use. If at any time you change the position of a window, PDS will "remember" the new position for future use. This applies to browse windows only. Browse windows are windows that display one to several records of data in column format. Network users of PDS can personalize their window positions without affecting other users. PDS stores the information on the client computer.

## User Settings

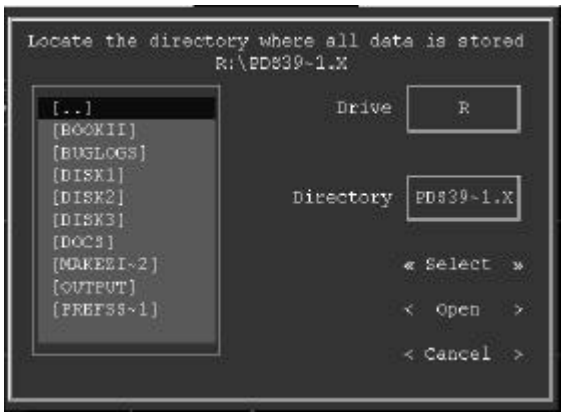



User Settings allows the user specify several things that personalize PDS. Data Location is the most important part of the setup. It must be set to "point to" the data whether on the local computer or on a network. PDS can not find the data without this information. Contractors and factors are also set up here.

## Data Location

### Basic Steps

- Select User Settings from the Utilities menu
- Click once on the Data Location field




- Select the drive and directory where the data is located
- Click on the <Select> button

### More Information

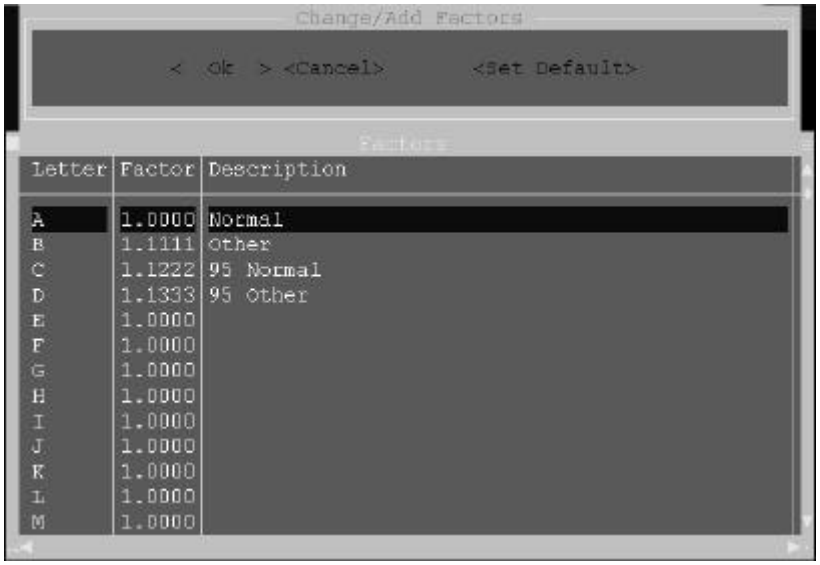
The data can be located on the local computer or network. If on the network, you must first map the appropriate drive to your machine (see you network manual for more information). Once mapped, the networked drive will be assigned a letter. You can select this letter from the drop down box next to

"Drive". Click once on the box and hold the mouse button down. Drag to the new drive and release. Select the directory from the list on the left.

## Factors

### Basic Steps

- Select *User Settings* from the *Utilities* menu
- Click once on the <Factors> button




- Edit Factors directly in the Factors list
- Select a factor from the list to be the default
- Click once on the <Set Default> button in the Change/Add Factors window
- Click once on the <Ok> button in the Change/Add Factors window

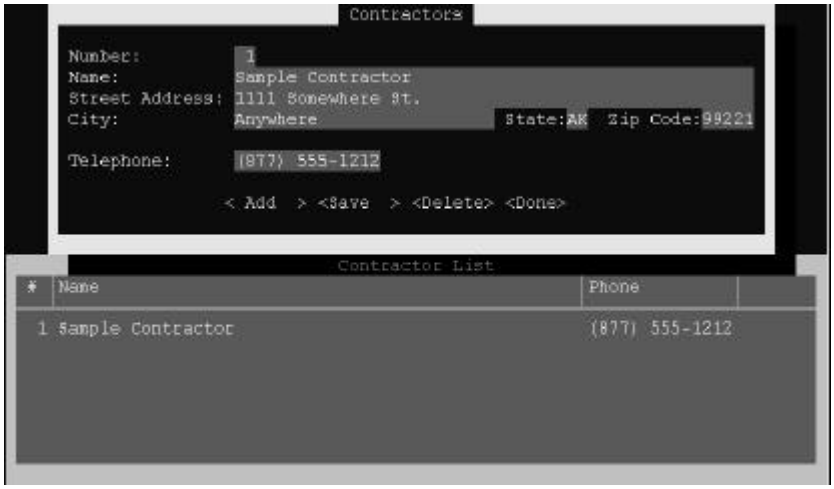
### More Information

Only the owner can access Factors. This option is disabled on the contractor's computer. The file PDS3.OVL stores the factor information. Once the owner sets the factors, they should copy this file to the contractor's computer into the data directory.

## Contractors

### Basic Steps

- Select User Settings from the Utilities menu
- Click once on the <Contractors> button




- Click once on the <Add >button on the Contractors window
- Enter the information in the blanks provided
- Click once on the <Save> button

### More Information

There can be more than one contractor entered and used in PDS. When using more than one contractor you have to assign factors to each one. For example, contractor 1 would use factors “A” and “B”; contractor 2 would use factors “C” and “D”.

Edit contractor data by selecting the contractor from the list. The information will display in the Contractors window. Edit the information and click on the <Save> button. To delete a contractor select the contractor from the list and click on the <Delete> button.

## Additional User Settings

### Date Format

There are two choices for date format. They are American and Military. PDS uses this format for every date within the program. American format will display and accept date input as Month/Day/Year whereas military format is Day/Month/Year. Take January 15, 1996 for example. American format for this date is 01/15/96. Military format for this date is 15/01/96.

### Sticky Menus

Menus can be sticky like most Windows® applications or non-sticky like most MacIntosh® applications. An “X” in the brackets indicates that sticky menus is on. Click on the “X” to turn it off.

### Bell

PDS uses a bell at the end of each field to notify the user the field has been completed. The bell is on if an “X” is in the brackets. Click on this “X” to turn the bell off.

### Clock

PDS displays a clock on the menu bar at the right side of the screen. The clock is on if an “X” is in the brackets. Click on this “X” to turn the clock off.

## 50 Line Display

PDS allows the user to have a 50 line display instead of the standard 25 line display. 50 Line display is on if a “X” is in brackets. Click on this “X” to use the 25 Line Display.

# Projects

## Creating, Opening, Closing & Deleting

This begins any new project. You first must create it by selecting *New* from the menu *File*. If the project has already been created then you *Open* it by selecting Open from the menu *File*. *Close* is rarely used because PDS automatically closes a project when a new one is opened or when you exit. *Delete*, of course, is used when you need to delete a project and all supporting data.

## Create

### Basic Steps

- Select *New* from the *File* menu
- Enter the Project Number
- Enter the Project Title
- Change the contractor (if necessary)
- Click on the <Ok> button to save the new project

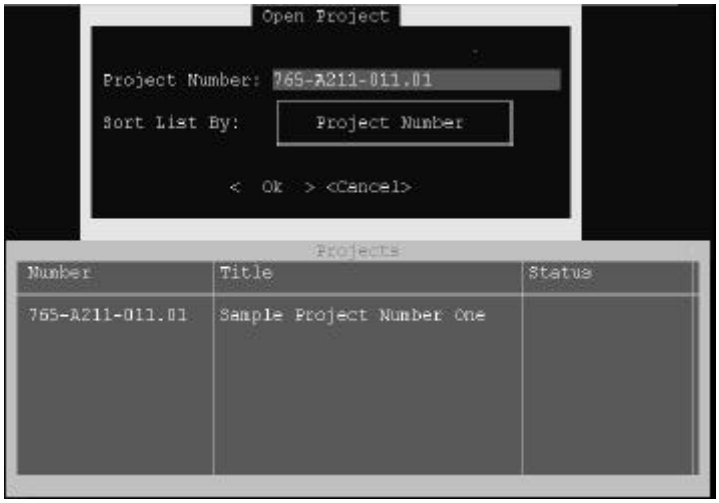
### More Information

Selecting *New* will open a small window in which you will enter some basic project information. The project number may have characters (dot, dashes, letters or numbers) pre-entered. These pre-entered characters are established using the number pattern field on the user settings window.

It is rare that more than one contractor will be loaded in PDS at one time. The default will probably be fine. If you do need to change the contractor you must click the box with the mouse and hold down the mouse button. Drag the pointer to the new contractor and release the mouse button. The new contractor will appear inside the box.

## Open

### Basic Steps




- Select *Open* from the *File* menu
- Click Once on the "Projects" window
- Click on the project to open
- Click once on the "Open Project" window
- Click on the <Ok> button

**OR**

- Select *Open* from the *File* menu
- Type the project number in the blank provided
- Click on the <Ok> button

### More Information

The file open window does a great deal more than just open a project. You can actually edit data on the "Projects" window. Some fields such as project number are locked and therefore can not be edited. Other fields, however, such as descriptions and dates can be edited on this window without the project actually being opened. To edit information, select the window first by clicking once on the title bar. Now click on the field you want to edit. The cursor should blink in the field. Type in the new information.

You can sort the list by changing the sort list by drop down box. Select this drop down box to view the different choices.

## Close

- Select *Close* from the *File* menu (Only works if a project is open)
- Project is Closed

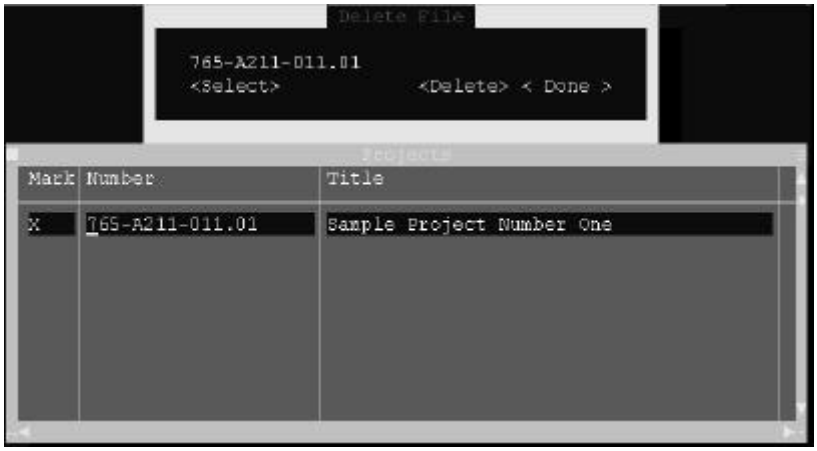
### Basic Steps

### More Information

PDS shows the number and title of the open project on the second to the last line on the desktop. There are no projects open if the desktop is blank. Closing a project does not change the status of saved information.

## Delete

### Basic Steps



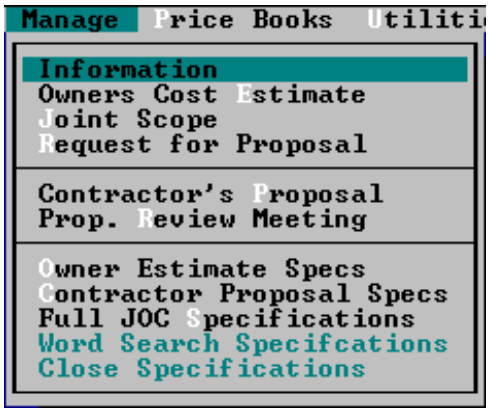
- Select *Delete* from the *File* menu
- Select the "Projects" window
- Click on the project to be deleted
- Click on the <Select> button on the "Delete File" window
- Repeat the previous two steps for each project to delete
- Select the <Delete> button from the "Delete File" window
- A new window will appear with the title of the first project to be deleted and four buttons **Select:**
- <Delete> to delete each selected project one at a time
- <Delete All> Selected to delete all selected projects at one time
- <Do Not Delete> to skip the currently displayed project (even though you selected it)
- <Cancel> to skip the remaining projects selected for deletion

### More Information

You really have to want to delete a project to remove it from PDS. The extra steps safeguard against accidental deletion. Once you get to the second window (the red one with all the buttons) you will not be warned again. Deletion is semi-final. PDS does not have the capability to undelete a project. An

experienced data base user using a third party data base program can actually undelete information. *Pack Data Bases* is a choice under the *Utilities* menu. Once it is run it is impossible to undelete information. Pack Data Bases is discussed in Chapter 9 - Other Useful Utilities.

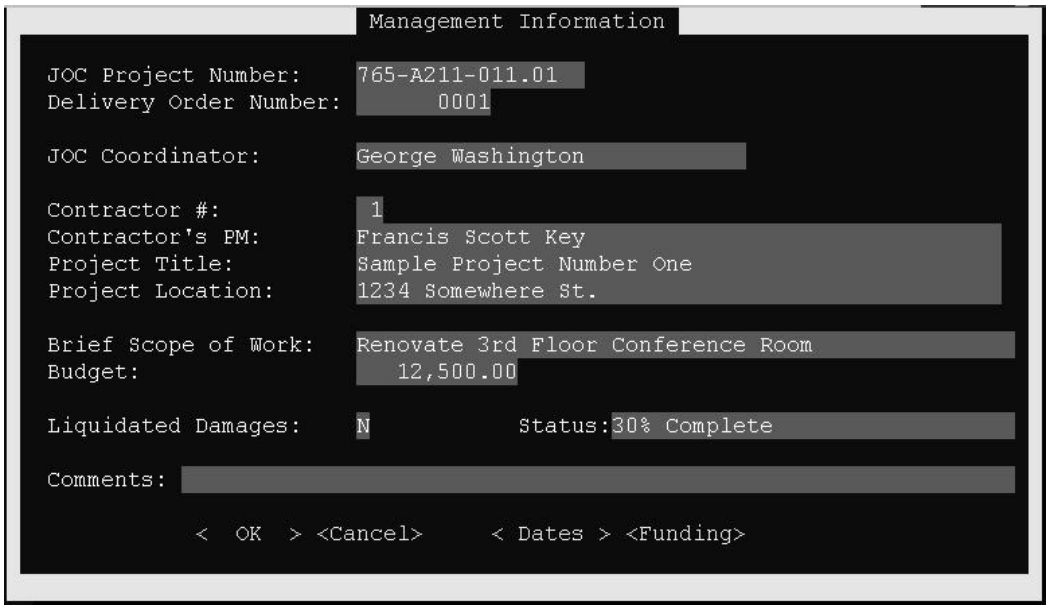
## Managing Projects

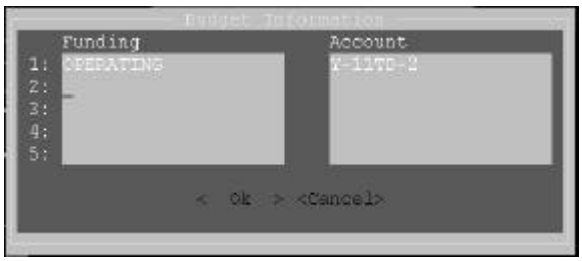



Managing a project is what PDS is all about. There are seven parts to PDS management. They are Information, Cost Estimate, Joint Scope, Request for Proposal, Contractor's Proposal and Proposal Review. This chapter deals with all but the estimate and proposal. Estimates and proposals are worthy of their own chapter. The JOC Specifications have also been added here, allowing review of the entire specification or just those relative to the line items in the current proposal or estimate.

## Information

### Basic Steps






- Select *Information* from the *Manage* menu

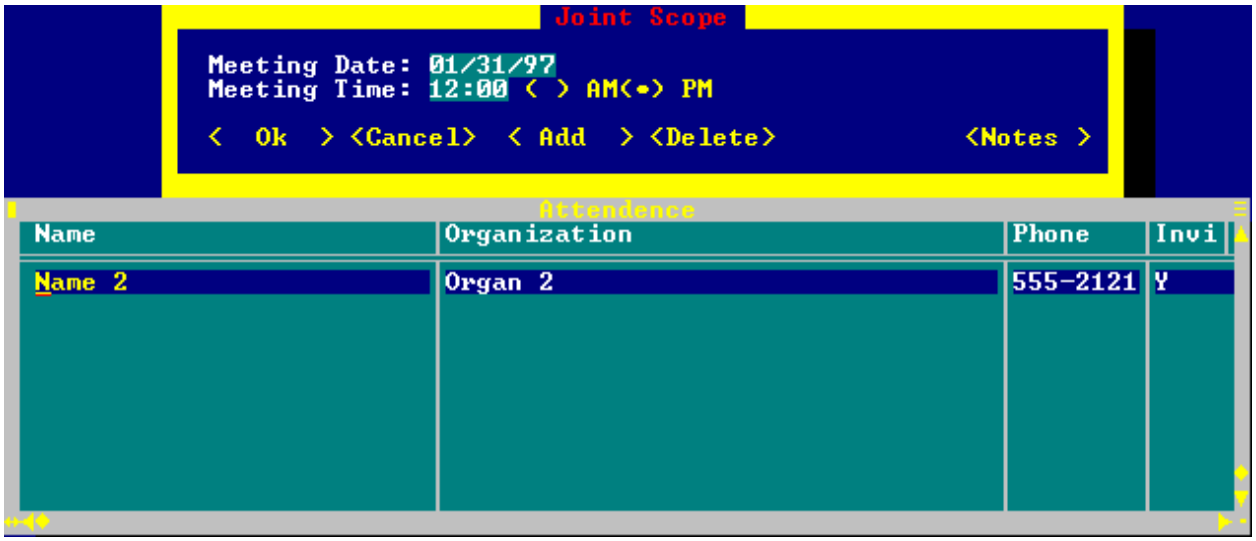
- Enter the data in the fields provided
- Click once on the <Dates> button to access the date fields
- Enter appropriate dates
- Click on the <Ok> button to save the dates
- Click on the <Funding> button to access the funding fields
- Enter funding as appropriate (up to five funding sources)
- Click once on the <Ok> button to save the funding
- Click once on the <Ok> button on the main information window to save all changes

### More Information

The information window can be completed as the project progresses. Dates are a perfect example of this. You may not have fixed a construction schedule when the project is created but will likely have one established by the time the you approve the contractor's proposal. Simply access the information window again and enter the new data.

Selecting <Ok> on the Dates and Funding windows will not save the data. You must select <Ok> on the main information window to save information on the subsequent Dates and Funding windows. Selecting Cancel on the Dates and Funding windows will only cancel recent, non-saved information from these windows.

## Joint Scope




### Basic Steps

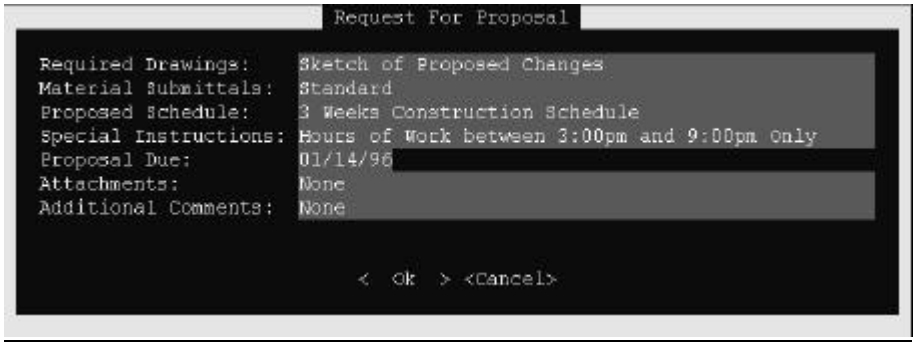
- Select *Joint Scope* from the *Manage* menu
- Enter the date of the Joint Scope meeting
- Enter the time of the meeting
- Select AM or PM with the Mouse
- Click once on the <Add> button

- Click once on the Attendance browse list
- Enter the person and information on the line provided in the Attendance list
- Repeat the two steps above for each person to be invited and those that attended the joint scope meeting
- Click once on the <Notes> button to add comments.
- Click the <Ok> button to save the changes and exit

### More Information

The fields located on the Joint Scope window are the only fields saved with the <Ok> button. Names entered in the Attendance list are saved automatically once they are entered. Selecting the <Cancel> button on the Joint Scope window will have no effect on the names in the list.

## Request for Proposal




### Basic Steps

- Select Request for Proposal from the Manage Menu

- Click on the <Yes> button to update the RFP prepared date
- Enter the information required for each field
- Select the <Ok> button to save the information as entered

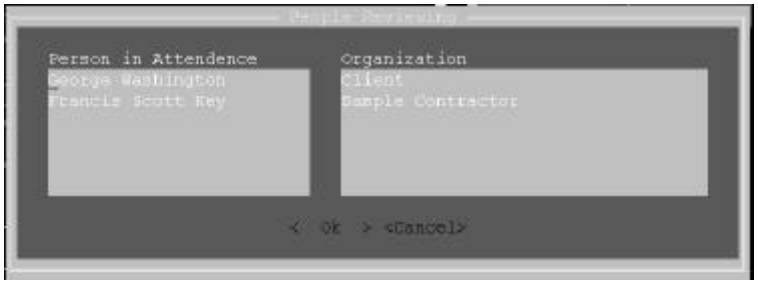
### More Information

The request for proposal window allows you to enter information that the contractor is to provide. The fields on this window will scroll to the left if the information exceeds the space available to a length of 120 characters. Try to be brief. The information on this window is set to print on one page. If the information runs onto two pages the Request for Proposal Report will look confusing.

# Proposal Review

## Basic Steps

- You must go through the Validation Process before you can do the following (See Chapter 8 - Validate Proposals)
- Select Prop. Review Meeting from the Manage menu
- Two windows will appear (Proposal Review and Review)
- Click once on the Review window
- Click once on the submittal to review
- Click once on the Proposal Review window
- Enter information in the fields provided
- Click once on the <People> button

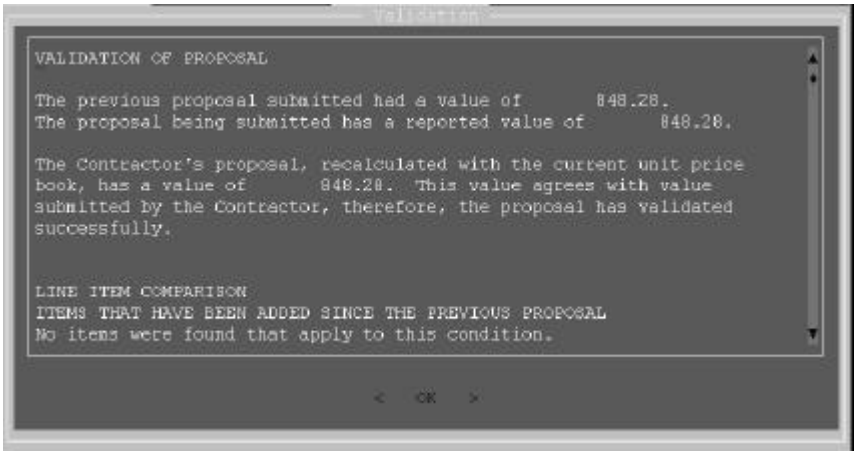



- Enter the people and their respective organizations that reviewed the proposal
- Click once on the <Ok> button to save the people
- Click once on the <Ok> button to save the current review

## More Information

The proposal review is an audit trail of the proposal submittal and review process. Each proposal submitted by a contractor and validated by the owner will appear in this list. Use the various fields and buttons to manage the list and information concerning the review process.

It is possible to validate a proposal more than once. It will appear in the list just as many times as it is validated. When this happens you should delete the proposals with identical dates from the bottom of the list first. Each proposal validated performs a comparison to the previous proposal submitted. If the same proposal is validated twice, the first one would show changes from the previous and the second would show no changes.



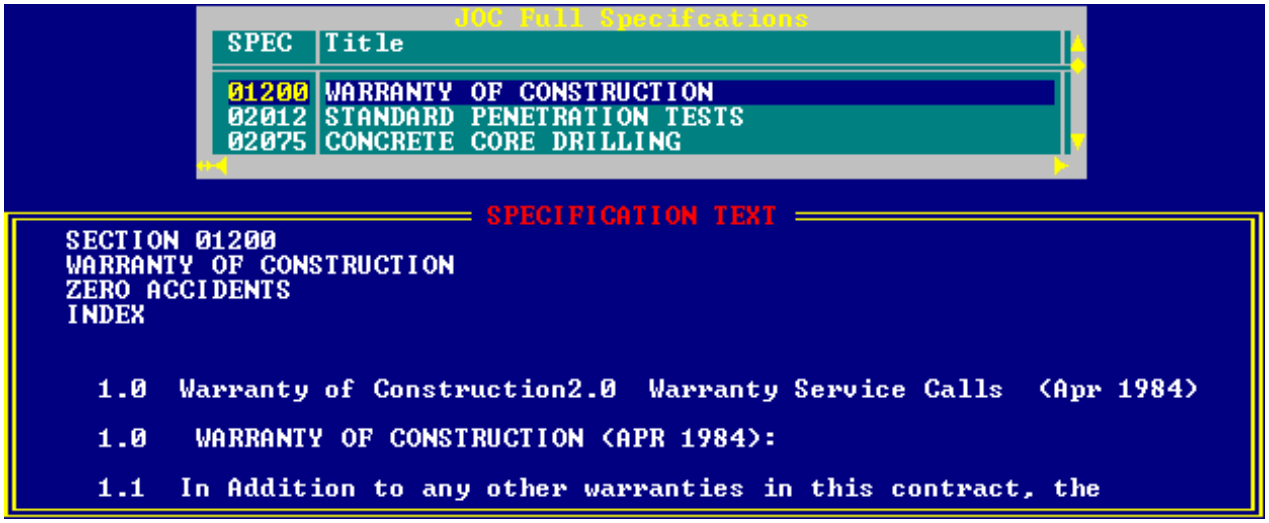

You can view the validation and comparison be selecting the <Validation> button on the Proposal Review window. The validation window that appears is read-only. This information can be printed using the *Report* feature under the *File* menu.

You must save information for each proposal record prior to moving to another record. A warning message asking you to save information will display when you move to another record without saving first.

Use caution when deleting proposal reviews. This is the only record of receipt of a proposal and it holds all information regarding changes and reviews. Click once on the Review window to begin the process of deleting a review. Click once on the review you want deleted. Click on the <Delete> button on the Proposal Review window. PDS will confirm that you want to continue with the deletion. Once you click on the <Yes> button, the selected proposal review will be permanently removed.

## Full JOC Specifications

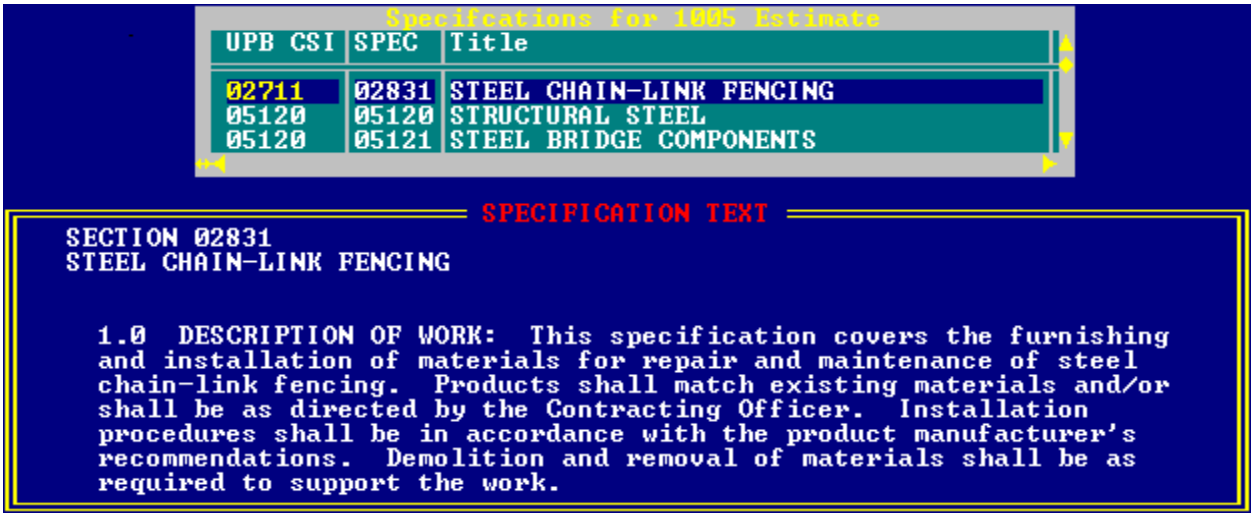
Basic Steps




- A project must be open to use any of the Specifications features.
- Select JOC Full Specifications from the Manage menu.
- Two windows will appear (JOC Full Specifications and Specification Text)
- Scroll through the JOC Full Specifications window. The Specification Text window will display the text of the specification title highlighted in the top window.
- To view beyond what is displayed in the Specifications Text window. Click once in the specifications Text window and then scroll down to see more text.
- To search for a specific word in the Specification Text window select Find from the Edit menu.

## Owner Estimate Specs / Contractor Proposal Specs

### Basic Steps

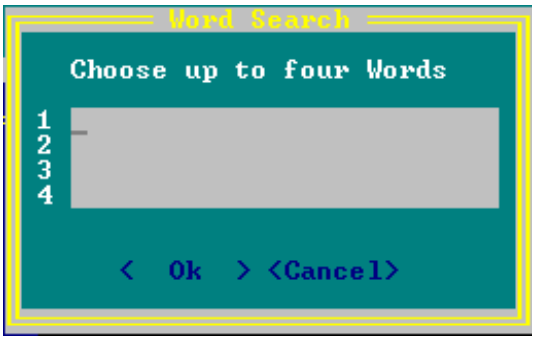



- A project must be open to use any of the Specifications features.
- Select Owner Estimate Specs from the Manage menu.
- Two windows will appear (Specifications for Estimate and Specification Text)
- The Specifications for Estimate window contains a list of all the specifications which the open Estimate line items are related to. Scroll through the top window to select a specific title. The Specification Text window will display the text of the specification title highlighted in the top window.
- To view beyond what is displayed in the Specifications Text window. Click once in the specifications Text window and then scroll down to see more text.
- To search for a specific word in the Specification Text window select Find from the Edit menu.
- Repeat for Contractor Proposal Specs.

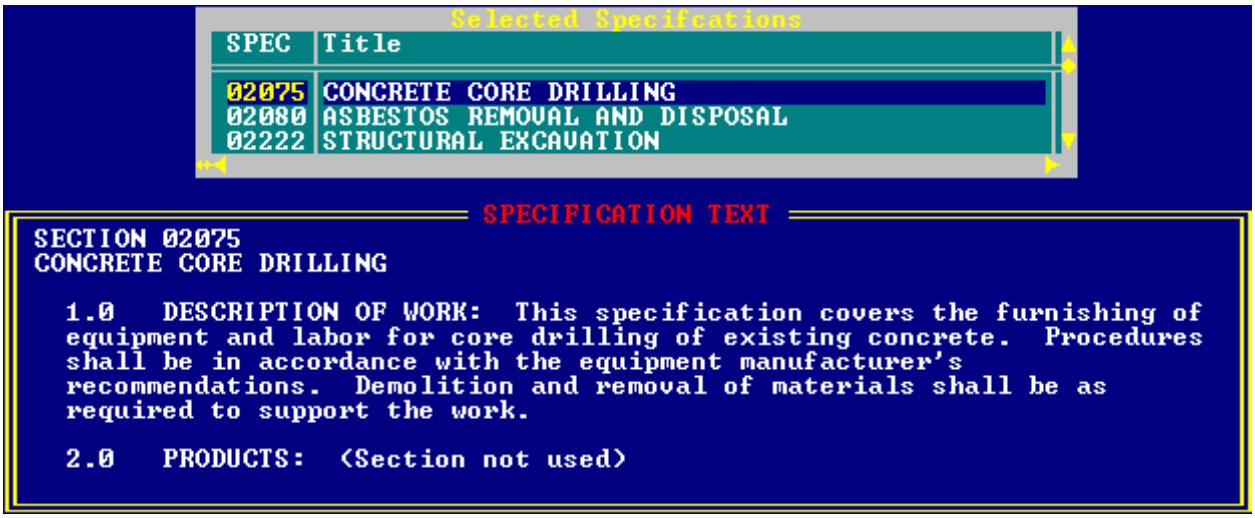
## Word Search Specifications

### Basic Steps

- A project must be open to use any of the Specifications features.
- Full, Owner or Contractor Specifications must be open to use the Word Search .
- Select *Word Search Specifications* from the *Manage* menu.




- A window will appear with 4 blank lines. Enter up to four words to search the entire specifications for and click <Ok> button. This function is identical to the UPB Word Search




- Two windows will appear (Selected Specifications and Specification Text)
- The Selected Specifications window contains a list of all the specifications which contained each of the four words entered into the search window. Scroll through the top window to select a specific title. The Specification Text window will display the text of the specification title highlighted in the top window.
- To view beyond what is displayed in the Specifications Text window. Click once in the specifications Text window and then scroll down to see more text.
- To search for a specific word in the Specification Text window select *Find* from the *Edit* menu.

# Estimates & Proposals

Estimates are used by the owner to create an estimate to accomplish the proposed work. Proposals are used by the Contractor to determine the price for a specified scope of work. Estimates and proposals are essentially the same. This chapter uses estimates for all text and examples. The words estimate and proposal can be interchanged except where noted.

This chapter discusses opening the estimate, adding items and modifying items. For more information on the unit price book see Chapter 7 - Unit Price Books.

## Opening an Estimate

### Basic Steps

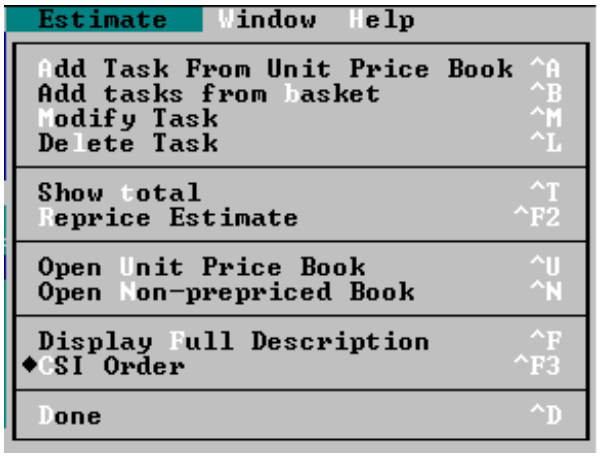
- Select *Estimate* from the *Manage* menu

- Click once on the <Yes> button to save the current date to the Estimate Prepared date

### More Information

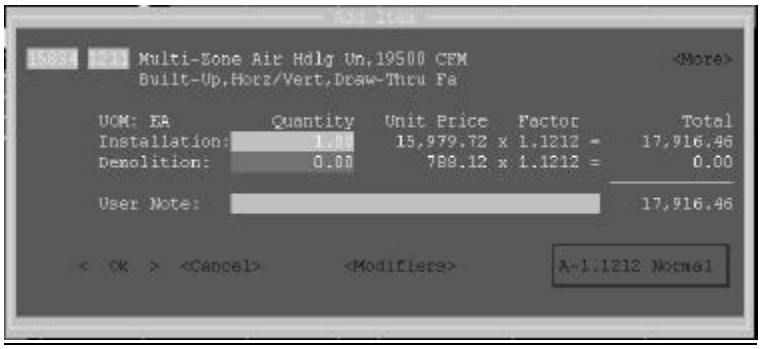
More than one person can work on the same estimate at one time. Each time an estimate is opened it is recalculated. This requires PDS to scan through all of the items in the estimate and determine a total value. When multiple users are in the same estimate, PDS will only recalculate for the first user. Just the opposite is true for exiting the estimate. The estimate will recalculate only for the last person to exit the estimate.

PDS will ask if you want to change the estimate Date Prepared field to the current date (PDS does not ask for proposals). Select Yes if you want the Date Prepared field to be the current system date or No to perform no changes to the field.



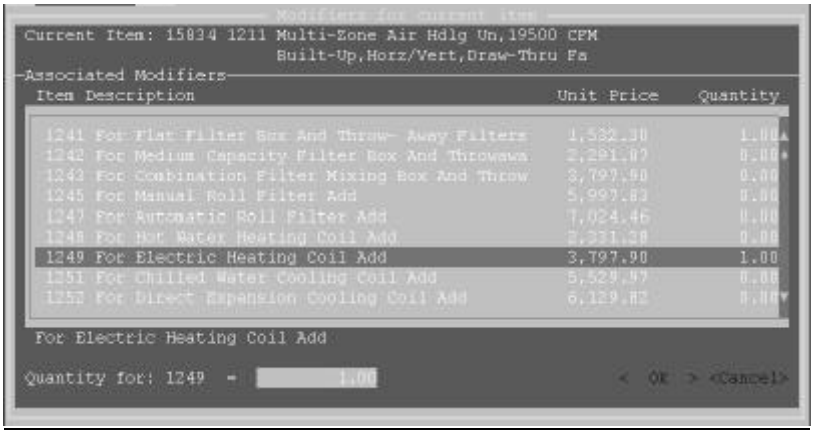

There are two windows that display on the desktop when you enter the estimate. One shows the total value of the estimate while the other shows detailed information for each item in the estimate. In addition to the two windows, an additional menu appears called Estimate. You will use this menu to make modifications to the estimate.

## Adding Tasks




### Basic Steps

- Select *Add Tasks From Unit Price Book* from the *Estimate/Proposal* menu
- Enter the CSI number of the item to be added
- Enter the quantity for installation
- Enter the quantity for demolition
- Enter a note (optional)
- Change the Factor with the drop down box (optional)
- Click once on <Ok> to save the new item
- Repeat steps above for all tasks to be added
- Click once on the <Cancel> button to end the adding of items




### Modifiers

- On the Add Task window Click once on the <Modifiers> button
- Select the modifier to add from the list
- Press the Tab key
- Enter the quantity for the selected modifier
- Repeat the three steps above for all modifiers to be added

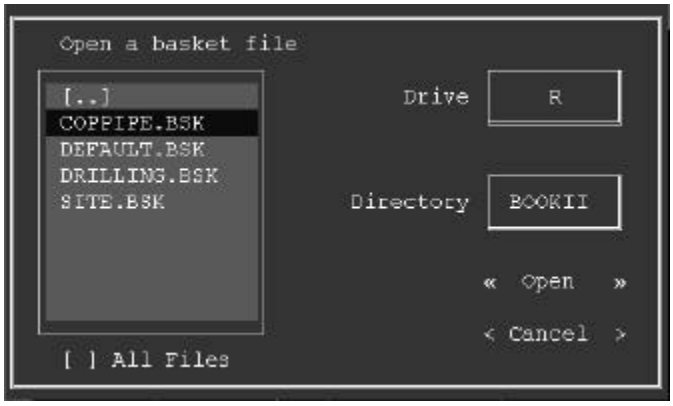
### More Information

This is only one method of adding items to an Estimate. It is most effective for people that review the paper copy of the UPB, write down the CSI numbers and enter the numbers in PDS. You can enter both UPB tasks and Non-prepriced tasks in this way.

The <More> button on the Add Task window allows the you to view the full description of an item in a scrollable window. The description shown in the box to the right of the CSI numbers is the line item level only. The <More> button will be disabled until a legitimate task is entered into the CSI fields.

There are two other methods of adding tasks to an estimate. One, through the use of Baskets. Two, directly from the electronic version of the Unit Price Book.

## Baskets



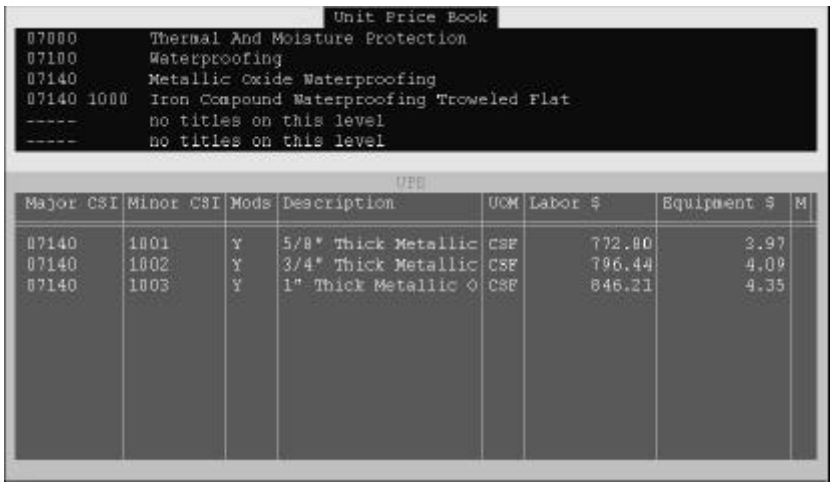

### Basic Steps

- Select *Add Tasks From Basket* from the *Estimate* menu
- Using the Open File Dialog, Find the basket you want to add
- Select the <Open> button
- All tasks in the selected Basket will be added to the estimate
- The quantities will be set to zero
- The factors will be set to the current default
- Modify the new tasks to reflect the proper quantities and factors

### More Information

Baskets are used to store UPB and Non-prepriced tasks to be used at a later time. Once stored, these baskets can be used on any estimate. Chapter 7 - Unit Price Books discusses the creation of baskets. You can create baskets while working on an estimate by selecting either *Open Unit Price Book* or *Open Non-prepriced Book* from the *Estimate Menu*. Once these price books are open they work exactly as if they were opened from the main menu.

## UPB Directly




### Basic Steps

- Select *Open Unit Price Book* from the *Estimate* Menu
- (See Chapter 7 - Unit Price Books, for more information on displaying certain tasks)
- Select the task to add to the estimate (Click on the task list then on the task)
- Select *Add Task to Estimate* from the *UPB* menu
- Repeat the steps above as many times as necessary
- Select *Close UPB* from the *UPB* menu
- The quantities will be set to zero
- The factors will be set to the current default
- Modify the new tasks to reflect the proper quantities and factors

### More Information

This method works well for adding tasks to the unit price book while browsing the UPB. You can not, however, add modifiers using this method. After adding the tasks to the estimate, select the task that should have modifier(s). Select *Modify Task* from the *Estimate* menu. The Add Task window will appear with the task displayed. Follow the directions for modifiers above to add the modifiers.

## Non-Prepriced Book Directly

### Basic Steps

- Select Open Unit Non-Price Book from the Estimate Menu
- Select the task to add to the estimate (Click on the task list then on the task)
- Select *Add Task to Estimate* from the *Non-pp* menu
- Repeat the steps above as many times as necessary
- Select Close *Non-pp Book* from the *Non-pp* menu
- The quantities will be set to zero

- The factors will be set to the current default
- Modify the new tasks to reflect the proper quantities and factors

## Modifying Tasks

Modifying tasks is best accomplished by using the estimate task list like a spreadsheet. You can change quantities, factors and notes. You accomplish this by selecting the field to change and typing the new value. The alternative is typically used if modifiers are to be added to a task.

### Basic Steps

- Select the task from the estimate list
- Select *Modify Task* from the *Estimate* menu
- The Add Task window will appear with the selected task displayed
- Enter the new quantities, user note and/or modifiers
- Click on the <Ok> button to save and exit the Add Task window

### More Information

Modifying Tasks using the menu choice *Modify Task* is little different than adding a task. The only difference is that you are unable to key in the CSI number if you modify the task. You can never change a CSI number. You must delete a task with the wrong CSI number and then add the correct task to the estimate.

The estimate task list can be customized as described in the Chapter 2 - Window Controls. Customizing the position of the columns and column widths can make it easier to modify the tasks.

## Deleting Tasks

### Basic Steps

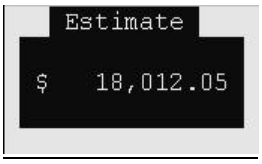
- Select the estimate task list
- Select a task in the list by clicking once on it
- Select *Delete* from the *Estimate* menu
- A warning will appear

- Click on the <Yes> button to delete the selected task
- Click on the <No> button to leave the selected task
- Click on the <Cancel> button to delete the task and to turn off the warning for future deletions

### More Information

Delete a task that no longer is needed in an estimate. If the task you delete has modifiers associated with it, they too will be deleted. The warning that displays when you first delete a task during each estimate session can be disabled. The <Cancel> button will delete the task but also disable the warning. **This goes against conventional use of the <Cancel> button so understand that your task will be deleted should you select this button**. Select the <No> button if you do not want to be warned about deletions during this estimating session.

## Show Total




### Basic Steps

- Select *Show Total* from the *Estimate* menu
- The Estimate Total window will show the current total for the estimate

### More Information

When more than one person is working in the same estimate at the same time, the total will not be correct. Only after all users exit from the estimate will the total be updated correctly.

## Reprice Estimate

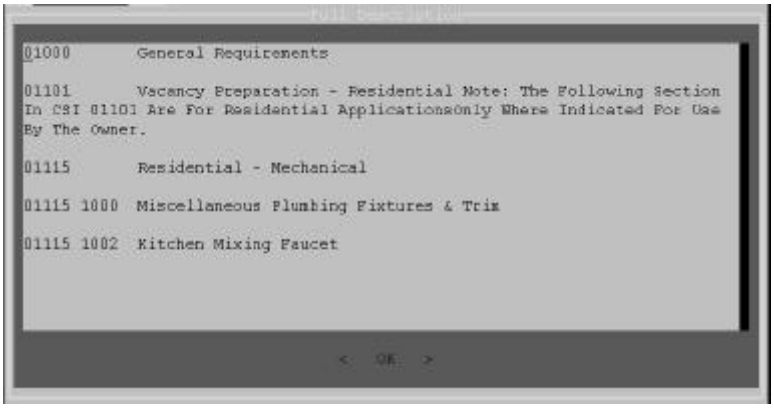
### Basic Steps

- Select *Reprice Estimate* from the *Estimate* menu
- The estimate is repriced based on the current Unit Price Book

### More Information

Reprice Estimate is used if the Unit Price Book is changed after the estimate has been prepared. The new unit prices will be pulled into the existing estimate and the estimate total updated.

## Display Full Description




### Basic Steps

- Select a task from the estimate task list
- Select *Display Full Description* from the *Estimate* menu
- The full description window will appear
- Select the <Ok> button to clear the window

### More Information

The estimate task list shows only the line item level title. Display full description allows you to view every title level in a scrollable window.

## CSI Order

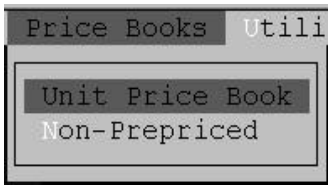
### Basic Steps

- Select *CSI Order* from the *Estimate* menu
- The menu will be marked or unmarked

### More Information

CSI Order is used to change the task list between CSI Order and Entry Order. When the menu choice is marked with a diamond to the left, the estimate tasks are in CSI order. When the menu is not marked, the list is in entry order. Selecting *CSI Order* from the menu alternates the order for the list.

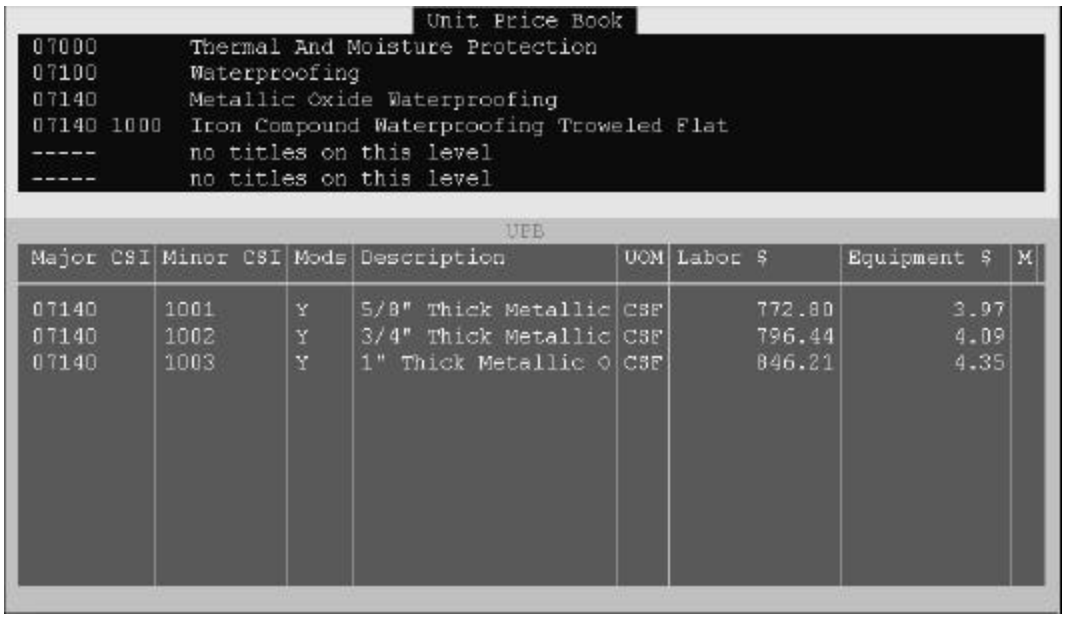
# Unit Price Books



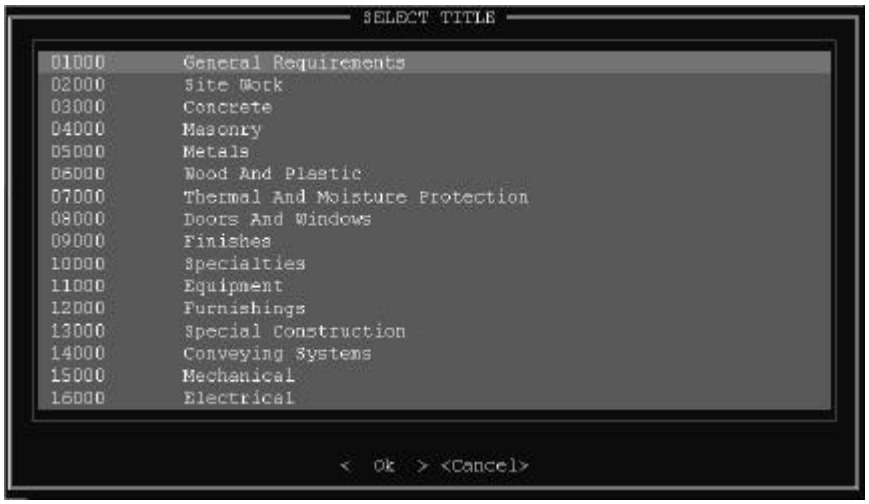

PDS works with two price books. One is the Unit Price Book that is bid with the JOC contract. The other is the Non-Prepriced Price Book that is developed as the need arises during the execution of a JOC contract. Non-prepriced tasks are those that are necessary for a particular project but are not located in the Unit Price Book.

## Unit Price Book

### Basic Steps




- Select *Open Unit Price Book* from the *Estimate* Menu
- Change the titles in the upper window Unit Price Book by clicking on a title level once




- Click once on the new title from the list that displays
- Click on the <Ok> button to accept the new title
- View tasks in lower window UPB which correspond to the titles you selected
- You can add tasks to estimates if the UPB was opened from an estimate

## More Information

The unit price books can be accessed directly from the main menu or through an estimate. It functions the same way except for one difference. You can not add a task to an estimate if the Unit Price Book was opened from the main menu. The menu choice *Add Task to…* under the *UPB* menu is unavailable under this circumstance.

Two menus appear when opening the Unit Price Book. They are *Baskets* and *UPB.* Each are described in this chapter.

## Word Search

## Basic Steps

- The UPB must be open
- Select Titles *On/Off* from the *UPB* menu
- Select *Word Search* from the *UPB* menu
- Enter up to four words (all words must be found in the task title)
- Click once on the <Ok> button

## More Information

The unit price book titles must be turned off in order to perform a word search. All words entered in the word search must be found in the task title for PDS to include the task in the list. This may take several minutes depending on the speed of your computer.

## Baskets

Baskets are actually files that save UPB item numbers for future use. You choose which CSI numbers are stored in a basket by browsing the UPB and selecting tasks. You can even mix UPB tasks with Non-prepriced tasks in the basket. Some have called baskets "dumb assemblies". Assemblies because you can add tasks that correspond to a specific requirement like fencing. Dumb because you can not attach quantity ratios to the tasks. The tasks from a basket are added to an estimate with a quantity of zero and a default factor. This is how you create a basket and add tasks to it.

### New Baskets

## Basic Steps

- Select *New Basket* from the *Basket* menu
- Enter a new name for the basket
- Click on the <Save> button
- Make the new basket smaller by dragging the lower right corner
- Click on the UPB list to bring it forward

## More Information

Creating a new basket save the file into which you will store tasks. You must make the basket list smaller so that the UPB list become visible. Review Chapter 2 - Window Controls if this sounds confusing. Click once on the UPB list to bring it to the top of the desktop. The basket will appear half under the UPB list and half over the UPB titles window. This is normal. It is not necessary to see the basket as you add tasks to it. Don't be alarmed if it disappears completely. More than likely it is covered by other windows on the desktop. To bring the basket to the top, select *Show Current Basket* from the *Basket* menu.

### Save Basket

## Basic Steps

- Select *Save Basket* from the *Basket* menu
- PDS will let you know the basket has been saved

## More Information

Baskets are not automatically saved. You must periodically save baskets with the menu choice *Save Basket*. PDS will warn you to save your basket if you choose to open, create a new one, close the existing one or close the Unit Price Book. If you do not save when warned your basket changes will be lost.

### Save Basket As

## Basic Steps

- Select *Save Basket As* from the *Basket* menu
- PDS will let you know the basket has been saved

## More Information

This function will save your current basket with a different name. Effectively it creates a copy. This useful for turning a general basket into several more specific baskets. Basket files can be copied to a disk and shared with other users using the export basket option.

### Open Basket

## Basic Steps

- Select *Open Basket* from the *Basket* menu
- Select the basket from the Open file window
- Click on the <Open > button

## More Information

Baskets can be modified once they are created. Using the basket menu in conjunction with both the UPB and Non-prepriced menus, you can create a variety of personalized baskets. Only one basket, however, can be opened at any one time. You can not copy tasks from one basket to another. Use the Save Basket As option to copy existing baskets.

### Close Basket

## Basic Steps

- Select *Close Basket* from the *Basket* menu
- PDS will prompt you to save the basket first
- Select the <Ok> button to save the basket – <Cancel> otherwise

## More Information

There is really no reason to close a basket. Baskets are automatically closed when you choose other basket functions.

### Delete Basket

#### Basic Steps

- Select *Delete Basket* from the *Basket* menu
- Select the basket to be deleted from the Delete a basket window
- Select the <Delete> button
- PDS will display a warning
- Select the <Yes> button to delete the basket – <Cancel> otherwise

#### More Information

Since baskets are files on your hard drive, deleting baskets is no different than deleting a file from your hard drive. Once it is deleted, it can not be retrieve from within PDS.

### Add Task

#### Basic Steps

- Select a task from the UPB list
- Select *Add Task* from the *Basket* menu
- Repeat the steps above for each task to be added to a basket

#### More Information

The process is the same whether you are using the UPB or Non-prepriced book. You can create the basket using the *Unit Price Book* menu. Add a few tasks. Then open the basket while using the *Non-prepriced* menu and add some more tasks. **PDS allows each CSI task to be added to a basket only once**.

### Add Modifier

#### Basic Steps

- Select a task from the UPB list that has modifiers
- Select *Add Modifier* from the *Basket* menu. If the parent item has not already been added to the basket, the parent item will be added to the basket.
- Select the modifiers to add just as you do when adding modifiers to an estimate. Because baskets do not store quantities the modifier quantity is always one in a basket.

#### More Information

The process is the same whether you are using the UPB or Non-prepriced book. You can create the basket using the *Unit Price Book* menu. Add a few tasks. Then open the basket while using the *Non-prepriced* menu and add some more tasks. **PDS only allows a CSI task to be added to a basket once**.

### Delete Task

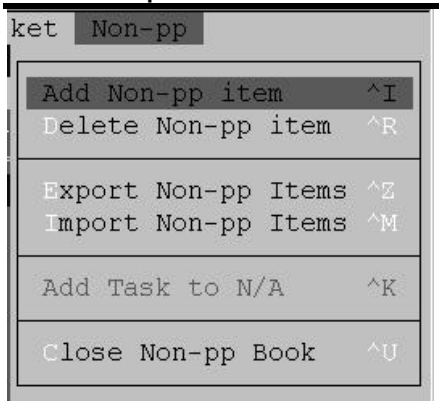
#### Basic Steps

- Select *Show Current Basket* from the *Basket* menu
- Select a task from the basket by clicking on it once
- Select *Delete Task* from the *Basket* menu
- Click once on the Basket list window
- A dot to the left of the task indicates that it has been deleted
- The task will not display next time you open the basket

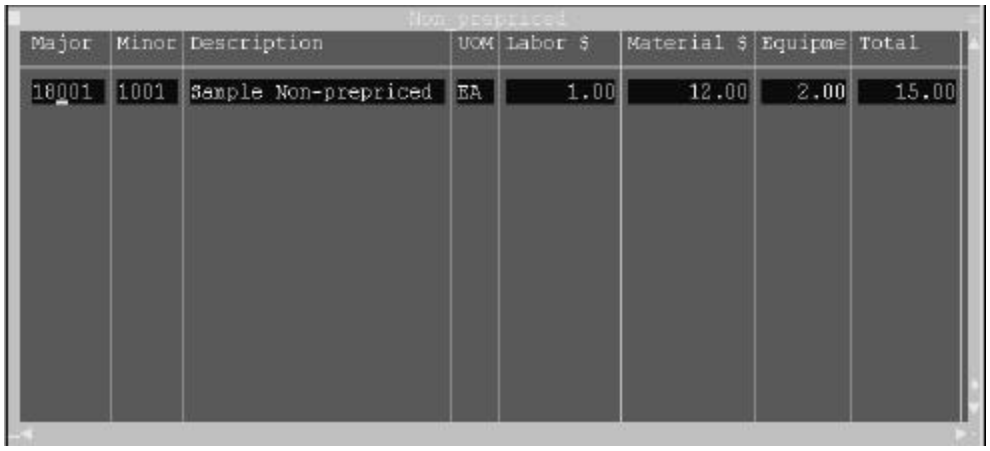
#### More Information

Tasks deleted from a basket often continue to display in the basket. The only indication that they have been deleted is the dot that appears on the left of the task. These deleted tasks will sometimes disappear when you select Show Current Basket from the Basket menu. Saving the basket will also remove deleted tasks from the basket.

## Non-Prepriced Book




Non-prepriced tasks are those necessary for completing a project but are not in the Unit Price Book. Adding tasks to estimates and using baskets are discussed thoroughly in the section on Unit Price Books and therefore will not be discussed again in this section. This section will concentrate on the use of the Non-prepriced book.



| Major | Minor | Description | UOM | Labor $ | Material $ | Equipme | Total |
|---|---|---|---|---|---|---|---|
| 18001 | 1001 | Sample Non-prepriced | EA | 1.00 | 12.00 | 2.00 | 15.00 |

## Add Non-pp Task

### Basic Steps

- From Main Menu - Select: Price Books - Select: Non-Prepriced - Select: Non-pp
- Select *Add Non-pp* Task from the *Non-pp* menu
- PDS displays a message to enter the non-pp information in the blank line, Click <Ok>
- Select the Non-pp task list
- Enter the information on the line provided
- Press tab to move to another column when PDS does not move automatically
- This information is automatically saved

### More Information

Adding a non-prepriced task is simple. The menu choice *Add Non-pp Task* creates the blank line that you use to enter the new task. Adding and modifying Non-preprice tasks is like working on a spreadsheet. Enter the appropriate information in the columns provided.

There are a couple of rules that PDS will force you to adhere to. Don't duplicate a non-prepriced CSI number. All non-prepriced CSI numbers must begin with 18. You can not change a non-prepriced CSI number for a task that has been used in an estimate previously.

One rule that PDS has no control over is the use of non-prepriced numbers on various, non-networked, computers. Coordinate the use of CSI numbers if your site falls into this category. Also coordinate the use of CSI numbers between Owner and Contractor. A person at each facility should be responcible for assigning the numbers used for non-pre-priced line items. We suggest the three remaining major CSI digits be the first three digits of a similar CSI division. For Example use 18022 for an earthwork item. The four digits of the minor CSI code can follow this system or be selected sequentially. **It is very important that a numbering system be developed and followed**.

## Delete Non-pp Task

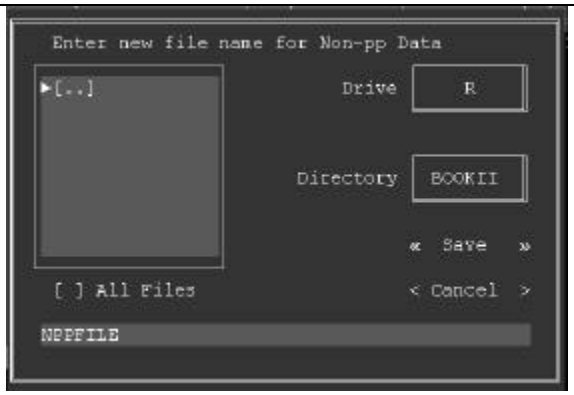
### Basic Steps

- Select the task from the Non-prepriced task list
- Select *Delete Non-pp Task* from the *Non-pp* menu
- PDS will warn you about deleting the task
- Select the <Yes> button to delete the task, otherwise <Cancel>

### More Information

PDS will not allow a task to be deleted if it has been used in an estimate. Should this occur, PDS will inform you of the condition.

## Export Non-pp Tasks



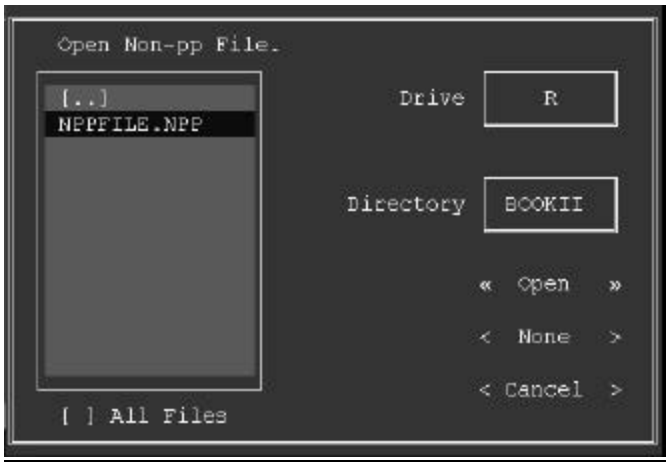

### Basic Steps

- Select *Export Non-pp Tasks* from the *Non-pp* menu
- Enter a name and location for the export file
- Select the <Save> button

### More Information

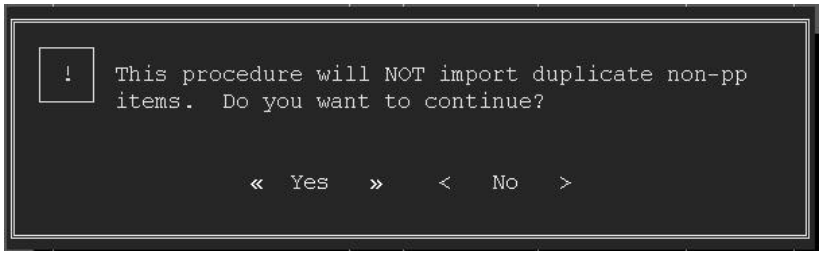
Export Non-prepriced Tasks is used to transfer non-prepriced tasks between non-networked computers. It simply copies all non-prepriced tasks to a file. Should you choose an existing file name when naming the file, PDS will overwrite the exiting file without warning.

## Import Non-pp Tasks




### Basic Steps

- Select *Import Non-pp Tasks* from the *Non-pp* menu
- Select the file to use for importing
- Select the <Open > button




- PDS will display a warning that duplicate non-prepriced tasks will not be imported
- Select the <Yes> button to continue, otherwise select <No>

## More Information

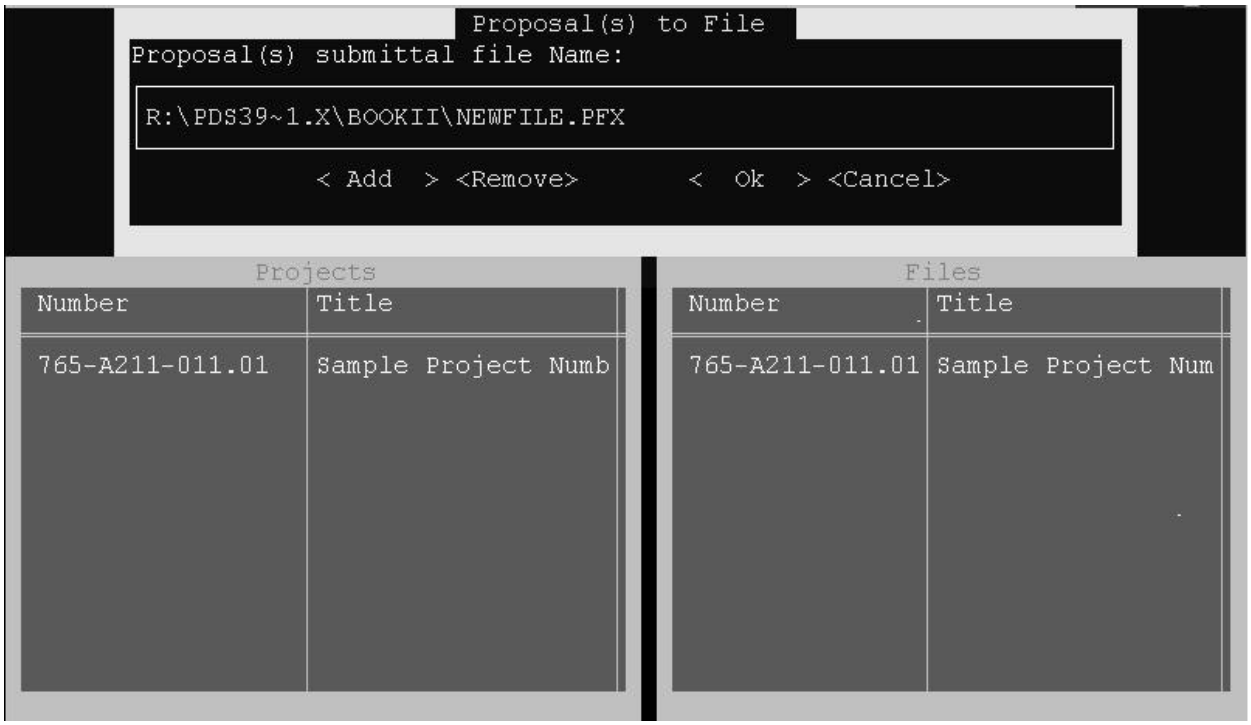
Importing non-prepriced tasks is useful if you are working on non-networked computers. Importing will not, however, update information on existing non-prepriced tasks. This must be done manually. Networked users access the same data, therefore, a change on one computer shows up on all computers.

## Transmittals

Transmittals are the functions used to get a proposal from a contractor's computer to an owner's. There are two menus associated with transmittals. The first, used by the contractor, is called *Proposal to Disk*. The second, used by the owner, is called *Validate Proposals*. These can both be found on the *Utilities* menu.

## Proposal to Disk (Used by the Contractor Only)

Basic Steps




- Insert Diskette in Drive, Select *Proposal to Disk* from the *Utilities* menu
- Click once in the box just below the words Proposal(s) submittal file Name: (behind Not Selected)
- Click once on the <New> button to open the New file window
- Enter a new file name in the space provided (DO NOT use Numbers in Filename, Use .PFX as extension. The extension will be added automatically if you do not enter it.)
- Select drive A from the drop down button (if you want to place the file on a floppy disk)
- Click once on the <Save> button
- Click once on the Projects list window
- Click once on the project to be added to the file list
- Click once on the <Add> button on the Proposals to File window
- OPTIONAL: Repeat the three steps above for each project to be added to the file

- Click once on the <Ok> button on the Proposals to File window

### More Information

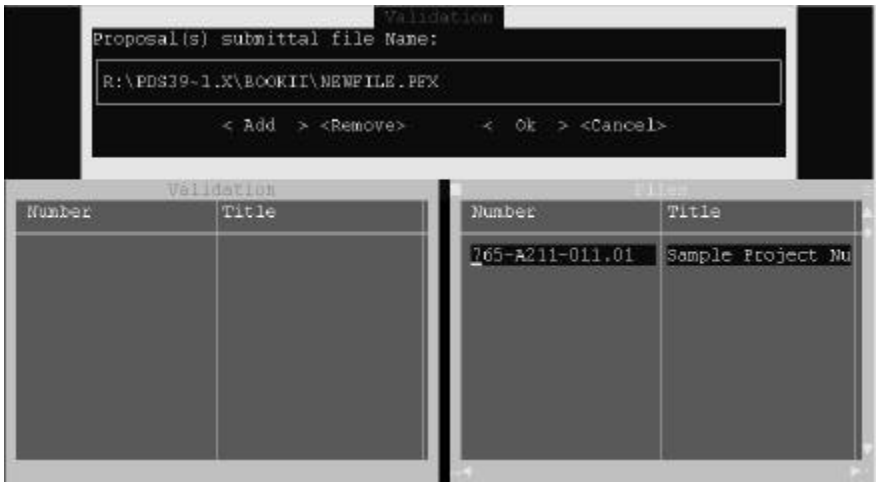
Projects added to the file window cause the window to scroll up displaying only the last project. To see all projects select the file window and scroll up.

The Proposal to Disk routine can seem confusing. It simply places one or more projects in a file that can be read by the validation routine. The two lists show projects on the PDS system and projects added to the file. The window called Project are the projects on PDS. You can place as many projects in a file as you want and as disk space will allow. The key is to open or create the file before adding projects to the file list.

Proposal files can be re-opened and modified. Use the open option when selecting a file. PDS will display the projects currently in the file. You can remove any of these projects or add to the list. When you select the <Ok> button PDS will update the file with the latest information on all files that are in the File list. Remove a project from the file list by selecting the project and then pressing the <Remove> button. There is no warning prior to the project being removed from the list.

All actions in this function effect only the File list and the file itself. Your project list and projects on PDS will not be affected.

## Validate Proposals




### Basic Steps

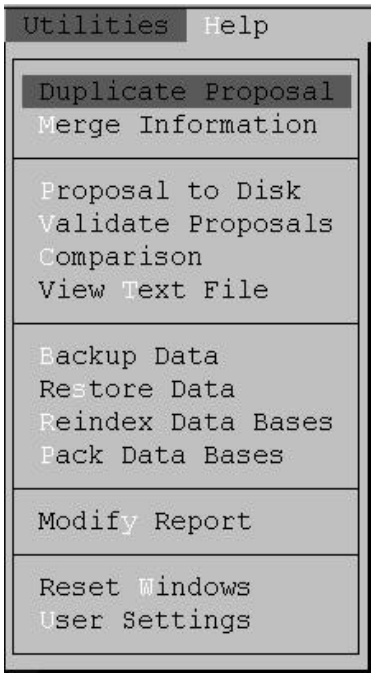
- Insert Diskette into Disk Drive (A or B) , Select *Validate Files* from the *Utilities* menu
- Click once in the box just below the words Proposal(s) submittal file Name: (Behind Not Selected)
- Select Drive A: (or B:) Select the file to open from the Open File Dialog window
- Click once on the <Open> button
- Click once on the Files list window
- Click once on the project to be added to the Validation list
- Click once on the <Add> button on the Validation window
- OPTIONAL Repeat the three steps above for each project to be added to the validation

- Click once on the <Ok> button on the Validation window

## More Information

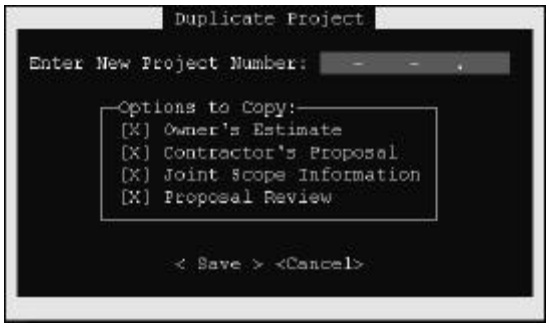
The owner uses *Validate Proposals* to import the contractor's proposal data and to verify that the unit prices are correct. The validation compares the most recent previous proposal for the same project numbers against the proposals being submitted. This procedure also tracks tasks that have been added, deleted and changed. This information is stored with the proposal review. Use the <Validation> button on the proposal review window to view the changes.

## Other Useful Utilities




There are several utilities that are useful in managing a Job Order Contract. This chapter will address all of the utilities except for Proposal to Disk and Validate Proposals (see Transmittals) and User Settings (see User Settings)

## Duplicate Project




### Basic Steps

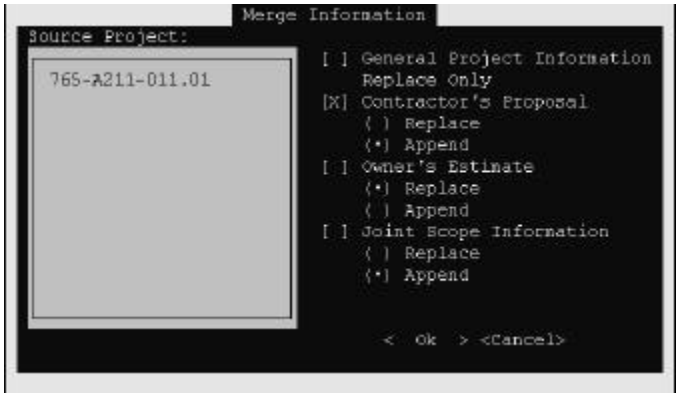
- Open the project to duplicate using the *Open* option under the *File* menu
- Select *Duplicate Project* from the *Utilities* menu
- Enter a new and unique project number
- Check off options to copy
- Click once on the <Save> button

### More Information

Duplicate Project is a quick way to start a new project with similar attributes of an existing one. It is also used when a project number changes. The copy options are used to limit the information that is copied

from the original project. If, for instance, you do not want the Owner's estimate, you would make sure this option is not checked. Once saved the project can be opened using *Open* from the *File* menu.

## Merge Information



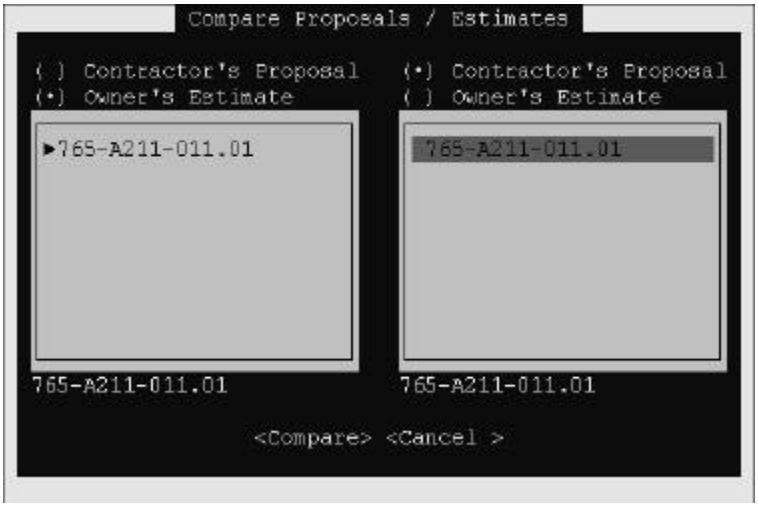

### Basic Steps

- Open the project to receive information from the merge using the *Open* option under the *File* menu
- Select *Merge Information* from the *Utilities* menu
- Select the project from which information is to be merged (source)
- Select the options for the merge
- Click once on the <Ok> button to begin the merge

### More Information

Merge information provides a way to get information from one project to another. Both projects must already exist. The project to receive the information must be open. The options, General Project Info., Contractor's Proposal, Owner's Estimate, and Joint Scope Info. can be chosen from check boxes to the right of the list of projects. If you choose General Information, it will overwrite the general information in the open project. PDS will warn you if you choose this option. For all other options you can replace or append the data. Replace means to delete the corresponding data from the open project and merge in the data from the source project. Append means to leave all data intact in the open project and append it with data from the source project.

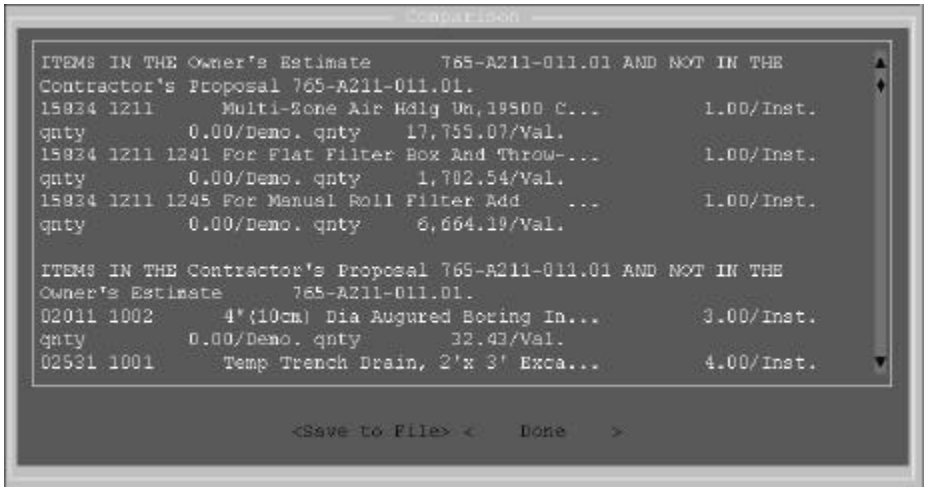
## Comparison



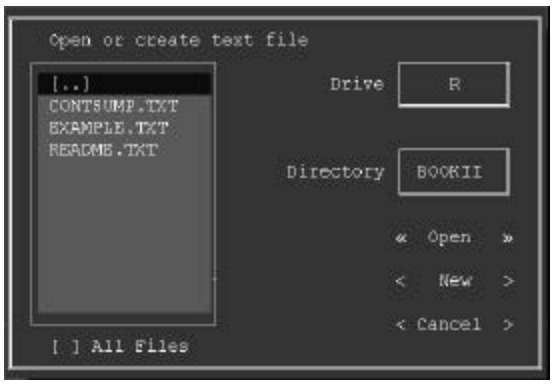

### Basic Steps

- Select *Comparison* from the *Utilities* menu
- Select Contractor's Proposal or Owner's Estimate on the left side
- Select Contractor's Proposal or Owner's Estimate on the right side
- Select a project from the left list
- Select a project from the right list
- Click once on the <Compare> button

### More Information



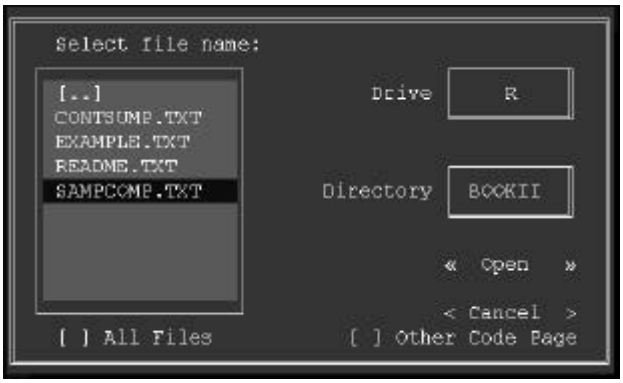

Comparison can be used to compare two estimates, two proposals or estimates against proposals. Select a project from each of the lists and designate whether to use the proposal or estimate. The comparison will display in a small window. Save this information by clicking once on the <Save to File> button.



You have two options to save a text file. The first is to save the file by overwriting an exiting text file. To do so select the file to be overwritten and then select the <Open> button. If you want to create a new text file select the <New> button. PDS will display another window where you can type the name of the new file. Select the <Save> button to save the information to the new text file. This information can be later view by using the option *View Text File* under the *Utilities* menu.

## View Text File

### Basic Steps




- Select View *Text File* from the *Utilities* menu
- Select the file from the list displayed
- Select the <Open > button

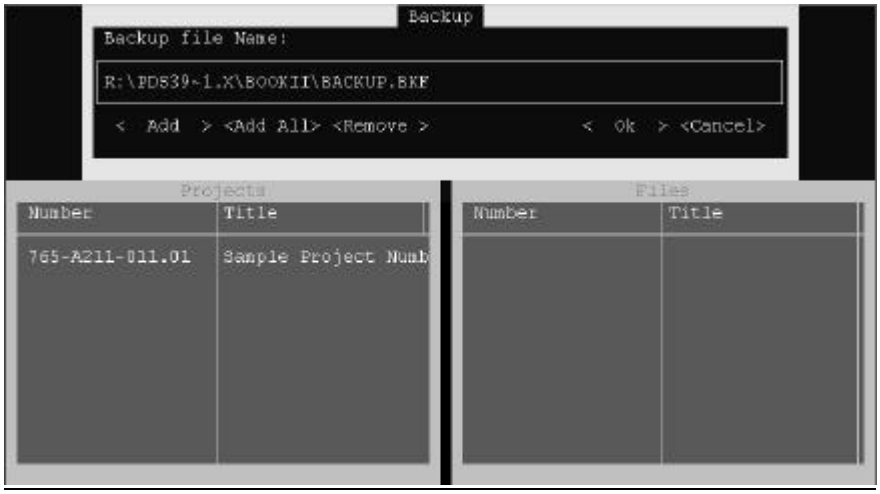
### More Information

This utility was added so that you could view comparison files without printing them. The module was set to open files with an extension of “TXT”, therefore, other files will not show in the file list.

```
SAMPCOMP.TXT [Read Only]
  L: 1      C: 1    Ins         Num
ITEMS IN THE Owner's Estimate      765-A211-011.01 AND NOT IN THE
15834 1211      Multi-Zone Air Hdlg Un,19500 C...         1.00/In
15834 1211 1241 For Flat Filter Box And Throw-...         1.00/In
15834 1211 1245 For Manual Roll Filter Add    ...         1.00/In

ITEMS IN THE Contractor's Proposal 765-A211-011.01 AND NOT IN THE
02011 1002      4"(10cm) Dia Augured Boring In...         3.00/In
02531 1001      Temp Trench Drain, 2'x 3' Exca...         4.00/In

ITEMS WITH DIFFERENT QUANTITIES
01951 1104      Faucet Mounted Eye Wash       ...
      Contractor's Proposal 765-A211-011.01 - Installation:
      Owner's Estimate      765-A211-011.01 - Installation:
      Total value of change: deduction of      -109.75

15450 3002      Kitchen Sink Faucet Replacemen...
      Contractor's Proposal 765-A211-011.01 - Installation:
      Owner's Estimate      765-A211-011.01 - Installation:
```

PDS by default word wraps lines to fit within the window. You can change this and other options using the function *Preferences* under the *Edit* menu. The format of the comparison report was set up to be viewed with word wrap turned off. When word wrap is off, the comparison columns line up.

## Backup Data




### Basic Steps

- Insert Disk in A(or B) Drive, Select Backup Data from the Utilities menu
- Click once in the box below the words Backup File Name
- Click once on the <New> button to open the New file window
- Enter a new file name in the space provided (Suggest using date - ie. 960822.BKF)
- Select drive A from the drop down button (if you want to place the file on a floppy disk)

- Click once on the <Save> button
- Click on the <Add All> button in the Backup window (complete backup)
- Click once on the <Ok> button in the Backup window

### More Information

Backup Data is a function within PDS used to create backups of PDS information. This backup can be used to restore information lost due to a system crash or used to update non-networked computers.

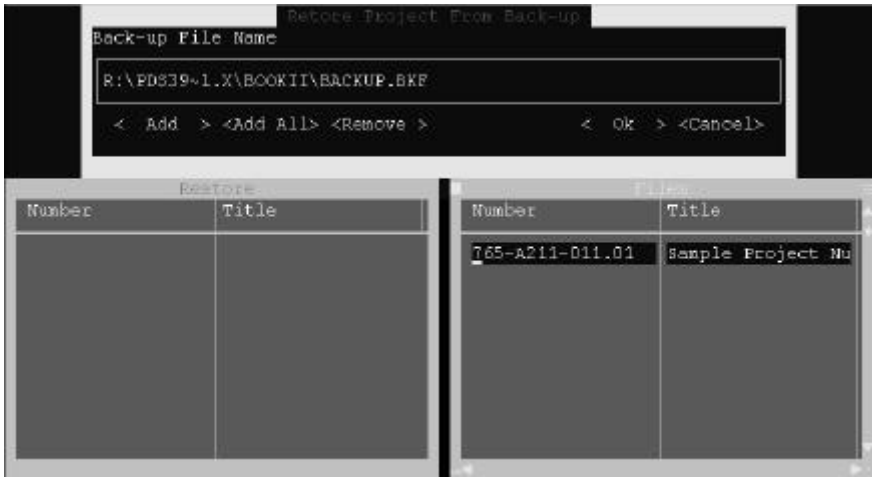
There are three components to a backup. The first is the Backup window. This window contains the backup file name and buttons for adding or removing files. The second window, Projects, is a list of all projects on PDS. The third and final window is a list of projects in the backup file.

You can Add projects to the file one at a time or all at once. The <Remove> button is used to remove projects from the file. The file is not created or updated until the <Ok> button is executed.

The backup file consists of two dependent files. Both files will have identical names but different extensions. One extensions is "BKF" and the other is "FPT". Backup and Restore will not work without both files located in the same directory.

PDS allows you to update an existing Backup file with current information. Click once on the box as explained in the Basic steps to start the backup process. Instead of clicking on the <New> button, find the file you want updated from the list and click on the <Open> button. The File list will show all projects in the file you open. Projects created after this backup was made will not be in the list and therefore will not be backed up unless added. Click on the <Ok> button to update the information for all projects in the file list.

## Restore Data




### Basic Steps

- Insert Backup Disk into Drive A (or B), Select *Restore Data* from the *Utilities* menu
- Click once in the box below the words Back-up File Name
- Select the file from the list
- Click once on the <Open> button
- Click once on the File list window
- Click once on a project to be restored

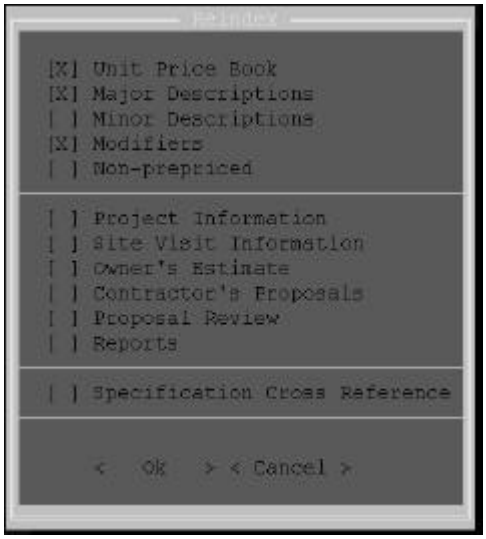
- Click once on the <Add >button
- Repeat the three steps above for each project to be restored
- Click once on the <Ok> button

### More Information

Restore will erase all information for a project that is currently on PDS. The information will be replaced by the data in the backup file. Use the <Add All > button to restore all of the projects in the backup file. The backup file will remain intact after a restore for later use if necessary.

## Reindex Data Bases

### Basic Steps




- Select *Reindex* from the *Utilities* menu
- Select each database to be reindexed
- Select the <Ok> button

### More Information

PDS uses automatic reindexing when indexes are lost or damaged making this function all but obsolete. When it is used PDS will check to see that everyone on a network isn't working in the databases to be reindexed. Should this conditions occur you will be given the following informational message.PDS will then skip that particular database.

## Pack Data Bases

### Basic Steps

- Select *Pack Data Bases* from the *Utilities* menu

### More Information

As with all data base type programs, PDS only marks data for deletion. The information is not completely deleted until Pack Data Bases is run. Use this utility to rid the data bases of unnecessary data. If on a network everyone will have to be out of PDS for the procedure to execute.

## Modify Report

This feature was added to PDS to give advanced users greater flexibility in reporting. Because it is out of scope for this version of PDS it will be unsupported. For more information we recommend third party manuals on the use of Foxpro for DOS.

In addition to modifying the report layout users can also add their own reports. You must own a copy of Foxpro for DOS or compatible data base program. All reports are stored in a data base called REP_SET.DBF/FPT. This file contains the code that sets up each of the reports. Compiling this code gives us files with an FXP extension. Reporting is a matter of running this FXP program. Look at the code for existing reports to get a better understanding of how they work. Each report must have three files associated with it. The first is the FXP (compiled Foxpro program), the second is FRX (Foxpro report layout) and the third is FRT (companion to the FRX file). These files must all be located in the data directory.

## Reset Windows

### Basic Steps

- Select *Reset Windows* from the *Utilities* menu

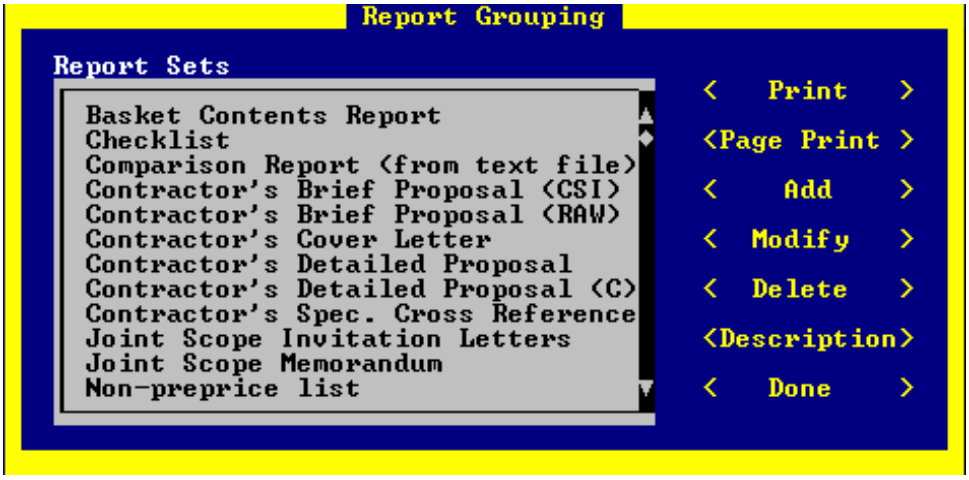
- Click <Ok> to the warning PDS displays

### More Information

PDS saves the position and setup of each window when a user exits a particular routine. This information is stored in a preferences file called PREFS.DBF/.FPT. There may be an occasion that the windows do not display information the way that are supposed to. Resetting the windows will fix this problem should it occur. All windows will be reset to their initial position. This will require the user to customize each window position again.

There are 2 default modes stored by PDS 3.9.2. The first is the standard 25 Line Display. The second default is for the 50 line display. PDS will restore based on you current display mode. For example if you are in 25 Line mode and reset windows, then the 25 Line Display Defaults are restored. If you are in 50 Line Display Mode and reset windows, then the 50 Line Display defaults are restored.

# Reporting

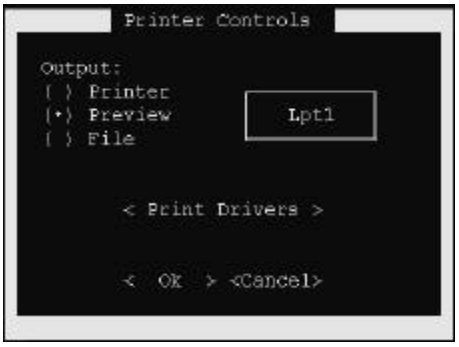



This chapter discusses two aspects to reporting. The first is the print setup and the second is report grouping. Print setup deals with where to print a report and report grouping deals with what to print.

## Printer Setup

### Basic Steps

- Select *Printer Setup* from the *File* menu




- Select the Output (Printer, Preview or File)
- Click Once on the <Ok> button

### More Information

The basic printer setup is no more than telling PDS where you want the report output to go. The options are simple – printer, preview (screen) or file. The drop down box with "Lpt1" in it is used to select the printer port. Printer ports are assigned to Lpt1 through Lpt3. When on a network you must redirect the Lpt1 port to the networked printer. Please see you network administrator for more information.

The last option on the printer setup window can be the most complicated. Print Drivers are used to set standard information that the reports use to properly print. Each report was set to use an HPIII compatible printer with a non-proportion font. Change nothing on the printer driver except for the printer. The reports will print incorrectly if a proportional font is selected.

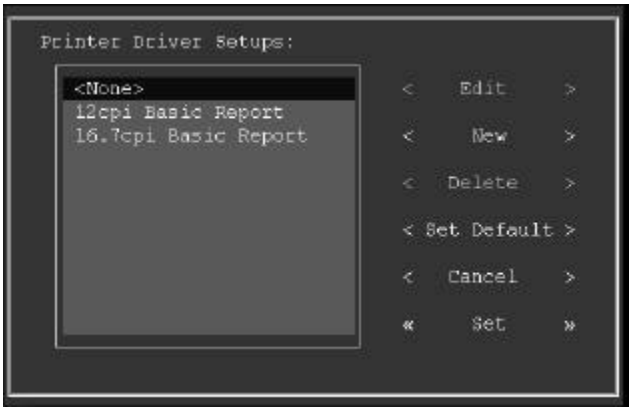
If you are sharing a printer on a network here are a few trouble shooting tips. In Windows95. Goto to settings printers. Select the printer driver you wish to use. Properties, select capture port button. Select the port you wish to capture. Type the path \\serverX\printerX. Click OK. Click Apply. Click OK. Verify that PDS is printing to the same port and using a similar driver IE LaserJet III is similar to HP5n. The output from PDS is directed to LPTX then redirected by Windows95 to the netwok printer. This is a little slow to print and network software may have a superior method of printing to a network printer.

On WindowsNT version 3.51 at the DOS prompt of the computer running PDS and trying to print to a shared device type: `NET USE LPT1: \\SERVER\PRINTER /PERSISTENT:YES` This command will capture the `LPT1` port for `DOS` programs and redirect it to the network printer. The `/PERSISTENT:YES` switch will redo the command at every startup there after. You may want to remove the `/PERSISTENT` clause and including the `NET USE` command in a batch file that will boot PDS. The `PERSISTANT` clause may cause problems for other devices that use that port.

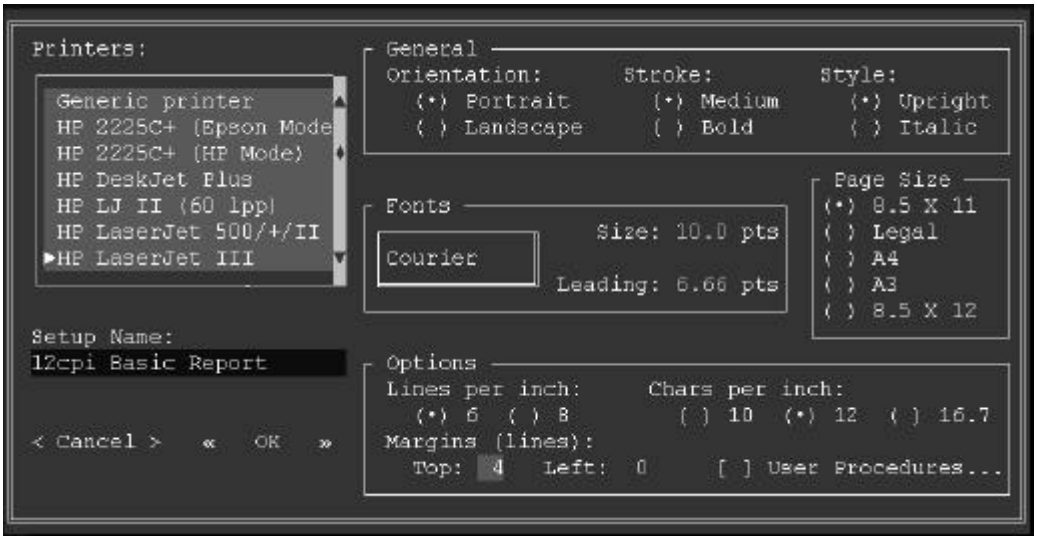
## Changing the Printer

### Basic Steps

- Select *Printer Setup* from the *File* menu
- Click once on the <Print Drivers> button




- Select the first Printer Driver Setup in the list (Below None)
- Click once on the <Edit> button



- Select your printer (or one compatible) from the list in the upper left corner
- Click on the <Ok> button
- Repeat the four steps above for each printer driver listed
- Click on the <Set> button

### More Information

The printer driver setup was provided with PDS so that you can change the printer. The other features are not support but remain active. Changing the name of a printer driver or changing information other than the printer type may adversely affect the printing of your reports.

## Report

PDS is shipped with twenty four reports. These reports can be printed independently or as part of a group. This is all controlled by the reports window. The following table is a list of reports that are shipped with PDS.

| **Report Name** | **Description** | **File Name (FXP; FRX; FRT)** |
|---|---|---|
| Basket item listing | The contents of a basket selected by the user. | Basket |
| Checklist for JOC package | A final checklist for a JOC package with basic information pulled from the data bases. | Chklist |
| Comparison text file | Prints a text file. Designed to print the comparison text files. | Compfile |
| Contractor's brief proposal in CSI order | Contractor's proposal with task descriptions only. | Contbrf |
| Contractor's brief proposal in order entered | Contractor's proposal with task descriptions only. | Cbrfraw |
| Contractor's detailed proposal | Contractor's proposal with full descriptions. | Contdet |
| Contractor's detailed proposal Compressed | Contractor's proposal with full descriptions (less paper). | Contdetc |
| Contractor's proposal cover page | Cover page that summarizes a contractor's proposal. | Concov |
| Contractor's spec cross reference | A cross reference between the contractor's proposal and the specifications. | Specxcon |
| Joint Scope invitation letters | Memo to all person in the joint scope list describing the upcoming joint scope. | Jsinvlet |
| Joint scope memo | Memo describing the details of the joint scope meeting. | Jscopem |
| Non-preprice item listing | Lists items in the Non-prepriced data base. | Npplist |
| Owner's brief estimate in CSI Order | Owner's estimate with task descriptions only. | Ownerbrf |

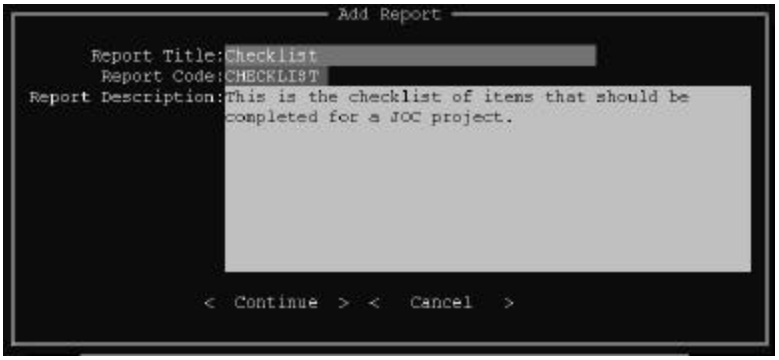
| Report Name | Description | File Name (FXP; FRX; FRT) |
|---|---|---|
| Owner's brief estimate as entered ordered. | Owner's estimate with task descriptions only. | Obrfraw |
| Owner's detailed estimate | Owner's estimate with full descriptions. | Ownerdet |
| Owner's detailed estimate Compressed | Owner's estimate with full descriptions (less paper). | Owndetc |
| Owner's estimate cover page | Cover page that summarizes the owner's estimate. | Ownercov |
| Owner's spec cross reference | A cross reference between the owner's estimate and the specifications. | Specxown |
| Proposal review | Record of a proposal review as selected by the user. | Proprevr |
| Proposal validation | The validation for a specific proposal received from the contractor. | valrept |
| Report group list | A list of all Report groups. | Repprint |
| Reports on file | A list of all available reports. | Repfiles |
| Request for Proposal | Request for proposal sent to the contractor. | rfp |
| Status report by month | Project status report sorted and grouped by month. | Status4 |
| Status report by pm | Project status report sorted and grouped by project manager. | Status1 |
| Status report by status | Project status report sorted and grouped by status. | Status2 |
| Status report by value | Project status report sorted by value. | Status3 |
| Work Order submitted to contractor | Work order authorizing the contractor to begin work. | Workord |

The first window that is displayed when you access *Reports* from the *File* menu is a list of report groups. These groups can contained from one to several of the reports listed above. PDS ships with just one report per group. Changes made to these groups effect all users on a network.

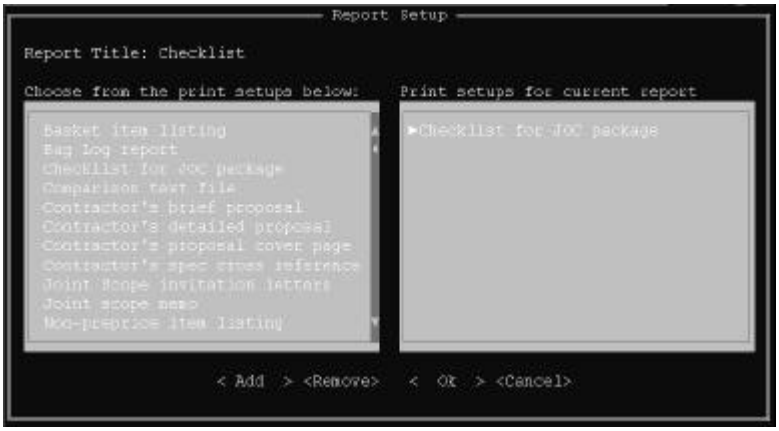
## Adding a Report Group

### Basic Steps

- Select *Reports* from the *File* menu
- Click once on the <Add> button




- Enter a description for the Report Group
- Enter a Report Code (a unique code for the group)
- Enter a description for the group
- Click once on the <Continue> button




- Select a report from the list on the left
- Click once on the <Add> button
- Repeat the two steps above for each report to include with the group
- Click on the <Ok> button on the Report Setup window
- Click on the <Done> button on the Add Report window
- Click on the <Done> button on the Report Grouping window

## More Information

Each report attached to a group will print when the group is printed. Grouping reports such as a cover page with a proposal saves time when printing. Other buttons on the Report Grouping window help with the management of the report groups.

The <Modify> button is used to change the a group title, description or make-up. The <Delete> button removes a report group from the list but leaves the actual reports intact. The <Description> button displays the description entered for a report group. The <Print> button is used to actually print the reports in the report groups.

## Printing a Report Group

### Basic Steps

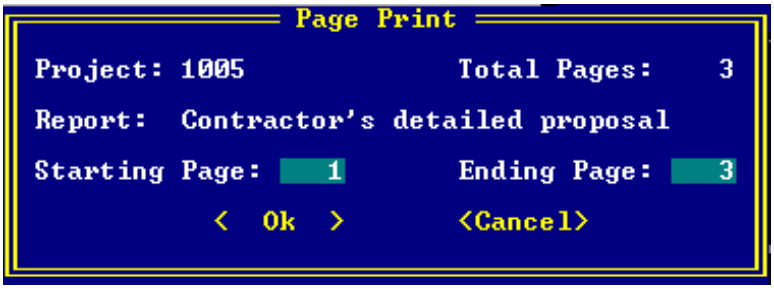
- Select *Reports* from the *File* menu
- Select the report group to print from the list
- Click once on the <Print> button

### More Information

The reports will print to the destination specified by the printer setup (see Printer Setup on page 10-1). If you choose printer, the reports will be sent to the printer attached or directed to the Lpt port specified. If you choose preview, the reports will be display on your screen. Two buttons (More and Done) will be at the bottom left corner of the screen. Click on more to see more of the report and done to terminate the screen print. If you choose file, PDS will display a window allowing you to name and save the file. This file is text format and can be opened by most word processors.

## Page Print

### Basic Steps




- Select *Reports* from the *File* menu
- Select the report group to print from the list
- Click once on the <Page Print> button
- Enter the starting page.
- Enter the ending page.
- Click once on the <Ok> button

### More Information

The printer will print from the report starting at the first page you entered and ending with the second. This should be vary helpful on long reports where the printer jams or runs out of paper.

## Sample Reports

Basket Report
Name: DEFAULT
Date: 04/22/97

| Major CSI | Minr CSI | Mod | UOM | Description | Installation Price | Demo Price |
|---|---|---|---|---|---|---|
| 02711 | 2115 | | EA | Galv Stl Line Post, 8' Fence Hgt 2-1/2"(3.8cm)OD Post Set in Con | 12.73 | 1.76 |
| 02711 | 2115 | 2191 | EA | Line Posts With Single Barbed Wire Arm Add | 0.23 | 0.00 |
| 02711 | 2115 | 2195 | EA | Line Posts With Top Rail Fitting Add | 0.52 | 0.00 |
| 02711 | 2115 | 2192 | EA | Line Posts With Double Barbed Wire Arms Add | 1.46 | 0.00 |

Page 1

JOB ORDER CONTRACT - CHECKLIST

Date: April 22, 1997

To: JOC Supervisor

From: JOC/PDS Project Manager

Project: Test project

Delivery Order #: del ord

JOC Project Number: 1005

---

| | Check | Doc. Date |
|---|---|---|
| Work Order | | |
| RFP | | 01/27/97 |
| Joint Scope Memorandum | | 01/31/97 |
| Cost Estimate | | 04/21/97 |
| The Contractor's proposal is ******% more than the independent estimate. | | |
| Proposal Review/Validation | | 07/31/96 2 cost proposals subtd |
| Contractor's Cover Letter | | |
| Cost Proposal | | 07/30/96 (Date proposal received) |
| Schedule | | |
| Submittals | | |
| Back-up for Non-prepriced Items | | 0.04% Non-prepriced |

I have verified that each and every item has been completed. Please approve this project at your earliest convience. Thank you,

---

JOC/PDS Project Manager Date

```
JOB ORDER CONTRACT - COMPARISON REPORT

Date:               April 22, 1997

File Name:          C:\PDS_EXE\UNTITLED.TXT

-----------------------------------------------------------------------------------------------------------------------
ITEMS IN THE Contractor's Proposal 1005 AND NOT IN THE Owner's Estimate      1005.
02411 1001      Shoring for 15'(5M) Exc, 22 PS...         5.00/Inst. qnty         0.00/Demo. qnty     6,611.31
02453 1001      15"(38cm) Prestressed Conc Pip...       200.00/Inst. qnty         0.00/Demo. qnty     5,413.60
02620 1101      6" x 18" Cast In Place Conc Cu...       200.00/Inst. qnty         0.00/Demo. qnty     2,314.92
02620 1101 1302 For Curved Cast In Place Add  ...       200.00/Inst. qnty         0.00/Demo. qnty       355.52
03110 2711      Superstruct Stair Forms, 1 Use...       250.00/Inst. qnty         0.00/Demo. qnty     1,843.25
04210 3001      Red Face Norman Brick-4"Veneer...     1,500.00/Inst. qnty         0.00/Demo. qnty     9,968.70
04210 3001 4005 For Interior Veneer Constructi...     1,500.00/Inst. qnty         0.00/Demo. qnty       545.40
04422 1101      3/4"(19mm)Thk Marble Face Pane...     1,100.00/Inst. qnty         0.00/Demo. qnty    35,607.55
08420 1001      3'x7'x1/2"Th Glass Entrance Do...         1.00/Inst. qnty         1.00/Demo. qnty     1,889.84
15655 2204      20 Ton Refrigerant Compressor ...         1.00/Inst. qnty         0.00/Demo. qnty     2,479.96
18021 1025      B                               ...        25.00/Inst. qnty         0.00/Demo. qnty        25.25

ITEMS IN THE Owner's Estimate      1005 AND NOT IN THE Contractor's Proposal 1005.
01030 1001      JOC NOTE:                       ...         0.00/Inst. qnty         0.00/Demo. qnty         0.00
01540 1101      6 Mil Polyethylene, 4'x8' Pane...         0.00/Inst. qnty         0.00/Demo. qnty         0.00
05120 1011      Beams,Girders,Clmns,1-2 Sty Bl...         0.00/Inst. qnty         0.00/Demo. qnty         0.00
05120 1011 4001 For Astm A441 High Strength St...         0.00/Inst. qnty         0.00/Demo. qnty         0.00
05120 1011 4002 For Astm A242 Type 2 High Stre...         0.00/Inst. qnty         0.00/Demo. qnty         0.00
05120 1011 4301 For Galvanizing Add             ...         0.00/Inst. qnty         0.00/Demo. qnty         0.00
05120 1011 4401 For Masonry End Bearing Add   ...         0.00/Inst. qnty         0.00/Demo. qnty         0.00
05120 1011 4403 For 3 Thru 6 Story Building Ad...         0.00/Inst. qnty         0.00/Demo. qnty         0.00
05120 1011 4404 For 7 Thru 15 Story Building A...         0.00/Inst. qnty         0.00/Demo. qnty         0.00
05120 1011 4405 For Over 15 Story Building Add...         0.00/Inst. qnty         0.00/Demo. qnty         0.00

ITEMS WITH DIFFERENT QUANTITIES
No items were found that apply to this condition.


TOTAL VALUE OF ALL CHANGES:    67,055.30



-----------------------------------------------------------------------------------------------------------------------
```

```
Job Order Contract Proposal 1005 Test project

Major Minor Modi-                                                                  Fac-
CSI   CSI   fier  Description                                                       tor  UOM            Line Total
-------------------------------------------------------------------------------------------------------------------


Section 02-Site Work

02411 1001        Shoring for 15'(5M) Exc, 22 PSF Steel Sheeting, Pull and Salvage
                                  Quantity     Unit Price   Factor              Total  A   TON             $6,611.30
                                                                                                                 .
                1 Installation         5.00 x     1,309.17 x 1.0100 =     6,611.3085
                                                                                                                 .
02453 1001        15"(38cm) Prestressed Conc Pipe 150 PSI
                                  Quantity     Unit Price   Factor              Total  A   LF              $5,413.60
                                                                                                                 .
                2 Installation       200.00 x        26.80 x 1.0100 =     5,413.6000
                                                                                                                 .
02620 1101        6" x 18" Cast In Place Conc Curb
                                  Quantity     Unit Price   Factor              Total  A   LF              $2,314.92
                                                                                                                 .
                3 Installation       200.00 x        11.46 x 1.0100 =     2,314.9200
                                                                                                                 .
02620 1101  1302  For Curved Cast In Place Add
                                  Quantity     Unit Price   Factor              Total  A   LF                $355.52
                                                                                                                 .
                4 Installation       200.00 x         1.76 x 1.0100 =       355.5200
                                                                                                                 .
Section 02-Site Work                                                                                    $14,695.34


Section 03-Concrete

03110 2711        Superstruct Stair Forms, 1 Use
                                  Quantity     Unit Price   Factor              Total  A   SF              $1,843.25
                                                                                                                 .
                5 Installation       250.00 x         7.30 x 1.0100 =     1,843.2500
                                                                                                                 .
Section 03-Concrete                                                                                      $1,843.25


Section 04-Masonry

04210 3001        Red Face Norman Brick-4"Veneer (4.5/SF w/Running Bond)
                                  Quantity     Unit Price   Factor              Total  A   SF              $9,968.70
                                                                                                                 .
                6 Installation     1,500.00 x         6.58 x 1.0100 =     9,968.7000
                                                                                                                 .
04210 3001  4005  For Interior Veneer Construction Add
                                  Quantity     Unit Price   Factor              Total  A   SF                $545.40
                                                                                                                 .
                7 Installation     1,500.00 x         0.36 x 1.0100 =       545.4000
                                                                                                                 .
04422 1101        3/4"(19mm)Thk Marble Face Panel (Italian)
                                  Quantity     Unit Price   Factor              Total  A   SF             $35,607.55
                                                                                                                 .
                8 Installation     1,100.00 x        32.05 x 1.0100 =    35,607.5500
                                                                                                                 .
Section 04-Masonry                                                                                      $46,121.65


Section 08-Doors & Windows

08420 1001        3'x7'x1/2"Th Glass Entrance Door Full Glass,Tmpd,Incl Trim & Hdw
                                  Quantity     Unit Price   Factor              Total  A   EA              $1,889.84
                9 Installation         1.00 x     1,816.90 x 1.0100 =     1,835.0690
                                                                                                                 .
               10 Demolition           1.00 x        54.23 x 1.0100 =        54.7723
                                                                                                                 .
Section 08-Doors & Windows                                                                               $1,889.84


-------------------------------------------------------------------------------------------------------------------
04/22/97                                                                                                     Page 1
```

```
Job Order Contract Proposal As Entered 1005 Test project

Major Minor Modi-                                                                    Fac-
CSI   CSI   fier  Description                                                         tor  UOM            Line Total
-----------------------------------------------------------------------------------------------------------------------
02411 1001        Shoring for 15'(5M) Exc, 22 PSF Steel Sheeting, Pull and Salvage
                                  Quantity     Unit Price   Factor              Total  A   TON             $6,611.30
                                                                                                                   .
                1 Installation        5.00 x     1,309.17 x 1.0100 =     6,611.3085
                                                                                                                   .
02453 1001        15"(38cm) Prestressed Conc Pipe 150 PSI
                                  Quantity     Unit Price   Factor              Total  A   LF              $5,413.60
                                                                                                                   .
                2 Installation      200.00 x        26.80 x 1.0100 =     5,413.6000
                                                                                                                   .
02620 1101        6" x 18" Cast In Place Conc Curb
                                  Quantity     Unit Price   Factor              Total  A   LF              $2,314.92
                                                                                                                   .
                3 Installation      200.00 x        11.46 x 1.0100 =     2,314.9200
                                                                                                                   .
02620 1101  1302  For Curved Cast In Place Add
                                  Quantity     Unit Price   Factor              Total  A   LF                $355.52
                                                                                                                   .
                4 Installation      200.00 x         1.76 x 1.0100 =       355.5200
                                                                                                                   .
03110 2711        Superstruct Stair Forms, 1 Use
                                  Quantity     Unit Price   Factor              Total  A   SF              $1,843.25
                                                                                                                   .
                5 Installation      250.00 x         7.30 x 1.0100 =     1,843.2500
                                                                                                                   .
04210 3001        Red Face Norman Brick-4"Veneer (4.5/SF w/Running Bond)
                                  Quantity     Unit Price   Factor              Total  A   SF              $9,968.70
                                                                                                                   .
                6 Installation    1,500.00 x         6.58 x 1.0100 =     9,968.7000
                                                                                                                   .
04210 3001  4005  For Interior Veneer Construction Add
                                  Quantity     Unit Price   Factor              Total  A   SF                $545.40
                                                                                                                   .
                7 Installation    1,500.00 x         0.36 x 1.0100 =       545.4000
                                                                                                                   .
04422 1101        3/4"(19mm)Thk Marble Face Panel (Italian)
                                  Quantity     Unit Price   Factor              Total  A   SF             $35,607.55
                                                                                                                   .
                8 Installation    1,100.00 x        32.05 x 1.0100 =    35,607.5500
                                                                                                                   .
08420 1001        3'x7'x1/2"Th Glass Entrance Door Full Glass,Tmpd,Incl Trim & Hdw
                                  Quantity     Unit Price   Factor              Total  A   EA              $1,889.84
                                        .
                9 Installation        1.00 x     1,816.90 x 1.0100 =     1,835.0690
                                                                                                                   .
               10 Demolition          1.00 x        54.23 x 1.0100 =        54.7723
                                                                                                                   .
15655 2204        20 Ton Refrigerant Compressor Recip Hermetic Type w/R-22 Ref
                                  Quantity     Unit Price   Factor              Total  L   EA              $2,479.96
                                                                                                                   .
               11 Installation        1.00 x     2,214.25 x 1.1200 =     2,479.9600
                                                                                                                   .
18021 1025        B
                                  Quantity     Unit Price   Factor              Total  A   EA                 $25.25
                                                                                                                   .
               12 Installation       25.00 x         1.00 x 1.0100 =        25.2500
                                                                                                                   .

-----------------------------------------------------------------------------------------------------------------------
Job Order Contract - Proposal Total                                                                       $67,055.30
The job order contract proposal total represents the correct total for the proposal.
Any discrepancies between line totals and the proposal total are due to rounding of
the line totals.

-----------------------------------------------------------------------------------------------------------------------
04/22/97                                                                                                       Page 1
```

JOB ORDER CONTRACT - CONTRACTOR PROPOSAL

Date: April 22, 1997

To: JOC/PDS Project Manager

From: U.S.Cost, Inc.
2001 Jefferson Davis Highway, Suite 1209
Arlington, VA 22202

Project # : 1005
Test project

Location : Nowhereville

---

SUMMARY BY FACTOR

| Factor | Installation | Demolition | Factor | Installation | Demolition |
|---|---|---|---|---|---|
| A 1.0100 | 64,520.5675 | 54.7723 | N 1.1400 | | |
| B 1.0200 | | | O 1.1500 | | |
| C 1.0300 | | | P 1.0000 | | |
| D 1.0400 | | | Q 1.0000 | | |
| E 1.0500 | | | R 1.0000 | | |
| F 1.0600 | | | S 1.0000 | | |
| G 1.0700 | | | T 1.0000 | | |
| H 1.0800 | | | U 1.0000 | | |
| I 1.0900 | | | V 1.0000 | | |
| J 1.1000 | | | W 1.0000 | | |
| K 1.1100 | | | X 1.0000 | | |
| L 1.1200 | 2,479.9600 | | Y 1.0000 | | |
| M 1.1300 | | | Z 1.0000 | | |

SUMMARY BY CSI

| CSI | Installation | Demolition | CSI | Installation | Demolition |
|---|---|---|---|---|---|
| 01 | | | 10 | | |
| 02 | 14,695.3485 | | 11 | | |
| 03 | 1,843.2500 | | 12 | | |
| 04 | 46,121.6500 | | 13 | | |
| 05 | | | 14 | | |
| 06 | | | 15 | 2,479.9600 | |
| 07 | | | 16 | | |
| 08 | 1,835.0690 | 54.7723 | 17 | | |
| 09 | | | 18 | 25.2500 | |
| | | | | NON-PP % | 0.03% |

INSTALLATION TOTAL: 67,000.5275
DEMOLITION TOTAL: 54.7723
JOB TOTAL W/FACTOR: 67,055.30 JOB TOTAL W/O FACTOR: 66,150.23

---

Contractor's Signature Date

```
Job Order Contract Proposal 1005 Test project

Major Minor Modi-                                                                    Fac-
CSI   CSI   fier  Description                                                         tor  UOM            Line Total
-------------------------------------------------------------------------------------------------------------------------


Section 02-Site Work

02000       Site Work
02400       Shoring
02411       Steel Sheeting
02411 1000  Standard Carbon Grade Steel Sheeting - Pull And
Salvage
02411 1001  Shoring for 15'(5M) Exc, 22 PSF Steel Sheeting, Pull and Salvage
                                 Quantity     Unit Price   Factor              Total  A   TON             $6,611.30
                                                                                                                 .
                1 Installation         5.00 x     1,309.17 x 1.0100 =     6,611.3085
                                                                                                                 .
02000       Site Work
02450       Utility Pipelines Water Main Pipe Includes Hydrostatic Testing And
Disinfection/Testing.Note: All Underground Utility Piping To Include Burial Warning Tape
Where Appropriate.
02453       Prestressed Concrete Pipe
02453 1000  150 Psi
02453 1001  15"(38cm) Prestressed Conc Pipe 150 PSI
                                 Quantity     Unit Price   Factor              Total  A   LF              $5,413.60
                                                                                                                 .
                2 Installation       200.00 x        26.80 x 1.0100 =     5,413.6000
                                                                                                                 .
02000       Site Work
02600       Paving And Surfacing
02620       Curbs And Gutters
02620 1000  Curbs
02620 1100  Concrete - Cast In Place
02620 1101  6" x 18" Cast In Place Conc Curb
                                 Quantity     Unit Price   Factor              Total  A   LF              $2,314.92
                                                                                                                 .
                3 Installation       200.00 x        11.46 x 1.0100 =     2,314.9200
                                                                                                                 .
For Curved Cast In Place Add
                                 Quantity     Unit Price   Factor              Total  A   LF                $355.52
                                                                                                                 .
                4 Installation       200.00 x         1.76 x 1.0100 =       355.5200
                                                                                                                 .
Section 02-Site Work                                                                                    $14,695.34


Section 03-Concrete

03000       Concrete
03100       Concrete Formwork
03110       Structural Cast-In-Place Concrete Formwork Note - Includes Erecting, Stripping,
Cleaning, And
Stacking PlusAccessories
03110 2000  Superstructure Formwork, Plywood
03110 2700  Stairs
03110 2710  Stairs (Slant Length X Width)
03110 2711  Superstruct Stair Forms, 1 Use
                                 Quantity     Unit Price   Factor              Total  A   SF              $1,843.25
                                                                                                                 .
                5 Installation       250.00 x         7.30 x 1.0100 =     1,843.2500
                                                                                                                 .
Section 03-Concrete                                                                                      $1,843.25


-------------------------------------------------------------------------------------------------------------------------
04/22/97                                                                                                        Page 1
```

```
Job Order Contract Proposal 1005 Test project
Major Minor Modi-                                                                                  Fac-
CSI   CSI   fier  Description                                                                       tor  UOM            Line Total
-------------------------------------------------------------------------------------------------------------------------------------

Section 02-Site Work

02400       Shoring
02411       Steel Sheeting
02411 1000  Standard Carbon Grade Steel Sheeting - Pull And Salvage
02411 1001  Shoring for 15'(5M) Exc, 22 PSF Steel Sheeting, Pull and Salvage
                                  Quantity     Unit Price   Factor              Total  A   TON             $6,611.30
                                                                                                                   .
                1 Installation         5.00 x     1,309.17 x 1.0100 =     6,611.3085
02450       Utility Pipelines Water Main Pipe Includes Hydrostatic Testing And
Disinfection/Testing.Note: All Underground Utility Piping To Include Burial Warning Tape Where
Appropriate.
02453       Prestressed Concrete Pipe
02453 1000  150 Psi
02453 1001  15"(38cm) Prestressed Conc Pipe 150 PSI
                                  Quantity     Unit Price   Factor              Total  A   LF              $5,413.60
                                                                                                                   .
                2 Installation       200.00 x        26.80 x 1.0100 =     5,413.6000
02600       Paving And Surfacing
02620       Curbs And Gutters
02620 1000  Curbs
02620 1100  Concrete - Cast In Place
02620 1101  6" x 18" Cast In Place Conc Curb
                                  Quantity     Unit Price   Factor              Total  A   LF              $2,314.92
                                                                                                                   .
                3 Installation       200.00 x        11.46 x 1.0100 =     2,314.9200
For Curved Cast In Place Add
                                  Quantity     Unit Price   Factor              Total  A   LF                $355.52
                                                                                                                   .
                4 Installation       200.00 x         1.76 x 1.0100 =       355.5200
Section 02-Site Work                                                        Subtotal:                    $14,695.34

Section 03-Concrete

03100       Concrete Formwork
03110       Structural Cast-In-Place Concrete Formwork Note - Includes Erecting, Stripping,
Cleaning, And Stacking PlusAccessories
03110 2000  Superstructure Formwork, Plywood
03110 2700  Stairs
03110 2710  Stairs (Slant Length X Width)
03110 2711  Superstruct Stair Forms, 1 Use
                                  Quantity     Unit Price   Factor              Total  A   SF              $1,843.25
                                                                                                                   .
                5 Installation       250.00 x         7.30 x 1.0100 =     1,843.2500
Section 03-Concrete                                                         Subtotal:                     $1,843.25

Section 04-Masonry

04200       Unit Masonry Including Cleaning Of Brick And Mortar With Muratic Acid And Brush Or
Wash.Note: Scaffolding Is Not Included In Unit Costs.
04210       Brick Masonry Note - All Brick Prices Include Brick And Mortar. Wall Ties,
Reinforcing,Scaffolding, Etc. Are Priced Seperately
04210 3000  Norman Brick, Red Face Running Bond
04210 3001  Red Face Norman Brick-4"Veneer (4.5/SF w/Running Bond)
                                  Quantity     Unit Price   Factor              Total  A   SF              $9,968.70
                                                                                                                   .
                6 Installation     1,500.00 x         6.58 x 1.0100 =     9,968.7000
For Interior Veneer Construction Add
                                  Quantity     Unit Price   Factor              Total  A   SF                $545.40
                                                                                                                   .
                7 Installation     1,500.00 x         0.36 x 1.0100 =       545.4000
04400       Stone
04422       Marble
04422 1000  Marble (Italian)
04422 1100  Facing Panels
04422 1101  3/4"(19mm)Thk Marble Face Panel (Italian)
-------------------------------------------------------------------------------------------------------------------------------------
04/22/97                                                                                                                   Page 1
```

```
JOB ORDER CONTRACT - PROPOSAL SPECIFICATION CROSS REFERENCE

Date:        04/22/97

By:          Project Manager
             U.S.Cost, Inc.
             2001 Jefferson Davis Highway, Suite 1209
             Arlington, VA  22202

Project # :  1005
             Test project

Location :   Nowhereville
-------------------------------------------------------------------------------

CSI   Spec.
Used  Number Specification Title
-------------------------------------------------------------------------------
02411 03720  BRIDGE PIERS, ABUTMENTS, AND ANCHORS
02453 02661  WATER LINES
02620 02525  CONCRETE CURBS AND GUTTERS
03110 03105  CONCRETE FORMWORK
03110 03730  CONCRETE BRIDGE COMPONENTS
04210 04202  UNIT MASONRY
04210 04210  BRICKWORK
04210 15576  BREECHING
04422 04405  STONEWORK
08420 08386  ALUMINUM SAFETY GLASS DOORS
08420 08412  ENTRANCES
15655 15680  REFRIGERANT EQUIPMENT

-------------------------------------------------------------------------------
                                                                      Page 1
```

```
MEMORANDUM

Date:              April 22, 1997

To:                Name 2

From:              JOC COORD, JOC/PDS Project Manager

Subject:           Joint Scope Meeting - JOC W.O. # 1005
                   Test project


Name 2, you are invited to participate in the joint scoping of the JOC Work
Order 1005.  The meeting will take place at 12:00pm on January 31, 1997 at
Nowhereville.


BRIEF DESCRIPTION OF WORK
Test Report Writer
```

```
JOB ORDER CONTRACT - JOINT SCOPE MEMORANDUM

Date:               April 22, 1997

To:                 U.S.Cost, Inc.
                    2001 Jefferson Davis Highway, Suite 1209
                    Arlington, VA  22202

Delivery Order #:   del ord

JOC Project Number: 1005
                    Test project
-------------------------------------------------------------------------------
Date of visit:      01/31/97

Invitation/Attendence List:
                                                                  I/A Name                      Organization
                                                                  I/  Name 2                    Organ 2

Brief Summary of Visit:

 This is the Memo field for Joint Scope Notes of meeting.  This data base con
 ntains one record per project and is perfect for this application.  A NOTES
 button will be added to the joint scope windpw that will access this memo in
 PROPS.DBF


--------------------------------------------------
JOC/PDS Project Manager                       Date
```

Non-preprice Item List April 22, 1997

| Major CSI | Minor CSI | Description | UOM | Labor | Material | Equipment | Total |
|---|---|---|---|---|---|---|---|
| 18001 | 1001 | q | ea | 0.00 | 0.00 | 0.00 | 0.00 |
| 18021 | 1025 | B | EA | 1.00 | 0.00 | 0.00 | 1.00 |

```
Job Order Contract Owner Estimate 1005 Test project
Major Minor Modi-                                                                    Fac-
CSI   CSI   fier  Description                                                         tor  UOM            Line Total
-----------------------------------------------------------------------------------------------------------------------
Section 01-General Conditions

01030 1001        JOC NOTE:
                                  Quantity     Unit Price   Factor              Total  A   NTE
                                                                                                                    .
                                                                                                                    .
01540 1101        6 Mil Polyethylene, 4'x8' Panels, 2"x4" Frame
                                  Quantity     Unit Price   Factor              Total  A   SF                  $0.33
                                                                                                                    .
                1 Installation         1.00 x         0.33 x 1.0100 =         0.3333
                                                                                                                    .
Section 01-General Conditions                                                                                   $0.33
Section 05-Metals

05120 1011        Beams,Girders,Clmns,1-2 Sty Bldg A-36 Rolled Strl Steel Members
                                  Quantity     Unit Price   Factor              Total  A   TON             $1,212.82
                                                                                                                    .
                2 Installation         1.00 x     1,200.81 x 1.0100 =     1,212.8181
                                                                                                                    .
05120 1011  4001  For Astm A441 High Strength Steel Add
                                  Quantity     Unit Price   Factor              Total  A   TON                $80.80
                                                                                                                    .
                3 Installation         1.00 x        80.00 x 1.0100 =        80.8000
                                                                                                                    .
05120 1011  4002  For Astm A242 Type 2 High Strength Steel Add
                                  Quantity     Unit Price   Factor              Total  A   TON                $80.80
                                                                                                                    .
                4 Installation         1.00 x        80.00 x 1.0100 =        80.8000
                                                                                                                    .
05120 1011  4301  For Galvanizing Add
                                  Quantity     Unit Price   Factor              Total  A   TON               $282.80
                                                                                                                    .
                5 Installation         1.00 x       280.00 x 1.0100 =       282.8000
                                                                                                                    .
05120 1011  4401  For Masonry End Bearing Add
                                  Quantity     Unit Price   Factor              Total  A   TON                $60.85
                                                                                                                    .
                6 Installation         1.00 x        60.25 x 1.0100 =        60.8525
                                                                                                                    .
05120 1011  4403  For 3 Thru 6 Story Building Add For New Construction
                                  Quantity     Unit Price   Factor              Total  A   TON                $22.82
                                                                                                                    .
                7 Installation         1.00 x        22.59 x 1.0100 =        22.8159
                                                                                                                    .
05120 1011  4404  For 7 Thru 15 Story Building Add For New Construction
                                  Quantity     Unit Price   Factor              Total  A   TON                $57.60
                                                                                                                    .
                8 Installation         1.00 x        57.03 x 1.0100 =        57.6003
                                                                                                                    .
05120 1011  4405  For Over 15 Story Building Add For New Construction
                                  Quantity     Unit Price   Factor              Total  A   TON                $94.31
                                                                                                                    .
                9 Installation         1.00 x        93.38 x 1.0100 =        94.3138
                                                                                                                    .
Section 05-Metals                                                                                           $1,892.80
-----------------------------------------------------------------------------------------------------------------------
Job Order Contract - Estimate Total                                                                         $1,893.13
The job order contract estimate total represents the correct total for the estimate.
Any discrepancies between line totals and the estimate total are due to rounding of
the line totals.


-------------------------------------------------------------
JOC COORD, JOC/PDS Project Manager                       Date


-----------------------------------------------------------------------------------------------------------------------
04/22/97                                                                                                      Page 1
```

```
Job Order Contract Owner Estimate As Entered 1005 Test project
Major Minor Modi-                                                                   Fac-
CSI   CSI   fier  Description                                                       tor  UOM            Line Total
-----------------------------------------------------------------------------------------------------------------------
01540 1101        6 Mil Polyethylene, 4'x8' Panels, 2"x4" Frame
                                  Quantity     Unit Price   Factor              Total  A   SF                 $0.33
                                                                                                                  .
                1 Installation        1.00 x         0.33 x 1.0100 =         0.3333
                                                                                                                  .
01030 1001        JOC NOTE:
                                  Quantity     Unit Price   Factor              Total  A   NTE
                                                                                                                  .
                                                                                                                  .
05120 1011        Beams,Girders,Clmns,1-2 Sty Bldg A-36 Rolled Strl Steel Members
                                  Quantity     Unit Price   Factor              Total  A   TON            $1,212.82
                                                                                                                  .
                2 Installation        1.00 x     1,200.81 x 1.0100 =     1,212.8181
                                                                                                                  .
05120 1011  4001  For Astm A441 High Strength Steel Add
                                  Quantity     Unit Price   Factor              Total  A   TON                $80.80
                                                                                                                  .
                3 Installation        1.00 x        80.00 x 1.0100 =        80.8000
                                                                                                                  .
05120 1011  4002  For Astm A242 Type 2 High Strength Steel Add
                                  Quantity     Unit Price   Factor              Total  A   TON                $80.80
                                                                                                                  .
                4 Installation        1.00 x        80.00 x 1.0100 =        80.8000
                                                                                                                  .
05120 1011  4301  For Galvanizing Add
                                  Quantity     Unit Price   Factor              Total  A   TON               $282.80
                                                                                                                  .
                5 Installation        1.00 x       280.00 x 1.0100 =       282.8000
                                                                                                                  .
05120 1011  4401  For Masonry End Bearing Add
                                  Quantity     Unit Price   Factor              Total  A   TON                $60.85
                                                                                                                  .
                6 Installation        1.00 x        60.25 x 1.0100 =        60.8525
                                                                                                                  .
05120 1011  4403  For 3 Thru 6 Story Building Add For New Construction
                                  Quantity     Unit Price   Factor              Total  A   TON                $22.82
                                                                                                                  .
                7 Installation        1.00 x        22.59 x 1.0100 =        22.8159
                                                                                                                  .
05120 1011  4404  For 7 Thru 15 Story Building Add For New Construction
                                  Quantity     Unit Price   Factor              Total  A   TON                $57.60
                                                                                                                  .
                8 Installation        1.00 x        57.03 x 1.0100 =        57.6003
                                                                                                                  .
05120 1011  4405  For Over 15 Story Building Add For New Construction
                                  Quantity     Unit Price   Factor              Total  A   TON                $94.31
                                                                                                                  .
                9 Installation        1.00 x        93.38 x 1.0100 =        94.3138
                                                                                                                  .
-----------------------------------------------------------------------------------------------------------------------
Job Order Contract - Estimate Total                                                                         $1,893.13
The job order contract estimate total represents the correct total for the estimate.
Any discrepancies between line totals and the estimate total are due to rounding of
the line totals.


-------------------------------------------------------------
JOC COORD, JOC/PDS Project Manager                       Date


-----------------------------------------------------------------------------------------------------------------------
04/22/97
                                                                                                                Page 1
```

```
Job Order Contract Owner Estimate 1005 Test project

Major Minor Modi-                                                                  Fac-
CSI   CSI   fier  Description                                                       tor  UOM            Line Total
-------------------------------------------------------------------------------------------------------------------


                                                                                                                  .
Section 01-General Conditions
01000       General Requirements
01030       Special Project Procedures
01031       Special Project Procedures JOC Note - 1. Prices Listed in the JOC Unit Price
Book include the following: Direct labor through
the foreman level at Davis-Bacon wage rates for
the area, equipment costs for the region, tools,
and materials costs including all incidentals.
Incidentals are items such as, but not limited to:
nails, screws, weldments, and connectors.  2. All
prices in the JOC Unit Price Book are for complete
and in-place construction unless explicitly
described otherwise.  3. Material unit costs
include delivery to the typical project site
unless explicitly described otherwise.  4.
Demolition costs in this JOC Unit Price Book
include costs for removal of the item, handling,
and loading in a truck.  5. Demolition costs
include placement of non-salvagable items in truck
or dumpster or turn-in of salvagable items To
DRMO. Demolition costs do not include costs for
hauling (See 02112-9000), Trash Chutes may be
necessary or use of elevator for multi-story
buildings (See 02112-1300).  6. The following are
not part of the JOC Unit Price Book: sales tax on
material & equipment costs; Employee payroll taxes
and insurance on labor costs.  7. Do not use line
items that use "Minimum" or "Maximum" prices.  8.
Typical working height can be up to 14'.  9. For
Sizes Of Items Not Listed, Use Next Appropriate
Size.
01030 1001  JOC NOTE:
                                  Quantity     Unit Price   Factor              Total  A   NTE
                                                                                                                  .
                                                                                                                  .
01000       General Requirements
                                                                                                            $0.33
01500       Construction Facilities And Temp
01540       Temporary Construction
01540 1000  Temporary Construction
01540 1100  Dust Protection
01540 1101  6 Mil Polyethylene, 4'x8' Panels, 2"x4" Frame
                                  Quantity     Unit Price   Factor              Total  A   SF
                                                                                                                  .
                1 Installation         1.00 x         0.33 x 1.0100 =         0.3333
                                                                                                                  .
Section 01-General Conditions                                                                               $0.33


                                                                                                                  .
Section 05-Metals


-------------------------------------------------------------------------------------------------------------------
04/22/97                                                                                                     Page 1
```

```
Job Order Contract Owner Estimate 1005 Test project
Major Minor Modi-                                                                    Fac-
CSI   CSI   fier  Description                                                         tor  UOM            Line Total
-----------------------------------------------------------------------------------------------------------------------

Section 01-General Conditions

01030       Special Project Procedures
01031       Special Project Procedures JOC Note - 1. Prices Listed in the JOC Unit Price Book
include the following: Direct labor through the foreman level at Davis-Bacon wage rates for
the area, equipment costs for the region, tools, and materials costs including all
incidentals. Incidentals are items such as, but not limited to: nails, screws, weldments, and
connectors.  2. All prices in the JOC Unit Price Book are for complete and in-place
construction unless explicitly described otherwise.  3. Material unit costs include delivery
to the typical project site unless explicitly described otherwise.  4. Demolition costs in
this JOC Unit Price Book include costs for removal of the item, handling, and loading in a
truck.  5. Demolition costs include placement of non-salvagable items in truck or dumpster or
turn-in of salvagable items To DRMO. Demolition costs do not include costs for hauling (See
02112-9000), Trash Chutes may be necessary or use of elevator for multi-story buildings (See
02112-1300).  6. The following are not part of the JOC Unit Price Book: sales tax on material
& equipment costs; Employee payroll taxes and insurance on labor costs.  7. Do not use line
items that use "Minimum" or "Maximum" prices.  8. Typical working height can be up to 14'.  9.
For Sizes Of Items Not Listed, Use Next Appropriate Size.
01030 1001  JOC NOTE:
                                  Quantity     Unit Price   Factor              Total  A   NTE
                                                                                                                    .
01500       Construction Facilities And Temp
01540       Temporary Construction
01540 1000  Temporary Construction
01540 1100  Dust Protection
01540 1101  6 Mil Polyethylene, 4'x8' Panels, 2"x4" Frame
                                  Quantity     Unit Price   Factor              Total  A   SF                 $0.33
                                                                                                                    .
               1 Installation         1.00 x         0.33 x 1.0100 =         0.3333
Section 01-General Conditions                                                     Subtotal:                 $0.33

Section 05-Metals

05100       Structural Metal Framing
05120       Structural Steel Note - Prices Are Based On Astm A36 Steel With Bolted Standard
BeamConnections And Shop Primed With Red Lead. Stock Sections Only. MaterialPrice Includes
Shop Fabrication Into Subassemblies And Delivery To Site.Includes All Connecting Bolts And
Welds.
05120 1000  Rolled Steel Members
05120 1010  Beams, Girders and Columns for 1 and 2 Story
05120 1011  Beams,Girders,Clmns,1-2 Sty Bldg A-36 Rolled Strl Steel Members
                                  Quantity     Unit Price   Factor              Total  A   TON            $1,212.81
                                                                                                                    .
                2 Installation         1.00 x     1,200.81 x 1.0100 =     1,212.8181
For Astm A441 High Strength Steel Add
                                  Quantity     Unit Price   Factor              Total  A   TON                $80.80
                                                                                                                    .
                3 Installation         1.00 x        80.00 x 1.0100 =        80.8000
For Astm A242 Type 2 High Strength Steel Add
                                  Quantity     Unit Price   Factor              Total  A   TON                $80.80
                                                                                                                    .
                4 Installation         1.00 x        80.00 x 1.0100 =        80.8000
For Galvanizing Add
                                  Quantity     Unit Price   Factor              Total  A   TON               $282.80
                                                                                                                    .
                5 Installation         1.00 x       280.00 x 1.0100 =       282.8000
For Masonry End Bearing Add
                                  Quantity     Unit Price   Factor              Total  A   TON                $60.85
                                                                                                                    .
                6 Installation         1.00 x        60.25 x 1.0100 =        60.8525


-----------------------------------------------------------------------------------------------------------------------
04/22/97                                                                                                      Page 1
```

```
JOB ORDER CONTRACT - OWNER ESTIMATE

Date:        April 22, 1997

By:          JOC COORD, JOC/PDS Project Manager

Contractor:  U.S.Cost, Inc.
             2001 Jefferson Davis Highway, Suite 1209
             Arlington, VA  22202

Project # :  1005
             Test project

Location :   Nowhereville
-------------------------------------------------------------------------------
SUMMARY BY FACTOR
Factor     Installation     Demolition   Factor     Installation     Demolition
A 1.0100     1,893.1339                 N 1.1400
B 1.0200                                O 1.1500
C 1.0300                                P 1.0000
D 1.0400                                Q 1.0000
E 1.0500                                R 1.0000
F 1.0600                                S 1.0000
G 1.0700                                T 1.0000
H 1.0800                                U 1.0000
I 1.0900                                V 1.0000
J 1.1000                                W 1.0000
K 1.1100                                X 1.0000
L 1.1200                                Y 1.0000
M 1.1300                                Z 1.0000

SUMMARY BY CSI
CSI  Installation     Demolition     CSI   Installation    Demolition
01         0.3333                    10
02                                   11
03                                   12
04                                   13
05     1,892.8006                    14
06                                   15
07                                   16
08                                   17
09                                   18
                                            NON-PP %

INSTALLATION TOTAL:    1,893.1339
DEMOLITION TOTAL:          0.0000
JOB TOTAL:             1,893.13


-------------------------------------------------------
JOC/PDS Project Manager                            Date
```

```
JOB ORDER CONTRACT - OWNER ESTIMATE SPECIFICATION CROSS REFERENCE

Date:        04/22/97

By:          JOC COORD, JOC/PDS Project Manager

Contractor:  U.S.Cost, Inc.
             2001 Jefferson Davis Highway, Suite 1209
             Arlington, VA  22202

Project # :  1005
             Test project

Location :   Nowhereville
-------------------------------------------------------------------------------

CSI   Spec.
Used  Number Specification Title
-------------------------------------------------------------------------------
05120 05120  STRUCTURAL STEEL
05120 05121  STEEL BRIDGE COMPONENTS
05120 05160  STEEL TRUSSES
05120 05550  MISCELLANEOUS METAL BRIDGE COMPONENTS
05120 05920  WATER TREATMENT PLANT DEBRIS RACKS
05120 14570  WATER TREATMENT PLANT TRAVELING SCREENS

-------------------------------------------------------------------------------
                                                                      Page 1
```

JOC Contract - Project Status Report April 22, 1997
Sorted by Project Manager

| | Current Status | Process Start | Joint Scope | RFP Issued | Proposal Due | 1st Prop Received | Last Prop Received | Estimate $ | Proposal $ |
|---|---|---|---|---|---|---|---|---|---|
| 115 | TEST EST/PROP | | | | | | | 0.00 | 0.00 |
| | | / / | / / | / / | / / | / / | / / | | |
| 12345 | ERROR CHECKING | | | | | | | 0.00 | 0.00 |
| | | / / | / / | / / | / / | / / | / / | | |
| 1997 | hotline | | | | | | | 2,495.05 | 0.00 |
| | | / / | / / | / / | / / | / / | / / | | |
| 6671 | ben report test | | | | | | | 1,316.74 | 0.00 |
| | | / / | / / | / / | / / | / / | / / | | |
| 9999 | test | | | | | | | 0.00 | 0.00 |
| | | / / | / / | / / | / / | / / | / / | | |
| 99999 | test | | | | | | | 542.35 | 0.00 |
| | | / / | / / | / / | / / | / / | / / | | |
| bfr | romm | | | | | | | 0.00 | 0.00 |
| | | / / | / / | / / | / / | / / | / / | | |
| xxyyzz | bad-house | | | | | | | 20,718.75 | 0.00 |
| | | 09/30/96 | 10/01/96 | 10/10/96 | 10/11/96 | / / | / / | | |
| Subtotal for JOC COORD | | | | | | | | 25,072.89 | 0.00 |
| 1005 | Test project | | | | | | | 1,893.13 | 67,055.30 |
| | unresolved | / / | 01/31/97 | 01/27/97 | / / | 07/30/96 | 08/19/96 | | |
| Subtotal for JOC COORD | | | | | | | | 1,893.13 | 67,055.30 |

Page - 1

JOC Contract - Project Status Report April 22, 1997
Sorted by Start Month

| | Current Status | Process Start | Joint Scope | RFP Issued | Proposal Due | 1st Prop Received | Last Prop Received | Estimate $ | Proposal $ |
|---|---|---|---|---|---|---|---|---|---|
| 1005 | Test project | | | | | | | 1,893.13 | 67,055.30 |
| | unresolved | / / | 01/31/97 | 01/27/97 | / / | 07/30/96 | 08/19/96 | | |
| 115 | TEST EST/PROP | | | | | | | 0.00 | 0.00 |
| | | / / | / / | / / | / / | / / | / / | | |
| 12345 | ERROR CHECKING | | | | | | | 0.00 | 0.00 |
| | | / / | / / | / / | / / | / / | / / | | |
| 1997 | hotline | | | | | | | 2,495.05 | 0.00 |
| | | / / | / / | / / | / / | / / | / / | | |
| 6671 | ben report test | | | | | | | 1,316.74 | 0.00 |
| | | / / | / / | / / | / / | / / | / / | | |
| 9999 | test | | | | | | | 0.00 | 0.00 |
| | | / / | / / | / / | / / | / / | / / | | |
| 99999 | test | | | | | | | 542.35 | 0.00 |
| | | / / | / / | / / | / / | / / | / / | | |
| bfr | romm | | | | | | | 0.00 | 0.00 |
| | | / / | / / | / / | / / | / / | / / | | |
| Subtotal for *bad date* 0 | | | | | | | | 6,247.27 | 67,055.30 |
| September 1996 | | | | | | | | | |
| xxyyzz | bad-house | | | | | | | 20,718.75 | 0.00 |
| | | 09/30/96 | 10/01/96 | 10/10/96 | 10/11/96 | / / | / / | | |
| Subtotal for September 1996 | | | | | | | | 20,718.75 | 0.00 |

Page - 1

JOC Contract - Project Status Report April 22, 1997
Sorted by Status

| | Current Status | Process Start | Joint Scope | RFP Issued | Proposal Due | 1st Prop Received | Last Prop Received | Estimate $ | Proposal $ |
|---|---|---|---|---|---|---|---|---|---|
| 115 | TEST EST/PROP | | | | | | | 0.00 | 0.00 |
| | | / / | / / | / / | / / | / / | / / | | |
| 12345 | ERROR CHECKING | | | | | | | 0.00 | 0.00 |
| | | / / | / / | / / | / / | / / | / / | | |
| 1997 | hotline | | | | | | | 2,495.05 | 0.00 |
| | | / / | / / | / / | / / | / / | / / | | |
| 6671 | ben report test | | | | | | | 1,316.74 | 0.00 |
| | | / / | / / | / / | / / | / / | / / | | |
| 9999 | test | | | | | | | 0.00 | 0.00 |
| | | / / | / / | / / | / / | / / | / / | | |
| 99999 | test | | | | | | | 542.35 | 0.00 |
| | | / / | / / | / / | / / | / / | / / | | |
| bfr | romm | | | | | | | 0.00 | 0.00 |
| | | / / | / / | / / | / / | / / | / / | | |
| xxyyzz | bad-house | | | | | | | 20,718.75 | 0.00 |
| | | 09/30/96 | 10/01/96 | 10/10/96 | 10/11/96 | / / | / / | | |
| Subtotal for unresolved | | | | | | | | 25,072.89 | 0.00 |
| 1005 | Test project | | | | | | | 1,893.13 | 67,055.30 |
| | unresolved | / / | 01/31/97 | 01/27/97 | / / | 07/30/96 | 08/19/96 | | |
| Subtotal for unresolved | | | | | | | | 1,893.13 | 67,055.30 |

Page - 1

JOC Contract - Project Status Report April 22, 1997
Sorted by Proposal Value

| | Current Status | Process Start | Joint Scope | RFP Issued | Proposal Due | 1st Prop Received | Last Prop Received | Estimate $ | Proposal $ |
|---|---|---|---|---|---|---|---|---|---|
| 115 | TEST EST/PROP | | | | | | | 0.00 | 0.00 |
| | | / / | / / | / / | / / | / / | / / | | |
| 12345 | ERROR CHECKING | | | | | | | 0.00 | 0.00 |
| | | / / | / / | / / | / / | / / | / / | | |
| 1997 | hotline | | | | | | | 2,495.05 | 0.00 |
| | | / / | / / | / / | / / | / / | / / | | |
| 6671 | ben report test | | | | | | | 1,316.74 | 0.00 |
| | | / / | / / | / / | / / | / / | / / | | |
| 9999 | test | | | | | | | 0.00 | 0.00 |
| | | / / | / / | / / | / / | / / | / / | | |
| 99999 | test | | | | | | | 542.35 | 0.00 |
| | | / / | / / | / / | / / | / / | / / | | |
| bfr | romm | | | | | | | 0.00 | 0.00 |
| | | / / | / / | / / | / / | / / | / / | | |
| xxyyzz | bad-house | | | | | | | 20,718.75 | 0.00 |
| | | 09/30/96 | 10/01/96 | 10/10/96 | 10/11/96 | / / | / / | | |
| 1005 | Test project | | | | | | | 1,893.13 | 67,055.30 |
| | unresolved | / / | 01/31/97 | 01/27/97 | / / | 07/30/96 | 08/19/96 | | |

Page - 1

```
JOB ORDER CONTRACT - PROPOSAL REVIEW

Date:               April 22, 1997

To:                 U.S.Cost, Inc.
                    2001 Jefferson Davis Highway, Suite 1209
                    Arlington, VA  22202

Delivery Order #:   del ord

JOC Project Number: 1005
                    Test project
-------------------------------------------------------------------------------

Meeting:-----------------------------------------------------------------------
  Place:
  Date:                /  /

Proposal:----------------------------------------------------------------------
  Proposal Value:       63,910.98
  Proposed Schedule:
  New Schedule:

Dates:-------------------------------------------------------------------------
  Received Date:     08/19/96
  Next Proposal Due:   /  /

Remarks:-----------------------------------------------------------------------


--------------------------------------------------
JOC/PDS Project Manager                       Date
```

```
JOB ORDER CONTRACT - REPORT FILE LIST    April 22, 1997
-------------------------------------------------------------------------------

Report Name
-------------------------------------------------------------------------------
Basket item listing
Checklist for JOC package
Comparison text file
Contractor's brief proposal (CSI)
Contractor's proposal cover page
Contractor's detailed proposal
Joint scope memo
Joint Scope invitation letters
Non-preprice item listing
Owner's brief estimate
Owner's estimate cover page
Owner's detailed estimate
Proposal review
Reports on file
Report group list
Request for Proposal
Contractor's spec cross reference
Owner's spec cross reference
Status report by pm
Status report by status
Status report by value
Status report by month
Proposal validation
Work Order submitted to contractor
Contractor's brief proposal
Cntr's detailed prop. Compressed
Owner's brief estimate as entered
Owner's detailed est. Compressed

-------------------------------------------------------------------------------
                                                                        Page 1
```

JOB ORDER CONTRACT - REPORT GROUP LIST April 22, 1997

| Report Group | Group Description<br>-> Associated Report(s) |
|---|---|
| Basket Contents Report | Lists out all items in a basket with descriptions.<br>-> Basket item listing |
| Checklist | This is the checklist of items that should be completed for a JOC project.<br>-> Checklist for JOC package |
| Comparison Report (from text file) | Opens a text file and prints the contents. The text file may or may not be a comparison of two estimates/proposals.<br>-> Comparison text file |
| Contractor's Brief Proposal (CSI) | The contractor's proposal using only line item descriptions for each task, in CSI order.<br>-> Contractor's brief proposal (CSI) |
| Contractor's Brief Proposal (RAW) | The contractor's proposal using only line item descriptions for each task, as enetered.<br>-> Contractor's brief proposal |
| Contractor's Cover Letter | The summary page for the contractor's proposal.<br>-> Contractor's proposal cover page |
| Contractor's Detailed Proposal | Prints the contractor's proposal using a complete title.<br>-> Contractor's detailed proposal |
| Contractor's Detailed Proposal (C) | Contractor's Detailed Proposal in a Compressed Format<br>-> Cntr's detailed prop. Compressed |
| Contractor's Spec. Cross Reference | A list of applicable specification numbers for a specific proposal.<br>-> Contractor's spec cross reference |
| Joint Scope Invitation Letters | Letters to each of the individuals listed on the Joint screen.<br>-> Joint Scope invitation letters |
| Joint Scope Memorandum | A memo detailing the people that were invited to a joint scope sessions and those that attended.<br>-> Joint scope memo |
| Non-preprice list | Lists all items in the non-preprice table.<br>-> Non-preprice item listing |
| Owner's Brief Estimate (CSI) | The owner's estimate with only line item descriptions for each task, in CSI order.<br>-> Owner's brief estimate |

Page 1

```
JOB ORDER CONTRACT - COST PROPOSAL VALIDATION

Date:               April 22, 1997

To:                 U.S.Cost, Inc.
                    2001 Jefferson Davis Highway, Suite 1209
                    Arlington, VA  22202

Delivery Order #:   del ord

JOC Project Number: 1005
                    Test project
-------------------------------------------------------------------------------
Proposal Received:  08/19/96

Proposal Amount:       63,910.98

Validation Notes:
VALIDATION OF PROPOSAL

The previous proposal submitted had a value of    63,910.98.
The proposal being submitted has a reported value of    63,910.98.

The Contractor's proposal, recalculated with the current unit price book, has
a value of    63,910.98.  This value agrees with value submitted by the
Contractor, therefore, the proposal has validated successfully.


LINE ITEM COMPARISON
ITEMS THAT HAVE BEEN ADDED SINCE THE PREVIOUS PROPOSAL
No items were found that apply to this condition.

ITEMS THAT HAVE BEEN DELETED SINCE THE PREVIOUS PROPOSAL
No items were found that apply to this condition.

ITEMS THAT HAD A QUANTITY CHANGE SINCE THE PREVIOUS PROPOSAL
No items were found that apply to this condition.


TOTAL VALUE OF ALL CHANGES:         0.00

ADDITIONS OR CHANGES TO NON-PREPRICED ITEMS

None of the non-pp items used on this proposal have change
from those currently on the system.



VALIDATION COMPLETE

--------------------------------------------------
JOC/PDS Project Manager                       Date




-------------------------------------------------------------------------------
                                                                        Page 1
```

```
JOB ORDER CONTRACT - WORK ORDER

Date:                 /  /

Contractor:         U.S.Cost, Inc.
                    2001 Jefferson Davis Highway, Suite 1209
                    Arlington, VA  22202

Project:            del ord

JOC Project Number: 1005
                    Test project

Account #:

Funding:

Contract Value:     $67,055.30
-------------------------------------------------------------------------------

Approval Signatures:



                                                     Date Rcv'd   Date Fwd

-------------------------------------------------- ------------ ------------
JOC COORD, JOC/PDS Project Manager             Date


-------------------------------------------------- ------------ ------------


-------------------------------------------------- ------------ ------------


 ------------------------------------------------------------- ------------
```

# Installation Procedure

## Getting the PDS392 Installation Program running

### Windows 3.11®

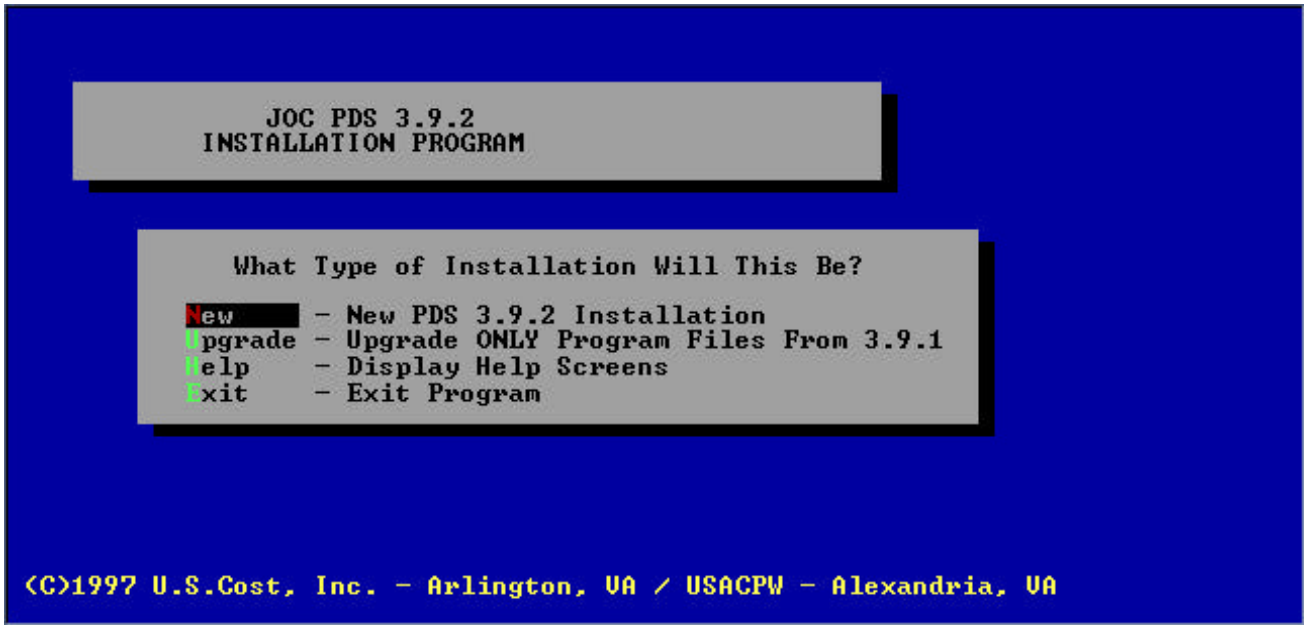
Go to the Program manager and click File menu then Run. Type into the text box a:\install to start up the PDS installation program. You can also use the Browse option, select drive A, highlight install.exe and click OK.

### Windows 95® and Windows NT®

Go to the Start button and click Run. Type into the text box a:\install to start up the PDS installation program. You can also use the Browse option, select drive A, highlight install.exe and click OK.

### MS-DOS®

At the C:\ prompt type : `A:INSTALL.EXE`




## Running the PDS392 Installation Program

1) Type “Y” to continue with the installation

2) Type “N” or highlight New for a new installation.

3) Select the floppy drive letter you are installing from “A” or “B”.

4) Select the hard drive letter where you want to install the program.

5) Type the name of the directory you wish to install the program into or use the default name already placed there for you and hit return.
6) PDS392 Installation Program will prompt you for the diskettes by name as needed. Follow the instructions the program provides.

### CONFIG.SYS

Your config.sys file must contain the line FILES = 110 or PDS will not function correctly. The installation program will do this for you.

## Setting Up a WINDOWS® Icon After Installing PDS 3.9.2

### Windows95

### Creating a Shortcut (Recommended)

1) Close or minimize all running programs. Move the mouse to anywhere in the desktop that is empty.

2) Click the right Mouse Button, and a menu is displayed at the point where you clicked.

3) Move the mouse down the list until the option **New** is highlighted.

4) A second menu will appear next to the first. Move the mouse on the second menu until the option **Shortcut** is highlighted and click the left mouse button.

5) The two menus will disappear and a dialog box will appear. The cursor will be blinking in a text box labeled **Command Line:** type the following in the text box: `C:\PDS392\PDS392o.EXE` If you are installing the contractors version type: `C:\PDS392\PDS392c.EXE` If you installed PDS392 into an alternate directory or drive you will have to type the path into the box or use the browse feature.

6) When finished inputting the command line move the mouse to the **Next** button and click with the left mouse button.

7) In this dialog box you can type the name of the shortcut. The default is the name of the EXE file from the command line. You may wish to enter a more descriptive name, for example `JOC PDS 3.9.2`

8) When finished inputting the title of your shortcut move the mouse to the **Next** button and click with the left mouse button.

9) Now you may select an Icon for your shortcut. The icon you select will be displayed on the desktop. Simply highlight the icon you wish to use by clicking on it with the left mouse button.

10) After you have highlighted the icon you wish to use for your shortcut move the mouse to the **Finished** button and click the left mouse button.

11) Now the shortcut appears on you desktop. To run PDS 3.9.2 double click on the desktop icon you just created.

### Adding to the Task Bar (Optional)

1) Move your mouse to the **Start** button and click the left mouse button.

2) Highlight the option **Settings** and a second list of options will appear.

3) On the new list highlight the option **Task Bar** and click the left mouse button. The option lists will disappear and a dialog box will be displayed on the screen.

4) The dialog box consists of two folders. Make sure the **Start Menu Programs** folder is on top. If it is not move the mouse to the tab labeled **Start Menu Programs** and click the left mouse button.

5) Move the mouse to the **Add…** button and click the left mouse button. A second dialog box will appear.

6) In the text box type labeled **Command Line:** type the following: `C:\PDS392\PDS392o.EXE` If you have installed the contractors version type: `C:\PDS392\PDS392c.EXE` If you installed PDS 3.9.2 in an alternate drive or directory you will have to type the complete path and filename in the text box or use the **Browse** button.

7) After inputting the path and filename into the **Command Line:** text box move the mouse to the **Next** button and click the left mouse button.

8) Now you must decide which folder to place PDS 3.9.2 into. This is completely up to the user. As an example we will place it in the Programs folder. To place PDS 3.9.2 into the ***Program*** folder simply highlight that folder by clicking on it one time with the left mouse button. After highlighting the ***Program*** folder move the mouse to the **Next** button and click the left mouse button.

9) Now you see another text box with the default name of the program. You may use this name or Type a more descriptive name, for example `JOC PDS 3.9.2` when you have entered the title you want move the mouse to the **Next** button and click the left mouse button.

10) You may now select an Icon for PDS 3.9.2. To select an icon it must be highlighted. To highlight an icon move the mouse to it and click the left mouse button. When you have highlighted the icon you want move the mouse to the **Finished** button and click the left mouse button.

11) You can no run your program as you would run any other program by clicking the start button highlighting programs and then clicking on JOC PDS 3.9.2. icon you just created.

## Windows 3.11 or Windows 3.1

## Creating a Group

1) In the ***Program Manager*** select the **File** menu by moving the mouse to it and clicking one time with the left mouse button.

2) A list of options is displayed. Highlight the **New…** option and click the left mouse button one time.

3) A dialog box appears with two radio buttons. Make sure that the **Program Group** radio button is black. If it is not black. Move the mouse to the **Program Group** radio button and click the left mouse button. Now move the mouse to the **OK** button and click the left mouse button.

4) Another dialog box appears. The cursor blinks in the **Description** text box. Type a description for the group. For example `JOC PROGRAM` when complete move the mouse over the **Group**

**File** text box and click the left mouse button. Type the name of the new group. For example, `JOC.` The group filename can only be eight characters with no spaces. When you are finished entering the **Group File** name move the mouse to the **OK** button and click the left mouse button.

5) Now a new program group named `JOC PROGRAM` appears in your **Program Manager**. It can be maximized and minimized like any other group.

## Creating an Icon in a Group

1) In the ***Program Manager*** select the **File** menu by moving the mouse to it and clicking one time with the left mouse button.

2) A list of options is displayed. Highlight the **New…** option and click the left mouse button one time.

3) A dialog box appears with two radio buttons. Make sure that the **Program Group** radio button is black. If it is not black. Move the mouse to the **Program Item** radio button and click the left mouse button. Now move the mouse to the **OK** button and click the left mouse button.

4) Another dialog box will appear with four text boxes. The cursor is blinking in the **Description:** text box. Type the name of the icon to appear in your program group. For Example `PDS 3.9.2`

5) Move the mouse to the **Command Line:** text box and click the left mouse button. Type: `C:\PDS392\PDS392o.EXE` If using the contractors version type: `C:\PDS392\PDS392c.EXE` If you installed PDS in an alternate drive or directory you will have to type the full path or use the **Browse** button.

6) Move the mouse to the **Working Directory:** text box and click the left mouse button. Type: `C:\PDS392` If you installed PDS in an alternate drive or directory you will have to type the path or use the **Browse** button.

7) Move the mouse to the **Change Icon…** button and click the left mouse button. Select the icon you want top use by highlighting it. To highlight an icon, move the mouse to the icon and click the left mouse button.

8) When you have selected the icon you wish to use move the mouse the **OK** button and click the left mouse button. The dialog box will disappear and you are left with the original dialog box. Move the mouse to the **OK** button and click.

9) You should see your new PDS 3.9.2 icon in the new group you created.

10) To run PDS 3.9.2 open the JOC PROGRAM group and double click the PDS 3.9.2 Icon

# Data Dictionary

## Cost.dbf

The unit price book line items.

| Field | Type | Length | Decimal | Description |
|---|---|---|---|---|
| Section | Character | 5 | | Major CSI Number |
| Item | Character | 4 | | Minor CSI Number |
| Desc | Character | 64 | | Task Description |
| Uom | Character | 3 | | Unit of Measure |
| Crew | Character | 10 | | Crew to accomplish task |
| Output | Number | 15 | 4 | Output factor |
| Manhours | Number | 15 | 4 | Manhours |
| Labor | Number | 12 | 2 | Labor Price |
| Equipment | Number | 12 | 2 | Equipment Price |
| Material | Number | 12 | 2 | Material Price |
| Ctotal | Number | 12 | 2 | Total Price for task |
| Modi | Logical | 1 | | True if task has associated modifiers |
| Descrip | Character | 9 | | Pointer to title line |
| Demo | Number | 9 | 2 | Demolition price for task |

## Sdesc.dbf

Secondary title data base.

| Field | Type | Length | Decimal | Description |
|---|---|---|---|---|
| Section | Character | 5 | | Major CSI Number |
| Item | Character | 4 | | Minor CSI Number |
| Descmem | Memo | 10 | | Memo file with the title and notes |
| Descrip | Character | 9 | | Title level pointer - not used in PDS 3.9.1 |
| desc_level | Number | 1 | | Hiearchial level of title |
| Hit | Logical | 1 | | Field used when publishing the UPB. |

## Mdesc.dbf

The primary title data base

| Field | Type | Length | Decimal | Description |
|---|---|---|---|---|
| Section | Character | 5 | | Major CSI Number |
| Desc | Character | 64 | | Short title |
| Descmem | Memo | 10 | | Notes and additional information |
| Descrip | Character | 9 | | Title level pointer - not used in PDS 3.9.1 |
| desc_level | Number | 1 | | Hiearchial level of title |
| Hit | Logical | 1 | | Field used when publishing the UPB |

## Modify.dbf

Modifiers to the cost items.

| Field | Type | Length | Decimal | Description |
|---|---|---|---|---|
| Section | Character | 5 | | Major CSI Number |
| Item | Character | 4 | | Minor CSI Number |
| Desc | Character | 64 | | Title for modifier |
| low_range | Character | 4 | | Low CSI range for modifier |
| hgh_range | Character | 4 | | High CSI range for modifier |
| Labor | Number | 15 | 4 | Labor component |
| Equipment | Number | 15 | 4 | Equipment component |

| | | | | |
|---|---|---|---|---|
| Material | Number | 15 | 4 | Material component |
| Muom | Character | 3 | | Modifier Unit of Measure |

## Props.dbf

Primary data base for tracking project information.

| Field | Type | Length | Decimal | Description |
|---|---|---|---|---|
| proj_num | Character | 17 | | Project Number |
| Bidate | Date | 8 | | Project ID date |
| Biworkord | Character | 100 | | Work order date |
| Bicoor | Character | 50 | | Coordinator for project (owner) |
| Bifund1 | Character | 20 | | Funding description 1 |
| Bifund2 | Character | 20 | | Funding description 2 |
| Bifund3 | Character | 20 | | Funding description 3 |
| Bifund4 | Character | 20 | | Funding description 4 |
| Bifund5 | Character | 20 | | Funding description 5 |
| Bidesc | Character | 140 | | Description of project or brief scope |
| Bititle | Character | 58 | | Project Title |
| Biloc | Character | 140 | | Project Location |
| Bibudget | Number | 11 | 2 | Budget Figure |
| Biliquid | Logical | 1 | | Liquidated Damages Applied |
| Bistatus | Character | 15 | | Project Status |
| Bintcd | Date | 8 | | Notice to Proceed Date |
| Bicomp | Date | 8 | | Construction Complete Actual Date |
| Bistrte | Date | 8 | | Construction Start Estimated Date |
| Bistrta | Date | 8 | | Construction Start Actual Date |
| Bicompe | Date | 8 | | Construction Complete Estimated Date |
| Bicmnts | Character | 120 | | Comments from the project information Screen |
| Projmgr | Character | 50 | | Contractor's Project Manager |
| Contnum | Number | 2 | | Contractor Number (Cross Referenced with the Contrac Data Base) |
| Delivord | Character | 10 | | Delivery Order Number |
| Value | Number | 11 | 2 | Value of the Proposal |
| Cetotal | Number | 10 | 2 | Value of the Estimate |
| Ceprep | Date | 8 | | Estimate prepared date |
| Svdate | Date | 8 | | Joint Scope Date |
| Svsampm | Character | 2 | | Joint Scope (AM/PM) |
| Svstime | Character | 5 | | Joint Scope Time |
| Rfpdue | Date | 8 | | Date Proposal Due from Contractor |
| Rfpprep | Date | 8 | | Date RFP was prepared |
| Rfpdraw | Character | 140 | | RFP drawings required |
| Rfpmater | Character | 140 | | RFP Material submittals required |
| Rfpsched | Character | 140 | | RFP Schedule requested |
| Rfpinst | Character | 210 | | RFP Special instructions |
| Rfpcopy | Character | 70 | | RFP Attachments |
| Rfpcomm | Memo | 10 | | RFP Comments |
| Preview | Memo | 10 | | Proposal Review Remarks |
| Jscope | Memo | 10 | | RFP Comments |

## Contrac.dbf

Contractors

| Field | Type | Length | Decimal | Description |
|---|---|---|---|---|
| Contnum | Number | 2 | | Contractor Number |
| Contname | Character | 50 | | Contractor Name |

| | | | | |
|---|---|---|---|---|
| Contadd | Character | 60 | | Contractor Address |
| Contcity | Character | 30 | | Contractor City |
| Contstate | Character | 2 | | Contractor State |
| Contzip | Character | 5 | | Contractor Zip Code |
| Contphone | Character | 14 | | Contractor Phone Number |

## Owndet.dbf

Owner's Estimate Line Items.

| Field | Type | Length | Decimal | Description |
|---|---|---|---|---|
| Proj_num | Character | 17 | | Project Number |
| Section | Character | 5 | | Major CSI Number |
| Item | Character | 4 | | Minor CSI Number |
| Modifier | Character | 4 | | Modifier CSI Number |
| Iprice | Number | 9 | 2 | Installation Price |
| Dprice | Number | 9 | 2 | Demolition Price |
| Uom | Character | 3 | | Unit of Measure |
| Qtyireg | Number | 9 | 2 | Install Quantity |
| Qtydreg | Number | 9 | 2 | Demolition Quantity |
| Factor_c | Character | 1 | | Factor Character |
| The_factor | Number | 6 | 4 | Factor Number |
| Linetot | Number | 10 | 2 | Line Total |
| Usernote | Character | 50 | | User Note |
| Refno | Character | 16 | | Reference Number |

## Propdet.dbf

Contractor's Proposal Line Items.

| Field | Type | Length | Decimal | Description |
|---|---|---|---|---|
| Proj_num | Character | 17 | | Project Number |
| Section | Character | 5 | | Major CSI Number |
| Item | Character | 4 | | Minor CSI Number |
| Modifier | Character | 4 | | Modifier CSI Number |
| Iprice | Number | 9 | 2 | Installation Price |
| Dprice | Number | 9 | 2 | Demolition Price |
| Uom | Character | 3 | | Unit of Measure |
| Qtyireg | Number | 9 | 2 | Install Quantity |
| Qtydreg | Number | 9 | 2 | Demolition Quantity |
| Factor_c | Character | 1 | | Factor Character |
| The_factor | Number | 6 | 4 | Factor Number |
| Linetot | Number | 10 | 2 | Line Total |
| Usernote | Character | 50 | | User Note |
| Refno | Character | 16 | | Reference Number |

## Jscope.dbf

Joint Scope People

| Field | Type | Length | Decimal | Description |
|---|---|---|---|---|
| Proj_num | Character | 17 | | Project Number |
| Jsname | Character | 25 | | Person's Name |
| Jsorganiz | Character | 35 | | Person's Organization |
| Jsinvite | Logical | 1 | | Invited/Not Invited |
| Jsattend | Logical | 1 | | Attended/Not Attended |
| Jsphone | Character | 8 | | Person's Phone Number |

## Proprev.dbf

Proposal Review

| Field | Type | Length | Decimal | Description |
|---|---|---|---|---|
| Proj_num | Character | 17 | | Project Number |
| Metdate | Date | 8 | | Date Review Held |

| | | | | |
|---|---|---|---|---|
| Place | Character | 40 | | Place Review Held |
| Proptime | Character | 40 | | Proposed Schedule |
| Finaltime | Character | 40 | | Revised Schedule |
| Propamount | Number | 10 | 2 | Proposal Amount |
| Revnotes | Memo | 10 | | Review Notes |
| Proprep | Date | 8 | | Proposal Prepared Date |
| Remarks | Character | 140 | | Remarks regarding proposal |
| Recdate | Date | 8 | | Proposal Received Date |
| Revdate | Date | 8 | | Next Proposal Due Date |
| Pratndp1 | Character | 25 | | Person Attending Meeting (1) |
| Pratndo1 | Character | 35 | | Person's Organization (1) |
| Pratndp2 | Character | 25 | | Person Attending Meeting (2) |
| Pratndo2 | Character | 35 | | Person's Organization (2) |
| Pratndp3 | Character | 25 | | Person Attending Meeting (3) |
| Pratndo3 | Character | 35 | | Person's Organization (3) |
| Pratndp4 | Character | 25 | | Person Attending Meeting (4) |
| Pratndo4 | Character | 35 | | Person's Organization (4) |
| Pratndp5 | Character | 25 | | Person Attending Meeting (5) |
| Pratndo5 | Character | 35 | | Person's Organization (5) |
| Pratndp6 | Character | 25 | | Person Attending Meeting (6) |
| Pratndo6 | Character | 35 | | Person's Organization (6) |

## Nonpp.dbf

Non-prepriced Data Base

| Field | Type | Length | Decimal | Description |
|---|---|---|---|---|
| Section | Character | 5 | | Major CSI Number |
| Item | Character | 4 | | Minor CSI Number |
| Desc | Character | 64 | | Description of item |
| Uom | Character | 3 | | Unit of Measure |
| Labor | Number | 9 | 2 | Labor Price |
| Equipment | Number | 9 | 2 | Equipment Price |
| Material | Number | 9 | 2 | Material Price |
| Nptotal | Number | 9 | 2 | Total for Non-prepriced item |
| Modi | Logical | 1 | | Always False (used to simplify programming) |

## Spec.dbf

Specification Cross Reference.

| Field | Type | Length | Decimal | Description |
|---|---|---|---|---|
| Section_u | Character | 5 | | Major CSI of UPB |
| Section_s | Character | 5 | | CSI of cooresponding Specification |
| Desc | Character | 50 | | Description of Specification |

## Pdshelp.dbf

On-line Hdelp data base

| Field | Type | Length | Decimal | Description |
|---|---|---|---|---|
| Topic | Character | 30 | | Topic of Help |
| Details | Memo | 10 | | Help text |
| Class | Character | 20 | | Not Used |

## Reports.dbf

Report Grouping Data Base

| Field | Type | Length | Decimal | Description |
|---|---|---|---|---|
| Rep_title | Character | 35 | | Name of Report Group |
| Rep_xref | Character | 10 | | Cross reference to rep_xref |
| Rep_desc | Memo | | | Description of Report Group |

## Rep_xref.dbf

Cross Reference between Reports and Rep_set

| Field | Type | Length | Decimal | Description |
|---|---|---|---|---|
| Rep_xref | Character | 10 | | Cross reference to Reports |
| Rep_code | Character | 10 | | Code to Rep_set file |

## Rep_set.dbf

Actual Reports and their setup code

| Field | Type | Length | Decimal | Description |
|---|---|---|---|---|
| Rep_code | Character | 10 | | Code as reference to Rep_xref. This is also the name of the report file (FRX) |
| Rep_setup | Memo | 10 | | Setup Code in a memo field. This code must be extracted and compiled for it to run. |
| Code_desc | Character | 35 | | Description of Report |

## Buglog.dbf

Used on Beta versions of PDS 3.9. Can still be used to record bugs but not through PDS 3.9.

| Field | Type | Length | Decimal | Description |
|---|---|---|---|---|
| Type | Character | 10 | | Type of Bug (i.e. Suggestion, Bug…) |
| Descrip | Character | 200 | | Description of problem |
| Id_date | Date | 8 | | Date discovered |
| Id_person | Character | 40 | | Person logging bug |
| Fix_date | Date | 8 | | Date fixed |
| Fix_versn | Character | 10 | | Version in which bug was fixed |
| Fix_desc | Character | 200 | | Description of fix |
| Fix_review | Character | 40 | | Fix Reviewed by person |

## Prefs.dbf

PDS 3.9 data base to store window positions.

| Field | Type | Length | Decimal | Description |
|---|---|---|---|---|
| Type | Character | 12 | | System Use Only |
| Id | Character | 12 | | System Use Only |
| Name | Character | 24 | | System Use Only |
| Readonly | Logical | 1 | | System Use Only |
| Ckval | Number | 6 | | System Use Only |
| Data | Memo | 10 | | System Use Only |
| Updated | Date | 8 | | System Use Only |

## Printit.dbf

Similar to Prefs.dbf but stores printer definitions.

| Field | Type | Length | Decimal | Description |
|---|---|---|---|---|
| Type | Character | 12 | | System Use Only |
| Id | Character | 12 | | System Use Only |
| Name | Character | 24 | | System Use Only |
| Readonly | Logical | 1 | | System Use Only |
| Ckval | Number | 6 | | System Use Only |
| Data | Memo | 10 | | System Use Only |
| Updated | Date | 8 | | System Use Only |

USC_Spec.dbf

Similar to Prefs.dbf but stores printer definitions.

| Field | Type | Length | Decimal | Description |
|---|---|---|---|---|
| SpecCSI | Character | 5 | | Specification section number |
| Title | Character | 38 | | Specification title |
| Text | Memo | 10 | | System Use Only |

# SECTION 01000 - GENERAL REQUIREMENTS FOR MILITARY CONSTRUCTION

## PART 1 GENERAL

### 1.1 PRECONSTRUCTION CONFERENCE

Approximately one week after award of the contract and prior to the start of any construction work an authorized representative of the Contracting Officer will schedule and conduct a preconstruction conference. The Contractor's Project Manager, Superintendent and his Quality Control manager will attend this meeting. The Contractor is encouraged to have an officer of his company and representation from his sub-contractors at this conference. This conference will be held at the location specified by the Contracting Officer's authorized representative.

#### 1.1.1 Purpose

The purpose of this preconstruction conference is to enable the Contracting Officer's representative to outline the procedures that will be followed by the Government in its administration of the construction contract and to discuss the performance that will be expected from the Contractor. This conference will allow the Contractor an opportunity to ask questions about the Government's supervision and inspection of contract work, about security requirements, regulations, etc. The Contracting Officer's authorized representative may invite using service engineering and security personnel and any other Government personnel to attend this conference.

#### 1.1.2 Items for Discussion

The following is a list of items for discussion during this conference. This is not considered to be a complete listing.

(1) Authority of the Area/Resident Engineer and organization of the Area/Resident office.

(2) Contractor's Safety Program.

(3) Contractor's Quality Control Plan.

NOTE: The Contractor will submit the plans for items (2) and (3) prior to the preconstruction conference.

(4) Contractor's Environmental Protection Plan.

(5) Contractor's Progress Schedule: The Contractor will bring a preliminary bar chart to the preconstruction conference for discussion.

(6) Correspondence Procedures.

(7) Contractor Labor Standards Provisions.

(8) Contractor Plan of Operations.

(9) Contract Modifications and Administrative Procedures.

(10) Contractor's Job Layout and Storage Area.

(11) Procedures for Processing Shop Drawings.

(12) Payment Estimate Data and Procedures.

(13) Contractor Utilities.

(14) Security Requirements, and Other Base Regulations, if applicable.

(15) Government Furnished Equipment, if applicable.

(16) Disposition of Salvage Property, if applicable.

(17) Contractor Insurance Requirements.

(18) Value Engineering Program.

(19) Contractor Performance Evaluation.

(20) Preliminary As-Built Drawings.

(21) Final As-Built Drawings.

(22) O & M Manuals, Spare Parts Data, Spare Parts, Inventory of Installed Property, and Special Tools.

(23) Single Point of Contact for Warranty of Construction.

1.1.3 Accident Prevention and Quality Control Plans

If the Contractor has submitted his Accident Prevention (Safety) Plan, and Quality Control Plan for review prior to this meeting, these may be approved in toto or approved with comments at the conference. Construction work will not proceed until after this meeting has been held, these two plans noted above as Items (2) and (3) have been approved and a task order has been received and acknowledged by the Contractor.

1.2 CONTRACTOR PROGRESS REPORTING

Pursuant to the CLAUSE: SCHEDULE FOR CONSTRUCTION CONTRACTS the Contractor shall prepare a schedule of construction utilizing a construction progress chart as described herein.

1.2.1 Construction Progress Chart

Construction progress charts shall be prepared on ENG Form 2454. The Contractor shall submit the Construction Progress Chart for approval. No progress payments will be made without an approved progress chart.

The Contractor shall prepare the chart with the following considerations. The contract work will be divided into definable contract features. As a minimum, the Contractor shall address each specification section as a principle contract feature. The WT. column should indicate the percentage of the contract for which each principle contract feature accounts. The vertical lines shall be identified by specific time frames, (i.e., weekly, bi-weekly, monthly) with one space accounting for no more than one month. The Contractor shall identify the date which Notice to Proceed is acknowledged on the chart.

The Contractor shall place bars on the chart to indicate scheduled progress for each feature of work. The Contractor shall note the anticipated percentage complete for each item at the end of each month and at the end of each scheduled block.

1.3 OPERATION AND MAINTENANCE INSTRUCTIONS, SPARE PARTS LISTS, SPARE PARTS, SPECIAL TOOLS, INVENTORIES OF INSTALLED PROPERTIES AND TRAINING OF OPERATING AND SERVICE PERSONNEL

The Contractor shall be responsible for the preparation, coordination, execution and submittal of six copies of all operation and maintenance instructions, training of operating and service personnel, spare parts lists,

special tools, and inventories of installed properties furnished under this contract. The equipment manuals and maintenance instructions shall be for all system installations provided in this contract and shall be in sufficient detail to facilitate normal maintenance and troubleshooting by persons with minimum experience with the installed equipment.

1.3.1 Submittal Requirements

All systems of these specifications shall be submitted to the Contracting Officer for approval with the equipment or systems shop drawings. Failure to submit this information will result in disapproval and return of the shop drawings. After approval, all equipment or systems instructions, parts lists, test reports and other similar data shall be assembled in binders in the number of copies specified and in the order specified or directed by the Contracting Officer. Approved operation and maintenance instructions shall be provided 30 days prior to scheduling training of operating and service personnel. The Contractor shall coordinate the content of each instruction period required in the Technical Provisions of these specifications with the Contracting Officer's representative prior to the actual start of the training period.

1.3.2 Operation and Maintenance Manuals and As-Built Drawings

Reference Contract Clause DFARS 52.227-7030, TECHNICAL DATA--WITHHOLDING OF PAYMENT.

Operation and Maintenance Manuals will be prepared and delivered for review and acceptance by the Contracting Officer prior to the final prove out or testing of the system, to be described within the Operation and Maintenance Manuals.

____ o

The percentage of the contract for the Operation and Maintenance Manuals and the As-Built Drawings will be shown on the Contractor's Progress Schedule or Network Analysis Schedule as applicable.

1.3.3 Non-Acceptance Actions

The Government may take possession of any completed or partially completed work, as provided for under the CLAUSE: USE AND POSSESSION PRIOR TO COMPLETION. If the installed equipment and/or systems thereto, have not been accepted by the Government due to the Contractor's failure to submit the above specified items, the Contractor shall operate and maintain such plant or system at no additional cost to the Government until such time that the specified items have been received, approved and any subsequent testing, check-out and/or training has been completed.

1.4 BASE REGULATIONS

The Contractor shall conform to all Government regulations and directives pertaining to security, safety, traffic and personal clearances, insofar as they pertain to the Contractor's activities on Government property. Contractor shall ensure conformance by all its employees and subcontractor's employees.

1.5 GOVERNMENT ACCESS PASS

At some secured installations all Contractor personnel are required to present photo identification to receive an access pass. An access pass is required for vehicles parked on Government property. Access passes are obtained as directed by the Contracting Officer. Prior to the start of construction, a letter that identifies all Contractor personnel and indicates hours of operation shall be sent to the Contracting Officer. All vehicles will be required to have current registration, insurance and state inspection if required.

1.6 RECEIPT OF MATERIALS

The Contractor shall have a representative available to receive all materials and equipment arriving on Government property.

## 1.7 EXCAVATION PERMIT

The Contractor shall obtain an approved permit prior to performing any excavation work (14 days written notice is generally required). Any damage to underground utilities, communication lines, etc., will be the responsibility of the Contractor if the approval is not obtained. Digging within three feet of underground communication or electrical power cables shall be performed by hand until the cable is exposed. The Contracting Officer will be notified three days prior to hand excavation. A representative from the appropriate utility shall mark underground cable locations prior to excavation. Once the cable is exposed, mechanical excavation may be used if there is no chance of damaging the cable. The Contractor shall be responsible for any damage to the cable by excavation procedures if the cable location has been previously marked.

## 1.7 BURIED CABLES AND LINES

The Contractor shall notify the Contracting Officer or his representative one working day prior to digging or performing other earthwork, as required by the approved excavation permit. If the Contractor fails to provide notification, the Contractor shall be liable for any damages to any buried telephone cables or lines regardless of care exercised or drawings followed. The Government shall not grant time extensions nor pay additional costs incurred because of delays, unless the Contractor has properly notified the Government one working day in advance of the desired digging date.

## 1.8 FIRE PROTECTION

Contractor is responsible for conformance with NFPA 241, "Standard for Safeguarding Construction, Alteration and Demolition Operation," including Appendix A.

# PART 2 PRODUCTS (NOT USED)

# PART 3 EXECUTION (NOT USED)

- - o O o - -

SECTION 01015
CONDITIONS

## PART 1 GENERAL

### 1.1 TIME EXTENSIONS FOR UNUSUALLY SEVERE WEATHER

(a) This provision specifies the procedure for determination of time extensions for unusually severe weather in accordance with the contract clause entitled "Default (Fixed Price Construction)". In order for the Contracting Officer to award a time extension under this clause, the following conditions must be satisfied:

(1) The weather experienced at the project site during the task order period must be found to be unusually severe, that is, more severe than the adverse weather anticipated for the project location during any given month.

(2) The unusually severe weather must actually cause a delay to the completion of the project. The delay must be beyond the control and without the fault or negligence of the Contractor.

(b) A schedule of monthly anticipated adverse weather delays provided by the Contracting Officer as noted in the task order is based on National Oceanic and Atmospheric Administration (NOAA) or similar data for the project location and will constitute the base line for monthly weather time evaluations. The Contractor's progress schedule must reflect these anticipated adverse weather delays in all weather dependent activities.

(c) Upon award of the first task order and continuing throughout the contract, the Contractor will record on the daily CQC report, the occurrence of adverse weather and resultant impact to normally scheduled work. Actual adverse weather delay days must prevent work on critical activities for 50 percent or more of the Contractor's scheduled work day. The number of actual adverse weather delay days shall include days impacted by actual adverse weather (even if adverse weather occurred in previous month), be calculated chronologically from the first to the last day of each month, and be recorded as full days. If the number of actual adverse weather delay days exceeds the number of days anticipated in paragraph (b), above, the Contracting Officer will convert any qualifying delays to calendar days, giving full consideration for equivalent fair weather work days, and issue a modification in accordance with the contract clause entitled "Default (Fixed Price Construction)".

SECTION 01200
WARRANTY OF CONSTRUCTION

1.0 WARRANTY OF CONSTRUCTION (APR 1984):

1.1 In Addition to any other warranties in this contract, the Contractor warrants, except as provided in paragraph 1.10 below, that work performed under this contract conforms to the contract requirements and is free of any defect in equipment, material, or design furnished, or workman-ship performed by the Contractor or any subcontractor or supplier at any tier.

1.2 This Warranty shall continue for a period of 1 year from the date of final acceptance of the work. If the Government takes possession of any part of the work before final acceptance, this warranty shall continue for a period of 1 year from the date the Government takes possession.

1.3 The Contractor shall remedy at the Contractor's expense any failure to conform, or any defect. In addition, the Contractor shall remedy at the Contractor's expense any damage to Government-owned or controlled real or personal property, when that damage is the result of-

1.3.1 The Contractor's failure to conform to contract requirements; or

1.3.2 Any defect of equipment, material, workmanship, or design furnished.

1.4 The Contractor shall restore any work damaged in fulfilling the terms and conditions of this clause. The Contractor's warranty with respect to work repaired or replaced will run for 1 year from the date of repair or replacement.

1.5 The Contracting Officer shall notify the Contractor, in writing, within a reasonable time after the discovery of any failure, defect, or damage.

1.6 If the Contractor fails to remedy any failure, defect, or damage within a time as specified in paragraph: WARRANTY SERVICE CALLS after receipt of notice, the Government shall have the right to replace, repair, or otherwise remedy the failure, defect, or damage at the Contractor's expense.

1.7 With Respect to all warranties, express or implied, from subcontractors, manufacturers, or suppliers for work performed and materials furnished under this contract, the Contractor shall--

1.7.1 Obtain all warranties that would be given in normal commercial practice;

1.7.2 Require all warranties to be executed, in writing, for the benefit of the Government, if directed by the Contracting Officer, and

1.7.3 Enforce all warranties for the benefit of the Government, if directed by the Contracting Officer.

1.8 In the Event the Contractor's warranty under paragraph 1.2 above has expired, the Government may bring suit at its expense to enforce a subcontractor's, manufacturer's, or supplier's warranty.

1.9 Unless a Defect is caused by the negligence of the Contractor or subcontractor or supplier at any tier, the Contractor shall not be liable for the repair of any defects of material or design furnished by the Government nor for the repair of any damage that results from any defect in Government-furnished material or design.

1.10 This Warranty shall not limit the Government's rights under the Inspection and Acceptance clause of this contract with respect to latent defects, gross mistakes, or fraud.

1.11 Defects in Design or manufacture of equipment specified by the Government on a "brand name and model" basis, shall not be included in this warranty. In this event, the Contractor shall require any subcontractors, manufacturers, or suppliers thereof to execute their warranties, in writing, directly to the Government. (Based on FAR 52.246-21)

2.0 WARRANTY SERVICE CALLS: The Contractor shall furnish to the Contracting Officer the names of local service representatives and/or Contractors that are available for warranty service calls and who will respond to a call within the time periods as follows: 4 hours for heating, air-conditioning, refrigeration, air supply and distribution, and critical electrical service systems and food service equipment, and 24 hours for all other systems. The names, addresses, and telephone numbers for day, night, weekend, and holiday service responses shall be furnished to the Contracting Officer and also posted at a conspicuous location in each mechanical and electrical room or close to the unit.

SECTION 01330
SUBMITTAL PROCEDURES

# PART 1 GENERAL

## 1.1 SUBMITTAL IDENTIFICATION

Submittals required are identified by SD numbers as follows:

SD-01 Data

SD-04 Drawings

SD-06 Instructions

SD-07 Schedules

SD-08 Statements

SD-09 Reports

SD-13 Certificates

SD-14 Samples

SD-18 Records

SD-19 Operation and Maintenance Manuals

## 1.2 SUBMITTAL CLASSIFICATION

Submittals are classified as follows:

### 1.2.1 Government Approved

Governmental approval is required for extensions of design, critical materials, deviations, equipment whose compatibility with the entire system must be checked, and other items as designated by the Contracting Officer. Within the terms of the Contract Clause entitled "Specifications and Drawings for Construction," they are considered to be "shop drawings."

### 1.2.2 Information Only

All submittals not requiring Government approval will be for information only. They are not considered to be "shop drawings" within the terms of the Contract Clause referred to above.

## 1.3 APPROVED SUBMITTALS

The Contracting Officer's approval of submittals shall not be construed as a complete check, but will indicate only that the general method of construction, materials, detailing and other information are satisfactory. Approval will not relieve the Contractor of the responsibility for any error which may exist, as the Contractor under the CQC requirements of this contract is responsible for dimensions, the design of adequate connections and details, and the satisfactory construction of all work. After submittals have been approved by the Contracting Officer, no resubmittal for the purpose of substituting materials or equipment will be considered unless accompanied by an explanation of why a substitution is necessary.

## 1.4 DISAPPROVED SUBMITTALS

The Contractor shall make all corrections required by the Contracting Officer and promptly furnish a corrected submittal in the form and number of copies specified for the initial submittal. If the Contractor considers any correction indicated on the submittals to constitute a change to the contract, a notice in accordance with the Contract Clause "Changes" shall be given promptly to the Contracting Officer.

1.5 WITHHOLDING OF PAYMENT

Payment for materials incorporated in the work will not be made if required approvals have not been obtained.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 GENERAL

The Contractor shall make submittals as required by each task order. The Contracting Officer may request submittals in addition to those specified when deemed necessary to adequately describe the work covered in the respective sections. Units of weights and measures used on all submittals shall be the same as those used in the contract drawings. Each submittal shall be complete and in sufficient detail to allow ready determination of compliance with contract requirements. Prior to submittal, all items shall be checked and approved by the Contractor's Quality Control (CQC) representative and each item shall be stamped, signed, and dated by the CQC representative indicating action taken. Proposed deviations from the contract requirements shall be clearly identified. Submittals shall include items such as: Contractor's, manufacturer's, or fabricator's drawings; descriptive literature including (but not limited to) catalog cuts, diagrams, operating charts or curves; test reports; test cylinders; samples; O&M manuals (including parts list); certifications; warranties; and other such required submittals. Submittals requiring Government approval shall be scheduled and made prior to the acquisition of the material or equipment covered thereby. Samples remaining upon completion of the work shall be picked up and disposed of in accordance with manufacturer's Material Safety Data Sheets (MSDS) and in compliance with existing laws and regulations.

3.2 SUBMITTAL REGISTER (ENG FORM 4288)

The Contractor will also be given the submittal register (ENG Form 4288) as required with each task order. Columns "D" through "R" have been completed by the Government; the Contractor shall complete columns "a" and "s" through "u" and submit the forms to the Contracting Officer for approval within 20 calendar days after Notice to Proceed or as directed by the Contracting Officer. The Contractor shall keep this submittal register up-to-date and shall submit it to the Government together with the monthly payment request. The approved submittal register will become the scheduling document and will be used to control submittals throughout the life of the task order. The submittal register and the progress schedules shall be coordinated.

3.3 SCHEDULING

Submittals covering component items forming a system or items that are interrelated shall be scheduled to be coordinated and submitted concurrently. Certifications to be submitted with the pertinent drawings shall be so scheduled. Adequate time (a minimum of 7 calendar days exclusive of mailing time) shall be allowed and shown on the register for review and approval. No delay damages or time extensions will be allowed for time lost in late submittals. An additional 7 calendar days shall be allowed and shown on the register for review and approval of submittals for food service equipment and refrigeration and HVAC control systems.

3.4 TRANSMITTAL FORM (ENG FORM 4025)

The ENG Form 4025 shall be used for submitting both Government approved and information only

submittals in accordance with the instructions on the reverse side of the form. These forms will be furnished to the Contractor. This form shall be properly completed by filling out all the heading blank spaces and identifying each item submitted. Special care shall be exercised to ensure proper listing of the specification paragraph and/or sheet number of the contract drawings pertinent to the data submitted for each item.

## 3.5 SUBMITTAL PROCEDURE

Submittals shall be made as follows:

### 3.5.1 Procedures

#### 3.5.1.1 Number of Copies

The Contractor shall provide five (5) sets of all submittals to the Contracting Officer.

#### 3.5.1.2 Certificates of Compliance (1969 MAY OCE)(EFARS 52.2/9108(c))

Any certificates required for demonstrating proof of compliance of materials with specification requirements shall be executed in the number of copies required by the above paragraph "Number of Copies." Each certificate shall be signed by an official authorized to certify in behalf of the manufacturing company and shall contain the name and address of the Contractor, the project name and location, and the quantity and date or dates of shipment or delivery to which the certificates apply. Copies of laboratory test reports submitted with certificates shall contain the name and address of the testing laboratory and the date or dates of the tests to which the report applies. Certification shall not be construed as relieving the Contractor from furnishing satisfactory material, if, after tests are performed on selected samples, the material is found not to meet the specific requirements.

### 3.5.2 Deviations

For submittals which include proposed deviations requested by the Contractor, the column "variation" of ENG Form 4025 shall be checked. The Contractor shall set forth in writing the reason for any deviations and annotate such deviations on the submittal. The Government reserves the right to rescind inadvertent approval of submittals containing unnoted deviations.

## 3.6 CONTROL OF SUBMITTALS

The Contractor shall carefully control his procurement operations to ensure that each individual submittal is made on or before the Contractor scheduled submittal date shown on the approved "Submittal Register."

## 3.7 GOVERNMENT APPROVED SUBMITTALS

Upon completion of review of submittals requiring Government approval, the submittals will be identified as having received approval by being so stamped and dated. 2 copies of the submittal will be retained by the Contracting Officer and the remainder of the copies of the submittal will be returned to the Contractor.

## 3.8 INFORMATION ONLY SUBMITTALS

Normally submittals for information only will not be returned. Approval of the Contracting Officer is not required on information only submittals. The Government reserves the right to require the Contractor to resubmit any item found not to comply with the contract. This does not relieve the Contractor from the obligation to furnish material conforming to the plans and specifications; will not prevent the Contracting Officer from requiring removal and replacement of nonconforming material incorporated in the work; and does not relieve the Contractor of the requirement to furnish samples for testing by the Government laboratory or for check testing by the Government in those instances where the technical specifications so prescribe.

3.9 STAMPS

Stamps used by the Contractor on the submittal data to certify that the submittal meets contract requirements shall be similar to the following:

```
 ____________________________________________________________________________
|                                CONTRACTOR                                  |
|                                                                            |
|                                (Firm Name)                                 |
|                                                                            |
|                                                                            |
|                                                                            |
| _____ Approved                                                             |
|                                                                            |
|                                                                            |
| _____ Approved with corrections as noted on submittal data and/or          |
| attached sheets(s).                                                        |
|                                                                            |
|                                                                            |
|                                                                            |
| SIGNATURE:  ___________________________________________________________    |
|                                                                            |
| TITLE:  ________________________________________________________________   |
|                                                                            |
| DATE:  _________________________________________________________________   |
|                                                                            |
|____________________________________________________________________________|
```

SECTION 01410
ENVIRONMENT PROTECTION

PART
1 GENERAL

1.1 GENERAL REQUIREMENTS

The Contractor shall perform the work minimizing environmental pollution and damage as the result of construction operations. Environmental pollution and damage is the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to humankind; or degrade the utility of the environment for aesthetic, cultural and/or historical purposes. The control of environmental pollution and damage requires consideration of land, water, and air, and includes management of visual aesthetics, noise, solid waste, as well as other pollutants. The environmental resources within the project boundaries and those affected outside the limits of permanent work shall be protected during the entire duration of this contract.

1.1.1 Subcontractors

The Contractor shall ensure compliance with this section by subcontractors.

1.1.2 Environmental Protection Plan

The Contractor shall submit an environmental protection plan within 15 days after the task order is issued. Approval of the Contractor's plan will not relieve the Contractor of responsibility for adequate and continuing control of pollutants and other environmental protection measures. The environmental protection plan shall include, but shall not be limited to, the following:

a. A list of Federal, State, and local laws, regulations, and permits concerning environmental protection, pollution control and abatement that are applicable to the Contractor's proposed operations and the requirements imposed by those laws, regulations, and permits.

b. Methods for protection of features to be preserved within authorized work areas like trees, shrubs, vines, grasses and ground cover, landscape features, air and water quality, fish and wildlife, soil, historical, archaeological, and cultural resources.

c. Procedures to be implemented to provide the required environmental protection, to comply with the applicable laws and regulations, and to correct pollution due to accident, natural causes, or failure to follow the procedures of the environmental protection plan.

d. Location of the solid waste disposal area.

e. Drawings showing locations of any proposed temporary excavations or embankments for haul roads, stream crossings, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials.

f. Environmental monitoring plans for the job site, including land, water, air, and noise monitoring.

g. Traffic control plan including measures to reduce erosion of temporary roadbeds by construction traffic, especially during wet weather, and the amount of mud transported onto paved public roads by vehicles or runoff.

h. Methods of protecting surface and ground water during construction activities.

i. Plan showing the proposed activity in each portion of the work area and identifying the areas of limited use or nonuse. Plan should include measures for marking the limits of use areas.

j. Drawing of borrow area location. Protection measures required at the work site shall apply to the borrow areas including final restoration for subsequent beneficial use of the land.

k. A recycling and waste prevention plan with a list of measures to reduce consumption of energy and natural resources; for example: the possibility to shred fallen trees and use them as mulch shall be considered as an alternative to burning or burial.

l. A settling pond removal plan 120 days prior to removal work. The plan shall include the method of removing and testing of the collected sediment.

m. Training for Contractor's personnel during the construction period.

1.1.3 Permits

The Contractor shall obtain all needed permits or licenses. The Government will not obtain any permits for this project; see Contract Clause PERMITS AND RESPONSIBILITIES. The State department of natural resources, through the national pollutant discharge elimination system (NPDES), requires general permits, a notice of intent, and a notice of discontinuation. The Contractor shall be responsible for implementing the terms and requirements of the appropriate permits as needed and for payment of all fees.

1.1.4 Preconstruction Survey

Prior to starting any onsite construction activities, the Contractor and the Contracting Officer shall make a joint condition survey after which the Contractor shall prepare a brief report indicating on a layout plan the condition of trees, shrubs and grassed areas immediately adjacent to work sites and adjacent to the assigned storage area and access routes as applicable. This report will be signed by both the Contracting Officer and the Contractor upon mutual agreement as to its accuracy and completeness.

1.1.5 Meetings

The Contractor shall meet with representatives of the Contracting Officer to alter the environmental protection plan as needed for compliance with the environmental pollution control program.

1.1.6 Notification

The Contracting Officer will notify the Contractor in writing of any observed noncompliance with the previously mentioned Federal, State or local laws or regulations, permits, and other elements of the Contractor's environmental protection plan. The Contractor shall, after receipt of such notice, inform the Contracting Officer of proposed corrective action and take such action when approved. If the Contractor fails to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No time extensions shall be granted or costs or damages allowed to the Contractor for any such suspensions.

1.1.7 Litigation

If work is suspended, delayed, or interrupted due to a court order of competent jurisdiction, the Contracting Officer will determine whether the order is due in any part to the acts or omissions of the Contractor, or subcontractors at any tier, not required by the terms of the contract. If it is determined that the order is not due to Contractor's failing, such suspension, delay, or interruption shall be considered as ordered by the Contracting Officer in the administration of the contract under the contract clause SUSPENSION OF WORK.

1.1.8 Previously Used Equipment

The Contractor shall thoroughly clean all construction equipment previously used at other sites before it is brought into the work areas, ensuring that soil residuals are removed and that egg deposits from plant pests are not present; the Contractor shall consult with the USDA jurisdictional office for additional cleaning

requirements.

1.1.9 Payment

No separate payment will be made for work covered under this section; all costs associated with this section shall be included in the contract Bidding Schedule.

1.2 LAND RESOURCES

The Contractor shall confine all activities to areas defined by the drawings and specifications. Prior to the beginning of any construction, the Contractor shall identify the land resources to be preserved within the work area. Except in areas indicated on the drawings or specified to be cleared, the Contractor shall not remove, cut, deface, injure, or destroy land resources including trees, shrubs, vines, grasses, topsoil, and land forms without permission. No ropes, cables, or guys shall be fastened to or attached to any trees for anchorage unless specifically authorized. Where such emergency use is permitted, the Contractor shall provide effective protection for land and vegetation resources at all times as defined in the following subparagraphs. Stone, earth or other material displaced into uncleared areas shall be removed.

1.2.1 Work Area Limits

Prior to any construction, the Contractor shall mark the areas that need not be disturbed under this contract. Isolated areas within the general work area which are to be saved and protected shall also be marked or fenced. Monuments and markers shall be protected before construction operations commence. Where construction operations are to be conducted during darkness, the markers shall be visible. The Contractor's personnel shall be knowledgeable of the purpose for marking and/or protecting particular objects.

1.2.2 Landscape

Trees, shrubs, vines, grasses, land forms and other landscape features indicated and defined on the drawings to be preserved shall be clearly identified by marking, fencing, or wrapping with boards, or any other approved techniques.

1.2.3 Unprotected Erodible Soils

Earthwork brought to final grade shall be finished as indicated. Side slopes and back slopes shall be protected as soon as practicable upon completion of rough grading. All earthwork shall be planned and conducted to minimize the duration of exposure of unprotected soils. Except in cases where the constructed feature obscures borrow areas, quarries, and waste material areas, these areas shall not initially be totally cleared. Clearing of such areas shall progress in reasonably sized increments as needed to use the developed areas as approved by the Contracting Officer.

1.2.4 Disturbed Areas

The Contractor shall effectively prevent erosion and control sedimentation through approved methods including, but not limited to, the following:

a. Retardation and control of runoff. Runoff from the construction site or from storms shall be controlled, retarded, and diverted to protected drainage courses by means of diversion ditches, benches, berms, and by any measures required by area wide plans under the Clean Water Act.

b. Erosion and sedimentation control devices. The Contractor shall construct or install temporary and permanent erosion and sedimentation control features as indicated on the drawings. Berms, dikes, drains, sedimentation basins, grassing, and mulching shall be maintained until permanent drainage and erosion control facilities are completed and operative.

c. Sediment basins. Sediment from construction areas shall be trapped in temporary or permanent

sediment basins in accordance with the drawings. The basins shall accommodate the runoff of a local 5 year storm. After each storm, the basins shall be pumped dry and accumulated sediment shall be removed to maintain basin effectiveness. Overflow shall be controlled by paved weirs or by vertical overflow pipes. The collected topsoil sediment shall be reused for fill on the construction site, and/or stockpiled for use at another site. The Contractor shall institute effluent quality monitoring programs as required by State and local environmental agencies.

### 1.2.5 Contractor Facilities and Work Areas

The Contractor's field offices, staging areas, stockpile storage, and temporary buildings shall be placed in areas designated on the drawings or as directed by the Contracting Officer. Temporary movement or relocation of Contractor facilities shall be made only when approved. Borrow areas shall be managed to minimize erosion and to prevent sediment from entering nearby waters. Spoil areas shall be managed and controlled to limit spoil intrusion into areas designated on the drawings and to prevent erosion of soil or sediment from entering nearby waters. Spoil areas shall be developed in accordance with the grading plan indicated on the drawings. Temporary excavation and embankments for plant and/or work areas shall be controlled to protect adjacent areas from despoilment.

## 1.3 WATER RESOURCES

The Contractor shall keep construction activities under surveillance, management, and control to avoid pollution of surface and ground waters. Toxic or hazardous chemicals shall not be applied to soil or vegetation when such application may cause contamination of the fresh water reserve. Monitoring of water areas affected by construction shall be the Contractor's responsibility. All water areas affected by construction activities shall be monitored by the Contractor.

### 1.3.1 Washing and Curing Water

Waste waters directly derived from construction activities shall not be allowed to enter water areas. Waste waters shall be collected and placed in retention ponds where suspended material can be settled out or the water evaporates to separate pollutants from the water. Analysis shall be performed and results reviewed and approved before water in retention ponds is discharged.

### 1.3.2 Cofferdam and Diversion Operations

Construction operations for dewatering, removal of cofferdams, tailrace excavation, and tunnel closure shall be controlled at all times to limit the impact of water turbidity on the habitat for wildlife and on water quality for downstream use.

### 1.3.3 Stream Crossings

Stream crossings shall allow movement of materials or equipment without violating water pollution control standards of the Federal, State or local government.

### 1.3.4 Fish and Wildlife

The Contractor shall minimize interference with, disturbance to, and damage of fish and wildlife. Species that require specific attention along with measures for their protection shall be listed by the Contractor prior to beginning of construction operations.

## 1.4 AIR RESOURCES

Equipment operation and activities or processes performed by the Contractor in accomplishing the specified construction shall be in accordance with the State's rules and all Federal emission and performance laws and standards. Ambient Air Quality Standards set by the Environmental Protection Agency shall be maintained. Monitoring of air quality shall be the Contractor's responsibility. All air areas

affected by the construction activities shall be monitored by the Contractor. Monitoring results will be periodically reviewed by the Government to ensure compliance.

### 1.4.1 Particulates

Dust particles; aerosols and gaseous by-products from construction activities; and processing and preparation of materials, such as from asphaltic batch plants; shall be controlled at all times, including weekends, holidays and hours when work is not in progress. The Contractor shall maintain excavations, stockpiles, haul roads, permanent and temporary access roads, plant sites, spoil areas, borrow areas, and other work areas within or outside the project boundaries free from particulates which would cause the air pollution standards to be exceeded or which would cause a hazard or a nuisance. Sprinkling, chemical treatment of an approved type, light bituminous treatment, baghouse, scrubbers, electrostatic precipitators or other methods will be permitted to control particulates in the work area. Sprinkling, to be efficient, must be repeated to keep the disturbed area damp at all times. The Contractor must have sufficient, competent equipment available to accomplish these tasks. Particulate control shall be performed as the work proceeds and whenever a particulate nuisance or hazard occurs.

### 1.4.2 Hydrocarbons and Carbon Monoxide

Hydrocarbons and carbon monoxide emissions from equipment shall be controlled to Federal and State allowable limits at all times.

### 1.4.3 Odors

Odors shall be controlled at all times for all construction activities, processing and preparation of materials.

### 1.4.4 Sound Intrusions

The Contractor shall keep construction activities under surveillance and control to minimize environment damage by noise. The Contractor shall comply with the provisions of the state's rules.

## 1.5 WASTE DISPOSAL

Disposal of wastes shall be as specified in the other sections of this specificationsn and as specified below.

### 1.5.1 Solid Wastes

Solid wastes (excluding clearing debris) shall be placed in containers which are emptied on a regular schedule. Handling and disposal shall be conducted to prevent contamination. Segregation measures shall be employed so that no hazardous or toxic waste will become co-mingled with solid waste. The Contractor shall transport solid waste off Government property and dispose of it in compliance with Federal, State, and local requirements for solid waste disposal. The Contractor shall comply with site procedures, Federal, State, and local laws and regulations pertaining to the use of landfill areas.

### 1.5.2 Chemical Wastes

Chemicals shall be dispensed ensuring no spillage to ground or water. Periodic inspections of dispensing areas to identify leakage and initiate corrective action shall be performed and documented. This documentation will be periodically reviewed by the Government. Chemical waste shall be collected in corrosion resistant, compatible containers. Collection drums shall be monitored and removed to a staging or storage area when contents are within 150 mm (6 inches) of the top. Wastes shall be disposed of in accordance with Federal and local laws and regulations.

### 1.5.3 Hazardous Wastes

The Contractor shall take sufficient measures to prevent spillage of hazardous and toxic materials during dispensing and shall collect waste in suitable containers observing compatibility. The Contractor shall

transport hazardous waste off Government property and dispose of it in compliance with Federal and local laws and regulations. Spills of hazardous or toxic materials shall be immediately reported to the Contracting Officer. Cleanup and cleanup costs due to spills shall be the Contractor's responsibility.

1.5.4 Burning

Burning will be allowed only if permitted in other sections of the specifications or authorized in writing by the Contracting Officer. The specific time, location, and manner of burning shall be subject to approval. Fires shall be confined to a closed vessel, guarded at all times, and shall be under constant surveillance until they have burned out or have been extinguished. Burning shall be thorough reducing the materials to ashes.

1.6 HISTORICAL, ARCHAEOLOGICAL, AND CULTURAL RESOURCES

Existing historical, archaeological, and cultural resources within the Contractor's work area will be so designated by the Contracting Officer if any has been identified. The Contractor shall take precautions to preserve all such resources as they existed at the time they were first pointed out. The Contractor shall provide and install protection for these resources and be responsible for their preservation during the life of the contract. If during excavation or other construction activities any previously unidentified or unanticipated resources are discovered or found, all activities that may damage or alter such resources shall be temporarily suspended. Resources covered by this paragraph include but are not limited to: any human skeletal remains or burials; artifacts; shell, midden, bone, charcoal, or other deposits; rocks or coral alignments, pavings, wall, or other constructed features; and any indication of agricultural or other human activities. Upon such discovery or find, the Contractor shall immediately notify the Contracting Officer. While waiting for instructions the Contractor shall record, report, and preserve the finds in accordance with the State and Federal regulations.

1.7 POST CONSTRUCTION CLEANUP

The Contractor shall clean up all areas used for construction.

1.8 RESTORATION OF LANDSCAPE DAMAGE

The Contractor shall restore landscape features damaged or destroyed during construction operations outside the limits of the approved work areas.

1.9 MAINTENANCE OF POLLUTION FACILITIES

The Contractor shall maintain permanent and temporary pollution control facilities and devices for the duration of the contract or for that length of time construction activities create the particular pollutant.

1.10 TRAINING OF CONTRACTOR PERSONNEL

The Contractor's personnel shall be trained in all phases of environmental protection. The training shall include methods of detecting and avoiding pollution, familiarization with pollution standards, both statutory and contractual, and installation and care of devices, vegetative covers, and instruments required for monitoring purposes to ensure adequate and continuous environmental pollution control.

SECTION 01415
METRIC MEASUREMENTS

## 1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

| | |
|---|---|
| ASTM E 380 | (1992) Practice for Use of the International System of Units (SI) (the Modernized Metric System) |
| ASTM E 621 | (1984; R 1991) Practice for the Use of Metric (SI) Units in Building Design and Construction |

## 1.2 GENERAL

This project may include metric units of measurements. The metric units used are the International System of Units (SI) developed and maintained by the General Conference on Weights and Measures (CGPM); the name International System of Units and the international abbreviation SI were adopted by the 11th CGPM in 1960. In some cases both metric SI units and English inch-pound (I-P) units are included in a section of the specifications; the measurements used in any particular case have been determined by the circumstances involved. Specifications requiring metric measurements may contain requirements for equipment (e.g. printers, HVAC systems) described in I-P units; in which case no metric substitution will be allowed. Specifications requiring metric measurements may include references to related non-metric industry and/or Government standards; in which case the requirements of the standard govern.

## 1.3 USE OF MEASUREMENTS

Measurements shall be either in SI or I-P units as indicated, except for soft metric measurements or as otherwise authorized. The Contractor shall be responsible for all associated labor and materials when authorized to substitute one system of units for another and for the final assembly and performance of the specified work and/or products.

### 1.3.1 Hard Metric

A hard metric measurement is indicated by an SI value with no expressed correlation to an I-P value (e.g. 38 mm). Hard metric measurements are often used for field data such as distance from one point to another or distance above the floor. Products are considered to be hard metric when they are manufactured to metric dimensions or have an industry recognized metric designation.

### 1.3.2 Soft Metric

A soft metric measurement is indicated by an SI value which is a mathematical approximation of the I-P value shown in parentheses (e.g. 38.1 mm (1-1/2 inches)). Soft metric measurements are used for measurements pertaining to products, test values, and other situations where the I-P units are the standard for manufacture, verification, or other controlling factor. The I-P value shall govern while the metric measurement is provided for information.

### 1.3.3 Neutral

A neutral measurement is indicated by an identifier which has no expressed relation to either an SI or an I-P value (e.g. American Wire Gage (AWG) which indicates thickness but in itself is neither SI nor I-P).

## 1.4 COORDINATION

Discrepancies, such as mismatches or product unavailability, arising from use of both metric and non-metric measurements and discrepancies between the measurements in the specifications and the measurements in the drawings shall be brought to the attention of the Contracting Officer for resolution.

## 1.5 RELATIONSHIP TO SUBMITTALS

Submittals for Government approval or for information only shall cover the SI or I-P products actually being furnished for the project. The Contractor shall submit the required drawings and calculations in the same units used in the contract documents describing the product or requirement unless otherwise instructed or approved. The Contractor shall use ASTM E 380 and ASTM E 621 as the basis for establishing metric measurements required to be used in submittals.

SECTION 01440
CONTRACTOR QUALITY CONTROL

PART
1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 3740 (1992) Evaluation of Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction

ASTM E 329 (1993b) Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction
US Army Corps of Engineers EM 385-1-1 (1996) Safety & Health Requirements Manual

1.2 PAYMENT

Separate payment will not be made for providing and maintaining an effective Quality Control program, and all costs associated therewith shall be included in the Bidding Schedule.

1.3 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with SECTION 01330 - SUBMITTAL PROCEDURES:

SD-08, Statements
Accident Prevention Plan; GA
Quality Control Plan; GA

A sample Quality Control Plan is included at the end of this Section. The Contractor may use this sample plan directly or may develop his own plan.

The Accident Prevention Plan shall be prepared in accordance with appendix z of EM 385-1-1.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 GENERAL

The Contractor is responsible for quality control and shall establish and maintain an effective quality control system in compliance with the Contract Clause entitled "Inspection of Construction." The quality control system shall consist of plans, procedures, and organization necessary to produce an end product which complies with the contract requirements. The system shall cover all construction operations, both onsite and offsite, and shall be keyed to the proposed construction sequence.

3.2 QUALITY CONTROL PLAN

3.2.1 General

The Contractor shall furnish for review by the Government, not later than 10 days after award of the contract, the Contractor Quality Control (CQC) Plan proposed to implement the requirements of the Contract Clause entitled "Inspection of Construction." The plan shall identify personnel, procedures, control, instructions, test, records, and forms to be used. Construction will be permitted to begin only after acceptance of the CQC Plan applicable to the particular feature of work to be started. Work will not be permitted to begin until acceptance of a CQC Plan.

3.2.2 Content of the CQC Plan For Each Task Order

The CQC Plan shall include, as a minimum, the following to cover all construction operations, both onsite and offsite, including work by subcontractors, fabricators, suppliers, and purchasing agents:

a. A description of the quality control organization, including a chart showing lines of authority and acknowledgment that the CQC staff shall implement the three phase control system for all aspects of the work specified. The staff shall include a CQC System Manager who shall report to the project superintendent.

b. The name, qualifications (in resume format), duties, responsibilities, and authorities of each person assigned a CQC function.

c. A copy of the letter to the CQC System Manager signed by an authorized official of the firm which describes the responsibilities and delegates sufficient authorities to adequately perform the functions of the CQC System Manager, including authority to stop work which is not in compliance with the contract. The CQC System Manager shall issue letters of direction to all other various quality control representatives outlining duties, authorities, and responsibilities. Copies of these letters will also be furnished to the Government.

d. Procedures for scheduling, reviewing, certifying, and managing submittals, including those of subcontractors, offsite fabricators, suppliers, and purchasing agents. These procedures shall be in accordance with Section 01330 SUBMITTAL PROCEDURES.

e. Control, verification, and acceptance testing procedures for each specific test to include the test name, specification paragraph requiring test, feature of work to be tested, test frequency, and person responsible for each test. (Laboratory facilities will be approved by the Contracting Officer.)

f. Procedures for tracking preparatory, initial, and follow-up control phases and control, verification, and acceptance tests including documentation.

g. Procedures for tracking construction deficiencies from identification through acceptable corrective action. These procedures will establish verification that identified deficiencies have been corrected.

h. Reporting procedures, including proposed reporting formats.

i. A list of the definable features of work. A definable feature of work is a task which is separate and distinct from other tasks and has separate control requirements. It could be identified by different trades or disciplines, or it could be work by the same trade in a different environment. Although each section of the specifications may generally be considered as a definable feature of work, there are frequently more than one definable feature under a particular section. This list will be agreed upon during the coordination meeting.

3.2.3 Acceptance of Plan

Acceptance of the Contractor's plan is required prior to the start of construction. Acceptance is conditional and will be predicated on satisfactory performance during the construction. The Government reserves the right to require the Contractor to make changes in his CQC Plan and operations including removal of personnel, as necessary, to obtain the quality specified.

3.2.4 Notification of Changes

After acceptance of the CQC Plan, the Contractor shall notify the Contracting Officer in writing of any proposed change. Proposed changes are subject to acceptance by the Contracting Officer.

3.3 COORDINATION MEETING

After the Preconstruction Conference, before start of construction, and prior to acceptance by the Government of the CQC Plan, the Contractor shall meet with the Contracting Officer or Authorized Representative and discuss the Contractor's quality control system. The CQC Plan shall be submitted for review a minimum of 7 calendar days prior to the Coordination Meeting. During the meeting, a mutual understanding of the system details shall be developed, including the forms for recording the CQC operations, control activities, testing, administration of the system for both onsite and offsite work, and the interrelationship of Contractor's Management and control with the Government's Quality Assurance. Minutes of the meeting shall be prepared by the Government and signed by both the Contractor and the Contracting Officer. The minutes shall become a part of the contract file. There may be occasions when subsequent conferences will be called by either party to reconfirm mutual understandings and/or address deficiencies in the CQC system or procedures which may require corrective action by the Contractor.

3.4 QUALITY CONTROL ORGANIZATION

3.4.1 General

The requirements for the CQC organization are a CQC System Manager and sufficient number of additional qualified personnel to ensure contract compliance. The Contractor shall provide a CQC organization which shall be at the site at all times during progress of the work and with complete authority to take any action necessary to ensure compliance with the contract. All CQC staff members shall be subject to acceptance by the Contracting Officer.

3.4.2 CQC System Manager

The Contractor shall identify as CQC System Manager an individual within his organization who shall be responsible for overall management of CQC and have the authority to act in all CQC matters for the Contractor. The CQC System Manager shall have a minimum of 5 years construction experience on construction similar to this contract. This CQC System Manager shall be on the site as required during construction and will be employed by the prime Contractor. The CQC System Manager shall be assigned no other duties. An alternate for the CQC System Manager will be identified in the plan to serve in the event of the System Manager's absence. The requirements for the alternate will be the same as for the designated CQC System Manager.

3.4.3 CQC Personnel

In addition to CQC personnel specified elsewhere in the contract, the Contractor shall provide as part of the CQC organization specialized personnel to assist the CQC System Manager when necessary to assure an overall quality product. These individuals may be employees of the prime or subcontractor; be responsible to the CQC System Manager; be physically present at the construction site during work on their areas of responsibility; have the necessary education and/or experience. These individuals may perform other duties but must be allowed sufficient time to perform their assigned quality control duties as described in the Quality Control Plan.

3.4.4 Additional Requirement

In addition to the above experience and education requirements the CQC System Manager shall have completed the course entitled "Construction Quality Management For Contractors". This course is periodically offered at Little Rock District Corps of Engineers, Federal Office Building, 700 W. Capitol, Little Rock, AR. The course will also be offered on an as-needed basis for specific contracts when the

proposed CQC System Manager has not previously attended the training. The Contracting Officer or Authorized Representative shall be informed at the Preconstruction Conference if this service is needed. A nominal charge will apply to cover reproduction of the required manual. The CQC System Manager may be accepted, at the Contracting Officer's discretion, conditioned upon completion of the course.

3.4.5 Organizational Changes

The Contractor shall maintain his CQC staff at full strength at all times. When it is necessary to make changes to the CQC staff the Contractor shall revise the CQC Plan to reflect the changes and submit the changes to the Contracting Officer for acceptance.

3.5 SUBMITTALS

Submittals shall be made as specified in Section 01330 SUBMITTAL PROCEDURES. The CQC organization shall be responsible for certifying that all submittals are in compliance with the contract requirements.

3.6 CONTROL

Contractor Quality Control is the means by which the Contractor ensures that the construction, to include that of subcontractors and suppliers, complies with the requirements of the contract. At least three phases of control shall be conducted by the CQC System Manager as required by the task order for each definable feature of work as follows:

3.6.1 Preparatory Phase

This phase shall be performed prior to beginning work on each definable feature of work and shall include:

a. A review of each paragraph of applicable specifications.

b. A review of the contract drawings.

c. A check to assure that all materials and/or equipment have been tested, submitted, and approved.

d. Review of provisions that have been made to provide required control inspection and testing.

e. Examination of the work area to assure that all required preliminary work has been completed and is in compliance with the contract.

f. A physical examination of required materials, equipment, and sample work to assure that they are on hand, conform to approved shop drawings or submitted data, and are properly stored.

g. A review of the appropriate activity hazard analysis to assure safety requirements are met.

h. Discussion of procedures for controlling quality of the work including repetitive deficiencies. Document construction tolerances and workmanship standards for that feature of work.

i. A check to ensure that the portion of the plan for the work to be performed has been accepted by the Contracting Officer.

j. Discussion of the initial control phase.

k. The Government shall be notified at least 3 working days in advance of beginning the preparatory control phase. This phase shall include a meeting conducted by the CQC System Manager and

attended by the superintendent, other CQC personnel (as applicable), and the foreman responsible for the definable feature. The results of the preparatory phase actions shall be documented by separate minutes prepared by the CQC System Manager and attached to the daily CQC report. The Contractor shall instruct applicable workers as to the acceptable level of workmanship required in order to meet contract specifications.

3.6.2 Initial Phase

This phase shall be accomplished at the beginning of a definable feature of work. The following shall be accomplished:

a. A check of work to ensure that it is in full compliance with contract requirements. Review minutes of the preparatory meeting.

b. Verify adequacy of controls to ensure full contract compliance. Verify required control inspection and testing.

c. Establish level of workmanship and verify that it meets minimum acceptable workmanship standards. Compare with required sample panels as appropriate.

d. Resolve all differences.

e. Check safety to include compliance with and upgrading of the safety plan and activity hazard analysis. Review the activity analysis with each worker.

f. The Government shall be notified at least 24 hours in advance of beginning the initial phase. Separate minutes of this phase shall be prepared by the CQC System Manager and attached to the daily CQC report. Exact location of initial phase shall be indicated for future reference and comparison with follow-up phases.

g. The initial phase should be repeated for each new crew to work onsite, or any time acceptable specified quality standards are not being met.

3.6.3 Follow-up Phase

Daily checks shall be performed to assure control activities, including control testing, are providing continued compliance with contract requirements, until completion of the particular feature of work. The checks shall be made a matter of record in the CQC documentation. Final follow-up checks shall be conducted and all deficiencies corrected prior to the start of additional features of work which may be affected by the deficient work. The Contractor shall not build upon or conceal non-conforming work.

3.6.4 Additional Preparatory and Initial Phases

Additional preparatory and initial phases shall be conducted on the same definable features of work if the quality of on-going work is unacceptable, if there are changes in the applicable CQC staff, onsite production supervision or work crew, if work on a definable feature is resumed after a substantial period of inactivity, or if other problems develop.

3.7 TESTS

3.7.1 Testing Procedure

The Contractor shall perform specified or required tests to verify that control measures are adequate to provide a product which conforms to contract requirements. Upon request, the Contractor shall furnish to the Government duplicate samples of test specimens for possible testing by the Government. Testing includes operation and/or acceptance tests when specified. The Contractor shall procure the services of a Corps of Engineers approved testing laboratory or establish an approved testing

laboratory at the project site. The Contractor shall perform the following activities and record and provide the following data:

a. Verify that testing procedures comply with contract requirements.

b. Verify that facilities and testing equipment are available and comply with testing standards.

c. Check test instrument calibration data against certified standards.

d. Verify that recording forms and test identification control number system, including all of the test documentation requirements, have been prepared.

e. Results of all tests taken, both passing and failing tests, will be recorded on the CQC report for the date taken. Specification paragraph reference, location where tests were taken, and the sequential control number identifying the test will be given. If approved by the Contracting Officer, actual test reports may be submitted later with a reference to the test number and date taken. An information copy of tests performed by an offsite or commercial test facility will be provided directly to the Contracting Officer. Failure to submit timely test reports as stated may result in nonpayment for related work performed and disapproval of the test facility for this contract.

3.7.2 Testing Laboratories

3.7.2.1 Capability Check

The Government reserves the right to check laboratory equipment in the proposed laboratory for compliance with the standards set forth in the contract specifications and to check the laboratory technician's testing procedures and techniques. Laboratories utilized for testing soils, concrete, asphalt, and steel shall meet criteria detailed in ASTM D 3740 and ASTM E 329.

3.7.2.2 Capability Recheck

If the selected laboratory fails the capability check, the Contractor will be assessed a charge of $1000 to reimburse the Government for each succeeding recheck of the laboratory or the checking of a subsequently selected laboratory. Such costs will be deducted from the contract amount due the Contractor.

3.7.3 On-Site Laboratory

The Government reserves the right to utilize the Contractor's control testing laboratory and equipment to make assurance tests and to check the Contractor's testing procedures, techniques, and test results at no additional cost to the Government.

3.7.4 Furnishing or Transportation of Samples for Testing

Costs incidental to the transportation of samples or materials will be borne by the Contractor. Samples of materials for test verification and acceptance testing by the Government shall be delivered to the Corps of Engineers Division Laboratory, f.o.b., at the following address:

Southwestern Division Laboratory
U.S. Army Engineer Division, Southwestern
4815 Cass Street
Dallas, TX 75235

Coordination for each specific test, exact delivery location, and dates will be made through the Resident or Project Office.

3.8 COMPLETION INSPECTION

3.8.1 Pre-Final Inspection

At the completion of all work or any increment thereof established by a completion time stated in the Special Clause entitled "Commencement, Prosecution, and Completion of Work," or stated elsewhere in the specifications, the CQC System Manager shall conduct an inspection of the work and develop a "punch list" of items which do not conform to the approved drawings and specifications. Such a list of deficiencies shall be included in the CQC documentation, as required by paragraph DOCUMENTATION below, and shall include the estimated date by which the deficiencies will be corrected. Once this is accomplished the Contractor shall notify the Government that the facility is complete and is ready for the Government's "Prefinal" inspection. The Government will perform this inspection to verify that the facility is complete and ready to be occupied. A Government "Prefinal Punch List" will be developed as a result of this inspection. The Contractor's CQC System Manager shall ensure that all items on this list have been corrected and so notify the Government so that a "Final" inspection with the customer can be scheduled. Any items noted on the "Final" inspection shall be corrected in a timely manner. These inspections and any deficiency corrections required by this paragraph will be accomplished within the time slated for completion of the entire work or any particular increment thereof if the project is divided into increments by separate completion dates.

3.8.2 Final Acceptance Inspection

The Contractor's Quality Control Inspection personnel, his superintendent or other primary management person and the contracting Officer's representative will be in attendance at this inspection. Additional Government personnel including, but not limited to, those from Base/Post Civil Facility Engineer user groups, and major commands may also be in attendance. The final acceptance inspection will be formally scheduled by the Contracting Officer based upon notice from the Contractor. This notice will be given to the Contracting Officer at least 14 days prior to the final acceptance inspection and must include the Contractor's assurance that all specific items previously identified to the Contractor as being acceptable, along with all remaining work performed under the contract, will be complete and acceptable by the date scheduled for the final acceptance inspection. Failure of the Contractor to have all contract work acceptably complete for this inspection will be cause for the Contracting Officer to bill the Contractor for the Government's additional inspection cost in accordance with the contract clause entitled "Inspection of Construction".

3.9 DOCUMENTATION

The Contractor shall maintain current records providing factual evidence that required quality control activities and/or tests have been performed. These records shall include the work of subcontractors and suppliers and shall be on an acceptable form that includes, as a minimum, the following information:

a. Contractor/subcontractor and their area of responsibility.

b. Operating plant/equipment with hours worked, idle, or down for repair.

c. Work performed each day, giving location, description, and by whom.

d. Test and/or control activities performed with results and references to specifications/drawings requirements. The control phase should be identified (Preparatory, Initial, Follow-up). List deficiencies noted along with corrective action.

e. Quantity of materials received at the site with statement as to acceptability, storage, and reference to specifications/drawings requirements.

f. Submittals reviewed, with contract reference, by whom, and action taken.

g. Off-site surveillance activities, including actions taken.

h. Job safety evaluations stating what was checked, results, and instructions or corrective actions.

i. Instructions given/received and conflicts in plans and/or specifications.

j. Contractor's verification statement.

These records shall indicate a description of trades working on the project; the number of personnel working; weather conditions encountered; and any delays encountered. These records shall cover both conforming and deficient features and shall include a statement that equipment and materials incorporated in the work and workmanship comply with the contract. The original and one copy of these records in report form shall be furnished to the Government daily within 24 hours after the date(s) covered by the report, except that reports need not be submitted for days on which no work is performed. As a minimum, one report shall be prepared and submitted for every seven days of no work and on the last day of a no work period. All calendar days shall be accounted for throughout the life of the contract. The first report following a day of no work shall be for that day only. Reports shall be signed and dated by the CQC System Manager. The report from the CQC System Manager shall include copies of test reports and copies of reports prepared by all subordinate quality control personnel.

## 3.10 NOTIFICATION OF NONCOMPLIANCE

The Contracting Officer will notify the Contractor of any detected noncompliance with the foregoing requirements. The Contractor shall take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the worksite, shall be deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders shall be made the subject of claim for extension of time or for excess costs or damages by the Contractor.

## 3.11 Inventory of Installed Property

A list of equipment or units of equipment that require electrical power or fuel, or may require removal of replacement such as AHUs, fans, air conditioners, compressors, condensers, boiler, thermal exchangers, pumps cooling towers, tanks, fire hydrants, etc. shall be made and kept up to date as installed. The list shall be reviewed periodically by the Government to insure completeness and accuracy. Partial payment my be withheld for equipment not incorporated in the list at the discretion of the Contracting Officer. List shall include on each item as applicable: Description, Manufacturer, Model or Catalog No., Serial No., Input (power, voltage, BTU, tons, etc.), Size or Capacity (tanks), and net inventory costs, any other data necessary to describe them. Final list shall be turned over to the Authorized Representative of the Contracting Officer 2 weeks prior to prefinal inspection.

## 3.12 DEFICIENCY TRACKING SYSTEM

The CQC System Manager shall maintain a deficiency tracking and closeout system that will identify deficiencies not only in written records, but also at the location of the deficiency on the worksite. The system should document at a minimum the description, date deficiency noted, current status, and date corrected. The system should make all parties concerned aware of the deficiency until correction is accomplished and prevent the defective work from being built upon or concealed.

(Sample of Typical Contractor Quality Control Report)

CONTRACTOR'S NAME
(Address)

DAILY CONSTRUCTION QUALITY CONTROL REPORT

Date:_____ Report No.____

Contract No.:_____

Description and Location of Work:_____

Weather: (Clear) (P. Cloudy) (Cloudy); Temperature:___ Min.___ Max.___
Rainfall _____ Inches.

Contractor/Subcontractors and Area of Responsibility with Labor Count For Each
a. _____
b. _____
c. _____
d. _____

Equipment Data: (Indicate items of construction equipment, other than hand tools, at the job site, and whether or not used.)

l. Work Performed Today: (Indicate location and description of work performed. Refer to work performed by prime and/or subcontractors by letter in Table above.)

2. Results of Surveillance: (Include satisfactory work completed, or deficiencies with action to be taken.)

a. Preparatory Inspection:

b. Initial Inspection:

c. Follow-Up Inspections:

3. Test Required by Plans and/or Specifications Performed & Results of Tests:

4. Verbal Instructions Received: (List any instructions given by Government personnel on construction deficiencies, retesting required, etc., with action to be taken.)

5. Remarks: (Cover any conflicts in plans, specifications, or instructions or any delay to the job attributable to weather conditions.)

6. Results of Safety Inspection: (Include safety violations and corrective actions taken.)

_____

Contractor's Inspector

CONTRACTOR'S VERIFICATION: The above report is complete and correct and all material and equipment used and work performed during this reporting period area in compliance with the contract plans and specifications except as noted above.

_____

Contractor's Approved Authorized Representative

FOR EXAMPLE ONLY

# QUALITY CONTROL PLAN

Project:_____
Location:_____
Contract:_____
Date:_____

1. Policy: _____ Construction Company will provide and maintain an effective Quality Control Program as required by this contract. All materials and workmanship will be closely inspected and coordinated to insure compliance with the contract plans and specifications.

2. Organization: This Quality Control Program will be managed by the quality Control System Manager, _____. The Contractor's Quality Control System Manager, CQC, will have authority over all subcontractors, vendors, and suppliers to accept or reject materials or workmanship and determine complizncе with the contract requirements. The CQC will have direct access to upper level management in the company for enforcement of this plan. This plan and the appointments of the above designated individuals are subject to rejection by the Contracting Officer in the event satisfactory performance is not delivered and maintained. Letters of direction for the CQC are attached in Appendix B. Qualifications/resumes of Quality Control Representatives are attached in Appendix C."

3. Duties and Responsibilities: The Quality Control System Manager will be responsible for the following tasks being performed in a timely manner so as to deliver a quality end product as required by the contract. These will consist of but, not limited to the following:

a. Maintain on the job site current up to date plans and specifications and insure these followed in the submittal of shop drawings and performance of construction.

b. Perform all daily inspections and tests as required under this contract to achieve the quality of construction outlined in the contract plans and specifications. Write a comprehensive daily report covering all activities on the job site. This report shall be submitted to the Government Representative not later than 48 hours from the date covered in the report.

c. Maintain marked-up drawings on site depicting as-built conditions. These drawings shall be available for inspection by the Government Representative at all times. These will be inspected for currency at least weekly.

d. Prepare and maintain a submittal register, ENG FORM 4288, for the duration of each task order. A review of the register will be performed at least every 30 days and appropriate actions taken to maintain an updated register. Review will also be made as necessary relative to work status, slippages, delays, and other scheduling matters as necessary to coordinate the submittal register with the construction progress schedule. Revisions will be made as necessary and provided to the Government at least every 60 days.

e. Review all shop drawings and other submittals for compliance with the contract requirements prior to submission to the Government. The ENG Form 4025 will be used for all submittals and be certified only by the designated Chief of Quality Control in accordance with the Contract Special Clauses.

f. Responsible for the inspection and enforcement of all work and equipment for compliance with the Corps of Engineers Safety and Health Requirements Manual, EM 385-1-1, and OSHA regulations. All violations will be brought immediately to the attention of the individuals responsible and will be corrected prior to work proceeding. Work will be halted to correct the deficiencies if necessary to avoid the occurrence of an accident. All violations and safety inspection activities will be reported in the daily inspection reports.

4. Control & Inspection: The control and inspection system will be a three phase inspection consisting of preparatory, initial, and follow-up inspections as described in Engineer Pamphlet, EP 715-1-2, entitled "Contractor Quality System Control (CQC)". See Appendix A. Government Representative will be notified in advance of all inspections and testing activities. The Quality Control Manager will conduct the Pre-Final and Final Inspections. A Pre-Final will not be scheduled until the punch list and master deficiency list is reduced to under ten items.

5. Testing: All testing will be in strict compliance with the contract specifications. All testing will be coordinated prior with the Government Representative as to contract compliance and schedule. Frequency of tests will be as determined by the contract specifications. Only Corps of Engineer approved commercial testing laboratories will be utilized for testing. The laboratory planned for use on this project is _____.

6. Submittals: Submittals will be executed in accordance with the contract clauses and the technical specifications. As stated in paragraph "3-d" above, a submittal register will be prepared and maintained to manage submittals. The Quality Control System Manager will be responsible for reviewing for compliance all submittals including those of sub-contractors. Only after compliance with the contract requirements has been verified will a submittal be sent to the Government Representative for review.

//signed//
NAME & TITLE
PROJECT MANAGER

Enclosures

REFERENCE AMENDEMENT 0002 FOR CHANGES EXAMPLE ONLY

# A C C I D E N T  P R E V E N T I O N  P L A N

Location:_____
Contract:_____
Date:_____

1. Scope: This work consists of (DESCRIPTION OF TASK ORDER) _____ construction company will perform all work with the exception of the following:

| Subcontractors | W o r k |
|---|---|
| _____ - | _____ |
| _____ - | _____ |
| _____ - | _____ |
| _____ - | _____ |

2. Safety and Health Policy: We, _____, and all of our subcontractors will comply with all provisions of the U.S. Army Corps of Engineers Safety and Health Requirements Manual, EM 385-1-1, and with OSHA regulations throughout the course of this contract. We will also comply with any additional directives issued by the Contracting Officer or his designated representative. It is our goal to provide a safe and healthy work environment for all of our workers and to protect the public.

3. Personnel: Mr._____ will be the responsible authority for inspection and enforcement of this safety and health program. This includes all subcontractors activities and suppliers delivering materials to the construction site.

4. Coordination and Control: Mr._____ will be responsible for scheduling and coordinating all work on site. All subcontractors and suppliers will be required to schedule and coordinate their work thru him prior to execution of work on site. No work will be allowed to begin until properly coordinated. Any change in personnel or work conditions will require additional coordination. Only fully qualified personnel will be utilized to perform the work. Supervisors will insure that proper safety measures are coordinated and complied during the performance of this work. The necessary disciplinary action to include suspension will be taken to insure compliance. Access to the site will be limited to only authorized personnel. The necessary signage, fencing, and barricades will be provided to control traffic flow and limit public access. Adequate sanitation facilities, first aid equipment, and drinking water will be provided.

5. Indoctrination and Training: All personnel assigned to this project will first be indoctrinated towards the required jobsite safety program, including subcontractor personnel. Indoctrination will consist of the following:

a. Alcohol and Drug Abuse Program-sign letters
b. Purpose and scope of the Safety Program-enforcement
c. Hazards relating to the project work-review hazard analyses
d. First Aid and Emergency Facilities-brief location
e. Reporting injuries and safety hazards
f. Tool Box Safety meetings required attendance, time, place
g. Required personal protective equipment

As part of the employees indoctrination he/she will be required to read and sign the letter, Appendix A, outlining the company's policy in regards to implementing this safety program and maintaining a safe work environment.

The employee will also be furnished a copy of the company's policy letter, Appendix B, on alcohol and drug abuse. There will be no tolerance of any alcohol/drug abuse on this project. Any employee found under the influence of illegal drugs or who is abusing legal prescription or non-prescription drugs will be immediately removed from the project.

Safety meetings will be held at least monthly for supervisors and a tool box safety meeting will be held weekly on _____at _____ hours. Attendance is mandatory for all employees. Meetings will be documented on the daily Contractor Quality Control Reports.

6. Emergency Plan: The following personnel are trained in CPR and First Aid. At least one will be on site anytime work is commencing. A copy of their current cards are enclosed: Appendix C

a. _____
b. _____

Emergency communications equipment will be provided on site as required by the contracting officer. The following emergency phone numbers will be clearly posted on the job site bulletin board and in the project office:

**EMERGENCY PHONE NUMBERS**

a. Ambulance: _____
b. Doctor: _____
c. Hospital: _____
d. Fire Dept.: _____
e. Police: _____
f. Corps of Engineers: _____
g. Company Home Office: _____

In case of any emergency notify the necessary authorities. Our trained on site personnel will immediately stabilize the victim by administering the necessary first aid to prevent further injury or complications. Depending on the severity of the injury, the employee will be transported by either company vehicle or ambulance to the nearest medical facility. In case of death or property damage exceeding $50,000.00, the site will be preserved for investigation by Government and law enforcement authorities.

7. Personal Protective Equipment: This entire project site is classified as a "HARD HAT" area for the entire duration of the work on site. Proper signs will be posted at the project boundary and barricades erected. The following will be required as a minimum:

a. Approved Hard Hats will be worn by all personnel on site.

b. Protective footgear will be required. Leather work shoes will be required as a minimum. Rubber boots will be used for concrete slab work or work in muddy conditions. Canvas athletic shoes will not be acceptable unless OSHA approved.

c. Approved safety glasses or eye protection will be required for personnel exposed to saws, drills, chipping tools, grinders, dust, etc. Additional goggles will be maintained on site for visitors, inspectors, etc.

d. Seat belts will be utilized on all company vehicles and equipment.

e. Leather gloves will be utilized when exposed to cuts, heat, or abrasion hazards.

f. Proper respiratory protection will be worn when exposed to dust particles or fibers from grinding, drilling, fiberglass insulation, etc.

h. Approved hearing protection will be worn when exposed to hazardous noise levels.

i. All hand tools must be on GFCI's, ground fault circuit interrupters. Portable electrical cords must be rated heavy duty (hard or extra hard usage by NEC/UL). Flat cords not approved!

j. Back-up alarm and roll-over protection is required on all backhoes, tractors, road graders, bulldozers, rollers, and front end loaders.

8. Hazard Communications Program: Material Safety Data Sheets, MSDS, will be maintained in Appendix D and posted on the job site bulletin board for all hazardous and toxic substances anticipated to be utilized on or near the site. Personnel will be briefed prior to utilization on the proper usage, storage, and associated health hazards of these substances. As a minimum the following substances will be considered for being included in this program:

a. Gasoline
b. Diesel fuel
c. Motor oil/lubricants
d. Paint latex, lead, epoxy
e. Paint thinners
f. Aerosols
g. Solvents
h. Fiberglass insulation
i. Lead solder, anchors, paint etc.
j. Galvanized coating
k. Pressure treated wood
l. Glue/adhesives/sealants
m. PVC
n. Oxygen/acetylene
o. Asbestos shingles? (demo)

9. Housekeeping: All work areas will be kept clean to alleviate any hazards to workers. At the conclusion of each work day debris on site will be collected, bagged, and disposed of off site as directed by the Contracting Officer's Representative. Trash and debris will not be allowed to accumulate on site for more than one day. Nails in boards will be removed or knocked over immediately. Blowing debris from open trucks will not be tolerated. Subcontractors will be briefed when arriving on site of this policy. Littering on or off site will not be tolerated.

10. Fire Protection: Adequate fire protection measures will be enforced at all times. No open burning will be allowed on site. All major pieces of equipment will have fire extinguisher as well as the project site office and work area. Routine inspections will be kept up to date. No flammable substances will be stored on site.

11. Temporary Electrical: A plan for the temporary electrical service will be submitted for approval prior to installation. All work will be performed by a licensed electrician and in strict accordance with the requirements of the National Electrical Code. Ground resistance will be checked and reported in writing to the Govt. Representative prior to energization. All hand tool circuits will have ground fault circuit interrupters either at the circuit breaker or receptacle. All portable cords will be rated for hard or extra hard usage. No flat cords will be used on the construction site. All electric hand tools will be checked on initial arrival on site and daily for proper grounding or be double insulated.

12. Job Hazard Analysis: Prior to each major phase of work, a hazard analysis of the operation will be conducted identifying the steps, equipment to be used, potential hazards, recommended controls, inspection requirements, and required training. The form in Appendix E will be used to perform this analysis. This analysis will be prepared prior to the Preparatory Inspection and will be reviewed by all personnel involved prior to commencement of work. This analysis will reviewed by Govt. representative and upon acceptance be incorporated into this Accident Prevention Program, Appendix F. As a minimum the following phases of work will be addressed:

a. Demolition/clearing/grading
b. Excavation/utilities
c. Concrete
d. Masonry
e. Carpentry/roofing
f. Mechanical/electrical
g. Finish/painting
h. Asphalt/turfing/mowing

13. Safety Inspections: Safety Inspections will be conducted frequently by a competent individual to insure compliance with the requirements of this plan and the applicable requirements of EM-385-1-1, 1 Oct. 92; and OSHA. The Contractor's Quality Control representative will conduct and report at least daily safety inspections in the daily CQC Report. Safety and health issues and deficiencies will be identified and the actions, timetable, and responsibility for correcting identified. All vehicles and equipment will be inspected upon arrival on site in accordance with the checklist in Appendix G. No equipment will be permitted to be put into operation until all noted deficiencies are corrected.

14. Investigating and Reporting Accidents: All accidents/incidents which occur on site will be investigated, reported, and analyzed as prescribed by the designated authority. Any lost time accidents will be immediately reported to the Contracting Officer. Employees will report any accidents/incidents as soon as possible to the on

site supervisor within 24 hours. No supervisor shall decline to accept a report or injury from a worker. Injuries involving a fatality, five or more persons admitted to a hospital, or property damage in excess of $50,000.00 will be reported to the Occupational Safety and Health Administration. A daily record of first aid treatments will be maintained on prescribed forms and furnished to the Govt. Representative upon request. The prime contractor will maintain records of exposure and accident experience incidental to the work for both the prime and his subcontractors. As a minimum these records will include exposure work-hours and a log of occupational injuries and illnesses, OSHA Form 200 or equivalent as prescribed by 29 CFR 1904.

The Contractor will also maintain a record of employee exposure to toxic and harmful substances. Notify employees and Contracting Officer of any excessive exposure. Take the necessary corrective action to control exposure. The contractor will maintain access to Workmen's Compensation Claims Reports on both prime and subcontractor personnel.

Date:_____

| | |
|---|---|
| //signed// | // signed // |
| Name, Title | NAME , Title |
| Chief, Quality Control | PROJECT MANAGER |

## Safety Rules

Construction Company wishes to welcome you to the organization. It is our policy to provide you with safe and healthful working conditions in all of our activities. Consistent with that policy, all location managers within our organization are responsible for compliance with the Occupational Safety and Health Act of 1970 as an integral part of their safety and loss control responsibility.

We must comply with OSHA and you, an employee, are charged with obeying the law also. Announcements of the law are posted on the Company bulletin board for your benefit. You have the privilege of inspecting the Company safety log and reading the Act's provisions as contained in the Federal Register at the Company's main office on your own time.

Your supervisor and co-worker will aid and instruct you in "work safe". Some basic rules are printed here for your information.

1. BE ALERT. Report unsafe conditions immediately. You are not required to work under any unsafe conditions.

2. Report every injury, including those of minor nature, and obtain first aid.

3. Hard hats must be worn in any area designated "HARD HAT AREA".

4. Horseplay or unsafe acts will be grounds for dismissal.

5. Lift correctly. Use your legs to take the strain, not your back.

6. Wear cloths suited for the job - safety shoes and gloves, if needed. No dangling or loose clothing or jewelry around moving machinery.

7. Hand tools such as hammers and chisels should be kept well dressed to prevent injury form flying particles.

8. Absolutely no beer or liquor consumed from starting to quitting time. No beer or liquor allowed in trucks or equipment at any time.

9. Ear protection in the form of ear muffs or approved ear plugs will be worn on all high noise level jobs as directed. Cotton or waste will not be used as ear plugs.

10. Power tools shall be operated only by authorized personnel with guard "IN PLACE".

11. Safety goggles shall be worn when sledging, hammering, chipping, welding, grinding or other operations where eye injuries may result.

12. Tampering with, or unauthorized removal of, fire extinguisher from assigned, locations is prohibited.

13. Compressed gas or oxygen is not to be used for dusting off cloths or cleaning equipment.

14. No employee other than the operator shall ride on any truck, loader, crane or other moving equipment unless specifically authorized to do so.

15. Approved respirators are to be used when conditions warrant.

16. Do not operate equipment without authorization.

17. Everyone must help with clean up work. Good housekeeping is a top safety policy. Every trade cleans up after itself.

18. Personal protective equipment shall be worn when exposed to hazardous conditions.

19. Riding on equipment without an approved rider's seat is prohibited.

20. Stay out from under loads.

21. When transporting small quantities of gasoline, an approved safety can must be used.

NOTICE TO EMPLOYEES

"ACCIDENTS"

Report all injuries immediately to your foreman or supervisor.

AUTHORIZATION for treatment must be obtained from your supervisor. Unauthorized medical treatment will not be recognized.

Detach at perforation and retain "Safety Rules".

CERTIFICATION

I have read the Company's basic safety rules attached to this form and the Safety Manual for Maintenance and General Construction. I understand violation of the rules may lead to dismissal. Also, if injured on the job, I must report immediately to my supervisor for care and instructions.

_____ _____

Date Employee's Signature

Issued: March 31, 1987
Revised: April 1, 1988

TO: All Employees - Construction Company

FROM: President

SUBJECT: Safety Policy on Drug, Alcohol and Other Prohibited Items

Effective May 1, 1987, the Company shall start enforcement of their recently adopted Safety Policy on Drug, Alcohol and Other Prohibited Items. Accordingly, you are urged to study the policy and become totally familiar with the provisions and requirements of the Policy and the resulting consequence for Policy violations.

POLICY STATEMENT

Construction Company is firmly committed to providing its employees with a safe, healthy and productive work environment; to protect Company property and other physical assets; and to safeguard the general public from accidents and/or injuries resulting from or related to Company operations.

The Company's Safety Policy on Drug, Alcohol and Other Prohibited Items restricts certain items and substances from being brought on or being present on Company property or Company controlled premises, prohibits Company employees and others working or being present on Company property or premises from having detectable levels or identifiable trace quantities for certain drugs and other substances, and prohibits the unauthorized possession, by employees or others, of prohibited items (defined hereafter).

COMPANY PROPERTY/PREMISES

For purposes of this Policy, the terms "Company property" or "Company premises" is used in its broadest sense and includes all property, facilities, land, offices, buildings, structures, fixtures, installations, trailers, equipment, boats, vessels, barges, aircraft, automobiles, trucks, all other vehicles, and parking areas, whether owned, leased, used or under the control of the Company. This may also include other work locations, including the job site of a customer, or to and from those locations while in the course and scope of Company employment.

POLICY ENFORCEMENT

Because of the importance of this Policy, Company reserves the right, at all times, while on the premises and property described above and circumstance warrant, to have Company supervisors and/or authorized Search and Inspection Specialists, including scent-trained dogs, conduct reasonable and voluntary searches and inspections of employees, or other persons, and their personal property and effects, to include, but not be limited to lockers, baggage, offices, desks, tool boxes, clothing, and vehicles, for the propose of determining if such employees or other persons are using, possessing, selling, distributing, concealing or transporting any of the prohibited items and substances contained in this Policy.

The employee's supervisor has the right to conduct an on-the-spot search and inspection of employees, or others, and their personal property and effects, as described above, if said supervisor has a reasonable suspicion* that employees, or others, are in direct violation of any part of this Policy. All searches and inspections conducted by outside authorized specialists will be in the presence of a Company representative.

A Search and Inspection, as defined herein, may also include employees and others present on Company property to submit to a Urine Drug Screen Test and/or Blood Test. These tests may be utilized under the following circumstances:

Pre-employment examinations.

Annual employee's physical examination, or to comply with contractual agreements.

Part of an overall Search and Inspection of an employee's or other person's work area or location of employment.

When an employee's supervisor has a reasonable suspicion* that an employee, or other person on Company property, is intoxicated, using or under the influence** of prohibited drugs and substances.

When an employee returns to active employment after a layoff or non-medical leave of absence of thirty (30) or more days.

Following an on-the-job injury requiring transport to a medical facility for treatment, or, following a serious or potentially serious accident or incident involving damage to Company property, including, but not limited to vehicles, boats, aircraft and other equipment. All persons involved and within the immediate vicinity of the incident may have their urine and blood tested and screen.

Searches (including Urine and/or Blood Drug Screening) and inspections by Company supervisors and specialists are voluntary and may be conducted from time to time without prior announcement. Searches will be performed with concern for the personal privacy of each employee or other individual.

PROHIBITED ITEMS

The use, possession, selling, distributing, concealing, or transporting on Company property, by employees or others, of any of the following items or substance is prohibited.

Illegal drugs, controlled substances, marijuana, mood or mind-altering substances, "look-alike" substances, designer and synthetic drugs, and certain inhalants, including detectable levels or identifiable tracer quantities. (Illegal drugs, for purposes of this Policy, include drugs which are not legally obtainable and drugs which are legally obtainable but have obtained illegally. "Detectable levels" or "Identifiable traces quantities", for purposes of this Policy, is the presence of an illegal or prohibited drug or substance found in the body fluids at levels of detection above the lowest cut-off level as established by the analytical methods used by the testing laboratory.)

Unauthorized alcoholic beverages; intoxicating substances. Unauthorized firearms, ammunition, explosives and weapons.

Equipment, paraphernalia and literature pertaining to illegal drug or substance use.

Theft, conversion, misappropriation or unauthorized removal, possession or use of property or equipment belonging to the Company, or others, including, but not limited to, materials, tools, documents and proprietary information.

Unauthorized prescription drugs and "over-the-counter" medications, except under the following conditions:

a. The drugs have been prescribed by a licensed physician for the person in possession of the drugs.

b. The drugs/medications are kept in their original container(s).

c. A "Prescription Drug Form" for the drug/medication is completed by the employee and appropriate supervisor with a copy of the signed form on file with the supervisor.

d. The prescription was filled by a registered/licensed pharmacist within the last twelve (12) months for the person possessing drugs/medication and the drugs/medication is in the original container from the pharmacy.

e. The Company, at all times, reserves the right to have a physician determine if a prescription drug or medication produces hazardous effects and may restrict the use of any such drug or medication accordingly. This may also include restricting the employee's work activity.

(For purposes of this Policy:

* "Reasonable suspicion" is a belief based on objective and articulable facts sufficient to lead a prudent supervisor to suspect that the employee, or other person, is using a prohibited drug, alcohol or substance.

** "Under the influence" is the presence of an illegal or prohibited drug, alcohol or substance found in the body fluids at levels of detection above the lowest cut-off level as established by the analytical methods used by the testing laboratory. Also, it means that the employee, or other individual, is affected by a drug, alcohol or prohibited substance, either singularly or in combination, in any detectable manner. The symptoms of influence are not confined to those consistent with misbehavior, nor to obvious impairment of physical or mental ability, such as slurred speech or difficulty in maintaining balance.)

## PENALTIES FOR VIOLATING POLICY

Any person found using, possessing, selling, distributing, concealing or transporting any of the items or substances prohibited by this Policy, or who refuses to submit to a search, urine and/or blood analysis, or other detection procedure, shall be removed from company property and be subject to disciplinary action, up to and including termination of employment.

Any person who, as a result of drug testing and screening, is found to have detectable levels or identifiable trace quantities of a prohibited drug or substance in his or her system, regardless of when or where the drug or substance entered that person's system, without an explanation satisfactory to the Company, will be considered in violation of this Policy, will be removed from Company property and will be subject to disciplinary action, up to and including termination of employment.

All subcontract and supplier personnel and other third parties on Company premises will be subject to this Policy. Any such individual found in violation of this Policy, or who refuses to be searched, will be subject to removal from the premises Violation of this Policy by subcontractor or supplier employees may also cause cancellation of the contract between the Company and such subcontractor or supplier and may result in the subcontractor or supplier losing the right to do business with the Company.

Any employee terminated for a violation of this policy will not be considered for re-employment for a minimum of one (1) year.

## EMPLOYEE ASSISTANCE

If an employee HAS and DEVELOPS a drug or alcohol related problem and sincerely wants to correct their problem and retain their job with _____, they must personally notify their area manager or project superintendent of the situation to obtain guidance and assistance from the Company. Any such revelation will be treated in confidence and only company employees with a definite "need to know" will be so advised and become involved in the situation.

The company representative will then determine available assistance programs and consult with the involved employee to develop an acceptable program to pursue. The company representative will thereafter monitor both the employee's progress in the assistance program and his or her freedom from drug and/or alcohol via periodic testing.

The employee shall be expected to successfully complete their assistance program and pass any subsequent test. FAILURE TO DO SO WILL RESULT IN TERMINATION!

If you have coverage under the Company's Group Medical Plan you will be eligible for some financial assistance to help defray part of the cost of the rehabilitation and assistance program. Otherwise any costs will be strictly the responsibility of the employee.

Any employee that wants to protect their job and "kick a problem area" should promptly contact the area manager or project superintendent to request assistance.

Any request for assistance made immediately prior to a scheduled test or afterwards, if a positive result is found, will not be considered as timely by the company.

Abuse of alcohol and drugs is recognized as a pervasive problem that affects the Company as well as society and creates a need for guidelines regarding assistance. Accordingly, when it is determined that an employee is suffering from an alcohol or drug abuse problem, efforts will be made to assist the employee using available Company and community resources. However, this does not preclude, under the Policy, Company's right to administer discipline up to and including termination of employment for on-the-job conduct even though it is related to the use of alcohol or drugs.

DATE: APRIL 1, 1988 CONSTRUCTION COMPANY

BY: _____ BY: _____
Safety Officer President

NOTICE AND ACKNOWLEDGEMENT

In accordance with _____ Safety Policy on Drugs, Alcohol and other Prohibited Items, I herein acknowledge and understand that the use and/or possession of alcoholic beverages, intoxicants, illegal and unauthorized drugs (including marijuana), narcotics, drug paraphernalia, "Look-alike" (simulated) drugs and firearms is strictly prohibited. As a condition of employment, I understand entry into or the presence on Company premises, facility or work place by any person is conditioned upon the Company's right to search the person, personal effect and vehicle. Likewise, I understand and hereby consent to give a urine, blood or salvia sample to be used for drug and alcohol analysis when requested by an agent that has been designated by Company management.

Employee Name: Employee Signature

_____ _____

please print

Soc Sec. No._____ Date_____

REFERENCE AMENDMENT 0002 FOR CHANGES

# SAFETY INSPECTION CHECKLIST FOR OFF-HIGHWAY SELF-PROPELLED WORK MACHINES AND MOTOR VEHICLES

PROJECT_____

PRIME CONTRACTOR_____CONTRACT NO_____

FURNISHED AND OPERATED BY:_____DATE OF INSPECTION_____

TYPE OF EQUIPMENT:_____

MAKE:_____MODEL NO._____SERIAL NO._____

INSPECTED BY:_____TITLE:_____EMPLOYER:_____

APPROVED BY:_____TITLE:_____EMPLOYER:_____ _____

| | YES | NO | NA |
|---|---|---|---|
| 1. Is required rollover protection provided? (18.B.20 | | | |
| a. Plate affixed to ROPS?_____Number?_____ | | | |
| b. Written certification attached to checklist?__ | | | |
| 2. Is operator protected from elements, falling or flying objects, etc? _____ | | | |
| 3. Is all glass in operator's compartment safety glass? _____ | | | |
| 4. Backup alarms where required? _____ | | | |
| 5. Brakes in good condition?_____ | | | |
| 6. Is emergency braking system couple of automatically stopping equipment?_____ | | | |
| 7. Is a seat belt provided for each person?_____ | | | |
| 8. Motor vehicles equipped w/speedometer, fuel gauge and ham? _____ | | | |
| 9. Engine equipped with power starter? _____ | | | |
| 10. Beds of dump trucks equipped with device for locking body in raised position? _____ | | | |
| 11. Tires in good condition? _____ | | | |
| 12. Are pulleys, belts, gears, chains, and other nip and shear points adequately guarded? _____ | | | |

| | YES | NO | NA |
|---|---|---|---|
| 13. Are fuel tanks located to prevent spills and overflows from hitting hot parts or electrical equipment? | | | |
| 14. Are fueling cans used with equipment approved safety type? | | | |
| 15. Windshield wipers in good condition? | | | |
| 16. If operated in dark, equipped with headlight and taillights? | | | |
| 17. Equipped with functioning turn signals? | | | |
| 18. Are platforms, steps, handrails, etc, provided for access? | | | |
| 19. Are exhausts and discharges directed so as not to endanger worker or abstract view of operator? | | | |

20. Remarks:

Equipment Type

1. Truck tractor - Without side boom. Used only for bulldozing, ripping, push loading, front-end loading or pulling a drawbar load.

2. Pneumatic tired, self-propelled grader - With rigid or articulated frame.

3. Pneumatic tired, front-end loader - with rid or articulated frame.

4. Pneumatic tired dozer - with rigid or articulated frame.

5. Pneumatic tired, two or four wheel tractor - with trailing scraper, water wagon, bottom dump wagon, side dump wagon, rear dump wagon, or towed fifth wheel attachment.

6. Pneumatic tired, off-highway, non-trailed hauling unit with-rear or side dump body.

7. Four wheel drive, skid steer, front-end loader.

8. Wheeled type, industrial front-end loader.

9. Wheeled type, industrial forklift truck.

10. Asphalt spreader or paving machine.

11. Trenching machine - Bucket-ladder or rotary wheel excavator.

12. Motor vehicle - Crew bus, dump truck, concrete truck, general-purpose truck (State capacity, i.e., 2 1/2 ton, 5 ton, 10 ton, etc.)

13. Other - State type.

SECTION 01500
TEMPORARY CONSTRUCTION FACILITIES

PART
1 GENERAL

1.1 GENERAL REQUIREMENTS

1.1.1 Site Plan

The Contractor shall prepare a site plan indicating the proposed location and dimensions of any area to be fenced and used by the Contractor, the number of trailers to be used, avenues of ingress/egress to the fenced area and details of the fence installation. Any areas which may have to be graveled to prevent the tracking of mud shall also be identified. The Contractor shall also indicate if the use of a supplemental or other staging area is desired.

1.1.2 Identification of Employees

The Contractor shall be responsible for furnishing to each employee, and for requiring each employee engaged on the work to display, identification as approved and directed by the Contracting Officer. Prescribed identification shall immediately be delivered to the Contracting Officer for cancellation upon release of any employee. When required, the Contractor shall obtain and provide fingerprints of persons employed on the project. Contractor and subcontractor personnel shall wear identifying markings on hard hats clearly identifying the company for whom the employee works.

1.1.3 Employee Parking

Contractor employees shall park privately owned vehicles in an area designated by the Contracting Officer. This area will be within reasonable walking distance of the construction site. Contractor employee parking shall not interfere with existing and established parking requirements of the military installation.

1.2 AVAILABILITY AND USE OF UTILITY SERVICES

1.2.1 Payment for Utility Services

The Government will make all reasonably required utilities available to the Contractor from existing outlets and supplies, as specified in the task orders. Unless otherwise provided in the task order, the amount of each utility service consumed shall be charged to or paid for by the Contractor at prevailing rates charged to the Government or, where the utility is produced by the Government, at reasonable rates determined by the Contracting Officer. The Contractor shall carefully conserve any utilities furnished without charge.

1.2.2 Metering and Temporary Connections

The Contractor, at its expense and in a manner satisfactory to the Contracting Officer, shall provide and maintain necessary temporary connections, distribution lines, and metering required to measure the amount of each utility used for the purpose of determining charges. Where the utility is operated by the Government, the Contractor shall notify the Contracting Officer, in writing, 5 working days before final electrical connection is desired so that a utilities contract can be established. Where the utility is operated by the Government, it reserves the right to make the final hot connection after approval of the Contractor's temporary wiring installation.

1.2.3 Advance Deposit

Where the Government operates the utility, an advance deposit for utility consisting of an estimated month's usage or a minimum of $50.00 will be required. The last monthly bills for the fiscal year will normally be offset by the deposit and adjustments will be billed or returned as appropriate. Services to be rendered for the next fiscal year, beginning 1 October, will require a new deposit. Notification of the due

date for this deposit will be mailed to the Contractor prior to the end of the current fiscal year.

1.2.4 Final Meter Reading

Where the utility is operated by the Government, before completion of and final acceptance of the work by the Government, the Contractor shall notify the Contracting Officer, in writing, 5 working days before termination is desired so that the Government may take a final meter reading. The Contractor shall then remove all the temporary distribution lines, metering equipment, and associated materials and equipment. The Contractor shall pay all outstanding utility bills before final acceptance of the work by the Government.

1.2.5 Sanitation

The Contractor shall provide and maintain within the construction area minimum field-type sanitary facilities approved by the Contracting Officer. Government toilet facilities will not be available to Contractor's personnel.

1.2.6 Telephone

The Contractor shall make arrangements and pay all costs for telephone facilities desired.

1.3 BULLETIN BOARD, PROJECT SIGN, AND PROJECT SAFETY SIGN

1.3.1 Bulletin Board

Immediately upon beginning of work, the Contractor shall display at each project location the Equal Employment Opportunity poster, a copy of the applicable wage decisions contained in the contract, Wage Rate Information poster, and other information approved by the Contracting Officer. The bulletin board shall be located at the project site in a conspicuous place easily accessible to all employees, as approved by the Contracting Officer. Legible copies of the aforementioned data shall be displayed until work is completed. Upon completion of work the bulletin board shall be removed by and remain the property of the Contractor.

1.3.2 Project and Safety Signs

The requirements for the signs, their content, and location shall be as shown on the drawings. The signs shall be erected within 15 days after receipt of the notice to proceed. The data required by the safety sign shall be corrected daily, with light colored metallic or non-metallic numerals. Upon completion of the project, the signs shall be removed from the site.

1.4 PROTECTION AND MAINTENANCE OF TRAFFIC

During construction the Contractor shall provide access and temporary relocated roads as necessary to maintain traffic. The Contractor shall maintain and protect traffic on all affected roads during the construction period except as otherwise specifically directed by the Contracting Officer. Measures for the protection and diversion of traffic, including the provision of watchmen and flagmen, erection of barricades, placing of lights around and in front of equipment and the work, and the erection and maintenance of adequate warning, danger, and direction signs, shall be as required by the State and local authorities having jurisdiction. The traveling public shall be protected from damage to person and property. The Contractor's traffic on roads selected for hauling material to and from the site shall interfere as little as possible with public traffic. The Contractor shall investigate the adequacy of existing roads and the allowable load limit on these roads. The Contractor shall be responsible for the repair of any damage to roads caused by construction operations.

1.4.1 Haul Roads

The Contractor shall, at its own expense, construct access and haul roads necessary for proper prosecution of the work under this contract. Haul roads shall be constructed with suitable grades and

widths; sharp curves, blind corners, and dangerous cross traffic shall be avoided. The Contractor shall provide necessary lighting, signs, barricades, and distinctive markings for the safe movement of traffic. The method of dust control, although optional, shall be adequate to ensure safe operation at all times. Location, grade, width, and alignment of construction and hauling roads shall be subject to approval by the Contracting Officer. Lighting shall be adequate to assure full and clear visibility for full width of haul road and work areas during any night work operations. Upon completion of the work, haul roads designated by the Contracting Officer shall be removed.

1.4.2 Barricades

The Contractor shall erect and maintain temporary barricades to limit public access to hazardous areas. Such barricades shall be required whenever safe public access to paved areas such as roads, parking areas or sidewalks is prevented by construction activities or as otherwise necessary to ensure the safety of both pedestrian and vehicular traffic. Barricades shall be securely placed, clearly visible with adequate illumination to provide sufficient visual warning of the hazard during both day and night.

1.5 CONTRACTOR'S TEMPORARY FACILITIES

1.5.1 Administrative Field Offices

The Contractor shall provide and maintain administrative field office facilities as required by the task order within the construction area at the designated site. Government office and warehouse facilities will not be available to the Contractor's personnel.

1.5.2 Storage Area

The Contractor shall construct a temporary 1.8 m (6 foot) high chain link fence around trailers and materials as required by the task order. The fence shall include plastic strip inserts, colored green or brown, so that visibility through the fence is obstructed. Fence posts may be driven, in lieu of concrete bases, where soil conditions permit. Trailers, materials, or equipment shall not be placed or stored outside the fenced area unless such trailers, materials, or equipment are assigned a separate and distinct storage area by the Contracting Officer away from the vicinity of the construction site but within the military boundaries. Trailers, equipment, or materials shall not be open to public view with the exception of those items which are in support of ongoing work on any given day. Materials shall not be stockpiled outside the fence in preparation for the next day's work. Mobile equipment, such as tractors, wheeled lifting equipment, cranes, trucks, and like equipment, shall be parked within the fenced area at the end of each work day.

1.5.3 Supplemental Storage Area

Upon Contractor's request, the Contracting Officer will designate another or supplemental area for the Contractor's use and storage of trailers, equipment, and materials. This area may not be in close proximity of the construction site but shall be within the military boundaries. Fencing of materials or equipment will not be required at this site; however, the Contractor shall be responsible for cleanliness and orderliness of the area used and for the security of any material or equipment stored in this area.

1.5.4 Appearance of Trailers

Trailers utilized by the Contractor for administrative or material storage purposes shall present a clean and neat exterior appearance and shall be in a state of good repair. Trailers which, in the opinion of the Contracting Officer, require exterior painting or maintenance will not be allowed on the military property.

1.5.5 Maintenance of Storage Area

Fencing shall be kept in a state of good repair and proper alignment. Should the Contractor elect to traverse, with construction equipment or other vehicles, grassed or unpaved areas which are not established roadways, such areas shall be covered with a layer of gravel as necessary to prevent rutting and the tracking of mud onto paved or established roadways; gravel gradation shall be at the Contractor's discretion. Grass located within the boundaries of the construction site shall be mowed for the duration of

the project. Grass and vegetation along fences, buildings, under trailers, and in areas not accessible to mowers shall be edged or trimmed neatly.

### 1.5.6 Security Provisions

Adequate outside security lighting shall be provided at the Contractor's temporary facilities. The Contractor shall be responsible for the security of its own equipment; in addition, the Contractor shall notify the appropriate law enforcement agency requesting periodic security checks of the temporary project field office.

## 1.6 PLANT COMMUNICATION

Whenever the Contractor has the individual elements of its plant so located that operation by normal voice between these elements is not satisfactory, the Contractor shall install a satisfactory means of communication, such as telephone or other suitable devices. The devices shall be made available for use by Government personnel.

## 1.7 TEMPORARY PROJECT SAFETY FENCING

As soon as practicable, but not later than 15 days after the date established for commencement of work, the Contractor shall furnish and erect temporary project safety fencing at the work site as required by the task order. The safety fencing shall be a high visibility orange colored, high density polyethylene grid or approved equal, a minimum of 1.1 m (42 inches) high, supported and tightly secured to steel posts located on maximum 3 m (10 foot) centers, constructed at the approved location. The safety fencing shall be maintained by the Contractor during the life of the task order and, upon completion and acceptance of the work, shall become the property of the Contractor and shall be removed from the work site.

## 1.8 CLEANUP

Construction debris, waste materials, packaging material and the like shall be removed from the work site daily. Any dirt or mud which is tracked onto paved or surfaced roadways shall be cleaned away. Materials resulting from demolition activities which are salvageable shall be stored within the fenced area described above or at the supplemental storage area. Stored material not in trailers, whether new or salvaged, shall be neatly stacked when stored.

## 1.9 RESTORATION OF STORAGE AREA

Upon completion of the project and after removal of trailers, materials, and equipment from within the fenced area, the fence shall be removed and will become the property of the Contractor. Areas used by the Contractor for the storage of equipment or material, or other use, shall be restored to the original or better condition. Gravel used to traverse grassed areas shall be removed and the area restored to its original condition, including top soil and seeding as necessary.

SECTION 01720
AS-BUILT DRAWINGS

## PART 1 GENERAL

### 1.1 PAYMENT FOR FINAL AS-BUILT DRAWINGS

No separate payment will be made for the work covered under this section of the specifications. All costs in connection therewith shall be included in the contract sum-job price for the work to be performed under the task orders.

### 1.2 AS-BUILT DRAWINGS

The as-built drawings shall be a record of the construction as installed and completed by the Contractor. They shall include the information shown on the contract set of drawings and a record of deviations, modifications, or changes from those drawings, however minor, which were incorporated into the work, additional work not appearing on the contract drawings, and changes which are made after final inspection of the work. If additional work changes the as-built conditions after submission of the as-built drawings, the Contractor shall furnish revised or additional drawings to depict as-built conditions.

### 1.3 PRELIMINARY AS-BUILT DRAWINGS

#### 1.3.1 Preparation

The Contractor shall maintain one set of paper prints which shall show the as-built conditions and which shall be kept current and available on the jobsite at all times. Changes from the contract plans which are made in the work or additional information uncovered in the course of construction shall be accurately and neatly recorded as they occur by means of details and notes. The as-built marked prints shall be jointly inspected for accuracy and completeness by the Contracting Officer and the Contractor prior to submission of each monthly pay estimate. The drawings shall show the following information, but not be limited thereto:

(1) The location and description of utility lines or other installations of any kind or description known to exist within the construction area. Exterior utilities shall be located in both the horizontal and vertical planes. Dimensions shall be within an accuracy of approximately 6 inches. Vertical location shall be referenced to finished grade or floor level and the horizontal location referenced to a permanent structure such as the face of a building or street curb.

(2) The location and dimensions of changes within the building or structure.

(3) Correct grade or alignment of roads, structures, or utilities if changes were made from contract plans.

(4) Correct elevations if changes were made in site grading.

(5) Changes in details of design or additional information obtained from shop drawings prepared of furnished by the Contractor including but not limited to fabrication, erection, installation plans and placing details, pipe sizes, insulation material, dimensions of equipment foundations, etc.

(6) The topography and grades of drainage constructed or affected as a part of the construction.

(7) Changes or modifications resulting from the final inspection.

(8) Where contract drawings or specifications allow options, the option selected for construction shall be shown on the as-built drawings.

1.3.2 Review

As part of the prefinal inspection, the preliminary as-built drawings will be reviewed. They must comply with this specification prior to scheduling the final inspection, and/or prior to substantial completion of the project.

1.3.3 Submittal to Contracting Officer for Review and Approval

Three copies of the preliminary as-built marked prints shall be delivered to the Contracting Officer before the time of final inspection for his review and approval. Final inspection will not be scheduled by the Contracting Officer until preliminary as-built drawings have been approved. The review by Government personnel will be expedited to the maximum extent possible. Upon approval, one copy of the as-built marked prints will be returned to the Contractor for use in preparation of final as-built drawings. If upon review, the drawings are found to contain errors and/or omissions, they shall be returned to the Contractor for corrections. The Contractor shall complete the corrections and return the drawings to the Contracting Officer within ten (10) calendar days.

1.4 FINAL AS-BUILT DRAWINGS

1.4.1 Preparation

Upon approval of the preliminary as-built prints, the Contracting Officer will return to the Contractor one copy of the approved preliminary as-built drawings. After receipt of the approved preliminary as-built drawings, the Contractor shall prepare final marked-up as-built prints of the contract drawings to correctly show all features of the project as it has been constructed.

1.4.2 Submittal

The Contractor shall submit three (3) sets of final marked-up as-built prints (full size), together with the approved preliminary as-built drawings to the Contracting Officer. The Contracting Officer's approval of the final marked-up prints will fulfill the Contractor's obligation for furnishing final as-built drawings under this contract.

1.4.3 Approval and Acceptance

Failure to submit as-built drawings as required herein shall be cause for withholding payment due the Contractor for final as-built drawings under this contract. Approval and acceptance of final as-built drawings shall be accomplished before final payment is made to the Contractor.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

SECTION 02012
STANDARD PENETRATION TESTS

1.0 DESCRIPTION OF WORK: This specification covers core drilling and borings for subsurface investigation of soils.

2.0 PRODUCTS: (Section not used.)

3.0 EXECUTION:

3.1 Auger Borings: ASTM D 1452.

3.2 Soil Samples: ASTM D 1586, ASTM D 1587.

3.3 Rock Cores: ASTM D 2113, Size BX and NX.

3.4 Bearing Capacity: ASTM D 1194.

3.5 Soils Classification: ASTM D 2487, D 2488, MIL-STD-619.

3.6 Boring Logs: Boring report shall include, but not be limited to, a boring location plan locating and numbering boring and boring logs. Log of borings shall have boring number; date of start and finish of boring; rig type, job number and name; sample number, depth, and type; depth of strata changes, soil description and classification, surface elevation, depth of boring, and depth of water table.

# SECTION 02075
# CONCRETE CORE DRILLING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing of equipment and labor for core drilling of existing concrete. Procedures shall be in accordance with the equipment manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS: (Section not used)

3.0 EXECUTION:

3.1 Preparation:

3.1.1 Equipment shall be of shot-drill or diamond-drill type and shall be acceptable to the Contracting Officer. Shot drilling shall be used on horizontal surfaces only.

3.1.2 Location and Size of Cores shall be as directed by the Contracting Officer.

3.2 Core Drilling:

3.2.1 Drilling shall be performed in a neat manner providing a smooth, clean hole perpendicular to the surface.

3.2.2 Equipment shall be rigidly affixed to the surface to prevent drifting or misalignment of the hole.

3.2.3 Work shall be planned and executed so that dust and rubble are held to a minimum.

3.2.4 Surrounding Surfaces, Material, and Equipment shall be protected from damage from dust, water, and flying debris.

3.3 Test Samples:

3.3.1 Where Cores from Drilling are to be used for testing of existing concrete, the resulting core shall meet the requirements of ASTM C 42.

3.3.2 Test Cores shall be taken at locations as directed by the Contracting Officer.

SECTION 02080
ASBESTOS REMOVAL AND DISPOSAL

1.0 APPLICABLE PUBLICATIONS: The publications listed below form a part of this specification to the extent referenced. References to these publications in the text will be by basic designation only. State and Local laws and regulations shall also apply.

1.1 U.S. Government Code of Federal Regulations (CFR):

29 CFR 1910 Occupational Safety and Health Standards

29 CFR 1926 Safety and Health Regulations for Construction

40 CFR 61 National Emission Standards for Hazardous Air Pollutants, Subpart A General Provisions

40 CFR 61 National Emission Standards for Hazardous Air Pollutants, Subpart M National Emission Standard for Asbestos

40 CFR 241 Guidelines for the Land Disposal of Solid Wastes

40 CFR 257 Criteria for Classification of Solid Waste Disposal Facilities and Practices

1.2 American National Standards Institute (ANSI) Publications:

Z9.2 Fundamentals Governing the Design and Operation of Local Exhaust Systems

Z88.2 Practices for Respiratory Protection

1.3 National Institute of Occupational Safety and Health (NIOSH):

Manual of Analytical Methods, 2nd Ed., Vol. 1, Physical and Chemical Analysis Methods (P&CAM):

Method 239 Asbestos Fibers in Air

Method 7400 Fibers (N1, 3rd Ed., Vol. 1)

1.4 Underwriters' Laboratories, Inc., (UL):

586 Test Performance of High Efficiency, Particulate, Air Filter Units

2.0 GENERAL REQUIREMENTS: This specification covers the removal and disposal of asbestos materials performed under this contract.

2.1 Work Required: Asbestos containing materials (ACM) present within and upon the structures, materials, and equipment to be altered, demolished, or repaired shall be removed and disposed of prior to demolition, alteration, or repair of the structures, materials, and equipment involved.

2.1.1 Locations: Asbestos containing materials shall be removed from the structures, materials, and equipment to be demolished, altered, or repaired, and from all other site locations where directed. Asbestos materials to be removed shall be as identified in the appropriate "Asbestos Sampling Report" provided by the Government or as shown on the drawings or written descriptions which form a part of the construction documents. This shall not relieve the Contractor from the responsibility of notifying the Contracting Officer or his representative of the discovery of suspected additional asbestos during the course of contract performance. Upon notification by the Contractor of suspected additional ACM, the Contracting Officer shall be responsible for the verification of existence and extent of additional work. Should the suspected material prove not to be ACM, the Contracting Officer shall so notify the Contractor.

2.1.2 Debris: All debris located within the project limits for asbestos removal and disposal work shall be considered as containing, or having been contaminated with asbestos, and shall be treated, handled, removed and disposed of in accordance with applicable regulations. Any miscellaneous debris located outside of the requested work area which is determined to contain asbestos shall also be disposed of in accordance with the applicable regulations.

2.1.3 Structures, Materials, and Equipment Surfaces: Interior building surfaces, including supporting structure surfaces or equipment shall be considered as contaminated with asbestos containing dust. Surfaces shall be cleaned in accordance with the regulations prior to demolition, alteration, or repair of the structures, materials, and equipment.

3.0 CONTRACTOR COMPLIANCE AND RESPONSIBILITY:

3.1 Compliance: The Contractor shall perform asbestos removal and disposal operations in compliance with all Federal, State, and Local laws, regulations, standards, codes and these specifications, governing asbestos removal and disposal. Any other work required in conjunction with such removal and disposal shall also comply with all Federal, State, and Local laws,

regulations, codes, and these specifications. In the event of a conflict between the requirements of the regulations and the requirements contained in these specifications, the more stringent requirements shall govern.

3.2 Responsibility: It shall be the responsibility of the Contractor to visit and investigate the site; review all applicable drawings and specifications; to review all applicable and available "Asbestos Sampling Reports"; to assess the actual amount of asbestos present; and become thoroughly familiar with conditions, and the relative difficulty thereof, which are present and will affect a complete asbestos removal and disposal operation.

3.2.1 The Contractor is responsible for supplying all labor, material, equipment, services, insurances, and all incidentals which are necessary or required to perform the work in accordance with the applicable regulations and these specifications.

3.2.2 The Contractor shall have a Certified Industrial Hygienist (CIH) or his representative at the job site throughout all phases of the work.

4.0 GOVERNMENT RESPONSIBILITY:

4.1 Asbestos Sampling Report: When available, the Contracting Officer or his representative shall provide the Contractor with an Asbestos Sampling Report based on samples taken and analyzed at a testing laboratory. This report shall constitute a representation of what is believed to be a complete identification of the asbestos containing material associated with a facility or site, and be definitive to the degree that the Contractor may use the report to determine initial project requirements. While the report should identify all known asbestos at the facility or site, it is not a certification of total scope identification. The Contractor shall remain responsible for notification to the Contracting Officer of any additional suspected asbestos containing materials discovered during the execution of the Contract.

4.2 Monitoring: The Government may employ a Certified Industrial Hygienist (independent of that required to be employed by the Contractor) to monitor air quality, project procedures, and to help ensure the Contractor is in compliance with applicable Federal, State, and Local regulations.

5.0 CONTRACTOR QUALIFICATIONS AND CERTIFICATION: Unless otherwise stated, at least five (5) days prior to the start of any asbestos removal work, the Contractor shall provide the following submittals to the Contracting Officer or his representative:

5.1 Certifications: That the principals of the firm actually performing the work and all employees involved in asbestos removal and disposal operations are familiar with the following:

a. The U.S. Environmental Protection Agency's Regulations for Asbestos--40 CFR 61, Subpart M.

b. The U.S. Department of Labor OSHA Asbestos Regulations--29 CFR 1910 and 29 CFR 1926.

c. State and local regulations pertaining to asbestos removal, abatement, hauling, and disposal.

The Contractor shall also certify that all employees who are involved in asbestos work have received the information and training required by 29 CFR 1926.58(k)(3) and that the Contractor has complied with all other State and Local requirements.

5.2 Licenses: Evidence shall be submitted that the Contractor is licensed to perform asbestos removal projects in the jurisdiction in which the project is located.

5.3 Notifications: Prior to starting any asbestos removal work, the Contractor shall attend a pre-construction meeting. The time and place of the meeting shall be designated by the Contracting Officer. At that meeting the Contractor shall provide a detailed written account(s) of the following:

a. Proposed work schedule for all operations involving asbestos.

b. Overview of site preparation plans and the proposed project containment strategy. A complete detailed asbestos removal plan shall be submitted at least three (3) days prior to start of asbestos removal work.

c. Submit for approval of the Contracting Officer the name, address, and telephone number of laboratories which will perform the test analysis throughout the project. The laboratories shall have participated in at least six (6) rounds of the EPA asbestos bulk sample quality assurance program and currently be proficient in the AIHA Administrated PAT program for air samples.

d. The name of the Certified Industrial Hygienist (CIH) to be assigned to the project by the Contractor. The CIH shall meet the qualification requirements of a "Competent Person" as stated in 29 CFR 1926.58(b).

5.4 Asbestos Inventory: Prior to any work at the site, the Contractor shall conduct a space-by-space inspection with the Contracting Officer or his

designated representative and prepare a written inventory of all existing areas where asbestos has been identified as being present (using the installation supplied asbestos sampling report as a basis). This document will be signed and certified as to apparent accuracy by both parties. All areas and materials previously described as containing asbestos shall be treated as such, unless the Contractor provides analytical evidence satisfactory to the Contracting Officer that specific portions of the material are not asbestos, or asbestos contaminated.

5.5 Asbestos Removal Plan: At least 3 days prior to the start of asbestos removal work, the Contractor shall submit for approval a complete detailed asbestos removal plan in accordance with Paragraph 5.3(b) above. The plan shall contain the following elements:

5.5.1 Project Containment Strategy: The plan shall be prepared, signed and sealed, including certification number and date by the Contractor's CIH. The plan shall include a sketch and shop drawings showing the location, size, and details of asbestos control of work areas; the location and details, including layout, of the decontamination area as described further in Paragraph 10.0 "DECONTAMINATION ENCLOSURE SYSTEMS"; location of local exhaust equipment and methods and materials to be used to prevent asbestos fiber contamination of the work site and environment. The plan will address all phases of the work including, but not limited to:

a. Preparation of the work area.

b. Storage of materials and equipment at the site.

c. Temporary utilities.

d. Engineering controls and work practices used to achieve compliance with exposure levels, such as negative air systems, containment barriers, use of removal encapsulants, wet methods, or other methods or combination of methods allowable under 29 CFR 1926.58(g). DRY REMOVAL METHODS WILL NOT BE ALLOWED.

e. Order of removal.

f. Decontamination procedures to be used for personnel, work area, and equipment.

g. Waste disposal.

h. Air monitoring procedures.

i. Final decontamination and cleanup.

j. Procedures for dealing with heat stress.

k. Emergency procedures.

l. Notification and permits required.

Prior to starting work, the Contractor, the Contractor's CIH, and the Contracting Officer shall meet to discuss plan details, work procedures, and safety precautions.

5.5.2 Work Schedule: This schedule will include all operations involving asbestos.

5.5.3 Equipment List: Shall include the brand name, model, capacity, performance characteristics (as applicable), quantities, and any other pertinent information for all equipment and materials to be used in all asbestos removal operations performed on this project. Shall include, but not be limited to the following:

a. Respirators and cartridges.

b. Vacuums and vacuum equipment.

c. Protective clothing and other personnel protection equipment.

d. Trucks used to haul waste.

e. Containment and disposal of waste materials.

f. Air sampling pumps.

g. Wetting agents.

h. Pressure differential air monitoring devices.

Manufacturers' certificates shall be submitted that all respiratory protection devices and equipment utilized on the site are approved by NIOSH. Provide manufacturer's certificate of HEPA filtration capabilities for all cartridges and filters.

5.6 Asbestos Safety Plan: The Contractor shall submit for approval a detailed safety plan for all phases of the asbestos abatement operation at least three (3) days prior to the start of removal operations. This plan shall include an

"Accident Prevention Plan" and shall include, but not be limited to the following elements:

5.6.1 General Safety Procedures:

5.6.2 Respirator Program: This program shall be in accordance with 29 CFR 1926.58(h) and 29 CFR 1910.134(b), (d), (e), and (f) and State and Local regulations.

5.6.3 Medical Surveillance Program: The program shall be in accordance with 29 CFR 1926.58(m), 1926.58(n), and 1910.20.

5.6.4 Emergency Procedures: Emergency procedures shall be in written form and prominently posted in the clean change area and equipment room of the personnel decontamination area. All persons entering the work area shall read and sign the procedures to acknowledge receipt and understanding of the work site layout, location of emergency exits and emergency procedures.

5.7 Asbestos Waste Disposal Plan: This plan will include, but not be limited to the following:

a. Name, location, and telephone number of the landfill used. A copy of the landfill's issued license, and a signed agreement that the landfill will accept the asbestos waste, shall be provided to the Contracting Officer or his representative.

b. Name, address, and telephone number of any waste subcontractors used and the subcontractor's landfill. Provide copies of licenses and signed agreements as in paragraph 5.7(a) above.

c. Should rented equipment be used in removal areas, or to transport asbestos waste materials, a copy of the written notification provided to the rental company informing them of the nature of the use to which the rental equipment will be put shall be included along with the rental company's acknowledgement and agreement.

5.8 Notifications and Permits: It shall be the Contractor's responsibility to secure all permits required and pay any necessary fees to carry out this asbestos removal project.

5.8.1 Permits: The Contractor shall submit copies of the following:

a. All permits required by Federal, State, and Local Government Agencies for the type of asbestos removal undertaken.

b. All permits required by the Federal, State, and Local authorities for asbestos waste hauling and dumping.

5.8.2 Notifications: The Contractor shall make the following notifications:

5.8.2.1 In accordance with 40 CFR 61.146, at least ten (10) days prior to commencement of demolition work, written notices, with copies, of intent to demolish friable asbestos materials shall be sent to:

a. National Emissions Standard for Air Pollution (NESHAPS) Coordinator at the governing EPA Regional Office.

b. The State asbestos regulatory office.

c. Local regulatory office.

d. Other required notifications.

6.0 PUBLIC WARNINGS AND POSTED SAFETY INFORMATION: In addition to the warning signs required by 29 CFR 1926.58(k), the Contractor shall post the following at the work site:

a. "DANGER--ASBESTOS HAZARD, AUTHORIZED PERSONNEL ONLY", signs will be posted at all entrances to each building or area in which work will take place. Additional public notices required by State and/or Local governments will also be posted on the structures and at work areas as necessary.

b. U.S. Department of Labor - OSHA Poster Number 3038 will be hung in a place where it will be clearly visible to personnel each day.

c. A copy of the U.S. Environmental Protection Agency Regulations for Asbestos, 40 CFR 61, Subpart M, and a copy of U.S. Department of Labor--OSHA Asbestos Regulations, 29 CFR 1926.58.

d. A list of all scheduled air sampling tests to be completed each day. This list will include the type of sample to be taken, the approximate time it will be taken, and the total amount of air which is to be taken through the filter cassette.

e. A list of telephone numbers of the local hospital and/or emergency squad, the local police department, the local fire department, a representative of the Contracting Officer who can be reached 24 hours a day, the Contractor's corporate headquarters, and any further professional consultants directly involved in the project.

7.0 PERSONNEL PROTECTION: To protect all personnel, authorized visitors, and others in or around the asbestos removal site during the course of this project, the Contractor shall comply with all of the requirements of 29 CFR 1926.58 and the following requirements:

7.1 Certified Industrial Hygienist (CIH): The Contractor's Certified Industrial Hygienist (CIH) or his representative shall be present on the job site throughout all phases of the removal project to supervise, monitor, and document all aspects of the project's health and safety provisions. The Contractor's CIH shall maintain a daily log showing the results of all air sampling tests done throughout each phase of the project; shall stop work inside the work area, or asbestos control area, if measured airborn fiber levels exceed the "action" level of 0.1 FCC outside the work area as defined by 29 CFR 1926.58(b); shall be responsible for maintaining the records required by the medical surveillance program, and collect all samples for the air monitoring program.

7.2 Medical Surveillance: Medical surveillance will be implemented in accordance with the Contractor's submitted Plan, and as a minimum shall comply with the requirements of 29 CFR 1926.58(m) and (n).

7.3 Respirators: The Contractor shall provide appropriate respirators as required for use in accordance with the Contractor's submitted plan and as a minimum shall conform to 29 CFR 1926.58. Fit testing shall be in accordance with 29 CFR 1926.58(h) (4) and Appendix C referenced therein.

7.4 Protective Equipment: The Contractor shall provide an adequate supply of respirators and protective clothing to all employees, authorized visitors, and personnel at the site in accordance with 29 CFR1926.58(i).

8.0 MATERIALS AND EQUIPMENT: Prior to the start of the asbestos removal and disposal work, the Contractor shall have at the site sufficient quantities of all the materials and equipment needed to complete the project in the proper manner, in accordance with 29 CFR 1926.58(g) and Appendices F and G to 29 CFR 1926.58.

9.0 AIR MONITORING AND ANALYSIS: Monitoring of airborne concentrations of asbestos fiber shall be done in accordance with 29 CFR 1926.58. The Contracting Officer shall retain the option to perform independent monitoring. One (1) day prior to beginning onsite demolition or construction work, the Contractor shall have the area monitored and establish the background concentrations for each work area. At least three general area air samples in each asbestos removal work area shall be taken.

9.1 Sampling Equipment: The Contractor shall use the following sample collection equipment:

a. High-volume, oil-less, vane-driven pumps with a calibrated air flow of at least 10 liters per minute. The air flow shall be calibrated while the pump is attached to the sampling train.

b. Low-volume, battery powered, body-attachable, portable personnel pumps with a calibrated flow of at least 2 liters per minute and a self-contained power pack capable of sustaining this calibrated flow for at least two hours. This pump unit shall also be equipped with an automatic flow control unit which will maintain a 2-liter per minute flow even as filter resistance increases due to trapped debris.

c. Standard filter cassettes will be utilized in accordance with 29 CFR 1926.58 Appendices A and B.

d. A portable flow calibrator capable of calibration to within +2 percent over a temperature range of -20 degrees C to +60 degrees C and a flow range to 50 liters per minute.

9.2 Type of Air Sampling: Three types of air samples shall be collected by the Contractor.

9.2.1 Area Samples: These shall be collected with a high-volume pump and filter cassette. They shall be collected at a single, specific spot, or station. A minimum of 2,000 liters of air shall be passed through the filter for each station sample outside the work area. Minimum collection amounts inside the work area shall be determined by filter loading conditions and consultation between the Contractor and the Government, but where possible, shall be sufficient to yield between 100 and 1,300 fibers per square millimeter on the membrane filter.

9.2.2 Personnel Samples: These shall be collected with a 2-liter per minute pump and a filter cassette. The cassette shall be attached to the pump with a length of plastic tubing. The cassette will be pinned, clamped, or otherwise securely attached on the forward part of the shoulder of a worker in an acceptable manner. The cassette's exposed filter surface shall be positioned so that it points downward. The pump shall remain attached to the body of the worker and shall run for ten minutes to two hours, adjusted for filter load and working conditions, to produce a filter fiber density of 100 to 1,300 fibers per square millimeter in accordance with 29 CFR 1926.58, Appendix B.

9.2.3 Dust Samples: Shall be collected with a 2-liter per minute portable pump equipped with a filter cassette and an extra length of tube extending from the filter end of the cassette. This tube from the forward end of the cassette shall be used in a manner similar to a small vacuum cleaner hose. The hose shall be placed on at least ten spots of visible dust or in areas such as room corners, locker tops, and similar locations where asbestos containing dust is

most likely to accumulate. Filters from cassettes used for collecting dust samples shall be analyzed as bulk samples rather than air samples.

9.3 Sampling Procedures: The Contractor shall utilize a CIH or a person working under the direct supervision of a CIH to collect all samples. Sampling shall be done in accordance with 29 CFR 1926.58, Appendices A and B.

9.3.1 Final Air and Dust Samples: The final air and dust samples will be analyzed using Transmission Electron Microscopy (TEM) methods to determine if asbestos contamination has been reduced to 0.01 FCC or the adjoining environmental concentration, whichever is less.

9.4 Sample Record Maintenance: The Contractor shall keep comprehensive records concerning the testing, monitoring, and analysis of air conditions in and around the work area throughout every phase of asbestos removal work.

9.4.1 Pumps: The Contractor shall keep records on all air pumps used on this project. "Air pumps" will include high-volume pumps and low-volume personnel pumps. The records shall show:

a. The manufacturer, model type, and serial number of each item.

b. The date on which the pump was flow calibrated.

c. The manufacturer, model type, and serial number of the flow calibrator used to calibrate the pump.

d. The rate of flow registered by the calibrating instrument for the pump.

e. The name of the person who performed the calibration.

9.4.2 Dust Sample Collection: A hand drawn map marked with X's to show the collection points for dust samples shall accompany each dust sample filter cassette. Each X shall also have a brief written description to further describe the collection point, for instance, "top of pipes".

9.5 Laboratory Analysis: The following analytical methods shall be employed where required.

9.5.1 TEM: The TEM laboratory shall provide written reports on the samples it processes using TEM analysis.

10.0 DECONTAMINATION ENCLOSURE SYSTEMS: Where required by the type of removal procedures utilized, the Contractor shall build suitable framing for the decontamination enclosures. Shop drawings shall be submitted for

approval by the Contracting Officer or his representative. Shop drawings shall be submitted as part of the "Asbestos Removal Plan" required by Paragraph 5.5 above, and in accordance with any Contract Clause(s). Adequate descriptions of any portable pre-fab units, if utilized, must be submitted for review and approval by the Contracting Officer or his representative before start of construction. Submittals shall include, but not be limited to, a floor plan layout showing dimensions, materials, sizes, thicknesses, plumbing, and electrical outlets. In all cases access between contaminated and uncontaminated rooms or areas shall be through an airlock. In all cases access between any two rooms within the decontamination enclosure systems shall be through a curtained doorway. The Contractor shall perform maintenance of the enclosure system in accordance with the approved Asbestos Removal Plan.

11.0 DECONTAMINATION PROCEDURES:

11.1 Personnel Decontamination Procedures: The Contractor shall ensure that the personnel decontamination procedures are done in accordance with all Federal, State, and Local laws and regulations.

11.2 Equipment Decontamination Procedures: All tools, furnishings, apparatus, fixtures, pieces of equipment, containers of supplies, exterior surfaces of bags or containers containing ACM, and any other item moved out of the sealed work area, or glove-bag, shall be thoroughly decontaminated.

11.2.1 Items removed from the sealed work area shall be HEPA vacuumed, damp wiped, showered thoroughly, wrapped and sealed in multiple layers of polyethylene sheeting. The item shall then be passed into the washroom, where it shall be damp wiped and/or HEPA vacuumed and then placed in the shower and thoroughly scrubbed as necessary. Electrical items which can be damaged by water shall be wrapped and sealed in at least two layers of 6-mil polyethylene sheeting before they are passed into the holding area.

11.2.2 All the Contractor's tools shall be removed from the work site in 6-mil plastic bags or sealed wraps or appropriate containers. Brooms, long scrapers, shovels, and similar implements shall have their working ends bagged. Each bag shall be secured to the handle with tape. Tubs of scrapers, wire brushes, and similar implements shall be completely bagged and sealed prior to their removal from the work area. Coils of hose and electrical wire shall be bagged and sealed prior to removal from the work area. Scaffolding and ladders shall be wrapped in polyethylene. The Contractor shall be responsible for ultimate disposition of contaminated tools and ensure they will be either disposed of or cleaned so as to meet State, Federal, and Local regulations.

12.0 ASBESTOS REMOVAL PROCEDURE OPTIONS: The Contractor shall determine the most efficient manner in which to carry out the asbestos removal

from the work areas in conformance with this specification. The Contractor shall select from options available and in conformance with 29 CFR 1926.58. The selected options or combinations of options selected to comply with the regulations shall be detailed in the Contractor's Asbestos Removal Plan, including, but not limited to details of construction, materials used, equipment required, work practices to be used, etc. Wet engineering control methods or use of removal encapsulants shall be used to comply with the regulations in conjunction with the selected removal procedures.

12.1 Methods: The following methods shall be used for asbestos removal, as applicable, in accordance with 29 CFR 1926.58.

12.1.1 Removal intact using polyethylene sheeting, glove bags, or liquid encapsulating agents approved by the Contracting Officer.

12.1.2 A containment barrier with a negative air system shall be used when asbestos insulation or material is stripped, cut, or otherwise removed from piping, duct, walls, or other surfaces and areas of building interiors without use of methods stated in 12.1.1 above.

12.1.3 In areas where establishment of a containment barrier is not practical, the Contractor shall use removal methods, engineering controls, and work practices which will prevent visible emissions and will prevent exceeding asbestos exposure levels in accordance with 29 CFR 1926.58 and 40 CFR 61. Where an enclosure or containment barrier is not provided, the Contractor shall provide a roped off perimeter around the work area where asbestos removal procedures are being performed. Perimeters shall be appropriately marked with warning signs and/or ribbons in accordance with Paragraph 6.0 "PUBLIC WARNINGS AND POSTED SAFETY INFORMATION". All other requirements for asbestos control areas shall be maintained. The perimeter shall be a minimum of twenty (20) feet from the perimeter of the work, or a greater distance as determined by the Contractor's Certified Industrial Hygienist, in order to maintain acceptable asbestos levels in adjacent areas. The Contracting Officer may require that the perimeter distance be expanded to more than twenty (20) feet should air monitoring results show such expansion is warranted. Personnel and area monitoring of airborne fibers shall be conducted during the work shift at the downwind limits of the asbestos work area, at a frequency recommended by the Contractor's CIH, but at intervals no greater than four (4) hours. Should the lesser concentration value of either the action level or twice the background level of airborne asbestos fibers monitored at the designated limited be exceeded, personnel in adjacent areas shall be evacuated. If after checking, adjacent areas are found to be contaminated, then the areas shall be cleaned, inspected for asbestos dust or residue and the fiber concentration of the air in the area checked, as for final cleanup. After cleanup the fiber concentration shall be less than 0.01 FCC of air, or not greater than the reference background, whichever is

less. Personnel decontamination facilities shall be provided as appropriate for removal of contaminated clothing, decontamination of personnel equipment, showering, and donning of clean clothing.

12.2 Encapsulation:

12.2.1 Liquid Removal Encapsulants: Shall be stored, handled, and prepared in accordance with the manufacturer's recommendations. Liquid encapsulants shall be penetrating type encapsulant and shall be applied to asbestos-bearing surfaces with airless spray equipment.

12.2.2 Polyethylene Sheeting: Used for wrapping asbestos-contaminated items prior to disposal. Shall be 6-mil in thickness. The asbestos-contaminated items shall be wrapped in two separate layers of polyethylene sheeting, with the seams and other openings of each layer completely and effectively sealed with duct tape.

12.3 Glove Bag Technique: Removal of asbestos using glove bags shall be done using methods and techniques in accordance with 29 CFR 1926.58, Appendix G. Glove bags shall be constructed of 6-mil polyethylene plastic, with two inward projecting longsleeves, rubber gloves, one inward projecting water wand sleeve, an internal tool pouch, and an attached, labeled receptacle for asbestos waste. The glove bag shall be constructed and installed in such a manner that it surrounds the object or area to be decontaminated and contains all asbestos fibers during the removal process.

12.4 Containment Barrier and Negative Air System: In situations where intact removal or glove bag techniques are not applicable for removing asbestos from buildings, the Contractor shall erect a containment barrier around the work area and equip the work area with a negative air system. The Contractor shall not remove or strip any asbestos insulation unless this activity is done in a negative air area.

12.4.1 The containment barrier shall consist of temporary partitions made from lumber and covered on both sides with 4-mil polyethylene, and/or 6-mil polyethylene attached to existing walls. All vents, ducts, grills, and other openings capable of passing air shall be sealed airtight. An opening in the ceiling, walls, or floors which constitute the containment barrier for the work area shall be sealed in this manner.

12.4.2 The negative air system units shall each meet the following minimum requirements:

a. Deliver its rated volume of air with a clean first stage filter, an intermediate filter, and a primary HEPA filter in place.

b. The HEPA filter must be certified capable of removing particles of 0.3 microns at a minimum efficiency of 99.97 percent.

c. Under typical asbestos removal conditions, it must continue to deliver no less than 70 percent of rated capacity when the HEPA filter is 70 percent full or measures 2.5 inches of static pressure differential on a magnehelic gauge.

d. Must have a magnehelic gauge to monitor and display readouts of the unit's air pressure difference across the filters.

e. Must provide a means for the operator to easily interpret the magnehelic gauge readings in terms of cubic feet of air per minute moving through the machine at any given moment.

f. Must have an electronic mechanism which automatically shuts the machine off in the event of a filter breach or absence of a filter.

g. Must have an audible horn which sounds an alarm when the machine has shut itself off.

h. Must have an automatic safety mechanism which prevents a workman from improperly inserting the main HEPA filter.

i. Must be ducted through the containment barrier walls to the outside of the work area. When possible, the duct will exhaust into the outside air; otherwise, it will exhaust into the area of the building beyond the containment barrier where no person not appropriately protected shall be admitted. The Unit shall never be exhausted into the work area.

12.4.3 The Contractor shall provide enough negative air system units to change all the air within the containment barrier at least once every 15 minutes. To compute the minimum number of units required, the Contractor shall divide the total cubic footage of the work space by the documented air moving capacity of the filter units. The air moving capacity of any particular kind of HEPA filtration unit shall be measured in cubic feet of air per minute (CFM). The machine's air moving capacity will be that number of CFM it can move when working under a filter load equivalent to 2 inches of static pressure. The Contractor shall compute the total cubic footage of all air space insidethe containment barrier. This computation will be recorded and available to the Contracting Officer upon request.

12.5 <u>Asbestos Removal</u>:

12.5.1 All asbestos removal will be in accordance with the Contractor's approved Asbestos Removal Plan. Prior to commencing intact removal procedures, glove bag procedures, construction of a containment barrier and

negative air system, or establishment of a perimeter barrier system around a work area, personnel wearing the appropriate protective clothing and respirator as determined by the pre-work air tests, shall enter the work area and begin wetting all asbestos bearing surfaces. All unattached debris shall be collected, contained, and cleaned and disposed of in the required manner for asbestos-contaminated materials.

12.5.2 Upon completion of the initial debris cleanup, intact removal, glove bag, containment barrier and/or perimeter barrier procedures shall be initiated.

12.5.3 Unless asbestos-bearing surfaces are encapsulated prior to removal, or removed by other means, they shall be wetted with amended water at such intervals as to prevent the asbestos-bearing surface from drying out. At the start of each new work day, the work shall begin with a thorough wetting of the work area. When wetting is conducted inside a containment barrier and negative air system, the wetting shall begin at points most distant from the negative air system unit intake openings and proceed toward the intake openings. The spray equipment used to apply the amended water shall be capable of producing a "mist" application to the the asbestos-bearing surface to reduce the release of fiber. The asbestos-bearing material shall be saturated sufficiently to wet the substrate without causing excess dripping.

12.5.4 In order to maintain asbestos concentrations at a minimum, the saturated, or encapsulated, or otherwise enclosed asbestos must be removed in manageable sections. Asbestos-bearing waste shall not be dropped from a height in excess of 15 feet. For heights up to 50 feet, the Contractor shall provide chutes or scaffolding to intercept the drop.

12.5.5 The Contractor shall place asbestos waste in approved containers, and apply caution labels on the containers in accordance with 29 CFR 1926.58(k) (2) if not already preprinted on the containers. The Contractor shall clean external surfaces of the filled containers thoroughly by wet sponging in the designated area. The containers shallthen be moved to the designated area. The containers shall then be moved to the washroom, thoroughly wet-cleaned, and then moved to the holding area pending removal. Uncontaminated personnel shall not enter the washroom or work area; contaminated personnel shall not exit through the equipment decontamination enclosure system.

12.5.6 Containers (bags or drums) shall be sealed when full. Double bagging of wet material, due to its weight, may be necessary and shall be done if single bagging is not adequate. Bags shall not be overfilled. They should be securely sealed to prevent accidental opening and leakage by tying the tops of bags in an overhand knot, or by taping in gooseneck fashion. Do not seal bags with wire or cord. Bags shall be placed in drums for staging and transportation to the approved sanitary landfill. Bags shall be decontaminated on exterior surfaces by

wet cleaning and HEPA vacuuming before being placed in clean drums and sealed with locking ring tops.

12.5.7 Large components removed intact may be wrapped in two (2) layers of 6-mil polyethylene sheeting secured with tape for transport to the landfill.

12.5.8 Asbestos containing waste with sharp-edged components, such as nails, screws, metal lath, or tin sheeting, will tear the polyethylene bags and sheeting and shall be placed into drums for disposal.

12.5.9 After completion of all asbestos stripping and removal work, surfaces from which asbestos containing materials have been removed shall be wet brushed, wiped or sponged clean, or cleaned by some equivalent method to remove all visible residue.

12.5.10 After the gross amounts of asbestos have been removed from every surface, and/or encapsulated materials have been removed, all remaining visible accumulations of asbestos remaining on floors shall be collected using shovels, dust pans, rubber squeegees, rubber dustpans, and HEPA vacuum cleaners as appropriate to maintain the integrity of the containment barrier as used.

12.5.11 When all coverings have been removed, personnel shall use HEPA vacuum cleaners to vacuum every surface. Particular attention shall be paid to those surfaces or locations which could harbor accumulations of residual asbestos dust.

13.0 FINAL CLEANUP: When all visible asbestos has been removed from the work area, the final cleanup phase shall begin. All outer perimeter seals shall remain in place during final cleanup. Protective clothing and respirators shall remain in use. All normal decontamination procedures shall continue to be followed. Containment barriers and negative air systems established inside of buildings shall remain in full operation.

13.1 Personnel shall use buckets of water to which a grease-cutting detergent has been added for washing the exposed surfaces.

13.2 Paper Wiping Cloths shall be wetted in the buckets and then wiped across all spaces of the work area. The wiping cloths shall not be rinsed and reused. Instead, when dirty, they shall be discarded in a debris bag which the personnel shall keep available for this purpose.

13.3 Wiping Down shall continue until final TEM analysis of air samples documents that the area is cleaned. The area shall be considered clean when the asbestos level does not exceed 0.01 FCC.

13.4 No Seals shall be removed until the Contracting Officer has approved such removal.

13.5 Where Perimeter Barrier Methods are used for cleanup of vacant concrete slabs, Final Cleanup procedures shall be carried out in accordance with the Contractor's Asbestos Removal Plan. Asbestos levels after Final Cleanup is complete shall not exceed 0.01 FCC, or the adjacent environmental concentration, whichever is less, to be acceptable.

14.0 DISPOSAL: All materials contaminated with asbestos shall be disposed of in accordance with the Contractor's Waste Disposal Plan (Reference Paragraph 5.7 above).

15.0 PROJECT DOCUMENTATION: The Contractor shall maintain and shall have available for inspection at the job site, the following:

15.1 A Daily Narrative Log kept by the Contractor's CIH or his designee. This log shall document the major events which occur each day. This log shall provide a comprehensive description of conditions in and around the job site. It shall include the names of all persons who visit the job site and all persons who enter the sealed or restricted work areas. It shall contain the details of all accidents, emergencies, breakdowns of equipment, and any material, procedural or safety difficulties. It shall contain details such as the number of persons on the job, the time they entered the work area and the time they left, and the nature of the work-in-progress. Each day's entries shall be signed and dated by the person who made them.

15.2 A Daily Air Monitoring Log which records all required items outlined in Paragraph 9.0, "AIR MONITORING AND ANALYSIS", subparagraph 9.4, "Sample Record Maintenance".

15.3 Work Schedules and Progress Charts amended on a daily basis.

15.4 Upon Completion of the Work at each structure, slab, or work area, the Contractor shall prepare a report and submit it to the Contracting Officer. The report shall contain:

a. A summary of all work that was done.

b. A brief description of how the work was accomplished.

c. A description of any problem areas encountered during the work.

d. A copy of the narrative log maintained at the job site throughout the work.

e. A copy of the air monitoring log maintained at the job site throughout the work.

16.0 QUALITY CONTROL: The Contractor shall establish and maintain a quality control system for all operations performed under this Section to assure compliance with contract requirements and pertinent Federal, State and Local laws, rules and regulations as cited throughout the text of this Section. The Contractor shall maintain records of his quality control for all operations performed, including, but not limited to, the following:

a. Qualifications of Contractor and Personnel.
b. Required Notifications and Permits.
c. Public Warnings and Safety Information.
d. Containment Barriers, Coverings, and Airlocks.
e. Personnel Protection.
f. Decontamination Procedures.
g. Collecting and Testing of Samples.
h. Project Documentation.
i. Asbestos Removal Procedures.
j. Final Cleanup.
k. Completion of Work Reports.
l. Special Conditions.
m. Disposal Site.
n. Observance of Safety Regulations.

16.1 Records: Copies of all records of inspection, testing, monitoring, or related items, as well as records of any corrective actions taken, shall be furnished to the Contracting Officer in accordance with Federal, State, and Local regulations, and as otherwise directed.

# SECTION 02110
# CLEARING AND GRUBBING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing of labor and equipment for clearing and grubbing.

2.0 PRODUCTS: (Section not used.)

3.0 EXECUTION:

3.1 Clearing: Trees, stumps, roots, brush, and other vegetation in areas to be cleared shall be cut off flush with or below the original ground surface, except such trees and vegetation as may be indicated or directed to be left standing. Clearing shall also include the removal and disposal of structures that obtrude, encroach upon, or otherwise obstruct the work.

3.2 Grubbing: Material to be grubbed, together with logs and other organic or metallic debris not suitable for foundation purposes, shall be removed to a depth of not less than 18 inches below the original surface level of the ground in areas indicated to be grubbed. Depressions made by grubbing shall be filled with suitable material and compacted to make the surface conform with the original adjacent surface of the ground.

3.3 Tree Removal shall include the felling of trees and the removal of stumps and roots.

3.4 Disposal of Materials: All felled timber, logs, stumps, roots, brush, rotten wood, and other refuse from the clearing and grubbing operations shall be in compliance with all federal, state, and local regulations.

SECTION 02210
SITE GRADING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing of labor and equipment for site grading.

2.0 PRODUCTS: Borrow material shall be selected to meet requirements and conditions of the particular fill for which it is to be used. Necessary clearing, grubbing, disposal of debris, and satisfactory drainage of borrow pits shall be performed by the Contractor. The source of borrow material shall be the Contractor's responsibility. Satisfactory material shall be approved by the Contracting Officer.

3.0 EXECUTION:

3.1 Topsoil shall be removed without contamination with subsoil and stockpiled convenient to areas for later application or at locations designated. Topsoil shall be removed to full depth and shall be stored separate from other excavated materials and piled free of roots, stones, and other undesirable materials.

3.2 Excavation: After all stripping has been completed, excavation of every description, regardless of material encountered, within the grading limits of the project shall be performed to the lines and grades designated. Satisfactory excavation material shall be transported to and placed in fill areas within the limits of the work. All unsatisfactory material and surplus material shall be disposed of in areas approved for surplus material storage.

3.3 Preparation of Ground Surface for Fill: All vegetation, such as roots, brush, heavy sods, heavy growth of grass, and all decayed vegetable matter, rubbish, and other unsatisfactory material within the area upon which fill is to be placed shall be stripped or otherwise removed before the fill is started. Sloped ground surfaces steeper than one vertical to four horizontal on which fill is to be placed shall be plowed, stepped, or broken up as directed, in such manner that the fill material will bond with the existing surface.

3.4 Fills and Embankments: The completed fill shall conform to the shape of the typical sections indicated or shall meet the requirements of the particular case. Fill shall be satisfactory material and shall be reasonably free from roots, other organic material, trash, and stones having a maximum diameter greater than 6 inches. No frozen material will be permitted in the fill. Stones having a dimension greater than 4 inches shall not be permitted in the upper 6 inches of fill or embankment.

3.5 Finished Excavation, Fills, and Embankments: All areas covered by the project, including excavated and filled sections and adjacent transition areas, shall be uniformly smooth graded. The finished surface shall be reasonably smooth, compacted, and free from irregular surface changes.

3.6 Placing Topsoil: On areas to receive topsoil, the compacted subgrade soil shall be scarified to a 2-inch depth for bonding of topsoil with subsoil. Topsoil then shall be spread evenly and graded to the elevations and slopes shown. Topsoil shall not be spread when frozen or excessively wet or dry.

SECTION 02211
ROCK REMOVAL

1.0 DESCRIPTION OF WORK: This specification covers removal of rock. Operating procedures shall be in accordance with the equipment manufacturer's recommendations. Demolition and removal of material shall be as required to support the work.

2.0 PRODUCTS: (Section not used.)

3.0 EXECUTION:

3.1 Preparation:

3.1.1 Review The Site for existing features, such as buildings or utilities, that will require protection or other coordination of the work.

3.1.2 Clear The Area and excavate as required to provide access to the rock to be removed.

3.1.3 Provide Bracing, Shoring, Etc., as required to safely execute the work.

3.1.4 Provide Dewatering as required.

3.2 Installation:

3.2.1 Remove Rock to the lines required or designated. Blasting must be approved by the Contracting Officer.

3.2.2 Haul Excavated Materials to the area designated.

SECTION 02215
FINISH GRADING FOR STRUCTURES AND SLABS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing of labor and equipment for finish grading for structures and slabs.

2.0 PRODUCTS: Borrow material shall be selected to meet requirements and conditions of the particular fill for which it is to be used. Necessary clearing, grubbing, disposal of debris, and satisfactory drainage of borrow pits shall be performed by the Contractor. The source of approved borrow material shall be the Contractor's responsibility. Satisfactory materials shall consist of cohesionless materials classified by ASTM D 2487 as CL, GW, GP, GM, GC, SP, SC, SM, and SW. Materials classified as GM and SM will be identified as cohesionless only when the fines are nonplastic.

3.0 EXECUTION:

3.1 Topsoil shall be removed without contamination with subsoil and stockpiled convenient to areas for later application or at locations specified.

3.2 Excavation shall be performed to the required lines and grades. Satisfactory excavation material shall be transported to and placed in fill areas within the limits of the work. All unsatisfactory material and surplus material shall be disposed of in areas approved for surplus material storage.

3.3 Fills and Embankments: The completed fill shall meet the requirements of the particular case. Fill shall be satisfactory material. No frozen material will be permitted in the fill. Stones having a dimension greater than 4 inches shall not be permitted in the upper 6 inches of fill or embankment.

3.4 Compaction Requirements: Satisfactory material shall be placed in horizontal layers not exceeding 8 inches in loose depth and compacted to 95 percent maximum density in conformity with ASTM D 1556.

SECTION 02220
SITE EXCAVATION AND FILL

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of material for site excavation and fill.

2.0 PRODUCTS: Satisfactory materials shall consist of cohesionless materials classified by ASTM D 2487 as CL, GC, GW, GP, GM, SP, SC, SM, and SW. Materials classified as GM and SM will be identified as cohesionless only when the fines are nonplastic.

3.0 EXECUTION:

3.1 Excavation: The Contractor shall perform excavation of every type of material encountered within the limits of the project, to the required lines, grades, and elevations. Satisfactory excavated materials shall be placed in fill or embankment within the limits of the work. Unsatisfactory materials encountered within the limits of the work shall be excavated below grade and replaced with satisfactory materials. Additionally required material for fill or embankments shall be excavated from approved borrow areas.

3.2 Ditches, Gutters, and Channel Changes: Excavation of ditches, gutters, and channel changes shall be to the required cross sections, grades, and elevations. Backfill shall be thoroughly compacted satisfactory material.

3.3 Selection of Borrow Material: Borrow material shall be selected to meet the requirements and conditions of the particular fill or embankment for which it is to be used. Borrow material shall be obtained from approved sources.

3.4 Backfill: Backfill adjacent to any and all types of structures shall be placed and compacted in such a manner as to prevent wedging action or eccentric loading upon or against any structure.

3.5 Embankment: Earth embankments shall be constructed from satisfactory materials free of organic or frozen material in the embankment and rocks with any dimension greater than 4 inches in the upper 8-inch layer. The material shall be placed in successive horizontal layers of loose material not more than 8 inches in depth.

3.6 Compaction Requirements: Satisfactory material shall be compacted to 90 percent maximum density in conformity with ASTM D 1556.

SECTION 02221
EXCAVATION, TRENCHING, AND BACKFILLING
FOR UTILITIES SYSTEMS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for excavation, trenching, and backfilling for utilities systems.

2.0 PRODUCTS:

2.1 Satisfactory Materials: Satisfactory materials shall consist of any cohesionless materials classified by ASTMD 2487 as CL, GC, GM, GW, GP, SC, SP, SM, and SW. Materials classified as GM and SM will be identified as cohesionless only when the fines are nonplastic.

2.2 Select Granular Material: Select granular material shall consist of well-graded sand, gravel, crushed gravel, or crushed slag composed of hard, tough, and durable particles.

3.0 EXECUTION:

3.1 Excavation: During excavation, material satisfactory for backfilling shall be stockpiled at a sufficient distance from the banks of the trench to prevent slides or cave-ins. Excavated material not required or not satisfactory for backfill shall be removed from the site. Trenches shall be dewatered as required.

3.1.1 Trench Excavation: Trench walls below and above the top of the pipe shall be sloped or made vertical, depending on the type of pipe used and the soil conditions. Trench width below the top of the pipe shall not exceed 24 inches plus pipe outside diameter (OD) for pipes of less than 24-inch inside diameter and shall not exceed 36 inches plus pipe OD for larger sizes. The bottoms of trenches shall be accurately graded to provide uniform bearing and support for the bottom quadrant of each section of the pipe. Bell holes shall be excavated to the necessary size at each joint or coupling to eliminate point bearing. Stones of 3 inches or greater shall be removed to avoid point bearing. Vertical trench walls more than 5 feet high shall be shored. Trench walls which are cut back shall be excavated toa t least the angle of repose of the soil.

3.1.2 Removal of Unyielding Material: Where unyielding material is encountered in the bottom of the trench, such material shall be removed 4 inches below the required grade and replaced with select materials and compacted.

3.1.3 Removal of Unstable Material: Where unstable material is encountered in the bottom of the trench, such material shall be removed to the depth directed and replaced to the proper grade with select granular material placed in layers not to exceed a loose thickness at 6 inches and compacted.

3.1.4 Excavation for Appurtenances: Excavation for manholes, catch-basins, inlets, or similar structures shall be of sufficient size to permit the placement and removal of forms for the full length and width of structure footings and foundations.

3.2 Backfilling: Backfill material shall be placed in layers of 8 inches loose thickness unless otherwise specified. Each layer shall be compacted to at least 95 percent maximum density for cohesionless soils and 90 percent maximum density for cohesive soils under roadways, railroads, and airfields. Water flooding or jetting will not be permitted.

3.2.1 Sidewalks, Turfed or Seeded Areas, and Miscellaneous Areas: Backfill shall be deposited in layers of a maximum of 12 inch loose thickness and compacted to 85 percent maximum density for cohesive soils and 90 percent maximum density for cohesionless soils.

Water flooding or jetting methods of compaction will be permitted for granular noncohesive backfill material. Water jetting will not be allowed to penetrate the initial backfill.

3.2.2 Trench Backfill: Trenches shall be backfilled to the grade required. The trench shall be backfilled to 2 feet above the top of pipe prior to performing the required pressure tests. The joints and couplings shall be left uncovered during any required pressure tests unless approved by the Contracting Officer.

3.2.3 Displacement of Sewers: After other required tests have been performed and the trench backfill compacted to 2 feet above the top of the pipe, the pipe shall be inspected to determine whether significant displacement has occurred. If the interior of the pipe shows poor alignment or any other defects that would cause improper functioning of the system, the defects shall be remedied as directed.

3.3 Special Requirements: Special requirements for both excavation and backfill relating to the specific utilities are as follows:

3.3.1 Gas Distribution: Trenches shall be excavated to a depth that will provide not less than 18 inches of cover in rock excavation and not less than 24 inches of cover in other excavation.

3.3.2 Water Lines: Trenches shall be excavated to a depth that will provide a minimum cover required for frost protection, or from the indicated finished grade, whichever is lower, to the top of the pipe. For fire protection yard mains or piping, the depth of cover shall comply with NFPA No. 24.

3.3.3 Heat Distribution System: Trenches shall be excavated to a depth that will provide a minimum cover required for frost protection. Initial backfill material shall be free of stones larger than 1/4 inch in any dimension.

3.3.4 Electrical Distribution System: Direct burial cable and conduit or duct line shall have a minimum cover of 24 inches from the finished grade, unless otherwise required.

SECTION 02222
STRUCTURAL EXCAVATION AND BACKFILL

1.0 DESCRIPTION OF WORK: This specification covers the furnishing of labor and equipment for structural excavation.

2.0 PRODUCTS: (Section not used.)

2.1 Satisfactory Materials: Satisfactory materials shall consist of any cohesionless materials classified by ASTMD 2487 as CL, GC, GM, GW, GP, SC, SP, SM, and SW. Materials classified as GM and SM will be identified as cohesionless only when the fines are nonplastic.

2.2 Select Granular Material: Select granular material shall consist of well-graded sand, gravel, crushed gravel, or crushed slag composed of hard, tough, and durable particles.

3.0 EXECUTION:

3.1 General: The excavation shall include trenching for utility and foundation drainage systems to a point 5 feet beyond the building line of each building and structure. Unsatisfactory material shall be removed, and satisfactory material shall be placed and compacted.

3.2 Drainage: Excavation shall be performed so that the area of the site and the area immediately surrounding the site and affecting operations at the site will be continually and effectively drained.

3.3 Utility and Drain Trenches: Trenches for underground utilities systems and drain lines within 5 feet of the building or structure shall be excavated to the required alignments and depths. The bottoms of trenches shall be graded to secure the required slope and shall be tamped if necessary to provide a firm pipe bed.

3.4 Borrow: Where satisfactory materials are not available in sufficient quantity from required excavations, approved materials shall be obtained from approved sources.

3.5 Excavated Materials: Satisfactory excavated material required for fill or backfill shall be placed in the proper section of the permanent work required under this section or shall be separately stockpiled if it cannot be readily placed.

3.6 Final Grade of Surfaces of Support Concrete: Excavation to final grade shall not be made until just before concrete is to be placed. For pile foundations, the excavation shall be stopped at an elevation 6 to 12 inches above the bottom of the footing before driving piles. Rock shall be worked down to a satisfactory bed or sidewall.

3.7 Filling and Subgrade Preparation: Satisfactory materials free from roots, debris, or stones larger than 3 inches shall be used in bringing fills to the lines and grades indicated and for replacing unsatisfactory materials.

3.8 Backfilling: Backfilling shall not begin until construction below finish grade has been approved; underground utilities systems have been inspected, tested, and approved; forms have been removed; and the excavation has been cleaned of trash and debris. Backfill shall be brought to indicated finish grade and shall include backfill for outside grease interceptors and underground fuel tanks. Backfill shall not be placed in wet or frozen areas. Backfill shall not be placed against foundation walls prior to 7 days after completion of the walls. As far as practicable, backfill shall be brought up evenly on each side of the wall and sloped to drain away from the wall.

SECTION 02224
PIPE SLEEVES FOR UTILITY LINES

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of pipe sleeves for utility lines. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Jack-Boring Operation: AREA-01.

2.2 Sleeve Materials:

2.2.1 Concrete Pipe: ASTM C 76.

2.2.2 Steel Pipe: ASTM A 53.

2.2.3 Corrugated Steel Pipe: ASTM A 760.

2.2.4 Ductile Iron Pipe: ASTM A 716.

3.0 EXECUTION:

3.1 Roads, Railroads and Airfields: At primary access road crossings, railroad crossings, and at airfield runways and taxiways where aircraft move under their own power, utility lines shall be encased in sleeves of rigid conduit for the length installed under such facilities. Sleeves shall extend a minimum of 5 feet beyond the toe of the slope on each side of the embankment.

3.2 Structures: Where utility lines are required to be installed within 3 feet of existing buildings or structural foundations, the lines shall be encased in sleeves of rigid conduit.

3.3 Clearance: A minimum clearance of at least 2 inches between the inner diameter of the sleeve and the maximum outside diameter of the sleeved pipe, including the joints, shall be provided.

3.4 Sand Bedding: Sand bedding shall be provided for the carrier pipe through the sleeve.

SECTION 02227
FIELD TESTS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing of labor and equipment for soils compaction testing.

2.0 PRODUCTS:

2.1 Cohesionless and Cohesive Materials: Cohesionless materials include materials classified in ASTM D 2487 as CL, GM, GC, GW, GP, SC, SM, SW, and SP. Cohesive materials include materials classified as GC, SC, ML, CL, MH, and CH.

2.2 Degree of Compaction: Degree of compaction required as expressed as a percentage of the maximum density obtained by the test procedure presented in ASTM D 1557, Method D, abbreviated below as maximum density.

3.0 EXECUTION:

3.1 Compaction Requirements: Each layer shall be compacted to not less than the percentage of maximum density specified below:

| | Percent CE 55 Maximum Density | |
|---|---|---|
| | Cohesive Material | Cohesionless Material |
| Fill, Embankment, and Backfill | | |
| Under proposed structures, building slabs, steps, and paved areas | 90 | 95 |
| Under sidewalks and grassed areas | 85 | 90 |
| Subgrade | | |
| Under building slabs, steps, and paved areas, top 12 inches | 90 | 95 |
| Under sidewalks, top 6 inches | 85 | 90 |

3.2 Test Procedure: Field in-place density shall be determined in accordance with ASTM D 1556.

SECTION 02240
SOIL STABILIZATION - CRUSHED ROCK SUBGRADE

1.0 DESCRIPTION OF WORK: This specification covers the furnishing of materials and the preparation and production of a stabilized subgrade by adding granular material and/or fines to the native subgrade material.

2.0 PRODUCT: The crushed rock subgrade shall be a composite mixture of coarse aggregate and fine aggregate. Coarse aggregate shall consist of hard, durable particles or fragments of stone, gravel, or slag, or a combination of these. Materials that break up when alternately frozen and thawed, or when alternately wetted and dried are not suitable for stabilized material. Fine aggregate shall consist of natural or crushed sand. The composite mixture of coarse and fine aggregates should be free from vegetable matter and lumps or balls of clay.

Aggregate used shall meet the following gradation limits or shall meet the gradation requirements of the applicable State Highway Department wherein the work is performed as approved by the Contracting Officer:

Coarse Aggregate

| | |
|---|---|
| Retained on 1-1/2 inch sieve | 0 percent |
| Retained on 3/4-inch sieve | 0 - 15 percent |
| Retained on No. 4 sieve, minimum | 10 percent |
| Retained on No. 8 sieve | 25 - 70 percent |

Fine Aggregate

| | |
|---|---|
| Retained on No. 40 sieve | 50 - 90 percent |
| Retained on No. 200 sieve | 85 - 95 percent |

3.0 EXECUTION: Scarify the subgrade to the depth required. Add granular material to the native material that will bring the composite mixture into compliance with subgrade material requirements. Add water and compact subgrade to required density.

# SECTION 02243
# SOIL STABILIZATION - HYDRATED LIME

1.0 DESCRIPTION OF WORK: This specification covers furnishing of materials and the preparation and production of a stabilized subgrade by the addition of hydrated lime to the native material.

2.0 PRODUCTS: Hydrated lime material requirements shall be as follows:

2.1 Available Lime Index as Calcium Hydroxide: 90 percent minimum.

2.2 Residue Retained on No. 30 Sieve: 1 percent maximum.

2.3 Residue Retained on No. 200 Sieve: 20 percent maximum.

3.0 EXECUTION:

3.1 Preparation: Scarify the subgrade to the depth required and pulverize the material until it is substantially free of lumps greater than 3 inches in diameter.

3.2 Installation: Lime shall be applied to the pulverized material as a slurry unless otherwise directed. Water shall be added as needed to provide a moisture content of not less than 20 percent. Surface-applied lime slurry shall be plowed and/or disced into the soil as necessary. The resulting mixture shall be aged for not less than 48 hours before compaction.

# SECTION 02250
# SOIL STABILIZATION - VIBROFLOTATION

1.0 DESCRIPTION OF WORK: This specification covers the densification of sandy subsurfaces by the method of vibroflotation.

2.0 PRODUCTS: (Section not used.)

3.0 EXECUTION: The vibroflotation process shall be applied only to areas of clean, granular soils, with not over 20 percent silt or 10 percent clay. Vibrators shall be water-jetted into the soil mass to the depth required. The vibrator shall be withdrawn in 1 foot increments as the saturated soil compacts laterally and at a rate of approximately 1 ft/min to a minimum relative density of 70 percent. As the surface crater forms, sand or crushed rock shall be added and compacted to the appropriate line and grade. The horizontal distance between successive treatments shall not exceed 5 feet, or as directed.

# SECTION 02251
# SOIL STERILIZATION

1.0 DESCRIPTION OF WORK: This specification covers soil sterilization. Products shall be as directed. Installation procedures shall be in accordance with the product manufacturer's recommendations.

2.0 PRODUCTS:

2.1 Weed Eradication and Soil Fumigation: Products approved by the Environmental Protection Agency.

2.2 Liquid and Dry Herbicides:

2.2.1 Bare Ground Herbicides: Bromacil powder mixture or an ammonium sulfamate spray.

2.2.2 Wetting Agents: As required.

2.3 Equipment: Equipment shall be appropriate to the application and approved before use by the Contracting Officer.

3.0 EXECUTION:

3.1 Soil: After the subgrade has been prepared, all areas to be surfaced shall be treated with a weed eradicator and soil fumigant only in the designated areas.

3.2 Wetting Agents: Wetting Agents may be used as an additive to improve the performance of weed and brush herbicides.

SECTION 02270
SEDIMENT CONTROL

1.0 DESCRIPTION OF WORK: This specification covers the furnishing of materials and the installation of sediment control by means of a silt fence to control the drifting of silt, sand, dust, or earth.

2.0 PRODUCTS:

2.1 Silt Fence shall be composed of 100 percent spunbounded nylon with polyester netting and shall have the following minimum properties:

| | | |
|---|---|---|
| Weight | 4.2 oz/yd$^2$ | ASTM D 3776 |
| Thickness | 10 mils | ASTM D 1777 |
| Grab Tensile | 130 lbs. | ASTM D 1682 |
| Elongation to Break | 25% $\pm$ 3% | ASTM D 1682 |
| Mullen Burst | 210 lbs. | |
| Water Flow Rate | 470 gpm/ft$^2$ | |
| Equip. Opn. Size | 70 - 100 | |
| Cord | 1/8 in. Nylon Braid | |

Strength Retention Ultraviolet Protection

| | |
|---|---|
| Fabric Width | Supplied in Widths to Meet Local, State, D.O.T., and/or Federal Requirements |

2.2 Fence Posts shall be steel T-posts or cured oak posts, spaced approximately 8 feet apart. Selection of the type of post used, as well as the distance between posts, shall be determined by the manufacturer of the fabric and approved by the Contracting Officer.

3.0 EXECUTION:

3.1 Installation: Installation procedures shall be as recommended by the manufacturer.

3.2 Reuse: Silt fence shall be of such quality that it may be removed and reused at other sites.

# SECTION 02272
# GABIONS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of gabions. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Wire Cages shall be made of hexagonal twist mesh (3 1/2 inches x 4 1/2 inches) with heavily galvanized steel wire. Wire for wire cages shall be a minimum of 0.118 inch in diameter and shall be in conformance with ASTM A 510 and A 641.

2.2 Lacing Wire shall meet the same specifications as the wire used in the mesh, except that its diameter shall be a minimum of 0.0866 inch.

2.3 Fill Material shall consist of hard, durable, clean stone, 4 to 8 inches in size, or as approved.

3.0 EXECUTION:

3.1 Preparation: Before gabions are placed, the earth on which the gabions are to be placed shall be graded to be relatively smooth.

3.2 Installation:

3.2.1 Baskets shall be delivered in a collapsed form. Erect and lace together with lacing wire.

3.2.2 Install Fill Rock in mesh baskets with appropriate equipment. Manually adjust stone during the filling operation to prevent undue voids.

3.2.3 Hand Place Exposed Faces using selected stone to prevent gabions from bulging. Level the last lift of stone with the top of the gabion to properly close the lid to provide an even surface for the next course.

SECTION 02274
RIPRAP

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of riprap. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Riprap: Stone used for dumped riprap shall be hard, durable, angular in shape, resistant to weathering and to water action, and free from overburden, spoil, shale, and organic material. Neither width nor thickness of a single stone should be less than one third its length. Rounded stone, boulders, shale, and stone with shale seams will not be acceptable. The minimum density of the riprap material shall be 162 pounds per cubic foot. Each load of riprap shall be reasonably well graded. Sand and rock dust exceeding 5 percent by weight of each load shall not be permitted.

2.2 Riprap Bedding: The riprap bedding blanket shall consist of well-graded gravel, crushed rock, sand, or a combination thereof with a maximum size of 6 inches. All material comprising the riprap bedding blanket shall be composed of tough, durable particles, reasonably free from thin, flat, and elongated pieces, and shall contain no organic matter nor soft, friable particles in excess quantities.

3.0 EXECUTION:

3.1 Preparation: Prepare earth slopes by grading and compacting.

3.2 Installation:

3.2.1 Riprap Bedding Blanket Layers shall be placed on the prepared slope or area to develop the full thickness. Each layer shall be placed in one operation, using methods that will not cause segregation of particle sizes within the bedding. The surface of the finished layer should be reasonably even and free from mounds or windrows.

3.2.2 Stone for Riprap shall be placed on the prepared slope or area in a manner that will produce a reasonably well-graded mass of stone with the minimum practicable percentage of voids. Riprap shall be placed to its full course in one operation and in such a manner as to avoid displacing the underlying material. The larger stones shall be well distributed and the entire

mass of stone shall be well-graded. The result shall be a compact, uniform riprap layer.

# SECTION 02275
# SOIL - CEMENT SURFACING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of soil-cement surfacing. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Soil: Use SP and SM soils as classified in ASTM D 2487. The soil aggregate shall contain not more than 55 percent material by dry weight passing the No. 4 sieve and not more than 25 percent material passing the No. 200 sieve. Clay lumps shall be removed.

2.2 Cement: ASTM C 150, Type I.

2.3 Curing Compound: ASTM C 309.

3.0 EXECUTION:

3.1 Place the Plant-Mixed Soil-Cement in uniform lifts and compact to the agreed-upon density as determined by ASTM D 558. The optimum moisture content shall be maintained.

3.2 Finish Soil-Cement Surface to the required lines, grades, and cross sections after compaction.

3.3 Construction Joints: If required, construction joints may be horizontal or vertical.

3.4 Curing: Temporary curing of surfaces to receive subsequent bonded lifts or coatings shall be by water fogging. Final curing shall be by application of a membrane maintained intact for 7 days.

SECTION 02450
RAILROADS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for laying and repairing of railroad track. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations and the American Railway Engineering Association (AREA) publications. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Ballast: Chapter 1, Part 2, AREA-01.

2.2 Oil: ASTM D 402.

2.3 Ties: Wooden, Chapter 3, all parts AREA-01. Concrete, Chapter 10, Part 1, AREA-01.

2.4 Rails: New, Chapter 4, Parts 1 and 2, AREA-01. Relay, Chapter 4, Part 2 "Specifications for Steel Rails" Paragraph 14-Workmanship, AREA-01 Chapter 4.

2.5 Track Fastenings: Track fastening shall include, but not be limited to, bolts and nuts, lockwashers, spikes, rail anchors, tie plates, derails, turnout frogs, and joint bars. Track fastenings shall conform to Chapter 4, Parts 1 and 2 and Chapter 5, Parts 1, 2, and 7, AREA-01.

3.0 EXECUTION:

3.1 Track Removal:

3.1.1 Trackage shall be removed in a manner such as to cause a minimum amount of damage to roadbed.

3.1.2 All Materials Acceptable for Reuse shall, after inspection, be properly stored clear of the work area and separate from new materials.

3.2 Roadbed Preparation:

3.2.1 Damaged Areas in Existing Roadbeds shall be repaired to original condition.

3.2.2 New Roadbeds shall be prepared in accordance with Chapter 1, Part 1 of AREA-01.

3.2.3 Roadbed Surface, Grade, and Drainage shall be approved prior to any distribution of construction material. Ruts and depressions shall be filled and compacted prior to track laying.

3.3 Track Construction:

3.3.1 All Track Construction shall be in accordance with Chapter 5, Parts 4 and 5, of the AREA-01, and in accordance with the adjoining railroad owner/operator specifications and recommendations.

3.3.2 Where Railroads Pass Near Structures where explosives, ammunition, or explosive ingredients are stored, handled, manufactured, or processed, rails that are not electrically continuous and rail switches shall be bonded together by means of flexible copper cable or straps for a distance of at least 100 feet on each side of the structure, and the rails shall be grounded. Where overhead electrical lines in excess of 600 volts cross railroad tracks, the rails shall be grounded at points 150 feet on each side of the crossing and the rails bonded between the grounds. At points where the tracks come within 25 feet of structures provided with a grounded system, such grounds shall be interconnected to the nearest rail. The cable used for the interconnection shall be at least 3/4-inch diameter or the same size as the conductors used on the structure.

3.3.3 Crossties shall be spaced in accordance to the adjoining railroad owner/operator specifications, but in no case shall be less than 21 ties per 39 feet of rail or main tracks of 16 ties per 39 feet of rail on sidings and yards.

3.3.4 New Trackage Rail shall be sized in accordance with the adjoining railroad owner/operator requirements. The base of the rail and the surface of tie plates and ties shall be cleaned prior to laying.Only rail saws or track chisels shall be used to cut rail. All new holes shall be drilled or punched.

3.3.5 Existing Trackage Being Rebuilt shall be sized to match the original. Construction of rebuilt trackage shall conform to the same requirements as new construction.

3.3.6 Relayer Rails, in either new or rebuilt tracks, shall be matched to prevent lipped or uneven joints. Any mismatched ends shall be ground or built-up welded.

3.4 Track Maintenance: Track maintenance shall be performed in accordance with Chapter 5, Part 5 of AREA-01.

SECTION 02511
PORTLAND CEMENT CONCRETE OVERLAYS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of Portland cement concrete overlays on previously paved areas. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Coarse Aggregate:

2.1.1 Composition: Coarse aggregate shall consist of gravel, crushed gravel, crushed stone, a combination thereof, or crushed blast-furnace slag.

2.1.2 Particle Shape: Particles of the coarse aggregate shall be generally spherical or cubical in shape. The quantity of flat and elongated particles in any size group shall not exceed 20 percent by weight as determined by ASTM D 3398.

2.1.3 Gradation: The maximum size of coarse aggregate shall be the lesser of 1/4 of the pavement thickness or 2 inches nominal size. Gradation limits are specified in ASTM C 136.

2.1.4 Deleterious Substances: The amount of deleterious substances in the coarse aggregate shall not exceed the limits, defined in ASTM C 117 and C 123.

2.2 Fine Aggregate shall consist of natural sand, manufactured sand, or a combination of natural and manufactured sand and shall be composed of clean, hard, durable particles. Particles of the fine aggregate shall be generally spherical or cubical in shape. Gradation limits are specified in ASTM C 136.

2.3 Portland Cement shall be Type I in compliance with ASTM C 150.

2.4 Air-Entraining Admixture shall be in compliance with ASTM C 260. Concrete mixtures shall have air content by volume of concrete of 4 to 7 percent based on measurements made immediately after discharge from the mixer.

2.5 Concrete Mixture shall have a nominal slump of 2 inches with a maximum of 3 inches and a 28-day flexural strength of not less than 650 psi.

2.6 Joint and Crack Sealing Materials: Joint filler, joint sealant, and crack sealant shall comply with the following:

2.6.1 Expansion Joint Fillers shall comply with ASTM D 1751 or D 1752 or shall be resin impregnated fiberboard in compliance with the physical requirements of ASTM D 1752.

2.6.2 Type I Sealant shall comply with Fed. Spec. SS-S-200, except that sealant may be furnished as a ready-mixed liquid.

2.6.3 Type II Sealant shall comply with Fed. Spec. SS-S-1401.

2.6.4 Type V Sealant shall comply with CE CRD-C-527 and may be either a single- or multiple-component material.

2.7 Epoxy-Resin Materials: Materials used in epoxy-resin grout, mortar, and concrete shall comply with the following:

2.7.1 Epoxy-Resin Grout shall be a two-compound material formulated to comply with Fed. Spec. MMM-A-001993.

2.7.2 Epoxy-Resin Concrete shall be composed of epoxy-resin binder and uniformly graded aggregate in compliance with ASTM C 144. The maximum size of aggregate shall be 3/8 or 1/2 inch.

2.8 Dowels shall be plain steel bars complying with ASTM A 499.

3.0 EXECUTION:

3.1 Preparation of Existing Surface: The Contractor shall raise and reset all structures such as manhole frames, valve boxes, drainage structures, etc. to meet the required grade. Bonding course shall be applied to the area prepared to receive overlay and shall be of epoxy-resin grout and Portland cement mortar.

3.2 Concrete Placement: Concrete shall be placed within 45 minutes from the time all ingredients are charged into the mixing drum.

3.2.1 Weather Limitations: The temperature of the concrete placed during warm weather shall not exceed 85 degrees F. Special protection measures, approved by the Contracting Officer, shall be used if freezing temperatures are anticipated before the expiration of the specified curing period. Calcium chloride shall not be used.

3.3 Vibration: In the final phases of placing, surface vibrating equipment shall be used, and the duration of vibration shall not exceed 20 seconds.

3.4 Joints shall be saw cut and in alignment with underlying existing joints.

3.5 Finishing:

3.5.1 Transverse Finishing: Immediately after placement, concrete shall be accurately struck off and screeded to such elevation that when consolidated and finished, the surface of the pavement will be free from porous places and will be at the required grade. The finishing machine shall make at least two trips over each area of pavement to compact the concrete and produce a surface of uniform texture, true to grade.

3.5.2 Longitudinal Floating: After completion of the transverse finishing, the longitudinal mechanical float shall be operated to smooth and finish the pavement to grade.

3.5.3 Hand Finishing shall be with an approved strike and tamping template and a longitudinal float.

3.5.4 Straightedge Finishing: After the longitudinal floating is completed but while the concrete is still plastic, minor irregularities and score marks in the pavement surface shall be eliminated by means of long-handled wood floats and straightedges. The final finish shall be made with the straightedges, which shall be used to float the entire pavement surface.

3.5.5 Burlap Drag Finishing: When most of the water glaze or sheen has disappeared and before the concrete becomes nonplastic, drag the surface of the pavement in the direction of the concrete placement with a multiple-ply burlap drag.

3.5.6 Edging: After other finishing has been completed, the edges of slabs along the forms and at the joints shall be carefully finished with an edging tool to form a smooth rounded surface of the required radius.

3.6 Concrete Curing and Protection:

3.6.1 Concrete Curing Methods shall consist of mat method, impervious sheeting method, or liquid membrane curing method.

3.6.2 Concrete Protection: Protect repaired areas against damage prior to final acceptance. Traffic shall be excluded from repaired areas.

SECTION 02512
STEEL REINFORCED PORTLAND CEMENT
CONCRETE OVERLAYS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of steel reinforced Portland cement concrete overlays on previously paved areas. Products shall match existing materials and/or shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Coarse Aggregate:

2.1.1 Composition: Coarse aggregate shall consist of gravel, crushed gravel, crushed stone, a combination thereof, or crushed blast-furnace slag.

2.1.2 Particle Shape: Particles of the coarse aggregate shall be generally spherical or cubical in shape. The quantity of flat and elongated particles in any size group shall not exceed 20 percent by weight as determined by ASTM D 3398.

2.1.3 Gradation: The maximum size of coarse aggregate shall be the lesser of one-fourth of the pavement thickness or a nominal size of 2 inches. Gradation limits are specified in ASTM C 136.

2.1.4 Deleterious Substances: The amount of deleterious substances in the coarse aggregate shall not exceed the limits defined in ASTM C 117 and C 123.

2.2 Fine Aggregate shall consist of natural sand, manufactured sand, or a combination of natural and manufactured sand and shall be composed of clean, hard, durable particles. Particles of the fine aggregate shall be generally spherical or cubical in shape. Gradation limits are specified in ASTM C 136.

2.3 Portland Cement shall be Type I in compliance with ASTM C 150.

2.4 Air-Entraining Admixtures shall be in compliance with ASTM C 260. Concrete mixtures shall have air content by volume of concrete of 4 to 7 percent based on measurements made immediately after discharge from the mixer.

2.5 Concrete Mixture shall have a nominal slump of 2 inches with a maximum of 3 inches and a 28-day flexural strength of not less than 650 psi.

2.6 Joint and Crack Sealing Materials: Joint filler, joint sealant, and crack sealant shall comply with the following:

2.6.1 Expansion Joint Fillers shall comply with ASTM D 1751 or D 1752 or shall be resin impregnated fiberboard in compliance with the physical requirements of ASTM D 1752.

2.6.2 Type I Sealant shall comply with Fed. Spec. SS-S-200, except that sealant may be furnished as a ready-mixed liquid.

2.6.3 Type II Sealant shall comply with Fed. Spec. SS-S-1401.

2.6.4 Type V Sealant shall comply with CE CRD-C-527 and may be either a single- or multiple-component material.

2.7 Epoxy-Resin Materials: Materials used in epoxy-resin grout, mortar, and concrete shall comply with the following:

2.7.1 Epoxy-Resin Grout shall be a two-compound material formulated to comply with Fed. Spec. MMM-A-001993.

2.7.2 Epoxy-Resin Concrete shall be composed of epoxy-resin binder and uniformly graded aggregate in compliance with ASTM C 144. The maximum size of aggregate shall be 3/8 inch or 1/2 inch.

2.8 Steel Reinforcement: All reinforcement shall be free from loose flaky rust, loose scale, oil, grease, mud, or other coatings that might reduce bond. Bar mats shall comply with ASTM A 184. Welded steel wire fabric shall comply with ASTM A 185. Tie bars shall be deformed bars in compliance with ASTM A 615, A 616, or A 617. Dowels shall be plain steel bars complying with ASTM A 499.

3.0 EXECUTION:

3.1 Preparation of Existing Surface: The Contractor shall raise and reset all structures such as manhole frames, valve boxes, drainage structures, etc., to meet the required grade. Bonding course shall be applied to the area prepared to receive overlay and shall be of epoxy-resin grout and Portland cement mortar.

3.2 Reinforcement Steel shall be installed by the strike-off method wherein the concrete is deposited on the subgrade and struck to the indicated elevation of the steel. The reinforcement shall be laid upon the prestruck surface.

3.3 Concrete Placement: Concrete shall be placed within 45 minutes from the time all ingredients are charged into the mixing drum.

3.3.1 Weather Limitations: The temperature of the concrete placed during warm weather shall not exceed 85 degrees F. Special protection measures, approved by the Contracting Officer, shall be used if freezing temperatures are anticipated before the expiration of the specified curing period. Calcium chloride shall not be used.

3.4 Vibration: In the final phases of placing, surface vibrating equipment shall be used, and the duration of vibration shall not exceed 20 seconds.

3.5 Joints shall be saw cut and in alignment with underlying existing joints.

3.6 Finishing:

3.6.1 Transverse Finishing: Immediately after placement, the concrete shall be accurately struck off and screeded to such elevation that when consolidated and finished, the surface of the pavement will be free from porous places and will be at the required grade. The finishing machine shall make at least two trips over each area of pavement to compact the concrete and produce a surface of uniform texture, true to grade.

3.6.2 Longitudinal Floating: After completion of the transverse finishing, the longitudinal mechanical float shall be operated to smooth and finish the pavement to grade.

3.6.3 Hand Finishing shall be done with an approved strike and tamping template and a longitudinal float.

3.6.4 Straightedge Finishing: After the longitudinal floating is completed but while the concrete is still plastic, minor irregularities and score marks in the pavement surface shall be eliminated by means of longhandled wood floats and straightedges. The final finish shall be made with the straightedges, which shall be used to float the entire pavement surface.

3.6.5 Burlap Drag Finishing: When most of the water glaze or sheen has disappeared and before the concrete becomes nonplastic, the surface of the pavement shall be dragged in the direction of the concrete placement with a multiple-ply burlap drag.

3.6.6 Edging: After other finishing has been completed, the edges of slabs along the forms and at the joints, where indicated or directed, shall be carefully finished with an edging tool to form a smooth rounded surface of the required radius.

3.7 Concrete Curing and Protection:

3.7.1 Concrete Curing Methods shall consist of mat method, impervious sheeting method, or liquid membrane curing method.

3.7.2 Concrete Protection: Repaired areas shall be protected against damage prior to final acceptance. Traffic shall be excluded from repaired areas.

SECTION 02513
FIBROUS REINFORCED PORTLAND CEMENT
CONCRETE OVERLAYS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of fibrous reinforced Portland cement concrete overlays on previously paved areas. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Coarse Aggregate:

2.1.1 Composition: Coarse aggregate shall consist of gravel, crushed gravel, crushed stone, a combination thereof, or crushed blast-furnace slag.

2.1.2 Particle Shape: Particles of the coarse aggregate shall be generally spherical or cubical in shape. The quantity of flat and elongated particles in any size group shall not exceed 20 percent by weight as determined by ASTM D 3398.

2.1.3 Gradation: The maximum size of coarse aggregate shall be the lesser of one-fourth of the pavement thickness or 2-inch nominal size. Gradation limits are specified in ASTM C 136.

2.1.4 Deleterious Substances: The amount of deleterious substances in the coarse aggregate shall not exceed the limits defined in ASTM C 117 and C 123.

2.2 Fine Aggregate shall consist of natural sand, manufactured sand, or a combination of natural and manufactured sand and shall be composed of clean, hard, durable particles. Particles of the fine aggregate shall be generally spherical or cubical in shape. Gradation limits are specified in ASTM C 136.

2.3 Portland Cement shall be Type I in compliance with ASTM C 150.

2.4 Air-Entraining Admixture shall be in compliance with ASTM C 260. Concrete mixtures shall have air content by volume of concrete of 4 to 7 percent based on measurements made immediately after discharge from the mixer.

2.5 Concrete Mixture shall have a nominal slump of 2 inches with a maximum of 3 inches and a 28-day flexural strength of not less than 650 psi.

2.6 Joint and Crack Sealing Materials: Joint filler, joint sealant, and crack sealant shall comply with the following:

2.6.1 Expansion Joint Fillers shall comply with ASTM D 1751 or D 1752 and shall be resin impregnated fiberboard in compliance with the physical requirements of ASTM D 1752.

2.6.2 Type I Sealant shall comply with Fed. Spec. SS-S-200, except that sealant may be furnished as a ready-mixed liquid.

2.6.3 Type II Sealant shall comply with Fed. Spec. SS-S-1401.

2.6.4 Type V Sealant shall comply with CE CRD-C-527 and may be either a single- or multiple-component material.

2.7 Epoxy-Resin Materials: Materials used in epoxy-resin grout, mortar, and concrete shall comply with the following:

2.7.1 Epoxy-Resin Grout shall be a two-compound material formulated to comply with Fed. Spec. MMM-A-001993.

2.7.2 Epoxy-Resin Concrete shall be composed of epoxy-resin binder and uniformly graded aggregate in compliance with ASTM C 144. The maximum size of aggregate shall be 3/8 inch or 1/2 inch.

2.8 Steel Fibers: The fibers shall be made from low carbon steel. The following sizes of steel are acceptable: 0.010-inch x 0.022-inch flat steel fiber, 0.010-inch x 0.50-inch round steel fiber, 0.016-inch x 1.0-inch round steel fiber, and 0.016-inch x 0.75-inch round steel fiber with 0.010-inch x 0.020-inch flat section along the length of the fiber and 2.5-inch x 0.025-inch round steel fibers.

3.0 EXECUTION:

3.1 Preparation of Existing Surface: The Contractor shall raise and reset all structures such as manhole frames, valve boxes, drainage structures, etc., to meet the required grade. Bonding course shall be applied to the area prepared to receive overlay and shall be of epoxy-resin grout and Portland cement mortar.

3.2 Batching: Fibers and aggregate shall be blended prior to charging the mixer. The introduction of cement, water, and additives shall be matched with the rate of flow of the fiber-aggregate mixture to assure uniform mix.

3.3 Concrete Placement: Concrete shall be placed within 45 minutes from the time all ingredients are charged into the mixing drum.

3.3.1 Weather Limitations: The temperature of the concrete placed during warm weather shall not exceed 85 degrees F. Special protection measures, approved by the Contracting Officer, shall be used if freezing temperatures are anticipated before the expiration of the specified curing period. Calcium chloride shall not be used.

3.4 Vibration: In the final phases of placing, surface vibrating equipment shall be used and the duration of vibration shall not exceed 20 seconds.

3.5 Joints shall be saw cut and in alignment with underlying existing joints.

3.6 Finishing:

3.6.1 Transverse Finishing: Immediately after placement, the concrete shall be accurately struck off and screeded to such an elevation that, when consolidated and finished, the surface of the pavement will be free from porous places and will be at the required grade. The finishing machine shall make at least two trips over each area of pavement to compact the concrete and produce a surface of uniform texture, true to grade.

3.6.2 Longitudinal Floating: After completion of the transverse finishing, the longitudinal mechanical float shall be operated to smooth and finish the pavement to grade.

3.6.3 Hand Finishing shall be done with an approved strike and tamping template and a longitudinal float.

3.6.4 Straightedge Finishing: After the longitudinal floating is completed but while the concrete is still plastic, minor irregularities and score marks in the pavement surface shall be eliminated by means of long-handled wood floats and straightedges. The final finish shall be made with the straightedges, which shall be used to float the entire pavement surface.

3.6.5 Broom Finishing: Burlap drag finishing will not be allowed as this brings the steel fibers to the surface. Finishing shall be accomplished using a stiff broom.

3.6.6 Edging: After other finishing has been completed, the edges of slabs along the forms and at the joints, where indicated or directed, shall be carefully finished with an edging tool to form a smooth rounded surface of the required radius.

3.7 Concrete Curing and Protection:

3.7.1 Concrete Curing Methods shall consist of mat method, impervious sheeting method, or liquid membrane curing method.

3.7.2 Concrete Protection: Repaired areas shall be protected against damage prior to final acceptance. Traffic shall be excluded from repaired areas.

SECTION 02514
ASPHALTIC CONCRETE OVERLAYS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of asphaltic concrete overlays. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Asphalt Cement: The asphalt cement shall comply with ASTM D 946 penetration grade 85-100 requirements and shall show a negative spot test when tested in compliance with AASHTO T 102.

2.2 Mineral Aggregates: Shall comply with ASTM D 3515 for 3/4-inch maximum aggregate mix.

2.3 Test Properties: The bituminous mixture shall meet the following requirements when tested in compliance with MIL-STD 620.

```
Stability minimum, lb.....................500
Flow maximum, 1/100-in. units.............20
Voids total mix, %........................3-5
Voids filled with bitumen, %..............75-85
```

3.0 EXECUTION:

3.1 Preparation of Existing Surface: The Contractor shall raise and reset all structures such as manhole frames, valve boxes, drainage structures, etc., to meet the required grade. An asphalt tack coat shall be applied to all contact surfaces in advance of the asphalt concrete overlay placement. The asphalt tack shall be placed at an asphalt residue coverage rate of 0.05 gal/sq yd.

3.2 Installation:

3.2.1 Joints: Longitudinal joints of the overlay shall be offset at least 1 foot from existing joints. Transverse joints shall be offset at least 2 feet from existing transverse joints.

3.2.2 All Asphalt Concrete Mixture and Pavement that are contaminated, damaged, or defective shall be removed and replaced by the Contractor. Skin patching of rolled pavement will not be permitted.

3.2.3 Compaction of Mixture: The asphalt concrete mixture shall be rolled until a density of not less than 95 percent and not more than 100 percent of laboratory compacted specimen is obtained.

3.2.4 Surface Smoothness: After final rolling, the pavement surface shall not vary in excess of 1/8 inch from a 10-foot straightedge laid on the surface.

SECTION 02515
CRUSHED STONE PAVING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of crushed stone paving. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Aggregates: Aggregates shall consist of natural gravel, crushed stone or slag, crushed gravel, angular sand, or other approved materials. Aggregates shall be durable, sound, and free from foreign material, including objectionable coatings, lumps and balls of clay, and organic matter.

2.1.1 Coarse aggregates, consisting of angular fragments of uniform density and quality, shall have a percentage of wear not to exceed 50 percent after 500 revolutions when tested in accordance with ASTM C 131. The amount of flat and elongated particles (length to width greater than 3 to 1) shall not exceed 30 percent.

2.1.2 Crushed gravel shall be manufactured from gravel particles 50 percent of which by weight are retained on the maximum site gradation sieve specified.

2.1.3 Crushed stone shall contain at least 50 percent by weight of crushed pieces having two or more freshly fractured faces for each range of sizes.

2.1.4 Slag shall be an air-cooled blast-furnace product having a dry weight of not less than 65 pcf.

2.2 Binder Material shall consist of screenings, angular sand, or other finely divided mineral matter processed or naturally combined with the coarse aggregate.

2.3 Gradation Requirements specified in the following table shall apply to the completed aggregate surface. The table shows permissible gradings for granular material used in aggregate surface roads and airfields. Sieves shall conform to ASTM E 11. Aggregate used shall meet the following gradation limits or shall meet the gradation requirements of the applicable State Highway Department wherein the work is performed as approved by the Contracting Officer:

Gradation for Aggregate Surface Courses

| Sieve Designation | | No. 1 | No. 2 | No. 3 | No. 4 |
|---|---|---|---|---|---|
| 25.0 mm | 1 in. | 100 | 100 | 100 | 100 |
| 9.5 mm | 3/8 in. | 50-85 | 60-100 | -- | -- |
| 4.7 mm | No. 4 | 35-65 | 50-85 | 55-100 | 70-100 |
| 2.0 mm | No. 10 | 25-50 | 40-70 | 40-100 | 55-100 |
| 0.425 mm | No. 40 | 15-30 | 24-45 | 20-50 | 30-70 |
| 0.075 mm | No. 200 | 8-15 | 8-15 | 8-15 | 8-15 |

2.4 Liquid Limit and Plasticity Index: The portion of the completed aggregate surface course passing the No. 40 sieve shall have a maximum liquid limit of 35 and a plasticity index of 4 to 9.

3.0 EXECUTION:

3.1 Preparation: The previously constructed layer or base shall be cleaned of loose and foreign matter. Adequate drainage shall be provided. Ruts or soft spots shall be corrected. For cohesionless underlying materials, the surface shall be stabilized with aggregate prior to placement of the stabilized-aggregate course.

3.2 Installation:

3.2.1 Mixing and Placing: Materials shall be mixed in such a manner as to obtain a uniform stabilized-aggregate material and a uniform optimum water content for compaction. Mixing and placing procedures shall produce true grades, minimize segregation and degradation, optimize water content, and ensure a satisfactory base course.

3.2.2 Compaction: Each layer of stabilized-aggregate paving shall be compacted. Water content shall be maintained at optimum. Areas inaccessible to the rollers shall be compacted with mechanical tampers and shall be shaped and finished by hand methods.

3.2.3 Layer Thickness: No layer shall be in excess of 8 inches nor less than 3 inches in compacted thickness.

3.2.4 Proof Rolling: Materials in paving or underlying materials that produce unsatisfactory results by rolling shall be removed and replaced with satisfactory materials and recompacted.

3.2.5 Edges of Paving: Approved materials shall be placed along edges of stabilized-aggregate paving course in such quantities as will compact to thickness of the course being constructed, allowing at least a 1-foot width of the shoulder to be rolled and compacted simultaneously with rolling and compacting of each layer of the paving course.

3.2.6 Finishing: Finished surface shall be of uniform grade and texture.

3.2.7 Thickness Control: Compacted thickness of the stabilized paving course shall be within 1/2 inch of the thickness required.

SECTION 02520
PORTLAND CEMENT CONCRETE SIDEWALKS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of Portland cement concrete (PCC) sidewalks. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Ready-Mixed Concrete: Ready-mixed concrete shall comply with ASTM C 94, Alternate No. 2. The concrete shall have a slump of not more than three inches. The concrete shall attain a minimum compressive strength of 2,500 psi at seven days.

2.2 Aggregates: ASTM C 33.

2.3 Reinforcement Steel: Wire mesh reinforcement shall comply with ASTM A 184.

2.4 Expansion Joint Fillers: Expansion joint fillers shall comply with ASTM D 1751 or D 1752 or shall be resin impregnated fiberboard complying with ASTM D 1752.

2.5 Joint Sealers: CE CRD-C-527.

3.0 EXECUTION:

3.1 Reinforcement Steel: Fasten reinforcement steel accurately and securely in place with suitable supports and ties before the concrete is placed.

3.2 Concrete Conveying: Convey concrete to construction areas by methods that will prevent segregation.

3.3 Concrete Placing: Moisten the subgrade just before the concrete is placed. Place concrete in one layer of such thickness that when compacted and finished the sidewalk will be of the required thickness.

3.4 Edge and Joint Finishing: Carefully finish all slab edges, including those at formed joints, with an edger having a radius of 1/8 inch.

3.5 Contraction Joints: Divide the concrete surface into rectangular areas by means of contraction joints spaced at not more than five feet on center.

3.6 Expansion Joints: Form expansion joints about structures and features that project through or into the sidewalk pavement. Fill expansion joints with joint filler of the type, thickness, and width to match existing or as directed by the Contracting Officer. Place the joint filler with the top edge 1/4 inch below the surface. Remove concrete over the joint filler.

3.7 Joint Sealing: At the end of the curing period, carefully clean and seal expansion joints.

3.8 Portland Cement Concrete Curing: Cure new concrete by protection against loss of moisture and rapid temperature changes for a period of not less than 7 days.

3.9 Backfilling: After curing, remove debris adjoining the sidewalk, backfill, grade, and compact to conform to the surrounding area.

SECTION 02521
ASPHALT CONCRETE SIDEWALKS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of asphalt concrete sidewalks. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Asphaltic Concrete:

2.1.1 Hot-Mixed, Hot-Laid Bituminous Paving Mixtures: ASTM D 3515.

2.1.2 Plant-Mixed, Stockpiled Asphalt Cold Mixes: Asphalt Institute Manual MS-14.

2.2 Bituminous Prime: ASTM D 2027, Grades MC-30 or MC-70; ASTM D 2028, Grade RC-70; or ASTM D 2026, Grade SC-70.

2.3 Base Course: ASTM D 2940.

2.4 Bituminous Tack Coat: ASTM D 977, Grades RS-1, MS-1 or SS-1h; ASTM D 2027, Grade MC-30; ASTM D 2028, Grade RC-70; ASTM D 2026, Grade SC-70; or ASTM D 2397, Grades CRS-1 or CSS-1.

2.5 Seal Coat: ASTM D 2027, Grade MC-250 or MC-800; or D 2028, Grade RC-250 or RC-800.

2.6 Slurry Coat Mixture shall be comprised of 70 percent sand or fine aggregate, 10 percent water, and 20 percent liquid or emulsified asphalt.

2.6.1 Fine Aggregate: ASTM D 1073, Grade 2.

2.6.2 Emulsified Asphalt: ASTM D 977, Grades SS-1 or SS-1h.

3.0 EXECUTION:

3.1 Application Temperatures: Application temperatures for all asphalt materials shall comply with provisions of the Asphalt Institute publications and the applicable ASTMs.

3.2 Subgrade: Construct the subgrade or walkway replacement true to grade and compact as required.

3.3 Base Course:

3.3.1 Placing: Spread the base course material evenly upon the prepared subgrade, in a layer of such depth that when compacted the layer will be uniform and of the thickness required.

3.3.2 Compaction: Immediately following the spreading of the material, compact the base course with equipment to a density as required.

3.4 Surface Course:

3.4.1 Placing: Apply prime coat, and allow it to cure. The placing of the mixture shall be continuous. Paint all contact surfaces of previously constructed sidewalk with a tack coat of rapid-setting liquid asphalt just before the fresh mixture is placed.

3.4.2 Forms: Set forms with the upper edge true to line and hold grade rigidly in place by stakes placed on the outside of the forms and set flush with the top edge of the forms.

3.4.3 Compaction: Immediately following the placement of the asphalt concrete mixture, compact the surface course with equipment to a density as required.

3.4.4 Backfilling: After removing the forms and debris, backfill the exposed or excavated area adjoining the sidewalk with granular material, grade, and compact to conform to the surrounding area.

3.5 Patching:

3.5.1 For Repair Operations Involving Raveling, Heaving, Spalling, and Alligatoring: Cut asphalt concrete paving back to solid material, making cut area rectangular with vertical sides. Remove deteriorated pavement including base material if required. Replace base course, compact, and tack coat the base material and the vertical surfaces of cut area. Fill area with new asphalt concrete and compact level with existing walkway. Dust patched area with sand or mineral dust.

3.5.2 Pothole Repair: Cut rectangular hole around pothole back to solid pavement leaving straight, vertical edges. Remove loose material and water to firm base. Fill holes and compact to within 3 inches of the surface in layers not exceeding 6 inches with either base material or asphalt mixture. Apply tack coat

to base material and vertical edges. On the surface layer, fill with asphalt mixture and mound to such height that when compacted the mix will be level with surrounding walkway surface. Dust patched area with sand or mineral dust.

3.5.3 Low Spot or Depression Repair: Determine limits of depression with straightedge, and mark outline with crayon. Apply tack coat, 0.05 to 0.15 gallon per square yard, to the cleaned area, and allow to cure. Spread area with asphalt concrete mix and feather edge by raking and manipulation of the material. Roll and compact area to surrounding walkway level. Recheck with straightedge. Apply a sand seal to the patched area to prevent entrance of water.

3.5.4 Polished Aggregate Repair: Clean and dry area thoroughly. Apply tack coat at a rate of 0.05 to 0.15 gallon per square yard; overlay area with new asphalt concrete mix to a minimum 1-1/2 inch thickness and feather to adjoining walkway surfaces. Roll with pneumatic or steel rollers.

3.5.5 Damaged Edging Repair: Remove damaged or deteriorated edging materials and replace.

3.5.6 Prime Coat: Prime new base course with MC-70 liquid asphalt at a rate of 0.20 to 0.30 gallon per square yard. Take care to apply no more asphalt than will penetrate into the base course during curing. Blot excess prime with sand before the surfacing material is applied.

3.5.7 Tack Coat: Surfaces and cut edges of existing asphalt concrete shall be given a tack coat of MC-70 liquid asphalt at a rate of 0.05 to 0.15 gallon per square yard. After application of the tack coat, allow time for the material to cure before surfacing and patching material is placed.

3.5.8 Seal Coat Spray Application: Walkway surfaces that are to be sealed shall receive a liquid asphalt coat applied at a rate of 0.15 to 0.20 gallon per square yard, along with a fine aggregate at a rate of 15 to 20 pounds per square yard.

3.6 Crack Repair: Fill cracks with liquid asphalt, sand asphalt emulsion water mixture, or slurry seal. After thorough cleaning, work the mixture into cracks by broom or squeegee. Cracks 1/8 to 1/2 inch width shall be slurry sealed and filled with liquid asphalt. Dust repaired cracks with fine aggregate or mineral dust to prevent cracking. Final thickness of the slurry seal shall be 1/8 inch minimum.

SECTION 02522
MISCELLANEOUS SIDEWALKS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of gravel, masonry, and wood sidewalks. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Aggregate shall comply with the following:

2.1.1 Surface Course Aggregates shall be well-graded, crushed stone, 3/4- to 1-1/4 inch size, consisting of clean, sound, durable particles.

2.1.2 Masonry Grout Aggregate: ASTM C 404, Size 2.

2.2 Base Course: Base course material shall be a granular, dense-graded, high-quality compactible material.

2.3 Ready-Mixed Concrete: Ready-mixed concrete shall comply with ASTM C 94. The concrete shall attain a minimum compressive strength of 2,500 psi at 28 days.

2.4 Portland Cement Concrete: Cement shall comply with ASTM C 150.

2.5 Joint Filler: Masonry joint filler shall be Portland cement concrete mix with cement complying with ASTM C 150.

2.6 Masonry Units: Color and texture shall match the existing as nearly as is practicable.

2.7 Wood and Preservatives: Footboards and supports shall be 1-1/2 inch thick Number 1 dense Douglas fir or yellow pine lumber, pressure-treated with chromated copper arsenate (CCA) preservative complying with Fed. Spec. TT-W-571 and AWPA P5. Retention shall be a minimum of 0.25 pounds per cubic foot.

3.0 EXECUTION:

3.1 Base Course Repair: Remove material in soft spots to such depth required to provide a firm foundation for surface materials and fill with granular material of

a quality that will compact when moistened. Roll or tamp this material to obtain the proper density.

3.2 Surface Repair:

3.2.1 Aggregate Walkways: Spread the surface material evenly on the base course in a layer of such depth that when compacted, the layer will be uniform with a minimum thickness of 4 inches.

3.2.2 Joint Filling: Completely remove and clean the joint of all loose joint material, dirt, clay, or other foreign matter. Fill the joint flush with concrete to provide a uniform surface.

3.2.3 Wood Walkways: Secure wood members with galvanized nails, screws, bolts, or other approved fasteners to ensure tight joints.

3.2.4 Masonry Walkways: New or salvaged masonry units will be placed on a 3/4-inch mortar setting bed with mortar joints matching the existing walkway. Place the setting bed on a fresh 3-inch thick Portland cement concrete slab.

SECTION 02523
PRECAST SIDEWALKS AND PAVERS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of precast sidewalks and pavers. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Precast Concrete Patio Blocks: Natural or colored, 2 inches thick.

2.2 Exposed Aggregate or Granite: ASTM C 615 and National Building Granite Quarries Association, Inc.

2.2.1 Exposed Limestone: Limestone (Oolitic), ASTM C 568, Category II.

2.2.2 Exposed White Tumblestone Aggregate: As directed.

2.3 Stone Pavers:

2.3.1 Bluestone Flagging Paver: Irregular cut, 1 inch thick.

2.3.2 White Marble, Crushed Stone: ASTM C 503 and Marble Institute of America (MIA), 3 inches thick.

2.3.3 Bluestone, Crushed Stone: 3 inches thick.

2.3.4 Natural Cleft Slate: ASTM C 629, 3/4-inch irregular cut, 1/2-inch random rectangular cut, or 1/4-inch random rectangular butted joints.

2.4 Granite Blocks: Blocks shall be 3 to 5 inches thick and comply with requirements of ASTM C 615 and National Building Granite Quarries Association, Inc. Sizes shall be 3- 1/2 inches square; 4 to 12 inches by 3 to 5 inches; and 6 to 15 inches by 3 to 6 inches.

2.5 Mortar and Grout:

2.5.1 Portland Cement: ASTM C 150 and the staining requirements of ASTM C 91.

2.5.2 Masonry Cement: ASTM C 91, non-staining.

2.5.3 Hydrated Lime: ASTM C 207, Type S.

2.5.4 Sand: ASTM C 144.

2.5.4.1 White Pointing Mortar: Natural white sand or ground white stone.

2.5.4.2 Colored Pointing Mortar: Marble, granite, or sound stone.

3.0 EXECUTION:

3.1 Preparation:

3.1.1 Clean Stone or Concrete Block with clear water.

3.1.2 Ferrous Metal: Apply a heavy coat of bituminous paint on metal surfaces in contact with block.

3.2 Installation:

3.2.1 Expansion Joints: Install continuous strips of preformed joint filler.

3.2.2 Clean Subbase and saturate with clean water.

3.2.3 Slush Coat: Apply 1/16-inch thick slush coat of cement grout over concrete subbase about 15 minutes prior to placing setting bed.

3.2.4 Setting Bed: Mix one 94-pound bag of cement to 3 cu ft of sand. Use only enough water to produce a moist surface when setting bed is ready for setting of stone. Spread and screed to a uniform thickness.

3.2.5 Set Stone or Concrete Block before initial set of cement bed occurs. Wet stone or block thoroughly before setting. Apply a thin layer of neat cement paste 1/32-inch to 1/16-inch thick to setting bed, or bottom of stone or block.

3.2.6 Grout Joints as soon as possible after initial set of setting bed and tool slightly concave. Use grout mix of one bag Portland cement to 2 cu ft sand. Cure grout by maintaining in a moist condition for 7 days. Do not permit traffic on surface during setting of units or for at least 24 hours after final grouting of joints.

SECTION 02525
CONCRETE CURBS AND GUTTERS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of concrete curbs and gutters. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Concrete Curing Materials:

2.1.1 Burlap: AASHTO M 182 having a weight of 14 ounces or more per square yard when dry.

2.1.2 Impervious Sheeting: ASTM C 171.

2.1.3 Liquid Membrane Curing Compound: ASTM C 309. Compound shall be free of paraffin or petroleum.

2.2 Joint Materials:

2.2.1 Expansion Joint Fillers: ASTM D 1751 or ASTM D 1752.

2.2.2 Joint Sealers: CE CRD-C-527 or Fed. Spec. SS-S-1401.

2.3 Concrete: Concrete shall have a minimum compressive strength of 3,000 psi. The maximum size of aggregate shall be 1-1/2 inches. Concrete shall have a slump of not more than 3 inches and an air content by volume of concrete of 3 to 6 percent.

2.4 Forms: Curb and gutter forms shall be of wood or steel. The outside forms shall have a height equal to the full depth of the curb or gutter. The inside form of curb shall have batter and shall be securely fastened to and supported by the outside form. Wood forms shall be surfaced plank, 2-inch nominal thickness, straight and free from warp, twist, loose knots, splits, or other defects. Corners, deep sections, and radius bends shall have additional stakes and braces, as required. Radius bends may be formed with 3/4-inch plywood. Steel forms shall be channel-formed sections with a flat top surface and with welded braces at each end and at not less than two intermediate points. Form ends shall be interlocked and self-aligning. Forms shall include flexible forms for radius forming, corner forms, form spreaders, and fillers.

3.0 EXECUTION:

3.1 Preparation: The subgrade shall be constructed to grade and cross section. The subgrade shall be of materials equal in bearing quality to the subgrade under the adjacent pavement and shall be compacted. The subgrade shall be maintained in a smooth, compacted condition, in conformity with the required section and established grade until the concrete is placed. The subgrade shall be in a moist condition when concrete is placed.

3.2 Installation:

3.2.1 Form Setting: Forms for curbs shall be carefully set to alignment and grade and to conform to the dimensions of the curb. Clamps, spreaders, and braces shall be used where required to ensure rigidity in the forms.

3.2.2 Concrete Placement and Finishing: Concrete shall be placed in layers not to exceed 6 inches. Concrete shall be thoroughly consolidated. The edges of the gutter and top of the curb shall be rounded with an edging tool to a radius of 1/2 inch, and the surfaces shall be floated and finished with a smooth wood float until true to grade and section and uniform in texture. Floated surfaces shall then be brushed with longitudinal strokes. Immediately after removing the front curb form, the face of the curb shall be rubbed. The surface shall be brushed in the same manner as the gutter and curb top. The top surface of gutter and entrance shall be finished to grade with a wood float. Expansion joints and contraction joints shall be constructed at right angles to the line of curb and gutter. Contraction joints shall be constructed by means of 1/8-inch thick separators, of a section conforming to the cross section of the curb and gutter. Contraction joints shall match joints in abutting Portland cement concrete pavement. At other pavements, construction joints shall be placed at not less than 5 feet nor greater than 15 feet apart. Expansion joints shall be formed by means of preformed expansion joint filler material cut and shaped to the cross section of curb and gutter. Expansion joints shall be provided in curb at the end of all returns. Expansion joints shall match expansion joints of abutting Portland cement concrete pavement. At other pavements, expansion joints at least 1/2 inch in width shall be provided at intervals not exceeding 45 feet. Exposed concrete surfaces shall be cured for not less than 7 days.

3.2.3 Backfilling: After curing, debris shall be removed, and the area adjoining the concrete shall be backfilled, graded, and compacted.

3.2.4 Sealing Joints: Expansion joints and the top 1-inch depth of contraction joints shall be sealed with joint sealer. The joint opening shall be thoroughly cleaned before the sealing material is placed. Excess material on exposed surfaces of the concrete shall be removed immediately and exposed concrete surfaces cleaned.

SECTION 02570
PORTLAND CEMENT CONCRETE

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for repair and maintenance of Portland cement concrete (PCC) pavements. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Ready-Mixed Concrete shall comply with ASTM C 94, Alternative No. 2. The concrete shall have a slump of not more than three inches. The concrete shall attain a minimum compressive strength of 2,500 psi at seven days.

2.2 Aggregates shall comply with ASTM C 33.

2.3 Air Entraining Admixtures shall comply with ASTM C 260.

2.4 Concrete Curing Materials shall comply with one of the following:

2.4.1 Burlap: AASHTO M182 or Fed. Spec. CCC-C-467.

2.4.2 White, Opaque Polyethylene-Coated Burlap: ASTM C 171.

2.4.3 White, Opaque Polyethylene Sheeting: ASTM C 171.

2.4.4 White Waterproof Paper: ASTM C 171.

2.4.5 Liquid Membrane Curing Compound: ASTM C 309.

3.0 EXECUTION: (Not used.)

SECTION 02575
BRIDGE DECK ASPHALT CONCRETE WEARING SURFACES

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for repair and maintenance of bridge deck asphalt concrete wearing surfaces. Products shall match those existing and/or as shall be directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work. The standard specification for highway construction for the state in which the project is located shall be considered the standard for material, equipment, details, and construction methods as supplemented hereafter.

2.0 PRODUCTS:

2.1 Aggregate:

2.1.1 Coarse Aggregate for Bituminous Mixtures: ASTM D 692.

2.1.2 Fine Aggregate for Bituminous Mixtures: ASTM D 1073.

2.1.3 Mineral Filler for Bituminous Mixtures: ASTM D 242.

2.2 Bituminous Materials:

2.2.1 Asphalt Cement: ASTM D 946, penetration grade 85-100.

2.2.2 Anionic Emulsified Asphalt: ASTM D 977, SS-1 or SS-1h.

2.2.3 Rapid Curing Type Liquid Asphalt: ASTM D 2028, RC-70 and RC-250.

2.2.4 Medium Curing Type Liquid Asphalt: ASTM D 2027, MC-30, MC-70, and MC 800.

2.2.5 Coal-Tar Pitch: Specific gravity shall be 1.20 to 1.27 at 77 degrees.

2.2.6 Coal-Tar Pitch Emulsion: ASTM D 3320.

2.2.7 Fiberglass Fabric: ASTM D 1668, Type II or III.

2.3 Asphalt Mixture:

2.3.1 Asphalt Seal Coat: RC-70 or MC-70 with following aggregate:

| Sieve Size | Percent Passing (Wt.) |
|---|---|
| 1/2-in. | 100 |
| 3/8-in. | 94-100 |
| No. 4 | 15-45 |
| No. 16 | 0-4 |

2.3.2 Asphalt Slurry Seal: SS-1 or SS-1h with following aggregate:

| Sieve Size | Percent Passing (Wt.) |
|---|---|
| No. 8 | 100 |
| No. 16 | 65-90 |
| No. 30 | 40-60 |
| No. 50 | 25-42 |
| No. 100 | 15-30 |
| No. 200 | 10-20 |

Mix shall contain not less than 15 percent asphalt emulsion nor more than 10 percent water by weight.

2.3.3 Asphalt Patch Mix: RC 250 or MC 800 with the following aggregate.

| Sieve Size | Percent Passing (Wt.) |
|---|---|
| 3/4-in. | 100 |
| 1/2-in. | 85-100 |
| No. 4 | 65-80 |
| No. 8 | 50-65 |
| No. 16 | 37-52 |
| No. 30 | 25-40 |
| No. 50 | 18-30 |
| No. 100 | 10-20 |
| No. 200 | 3-10 |

Liquid asphalt shall not be less than 5 percent by weight.

2.3.4 Coal-Tar Emulsion Slurry: The slurry shall not have more than 10 percent water or 5 pounds of aggregate per gallon of coal-tar emulsion. Aggregate shall have the following gradation:

| Sieve Size | Percent Passing (Wt.) |
|---|---|

| | |
|---|---|
| No. 10 | 100 |
| No. 16 | 30-65 |
| No. 30 | 0-5 |

2.3.5 Asphalt-Sand Seal Protection Mix: Asphalt cement penetration shall be grade 85-100 with the following aggregate.

| Sieve Size | Percent Passing (Wt.) |
|---|---|
| 3/8-in. | 100 |
| No. 4 | 97-100 |
| No. 10 | 80-95 |
| No. 40 | 50-70 |
| No. 80 | 25-40 |
| No. 200 | 8-10 |

3.0 EXECUTION:

3.1 Preparation:

3.1.1 Traffic Control: When traffic is maintained on bridge under repair or is directed over a temporary run-around, furnish, erect, and maintain all barricades, flags, torches, lights, guardrails, temporary pavement markings, and traffic control signs required for the protection of the public and for the direction of traffic. Number, type, color, size, and placement of all traffic control devices and the use of a flagman shall comply with USDOT FHA MUTCD "Traffic Controls for Highway Construction and Maintenance Operations." All traffic control devices in advance of the construction limits shall also be the responsibility of the Contractor.

3.1.2 Removal of Damaged or Deteriorated Materials:

3.1.2.1 Cleaning for Crack Filling and Slurry Seals: The area shall be swept with stiff bristle brooms and blown clean. Cracks shall be cleaned to the maximum depth possible and made free from any dirt, stones, or other foreign matter.

3.1.2.2 Removal of Deteriorated Material for Patching: Areas to be patched shall extend a minimum of 1 foot into sound surfacing around the perimeter. Saw cut to minimum 3/4 inch deep along all edges of areas delineated to be patched. Remove loose and unsound material completely to the support structure.

3.1.2.3 Preparation for Waterproofing Structural Deck: Remove existing asphalt wearing course and membrane completely to the support structure. Surface shall be smooth and free from projections that might damage the waterproofing membrane.

3.2 Maintenance and Repair Methods:

3.2.1 Filling and Sealing Cracks: Fill the cracks to within 1/8 inch of the surface with asphalt emulsion slurry. Allow the slurry to cure completely before sealing. Seal cracks with liquid asphalt RC-70. The surface of the sealant shall be sprinkled with dry sand to prevent tracking.

3.2.2 Seal Coating: Spray asphalt emulsion seal coat uniformly over the repair area at the rate of 0.15 to 0.25 gallon per square yard after all cracks in the repair area are filled. Immediately following the application of the asphalt emulsion, spread seal coat aggregate uniformly over the treated surface at the rate of 15 to 25 pounds per square yard. Compact by rolling the entire surface. Upon the completion of the work, no loose aggregate shall be allowed to remain on the surface. Allow the sealed area to cure thoroughly before opening to traffic.

3.2.3 Slurry Seal Coating: Where cracks exceed 1 inch in depth or 1/2 inch in width, or both, they shall be filled with the slurry mixture and allowed to cure before placing the slurry seal. Place slurry mixture evenly over area to be sealed. Final thickness of the slurry seal shall be between 1/16 inch and 1/8 inch. Where two applications of the slurry seal are required, allow the initial application to cure before placing the succeeding application.

3.2.4 Patching Asphalt Concrete Surface:

3.2.4.1 Prime Coat: Prime the entire area of patch, including vertical faces, with liquid asphalt RC-70.

3.2.4.2 Placing and Compacting Asphalt Patch Mix: Place sufficient material in the patch area to ensure that the patch surface will not be below that of the adjacent material after compaction. Where the thickness of the finished compacted patch is greater than 3 inches, spread and compact the mixture in 2 or more layers.

3.2.5 Waterproofing Structural Deck: The waterproofing membrane system shall consist of a penetrating primer, a built-up coal-tar pitch emulsion membrane with 2 plies of coated glass fabric, and a 1/2-inch asphalt-sand seal protection layer.

SECTION 02576
CRACK SEALING OF ASPHALT CONCRETE PAVEMENTS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for crack sealing of asphalt concrete pavements. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Liquid Asphalt shall comply with ASTM D 2027, Grade MC-250.

2.2 Emulsified Asphalt shall comply with ASTM D 977, Grade MS-2.

2.3 Sealing Compound shall comply with Fed. Spec. SS-S-1401.

2.4 Fine Aggregate shall be natural sand or crusher dust and have a maximum size of not more than 1/8 inch and be free of clay or organic matter.

3.0 EXECUTION:

3.1 Preparation:

3.1.1 All Cracks to be sealed shall be cleaned of dirt and debris.

3.1.2 Crack Cleaning Equipment shall consist of a portable air compressor with hose and nozzles for directing air directly into cracks and stiff bristle brooms.

3.1.3 Heating Equipment for Liquid Asphalt shall be mobile and shall be equipped with an agitating device for stirring material during heating, a thermometer, regulating equipment for heat control, and a gravity-type draw-off valve.

3.1.4 Heating Equipment for Sealing Compound: Unless otherwise required by the manufacturer's recommendations, the equipment shall be mobile and shall consist of double-boiler, agitator-type kettles with oil medium in the outer space for heat transfer. The applicator unit shall be so designed that the sealant will circulate through the delivery hose and return to the inner kettle when not sealing cracks.

3.1.5 Application Equipment shall have a spout or nozzle of such size that the sealing material will be placed in the cracks without entrapping air in cracks or spreading material on adjacent pavement surface.

3.2 Installation:

3.2.1 Sealing Compound: All cracks 1/8 inch wide and wider shall be sealed. The application temperature for sealing compound shall comply with Fed. Spec. SS-S-1401. Cracks 1/2 inch wide and wider shall be filled with a slurry of fine sand and an emulsified asphalt or liquid asphalt. After the slurry has cured, cracks shall be sealed with liquid asphalt or emulsified asphalt and lightly sanded.

3.2.2 Liquid and Emulsified Asphalt Sealer: The temperature shall be varied so that it flows freely into cracks and completely fills cracks without entrapping air. Cracks shall be free of moisture before filling and shall be filled slightly above the pavement surface. When excess sealer has been removed, the sealer shall be covered with fine sand.

3.2.3 Traffic Control: Traffic will not be permitted over sealed cracks until the sealer has cooled so that it is not picked up by vehicle tires. The Contractor will be responsible for all barricades and flagmen necessary to control traffic.

# SECTION 02577
# PATCHING OF ASPHALT CONCRETE PAVEMENTS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for patching of asphalt concrete pavements. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Asphaltic Concrete:

2.1.1 Hot-Mixed, Hot-Mixed Asphaltic Concrete and Emulsified Asphalt shall comply with requirements of ASTM D 3515.

2.1.2 Plant-Mixed, Stockpiled Asphalt Cold Mixes shall comply with the requirements of Asphalt Institute Specification PM-2.

2.2 Bituminous Prime: Bituminous prime shall comply with ASTM D 2027.

2.3 Base Course: Base course material shall comply with local highway department specification for dense-graded, high-quality material.

2.4 Bituminous Tack Coat: Bituminous tack coat shall comply with ASTM D 2027.

3.0 EXECUTION:

3.1 Preparation of Areas for Patching:

3.1.1 Pot Holes: Trim the perimeter of each hole to a vertical face and back to well-compacted material. Remove material to a depth that provides a uniform well-compacted bottom surface. Remove all loose material resulting from trimming or otherwise existing in the hole. Areas to be repaired are to be dry before repair is started.

3.1.2 Alligator-Cracked and Rutted Areas: The pavement shall be sawed or cut with pavement breakers to a smooth vertical face 1 foot outside of the alligator-cracked ares. Unsatisfactory material shall be removed in a manner not to disturb the sides of the excavated area.

3.1.3 Slippage Areas: Saw a rectangular area around the slippage area that overlaps into the well-bonded material by at least 1 foot. The depth of the saw cut shall be equal to the thickness of the layer of material that is slipping. The surface where slipping is occurring shall be broomed clean and all loose material removed.

3.2 Installation:

3.2.1 Application Temperatures: Application temperatures for all asphalt material shall comply with provisions of the Asphalt Institute Publications and the applicable ASTM.

3.2.2 Base Course: Place base course material in layers not exceeding a compacted thickness of 6 inches. After placing, compact each layer by mechanical compactors to a density of not less than the density of the corresponding layer of the adjacent pavement structure.

3.2.3 Prime Coat: Prime base course with MC-70 liquid asphalt at a rate of 0.20 to 0.30 gallon per sq. yd. Bolt excess prime with sand before the surfacing material is applied.

3.2.4 Tack Coat: Give the edges of existing asphaltic concrete or surfaces of Portland cement concrete and asphaltic concrete a tack coat of MC-70 liquid asphalt at a rate of 0.05 to 0.15 gallon per sq. yd. Allow the material to cure before placing the surfacing material.

3.2.5 Hot-Mixed Asphaltic Concrete: Place the material in layers not exceeding 2-1/2 inches in thickness and compact to a density equal to the density of the adjacent asphaltic concrete.

3.2.6 Stockpiled Cold Mixes: The compacted thickness of each layer of material shall not exceed 2 inches. Before compaction, the material shall be allowed to aerate, if necessary, until the proper amount of cohesion has developed to obtain adequate compaction. When more than one layer is used, each layer shall be thoroughly cured before the succeeding layer is placed.

# SECTION 02578
# SPRAY APPLICATIONS, SEAL COATS AND SURFACE TREATMENTS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for the spray applications, seal coats, and surface treatments of asphalt concrete pavements. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Bituminous Material: Bituminous material shall be liquid asphalt complying with ASTM D 2028, Grade RC-250, or tar complying with ASTM D 490, Grade RT-6.

2.2 Aggregate: Aggregates shall consist of crushed stone, crushed gravel, or crushed slag. The moisture content of the aggregate shall be such that the aggregate will be readily coated with the bituminous material. Aggregate gradations shall be in compliance with ASTM C 136.

2.3 Construction Equipment:

2.3.1 Bituminous Distributor shall be designed and equipped to distribute the bituminous material uniformly at even heat on variable widths of surface at readily determined and controlled rates from 0.05 to 2.0 gal/sq yd with a pressure range of from 25 to 75 lb/sq in. and with an allowable variation from any specified rate not exceeding 5 percent.

2.3.2 Single-Pass Surface Treatment Machine shall be capable of distributing the bituminous material and aggregates uniformly in controlled amounts in a single-pass operation over the surface to be sealed.

2.3.3 Heating Equipment for Storage Tanks shall consist of steam coils, hot oil coils, or electrical coils. If steam or hot oil coils are used, the coils must be so designed and maintained that the bituminous material cannot become contaminated.

2.3.4 Power Rollers shall be the self-propelled tandem and three-wheel type rollers, weighing not less than 5 tons and shall be suitable for rolling bituminous pavements.

2.3.5 Self-Propelled Pneumatic-Tired Rollers shall have a total compacting width of not less than 60 inches. The gross weight shall be adjustable within the ranges of 200 to 350 lb/in. of compacting width.

2.3.6 Spreading Equipment: Aggregate spreading equipment shall be adjustable and capable of spreading aggregate at controlled amounts per square yard.

2.3.7 Drags: Broom drags shall consist of brooms mounted on a frame, designed to spread fine aggregate uniformly over the surface of a bituminous pavement. Towing equipment shall have pneumatic tires.

2.3.8 Brooms and Blowers shall be of the power type and shall be suitable for cleaning surfaces of bituminous pavements.

3.0 EXECUTION:

3.1 Preparation of Surface:

3.1.1 Immediately Before Application of the Spray, all loose material, dirt, clay, or other objectionable material are to be removed from the surface with a power broom or blower supplemented with hand brooms. Correct all deficient areas such as pot holes, depressions, and excessive cracking.

3.1.2 Application of Bituminous Material: Immediately following the preparation of the surface, apply the bituminous material uniformly over the entire surface to be treated. All spots missed by the distributor shall be properly treated with bituminous material.

3.1.3 Application Temperature: Application temperatures for all materials shall comply with provisions of the Asphalt Institute Publications and the applicable ASTMs.

3.2 Installation:

3.2.1 Spreading Aggregate: Application of seal aggregate shall immediately follow the application of bituminous material, and in no case shall the time to application exceed 15 minutes.

3.2.2 Brooming and Rolling: Begin the rolling operations immediately following the application of cover aggregate. Rolling shall be accomplished with pneumatic-tired rollers; steel-wheeled rollers shall be used in a supplementary capacity only. All surplus aggregate shall be swept off the surface and removed not less than 24 hours or more than four days after rolling is completed.

# SECTION 02579
# SLURRY SEALS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for slurry seals for asphalt concrete pavements. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS: Project materials, design, material proportions, mix composition, and mix property requirements shall comply with current state slurry seal specifications.

3.0 EXECUTION:

3.1 Preparation of Surface:

3.1.1 Cleaning: Clean the existing surface prior to application of a tack coat or slurry seal mixture.

3.1.2 Repair: Repair all unsatisfactory or defective areas prior to application of a tack coat or slurry seal mixture.

3.1.3 Tack Coat: Apply a tack coat, with a bituminous distributor at the rate of 0.05 gal per sq yd., after the surface is repaired and cleaned. The tack coat shall consist of one part emulsion and three parts water and shall be the same type and grade emulsion as used in the slurry seal mixture. The tack shall be cured before application of the slurry seal mixture.

3.2 Installation:

3.2.1 Preparation and Application of Slurry Seal: Mix and apply the slurry seal mixture with a self-propelled continuous flow unit calibrated to accurately deliver and thoroughly mix the required proportion of aggregate, emulsion, water, and mineral filler. Total mixing time shall not exceed four minutes, and no violent mixing shall be permitted. A water fog spray shall immediately precede application of the slurry seal mixture. The slurry seal mixture shall show no signs of segregation during mixing or placing. The slurry seal mixture shall be free of uncoated or oversized aggregate, lumps, or premature breaking of the emulsion when placed. The average thickness of the cured slurry seal, when measured over the pavement surface, shall be 1/4 inch. The slurry seal minimum thickness shall not be less than 1/8 inch.

3.2.2 Drags: The drag shall be of a burlap material and shall be cleaned or replaced to prevent accumulations of slurry seal mix.

3.2.3 Rolling: Roll the slurry seal mix a minimum of five coverages with a pneumatic roller.

3.2.4 Curing: Protect the slurry seal mix from traffic until cured.

3.2.5 Correcting Deficient Areas: Any slurry seal that becomes contaminated, segregated, defective, or damaged before final acceptance by the Contracting Officer shall be removed and replaced by the Contractor.

3.3 Weather Limits: Air and pavement temperatures shall be 60 F and rising prior to the application of the slurry seal mixture.

# SECTION 02580
# ASPHALT CURBS

1.0 DESCRIPTION OF WORK: This specification covers construction of asphaltic concrete curbs in conformity with the lines, grades, and dimensions shown on the plans or established by the Contracting Officer. The standard specification for highway construction for the state in which the project is located shall be considered the standard for material, equipment, details, and construction methods as supplemented hereafter.

2.0 PRODUCTS:

2.1 Asphalt Cement: ASTM D 946, penetration grade 60-70 or 85-100.

2.2 Coarse Aggregate: ASTM D 692.

2.3 Fine Aggregate: ASTM D 1073.

2.4 Mineral Filler: ASTM D 242.

2.5 Composition of Mixture: The asphaltic concrete mixture shall consist of aggregates, filler if needed, and asphalt cement combined in such proportions that the composition by weight of the finished mixture shall be within the limits specified by the state in which the project is located.

3.0 EXECUTION: The curb shall be placed in position on a primed surface by means of an approved automatic curb machine which shapes and compacts the mixture to the designated cross section. The placement temperature of the mixture shall be approximately 260 F. Any required joints shall be carefully made in such manner as to ensure a continuous bond between the old and new sections of the curb. The newly laid curb shall be protected from traffic by barricades or other suitable methods until the heat of the asphalt mixture has dissipated. Immediately after the asphalt curb has hardened, it shall be backfilled where required with suitable material.

# SECTION 02581
# COLD MILLING OF BITUMINOUS PAVEMENTS

1.0 DESCRIPTION OF WORK: This specification covers the removal of the existing bituminous surface by cold milling to the depths and limits shown on the drawings or as established by the Contracting Officer. It also includes the loading and stockpiling, if required, of the milled material.

2.0 PRODUCTS: (Section not used).

3.0 EXECUTION:

3.1 Equipment, Tools, and Machines:

3.1.1 Cold-Milling Machine: The cold-milling machine shall be a self-propelled machine capable of milling the pavement to a specified depth and smoothness. The milling machine shall have effective means of controlling transverse slope and controlling dust produced during the pavement milling operation. The milling machine shall not cause damage to any part of the pavement structure that is not to be removed.

3.1.2 Cleaning Equipment: All cleaning equipment shall be suitable for removing and cleaning loose material from the pavement surface.

3.2 Grade: The finished mill surfaces shall conform to the lines, grades, and cross sections indicated. Finished surfaces at a juncture with other pavements shall coincide with the finished surfaces of the abutting pavements.

3.3 Preparation of Surface: The pavement surface shall be cleaned of excessive dirt, clay, or other foreign material immediately prior to milling the pavement.

3.4 Milling Operation: Sufficient passes shall be made so that the designated area is milled to the grades and cross sections indicated. Any items, such as manholes, valve boxes, and utility lines, damaged or any pavement that is torn, gouged, broken, or undercut shall be repaired or replaced as directed by the Contracting Officer.

SECTION 02582
BITUMINOUS REJUVENATION

1.0 DESCRIPTION OF WORK: This specification covers the rejuvenation of existing bituminous airfield pavements, roads, streets, parking areas, and other general applications by the use of a chemical rejuvenator.

2.0 PRODUCTS:

2.1 Rejuvenator: The asphalt rejuvenating agent shall be composed of a petroleum resin-oil base uniformly emulsified with water and shall conform to the following physical and chemical requirements:

| Property | Test Method | Requirement |
|---|---|---|
| Viscosity, S.F. at 77 F, sec.. | ASTM D 244 | 15-40 |
| Residue, % (1)..... | ASTM D 244 (Mod.) | 60-65(min.) |
| Sieve Test, %..... | ASTM D 244 (Mod.) | 0.10 (max.) |
| Viscosity @ 140 F, centistokes (2)..... | ASTM D 2170 | 80-500 |
| Flash Point, Cleveland Open Cup(COC), oF (3)..... | ASTM D 92 | 350 (min.) |

(1) ASTM D 244 Modified Evaporation Test for percent residue is made by heating 50 gm samples to 300 F until foaming ceases; then cool immediately and calculate results.

(2) Viscosity on residue obtained from evaporation test.

(3) Flash point on residue from evaporation test.

2.2 Aggregate: Gradation of mineral aggregate shall meet the following requirements:

| Sieve Designation | Percent by Weight Passing |
|---|---|
| No. 16 | 100 |
| No. 30 | 40-75 |
| No. 50 | 4-12 |
| No. 100 | 0-5 |

3.0 EXECUTION:

3.1 Bituminous Storage Tanks shall be capable of heating the bituminous material under effective and positive control at all times to the required temperature.

3.2 Bituminous Distributor shall be designed and equipped to spray the bituminous material in a uniform double to triple lap at the temperature recommended by the manufacturer, at variable widths, and at readily determined and controlled rates from 0.04 to 0.2 gallons per square yard, plus or minus 5 percent.

3.3 Brooms and Blowers shall be of the power type.

3.4 Preparation of Surface: Immediately before applying the rejuvenator, all loose material, dirt, clay, or other objectionable material shall be removed from the surface to be treated.

3.5 Application of Rejuvenator: The rejuvenator shall be uniformly applied over the surface at the approved rate with an allowable variation of plus or minus 20 percent. Materials shall be applied at the temperature recommended by the manufacturer.

3.6 Excess Rejuvenator Material: Approved mineral aggregate shall be provided by the Contractor and shall be spread in sufficient quantity to effectively blot up any excess rejuvenator material remaining on the treated pavement surface after 24 hours.

3.7 Insufficient Rejuvenator Material: When it is determined by the Contracting Officer that the actual application rate of the rejuvenator is more than 20 percent below the approved application rate, subsequent application(s) shall be made within 24 hours to ensure adequate penetration into the pavement surface.

SECTION 02583
COLD MIX RECYCLING

1.0 DESCRIPTION OF WORK: This specification covers the cold mix recycling of existing paving and the addition of new materials, as required, or as directed by the Contracting Officer.

2.0 PRODUCTS:

2.1 Aggregates:

2.1.1 General: Aggregates shall consist of material obtained from milling, or removing and crushing the existing in situ material, and/or new aggregate material as needed.

2.1.2 Aggregate Quality and Gradation: Aggregate for bituminous mixture shall be of such size that the material can be spread with a paver to the desired thickness and compacted to meet the specified smoothness, grade, and density requirements. New aggregates shall be approved and be equal to or better than the reclaimed aggregate in quality. Maximum size of new aggregate shall not exceed one-half of the layer thickness and in no case shall the maximum aggregate size exceed 1 inch.

2.2 Bituminous Materials: Bituminous materials, if required, shall be an emulsified asphalt conforming to ASTM D 977 or ASTM D 2397, grade as required.

2.3 Job-Mix Formula: The Job-Mix Formula (JMF) for the recycled mixture will be furnished by the Contractor to the Contracting Officer. The formula will indicate a definite percentage of water and asphalt to be added to the mixture. The JMF will be allowed an asphalt content tolerance of 0.3 percent. The asphalt content may be adjusted by the Contracting Officer to improve paving mixture, without adjustment in contract unit price. When asphalt is added, the optimum asphalt content will be selected to provide the following properties when samples are compacted at 250 F with 75 blows of standard Marshall hammer on each side of the specimen.

| Property | Requirement |
|---|---|
| Stability minimum, pounds | 1,800 |
| Flow maximum, 1/100-inch units | 16 |
| Voids in total mix, percent | 3-5 |
| Voids filled with bitumen, percent | 70-80 |

The water content will be selected to provide maximum density when samples are prepared at the optimum asphalt content and compacted with 75 blows of Marshall hammer at ambient temperature. When no asphalt binder is added to the mixture, the water content will be selected by the Contracting Officer to provide maximum density.

3.0 EXECUTION:

3.1 Preparation of Bituminous Mixtures: The required amount of bituminous material for each batch, or calibrated amount of continuous mixing, shall be introduced into the mixer. Aggregates, asphalt emulsion, and water shall be mixed for 35 seconds or longer, as necessary, to thoroughly coat all particles with bituminous material. When longer mixing time is necessary, additional mixing time shall be determined by the Contracting Officer.

3.2 Conditioning of Existing Surface: Ruts or soft yielding spots that appear in the existing pavement areas and deviations of surface from requirements specified shall be corrected. An asphalt tack coat shall be applied to all contact surfaces in advance of the recycled overlayment. The asphalt tack shall be placed at an asphalt residue coverage rate of 0.05 gal/sq. yd.

3.3 Placing:

3.3.1 Layer Thickness and Curing: Each layer of compacted mixture shall be no more than 2-1/2 inches in thickness; each layer of bituminous mixture shall be allowed to cure for at least 5 days before placing a succeeding layer.

3.3.2 Compaction of Mixture: Bituminous mixtures shall be rolled until all roller marks are eliminated and a density of at least 86 percent of the theoretical maximum density has been obtained when tested in accordance with MIL-STD-620, Method 101 or ASTM D 2041. When bituminous material is not added to the cold recycled mixture, the material shall be compacted to 100 percent of density determined by MIL-STD-621, Method 100, compaction effort designation CE-55.

3.3.3 Joints: Longitudinal joints shall be offset at least 1 foot from existing joints. Transverse joints shall be offset at least 2 feet from existing transverse joints.

3.3.4 Surface Smoothness: After final rolling, the pavement surface shall not vary in excess of 1/8 inch from a straightedge laid on the surface.

# SECTION 02584
# CENTRAL PLANT HOT-MIX RECYCLING

1.0 DESCRIPTION OF WORK: This specification covers the central plant hot-mix recycling of existing asphalt concrete intermediate and wearing courses for airfields, heliports, and heavy-duty pavements. The specification also includes the addition of new materials, as required or as directed by the Contracting Officer.

2.0 PRODUCTS:

2.1 Aggregates:

2.1.1 General: Aggregates shall consist of material obtained from milling, or removing and crushing the existing in-situ material, and/or new aggregate material as needed.

2.1.2 Aggregate Quality and Gradation: Aggregate for the bituminous mixture shall be such size that the material can be spread with a paver to the desired thickness and compacted to meet the specified smoothness, grade, and density requirements. New aggregates shall be approved and shall be equal to or better than the reclaimed aggregate in quality. Maximum size of new aggregate shall not exceed one-half of the layer thickness, and in no case shall the maximum aggregate size exceed one inch. Aggregate gradations shall be as prescribed by local usage, with the approval of the Contracting Officer. In order to meet pollution requirements and ensure the recycled mixture is satisfactory, the amount of reclaimed asphalt pavement shall not exceed 60 percent for drum mixers or 50 percent for batch plants.

2.2 Mineral Filler shall conform to ASTM D 242.

2.3 Bituminous Materials:

2.3.1 New Asphalt Cement: The appropriate types and grades of bituminous materials for the anticipated use and climactic environment shall be used. Requirements of ASTM D 946 shall be used to specify penetration-graded asphalt cement, or ASTM D 3381 for viscosity-graded asphalt cement.

2.3.2 Recycled Asphalt Cement: The penetration of asphalt cement recovered from the recycled mixture shall be in accordance with ASTM D 1856 and shall have a penetration between 50 and 70 percent of that specified for the particular region for new asphalt cement, measured in accordance with ASTM D 5.

2.4 Job-Mix Formula (JMF): The JMF for the recycled mixture will be furnished by the Contractor to the Contracting Officer. The formula will indicate the percentage of reclaimed asphalt pavement, the percentage of bitumen, and the temperature of the completed mixture when discharged from the mixer. The requirements for stability, flow, and voids are shown in the following tables for nonabsorptive and absorptive mixtures, respectively.

Nonabsorptive-Aggregate Mixture

| Property | Wearing Course | Intermediate Course |
|---|---|---|
| Stability minimum, lbs | 1,800 | 1,800 |
| Flow maximum, 1/100-inch units | 16 | 16 |
| Voids total mix, percent | 3-5 | 5-7 |
| Voids filled with bitumen, percent | 70-80 | 50-70 |

Absorptive-Aggregate Mixture

| Property | Wearing Course | Intermediate Course |
|---|---|---|
| Stability minimum, lbs. | 1,800 | 1,800 |
| Flow maximum, 1/100-inch units | 16 | 16 |
| Voids total mix, percent | 2-4 | 4-6 |
| Voids filled with bitumen, percent | 75-80 | 55-75 |

When the water-absorption value of the entire blend of aggregate does not exceed 2.5 percent, the aggregate is designated as nonabsorptive. When the water-absorption value exceeds 2.5 percent as determined by ASTM C 127 and ASTM C 128, the aggregate is designated as absorptive.

3.0 EXECUTION:

3.1 Preparation of Bituminous Mixtures: Aggregates, reclaimed asphalt pavement, mineral filler, bitumen, and recycling agent shall be conveyed into the mixer in proportionate quantities required to meet the JMF. Particles larger than 2 inches shall be removed from the reclaimed asphalt pavement prior to being added to the mixer. Mixing time shall be as required to obtain a uniform coating of the aggregate with the bituminous material. Temperature of bitumen at time of mixing will be specified by the Contracting Officer. Temperature of aggregate and mineral filler in the mixer shall not exceed 325 F when bitumen is added.

3.2 Surface Preparation of Underlying Course: Prior to placing of intermediate or wearing course, the underlying course shall be cleaned of all foreign or objectionable matter. The surface of previously constructed base course shall be sprayed with a prime coat at an asphalt residue coverage rate of 0.25 gal/sq.

yd. Contact surfaces of previously constructed pavement, curbs, manholes, and other structures shall be sprayed with a thin tack coat at an asphalt residue coverage rate of 0.05 gal/sq. yd.

3.3 Placing:

3.3.1 Layer Thickness and Curing: A required uncompacted thickness of intermediate course, 7 inches or less, may be spread and compacted in one layer. Where the required thickness of base is more than 7 inches, the mixture shall be spread and compacted in two or more layers. Each layer of compacted mixture for the surface course shall be no more than 2-1/2 inches in thickness. Each layer of bituminous mixture shall be allowed to cure for at least 5 days before placing a succeeding layer.

3.3.2 Compaction of Mixture: Rolling shall begin as soon after placing as the mixture will bear roller without undue displacement. After the Contractor is assured of meeting crown, grade, and smoothness requirements, rolling shall be continued until a mat density of 98 to 100.0 percent and a joint density of 96.5 to 100.0 percent of density is obtained. Places inaccessible to rollers shall be thoroughly compacted with hot hand tampers.

3.3.3 Joints: Longitudinal joints shall be offset at least 1 foot from existing joints. Transverse joints shall be offset at least 2 feet from existing transverse joints.

3.3.4 Surface Smoothness: After final rolling, the pavement surface shall not vary in excess of 1/8 inch from a straightedge laid on the surface.

SECTION 02590
PAVEMENT MARKINGS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for repair and replacement of pavement markings. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 General: Paint and reflective media shall be in sealed containers that plainly show the designated name, formula or specification number, batch number, color, date of manufacturer, manufacturer's name, formulation number, and directions, all of which shall be plainly legible at time of use. The paint shall be homogeneous and easily stirred to smooth consistency. Paint that is older than one year shall not be used.

2.2 Paint:

2.2.1 Paint for Roads and Streets shall comply with Fed. Spec. TT-P-85, Type I or II; Fed. Spec. TT-P-115, Type I, II, or III; or with Fed. Spec. TT-P-1952.

2.2.2 Paint for Airfields shall comply with Fed. Spec. TT-P-85, Type I or II or with Fed. Spec. TT-P-1952.

2.3 Reflective Media for Roads and Streets shall comply with Fed. Spec. TT-B-1325, Type I, gradation A.

2.4 Thermoplastic Materials shall comply with AASHTO M 249.

2.5 Raised Pavement Markers shall comply with the Federal Highway Administration Manual on Uniform Traffic Control Devices:

2.5.1 Reflective Pavement Markers: Reflective pavement markers shall be of the prismatic reflector type, consisting of a high impact plastic shell filled with a mixture of inert thermosetting compound and filler material.

2.5.2 Nonreflectorized Pavement Markers: Nonreflective pavement markers shall consist of a heat fired, white, vitreous, ceramic base and a heat-fired, opaque, glazed surface to produce the properties in these specifications.

2.6 Adhesive for Installation of Raised Pavement Markers shall comply with AASHTO M 237.

3.0 EXECUTION:

3.1 Preparation:

3.1.1 Safety and Protection: Contractor shall assure the least possible obstruction to traffic.

3.1.2 Removal of Existing Pavement Marking: Remove paint, plastic markings, and raised markers by sandblasting, infrared heat, high pressure water, and water or scraping. Heat may be used to augment scraping; however, the underlying pavement shall not be burned.

3.2 Installation:

3.2.1 Thermoplastic Applicator: Utilize extrusion or spray application equipment for applying thermoplastic material to the pavement. The equipment shall provide for varying widths of traffic markings.

3.2.2 Bead Dispensers: Attach bead dispensers to the striping machine in such a manner that the beads are dispensed almost instantaneously upon the installed line.

3.2.3 Tolerances in Dimensions and in Alignment: The length of the painted segment for skip stripe and the gap between segments may each vary plus or minus one foot, except that over-tolerance and under-tolerance lengths shall approximately compensate.

3.2.4 Protection: Adequate warning signs, flagmen, and necessary precautions for the protection of the wet paint and the safety of the public shall be provided. Cones, rubber "Z" guards or similar protective devices shall be placed along the newly painted stripe to prevent traffic from crossing the wet paint.

3.2.5 Corrective Measures: Stripes that fail to meet the specifications, including the permissible tolerances and the appearance requirements, or are marred or damaged by traffic or from other causes, shall be corrected. Drip and spattered paint shall be removed.

SECTION 02661
WATER LINES

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of water lines. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS: Piping for water service lines shall be galvanized steel, polyvinyl chloride (PVC) plastic, polyethylene, polybutylene, or copper tubing. Piping for water distribution and supply lines shall be ductile iron, polyvinyl chloride (PVC) plastic, filament-wound reinforced or centrifugally cast reinforced thermosetting resin, thermosetting reinforced plastic mortar pressure pipe, or reinforced concrete.

2.1 Copper Tubing: ASTM B 88, Type K, annealed, with compression pattern flared joints.

2.2 Ductile Iron Pipe: AWWA C151, 150 psi working pressure. Pipe shall be cement-mortar lined in accordance with AWWA C104. Joints shall conform to AWWA C111. Flanges shall conform to AWWA C115.

2.3 Polyvinyl Chloride (PVC) Plastic Pipe: All pipe, couplings, and fittings shall be manufactured of material conforming to ASTM D 1784, Class 12454B, designated as PVC 1120 in ASTM D 1785.

2.3.1 Pipe Less Than 4 Inches in Diameter:

2.3.1.1 Screw Joint: ASTM D 1785, Schedule 80, with joints meeting requirements of 150 psi working pressure, 200 psi hydrostatic test pressure.

2.3.1.2 Elastomeric Gasket Joint: ASTM D 1785, Schedule 40, with joints meeting the requirements of 150 psi working pressure, 200 psi hydrostatic test pressure.

2.3.1.3 Solvent Cement Joint: ASTM D 1785 or D 2241, with joints meeting the requirements of 150 psi working pressure and 200 psi hydrostatic test pressure.

2.3.2 Pipe, 4-Inch through 12-Inch Diameter: Pipe, couplings, and fittings shall conform to the requirements of AWWA C900, Class 150, CIOD pipe dimensions, elastomeric gasket joint.

2.4 Reinforced and Prestressed Concrete Pipe: Steel cylinder reinforced concrete pipe shall conform to AWWA C300, C301, or C303 and shall be designed to withstand a working pressure of not less than 150 psi, with bell and spigot steel joints and gaskets.

2.5 Steel Pipe 3 Inches and Larger, not Galvanized: AWWA C200 with dimensional requirements as given in ANSI B36.10M for pipe 6 inches in diameter and larger, and ASTM A 53 for smaller sizes. Joints shall be mechanical, bell and spigot, or flanged. Pipe shall be coated with coal-tar primer followed by a hot coat of coal-tar enamel, a wrapper of asbestos felt impregnated with coal-tar, and a wrapper of kraft paper or a coat of water-resistant white wash.

2.6 Galvanized Steel Pipe, Less than 3 Inches: ASTM A 53, standard weight, screwed joints.

2.7 Polyethylene Plastic (PE) Pipe Less than 3 Inches in Diameter: Pipe, tubing, and heat fusion fittings shall conform to AWWA C901.

2.8 Polybutylene Plastic (PB) Pipe Less than 3 Inches in Diameter: Pipe, tubing, and fusion fittings shall conform to AWWA C902.

2.9 Filament Wound Reinforced Thermosetting Resin Pipe (RTRP-I) for Lines 3 Inches and Larger: ASTM D 2996, normal working pressure of 150 psi at 73 F.

2.10 Centrifugally Cast Reinforced Thermosetting Resin Pipe (RTRP-II) for Lines 3 Inches or Larger: ASTM D 2997.

2.11 Reinforced Plastic Mortar Pressure (RPMP) Pipe for Lines 3 Inches or Larger: ASTM D 3517, bell and spigot type joints with elastomeric or mechanical gaskets.

2.12 Filament Wound and Centrifugally Cast Reinforced Thermosetting Resin Pipe and Reinforced Plastic Mortar Pressure Pipe: Pipe shall have a quick burst strength equal to or greater than four times the normal working pressure of the pipe. The quick burst strength test shall conform to the requirements of ASTM D 1599. Joints shall be bell and spigot type with elastomeric gaskets.

2.13 Valves:

2.13.1 Check Valves shall be designed for a minimum working pressure of 150 psi. Valves 2 inches and smaller shall be all bronze with screwed fittings and shall conform to MSS SP-80, Class 150, Types 3 and 4. Valves larger than 2

inches shall be iron body, bronze-mounted with flanged ends, and non-slam type. Flanges shall be the 125-pound type conforming to ANSI B16.1.

2.13.2 Gate Valves shall be designed for a working pressure of not less than 150 psi. Valves smaller than 3 inches shall be all bronze and shall conform to MSS SP-80, Type 1, Class 150. Valves 3 inches and larger shall be iron body, bronze-mounted, and shall conform to AWWA C500.

2.13.3 Rubber-Seated Butterfly Valves shall conform to the performance requirements of AWWA C504.

2.13.4 Indicator Post for Valves shall conform to the requirements of NFPA No. 24.

2.14 Fire Hydrants: AWWA C502 or C503.

2.15 Fire Hydrant Hose Houses: NFPA No. 24.

2.16 Disinfection Materials: Liquid chlorine conforming to AWWA B301 or calcium or sodium hypochlorite conforming to AWWA B300.

3.0 EXECUTION:

3.1 Installation:

3.1.1 Water Lines shall not be laid in the same trench with sewer lines, gas lines, fuel lines, or electric wiring.

3.1.2 Copper Tubing shall not be installed in the same trench with ferrous piping materials.

3.1.3 Roads, Railroads, and Airfields: Sleeves under railroads shall be in accordance with the criteria contained in the Manual for Railway Engineering of the American Railway Engineering Association. Where sleeves are required in all other cases, the pipe sleeve shall be rigid conduit and shall have a minimum clearance of at least 2 inches between the inner wall of the sleeve and the maximum outside diameter of the sleeved pipe and joints shall be provided.

3.1.4 Structures: Where water pipe is required to be installed within three feet of existing structures, the water pipe shall be sleeved as required for roads, railroads, and airfields.

3.2 Joint Deflection:

3.2.1 Ductile Iron Pipe: The maximum allowable deflection will be as given in AWWA C600.

3.2.2 Flexible Plastic Pipe: Maximum offset in alignment between adjacent pipe joints shall not exceed 5 degress.

3.2.3 Reinforced Concrete Pipe: Maximum allowable deflections from a straight line or grade, as required by vertical curves, horizontal curves, or offsets, will be 5 degrees.

3.2.4 Steel Pipe: For pipe with bell and spigot rubber gasket joints, maximum allowable deflections from a straight line or grade, as required by vertical curves, horizontal curves, or offsets will be 5 degrees.

3.3 Placing and Laying:

3.3.1 The Following Codes shall govern pipe installations: RTRP, ASTM D 3839; PE and PB, ASTM D 2774; PVC, AWWA M23.

3.3.2 Pipe Passing Through Walls of valve pits and structures shall be provided with cast-iron wall sleeves.

3.4 Service Lines: Service lines 2 inches and smaller shall be connected to the main by a directly tapped corporation stop or by a service clamp. A corporation stop and a copper gooseneck shall be provided with either type of connection. Service lines 1-1/2 inches and smaller shall have a service stop. Service lines 2 inches or larger shall have a gate valve.

3.5 Setting of Fire Hydrants: Each hydrant shall be connected to the main with a 6-inch branch line having at least as much cover as the distribution main. Not less than 7 cubic feet of free draining broken stone or gravel shall be placed around and beneath the waste opening of dry barrel hydrants to ensure drainage.

3.6 Thrust Blocks: Plugs, caps, tees, and bends deflecting 22-1/2 degrees or more, either vertically or horizontally, on waterlines 6 inches in diameter or larger, and fire hydrants shall be provided with thrust blocking or metal tie rods and clamps or lugs.

3.7 Hydrostatic Tests: The pipeline shall be subjected to both a pressure test and a leakage test.

3.7.1 Pressure Test: After the pipe has been installed and the trench has been partially backfilled, leaving the joints exposed for examination, the pipe shall be filled with water in a manner to expel all air. The pipeline shall be subjected to a

test pressure of 100 psi or 150 percent of the working pressure, whichever is greater, for a period of at least one hour.

3.7.2 Leakage Test: A standard one-hour leakage test shall be performed subsequent to or concurrently with the pressure test and shall meet an allowable leakage rate according to the following formula:

$$L = NDP/K, \text{ where}$$

L equals the allowable leakage in gallons per hour, N is the number of field joints in the length of pipeline tested, D is the nominal diameter of the pipe in inches, P is the square root of the average test pressure in psig, and K is equal to 7,400.

3.8 Disinfection: Each unit of completed water line shall be disinfected as prescribed by AWWA C651.

SECTION 02665
WATER RESERVOIRS AND TANKS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of elevated water tanks, ground level water tanks, and standpipes. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS: Standpipe, elevated steel water tank, or storage reservoir shall be in accordance with the applicable requirements of AWWA D100 and AWWA D102, except as modified herein.

2.1 Bolts, Anchor Bolts, and Rods for Welded Steel Tanks: ASTM A 307; galvanizing shall conform to ASTM A 153.

2.2 Reinforcing Steel: ASTM A 615, ASTM A 616, or ASTM A 617.

2.3 Plates: ASTM A 36.

2.4 Tubular Shapes: ASTM A 500, Grade B, for cold-formed; ASTM A 501 for hot-formed.

2.5 Design Loads: The following loads shall be considered in the design of tank structures and foundations:

a. Dead Loads: The unit weights for steel shall be 490 pcf and 144 pcf for concrete.

b. Live Load: Live load shall be the weight of all liquid when the tank is filled to just overflowing.

c. Wind Load and Snow Load: The elevated tank shall be designed according to ANSI A58.1 for a wind speed of 100 mph and for a snow load of 25 psf.

3.0 EXECUTION:

3.1 Foundations for the standpipe, reservoir, tank columns and riser, and for the valve chamber shall be constructed of concrete, reinforced where necessary, and designed in accordance with Section 12 of AWWA D100 except as shown or specified herein. Footings shall be designed in accordance with ACI 318 and constructed in conformance with the applicable requirements of SECTION:

CONCRETE. The foundation for the reservoir shall be composed of a concrete ring at base of reservoir with bed of gravel under bottom of reservoir. After concrete ring walls are constructed, the gravel fill shall be placed to thickness shown on plans. Well-graded gravel or crushed stone, not exceeding 2 inches in size with no more than 5 percent passing the No. 200 sieve, shall be placed and thoroughly tamped or rolled at a moisture content that will yield a maximum density for the type of compaction equipment used. The material shall have a crowned surface of 1 inch vertical to 10 feet horizontal as a minimum to allow for the settlement and to ensure that tank bottom will be approximately level.

3.2 Anchors: A sufficient number of anchors, designed to prevent overturning of the standpipe, reservoir, or elevated storage tank, when empty, shall be installed. The anchors shall be not less than 1-1/4 inches in diameter and shall be set deep enough to resist the computed uplift. The anchors shall be bent 90 degrees for anchorage in the concrete, or they shall be provided with anchor plates which may be made of scrap plates or structural steel channels. The anchor bolts shall be attached to the cylinder or anchor plates by means of properly designed lugs made of structural steel shapes or bent plates. Factor of safety on overturning under design wind load shall be 1.33 minimum. An inverted truncated pyramid of earth with 2 on 1 side slopes above top of footing may be used in determining overturning stability.

3.3 Test of Valves and Piping: After the tank has been erected and the valves and piping installed and before field painting is begun, the valves and piping shall be subjected for 1 hour to a hydrostatic pressure test of 1.33 times the anticipated static pressure at the points of reading when the system is put into operation.

3.4 Disinfection: Comply with requirements of AWWA C652.

SECTION 02666
CHILLED WATER LINES

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for repair and maintenance of chilled water lines. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Piping and Fitting for Chilled Water Lines:

2.1.1 Pipes to 4 Inches: Steel, welded, Schedule 40, ASTM A 53.

2.1.2 Pipes 6 to 16 Inches: Steel, seamless or ERW, standard weight, ASTM A 53.

2.1.3 Fittings to 1-1/2 Inches: MI, 150-pound, ASTM A 197, screwed ends ANSI B16.3.

2.1.4 Fittings 2 to 16 Inches: Steel, seamless, standard weight, ASTM A 234, butt weld ends, ANSI B16.9.

2.1.5 Unions to 2 Inches: MI, 150-pound, ASTM A 197, screwed ends, brass-to-iron seats.

2.1.6 Unions 2-1/2 to 16 Inches: Flanged.

2.1.7 Flanges 16 Inches and Under: Steel, ASTM A 105 or A 181, 150-pound, slip-on or welding neck type, ANSI B16.5.

2.1.8 Gaskets-Water Service: Red rubber sheet, 1/16 inch thick, ring or full face as required, ASTM D 2000.

2.1.9 Gaskets-Air Service: Compressed asbestos, 1/16 inch thick, ring or full-faced as required, ASTM F 104.

2.2 Shutoff Valves for Chilled Water Lines:

2.2.1 Gate Valves: MSS SP-80. Size 1/4 to 2 inches shall be screwed ends with bronze body. Size 2-1/2 to 16 inches shall be flanged ends with cast-iron body.

2.2.2 Butterfly Valves: AWWA C504. Size 3 to 16 inches, wafer-flanged ends with cast-iron body.

2.3 Control Valves for Chilled Water Lines:

2.3.1 Globe Valves: MSS SP-80. Size 1/4 to 2 inches shall be screwed ends with bronze body. Size 2-1/2 to 10 inches shall be flanged ends with cast-iron body.

2.3.2 Angle Valve: MSS SP-80. Size 1/4 to 2 inches shall be screwed ends with brass body. Size 2-1/2 to 14 inches shall be flanged ends with cast-iron body.

2.3.3 Butterfly Valve: AWWA C504. Size 3 to 16 inches shall be wafer-flanged with cast-iron body.

2.4 Check Valves for Chilled Water Lines: Fed. Spec. WW-V-51. Swing valves shall be size 1/4 to 2 inches, screwed ends with bronze body or size 2-1/2 to 16 inches, flanged ends with bronze body.

2.5 Preinsulated Pipe Materials:

2.5.1 Foam Insulation: ASTM C 1029. Factory-applied polyurethane foam insulation shall completely fill the annular space between carrier pipe and jacket.

2.5.2 Jacketing Material: Material shall be extruded white polyvinylchloride, conforming to ASTM D 1784.

2.5.3 Joints shall be insulated with polyurethane foam, jacketed with PVC sleeves, and sealed with heat-shrinkable tape.

2.5.4 Fittings shall be insulated with polyurethane foam and jacketed with PVC fittings.

3.0 EXECUTION:

3.1 Preparation: The trench bottom shall be stabilized by overexcavating 6 inches and replaced by fine graded earth or sand. After pipe is assembled in place and prior to testing, a partial backfill shall be accomplished by tamping fine graded earth or sand around the pipe in 6-inch layers to a minimum of 6 inches above the jacket, leaving joints exposed for visual inspection during hydrostatic testing.

3.2 Testing: The joints of the chilled water lines shall be exposed for visual inspection during hydrostatic testing. After testing is complete, joints shall be covered in a similar manner and backfill operation shall proceed.

# SECTION 02670
# WELL REPAIR

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for repair and maintenance of water wells. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Repair and Replacement Parts shall be clean, free of rust and scale, and of proper size and design for the specific well repair to be made.

3.0 EXECUTION:

3.1 Cement Grout may be hand mixed at the site.

3.2 Level and Re-Sod Area, after heavy equipment has been used or if chemicals have been spilled.

3.3 Abandoned Wells shall be sealed in accordance with AWWA A100.

3.4 Disinfect well, after repair, in accordance with AWWA A100.

SECTION 02672
WATER WELLS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for drilled and gravel packed water wells. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the American Water Works Association (AWWA) standards and the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Casings:

2.1.1 Carbon Steel: ASTM A 53 and ASTM A 139.

2.1.2 Stainless Steel: ASTM A 409.

2.1.3 Plastic: ASTM F 480.

2.2 Screens: Stainless Steel ASTM A 304.

2.3 Gravel Packs: AWWA A100, Sections 6.3, 6.4, and 6.5.

2.4 Sealing Grout: AWWA A100, Sections 7.2 and 7.3.

3.0 EXECUTION:

3.1 General: Construction shall be in accordance with the latest edition of AWWA A100 in its entirety including appendices. The standard shall not only cover 8-inch drilled wells and gravel packed wells but the criteria shall also be applied to 4-inch to 6-inch diameter wells.

3.2 Drilling: The method of drilling shall be approved by the Contracting Officer.

3.3 Drilling Samples: Samples of formations shall be retained by the Contractor during drilling with full access by the Contracting Officer. Additional samples shall be taken as directed by the Contracting Officer. Drilling samples shall be delivered to the Government at the completion of the well installation as directed.

3.4 Reports: Geophysical logging and drillers log report shall be required as directed by the Contracting Officer.

3.5 Casing Size: Casing diameter and wall thickness shall be as determined by Tables 2 and 3 of AWWA A100 but in no case shall the wall thickness be less than 1/4 inch (or Schedule 40 for 4-inch pipe).

3.6 Screen Size: The screen diameter, length, and grid openings shall be as required by the aquifier but in no case shall the entrance velocity exceed 1.5 fps. Screen construction shall be approved by the Contracting Officer.

3.7 Constant Flow Rate: The Contracting Officer will determine the constant flow rate test level based on information from the step-drawdown tests considering the recommendation of the Contractor.

SECTION 02685
GAS DISTRIBUTION LINES

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for repair and maintenance of gas distribution lines. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Piping for Gas Distribution Lines: Piping shall be steel, Schedule 40, ASTM A 53 or polyethylene, ASTM D 1248 and ASTM D 2513. Pipe designations shall be PE 2306 and PE 3306, designated for gas distribution.

2.2 Fittings for Steel Pipe:

2.2.1 Threaded: Fed. Spec. WW-P-521, Type I, black.

2.2.2 Welded: Butt-welded fittings shall conform to ANSI B16.9. Socket welded fittings shall conform to ANSI B16.11.

2.2.3 Flanged: ANSI B16.5.

2.2.4 Pipe Threads: ASME B1.20.1.

2.3 Valves: Valves shall conform to Mil. Spec. MIL-V-12003, type I, 175 psig. In plastic lines, valves shall be so designed as to protect against excessive torsional or shearing loads.

2.4 Protective Covering for Underground Steel Pipe: A coat of coal-tar primer, a coat of coal-tar enamel, a wrapper of coal-tar saturated felt, and a wrapper of kraft paper or a coat of water-resistant whitewash shall be applied in accordance with the requirements of AWWA C203.

3.0 EXECUTION:

3.1 Gas Lines: Plastic pipe shall not be installed above ground, in distribution systems that exceed 50 psig, or where operating temperatures of the materials will be below -20 F or above 100 F.

3.2 Installation of Gas Lines shall be in conformance with ANSI B31.8 and, where applicable, IAPMO IS-10.

3.3 Gas Mains shall have a minimum cover of 24 inches, and service lines shall have a minimum cover of 18 inches.

3.4 A Single Conductor No. 14 AWG Wire with type TW insulation shall be installed with plastic pipe to facilitate pipe locating.

3.5 Tests: The distribution system of gas mains and gas service lines shall prove gas-tight by air test under a pressure of 75 psig or not less than 1-1/2 times the operating pressure, whichever is greater.

3.5.1 Test of Gas Mains: The test shall continue for at least 24 hours from the time of the initial readings to the final readings of pressure and temperature. The initial test readings shall not be made for at least one hour after the pipe has been subjected to the full test pressure. The testing instruments shall be approved and subject to inspection at all times during the test.

3.5.2 Test of Service Lines: Service lines shall be tested in accordance with ANSI B31.8.

SECTION 02710
FOUNDATION DRAINAGE SYSTEMS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of foundation drainage systems. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Clay Pipe: ASTM C 700.

2.2 Perforated Clay Pipe: ASTM C 700.

2.3 Concrete Pipe: ASTM C 14.

2.4 Perforated Concrete Pipe: ASTM C 14 with perforations conforming to ASTM C 444.

2.5 Porous Concrete Pipe: ASTM C 654.

2.6 Clay Drain Tile: ASTM C 4.

2.7 Perforated Clay Drain Tile: ASTM C 498.

2.8 Concrete Drain Tile: ASTM C 412.

2.9 Cast-Iron Soil Pipe: ASTM A 74.

2.10 Perforated Corrugated Steel Pipe: ASTM A 760.

2.11 Perforated Corrugated Aluminum Alloy Pipe: Fed. Spec. WW-P-402.

2.12 Perforated Bituminized-Fiber Pipe: ASTM D 2311 or D 2417.

2.13 Perforated Corrugated Polyethylene Drainage Tubing: Soil Conservation Service, Engineering Standard 606.

2.14 Acrylonitrile-Butadiene-Styrene (ABS) Pipe: ASTM D 2751, with a maximum SDR of 35.

2.15 Polyvinyl Chloride (PVC) Pipe: ASTM D 3034, with maximum SDR of 35, and with flexible elastomeric seal joint.

2.16 Fittings: Fittings shall be of compatible materials for pipe.

2.17 Cleanouts: Cleanout pipe and fittings and piping through walls and footings shall be cast-iron soil pipe. Each cleanout shall have a brass ferrule and cast-brass, screw- jointed plug with socket or raised head for wrench.

2.18 Cover and Wrapping Materials for Open Joints in Drain Tile: Tar paper, roofing paper, reinforced building paper, glass fiber fabric, or other similar type material. Wrapping material shall be 18 x 14 mesh, 0.01-inch diameter nonferrous wire cloth.

3.0 EXECUTION:

3.1 Trenches shall be kept dry during installation of drainage system. Changes in direction of drain lines shall be made with 1/8 bends. Wye fittings shall be used at intersections.

3.2 Bedding: Graded bedding, minimum 6 inches in depth, shall be placed in the bottom of trench for its full width and length. Except for recesses for bell joints, the bedding shall fully support the lower quardrant of the pipe.

3.3 Pipe Laying: Drain lines shall be laid to true grades and alignment with a continuous fall in the direction of flow. Bells of pipe sections shall face upgrade. Perforated pipe shall be laid with perforations facing down.

3.4 Joints:

3.4.1 Perforated and Porous Types of Drain Pipes shall be laid with closed joints.

3.4.2 Non-Perforated and Plain-End Drain Tile shall be laid with 1/8-inch to 1/4-inch open joints. Open joints shall be covered or wrapped.

3.4.3 Joints of Concrete or Clay Sewer Pipe shall be caulked with oakum and filled solid with cement mortar.

3.4.4 Joints of Cast-Iron Pipe or connections between cast-iron and porous concrete pipes shall be caulked with oakum gasket and filled with lead.

3.4.5 Perforated Bituminized-Fiber Pipe Joints in which pipe ends and couplings are tapered shall have a tight-driven fit. Approved split-collar couplings may be used with square-end pipe.

3.4.6 Plain-End Perforated Clay Drain Tile Joints shall be made with spring-wire clips, coated with a rust preventive that will maintain a taut but elastic joint between sections when laid.

3.4.7 Acrylonitrile-Butadiene-Styrene (ABS) Pipe shall be jointed using solvent cement or elastomeric joints.

3.4.8 Polyvinyl Cloride (PVC) Pipe Joints shall be in accordance with ASTM D 3212.

3.5 Outlet Lines: The outlet end of drain lines connecting with an open gutter or outfall shall be covered with a removable wire basket of copper or bronze wire cloth.

3.6 Backfilling: After joints and connections have been inspected and approved, pervious backfill material shall be placed on each side of the pipe or tile and 12 inches above the top of the pipe as shown for the full width of the trench. A protective covering shall be placed over the pervious backfill for the full width of the trench before regular backfill is placed.

3.7 Cleanouts in Unpaved Areas shall be set in 12-inch by 12-inch by 4-inch concrete blocks.

# SECTION 02712
# UNDERSLAB DRAINAGE

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of underslab drainage. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Concrete Pipe shall conform to ASTM C 14.

2.2 Clay Pipe shall conform to ASTM C 700.

2.3 Perforated Clay Pipe shall conform to ASTM C 700. Clips for plain-end pipe shall be constructed of not smaller than No. 9 hard-drawn or oil-tempered steel wire conforming to ASTM A 227 or A 229, and shall be coated with an approved rust preventive coating.

2.4 Perforated Concrete Pipe shall conform to ASTM C 444 and to ASTM C 14.

2.5 Perforated Bituminized Fiber Pipe and Couplings shall conform to ASTM D 2418.

2.6 Perforated Corrugated Steel Pipe shall conform to ASTM A 760.

2.7 Perforated Corrugated Steel Pipe, Fully Bituminous-Coated shall conform to Fed. Spec. WW-P-405.

2.8 Drain Tile: Clay drain tile shall conform to ASTM C 4. Concrete drain tile shall conform to ASTM C 412.

2.9 Porous Concrete Pipe shall conform to ASTM C 654.

2.10 Galvanized Bituminous-Coated, Semicircular Steel Pipe shall conform to ASTM A 444. Bituminous coating shall be in accordance with Fed. Spec. WW-P-405.

2.11 Perforated Corrugated Aluminum Alloy Pipe shall conform to Fed. Spec. WW-P-402.

2.12 Perforated Corrugated Aluminum Alloy Pipe, Fully Bituminous-Coated shall conform to Fed. Spec. WW-P-402.

2.13 Precoated Corrugated Steel Pipe shall conform to Fed. Spec. WW-P-405.

2.14 Acrylonitrile-Butadiene-Styrene (ABS) Piping shall conform to ASTM D 2751.

2.15 Polyvinyl Chloride (PVC) Pipe and Fittings shall conform to ASTM D 3034, Type PSM, with flexible elastomeric seal joint.

2.16 Filter Fabric shall be a pervious sheet of polyester, nylon, or polypropylene filaments woven or otherwise formed into a uniform pattern with distinct and measureable openings. The fabric shall be constructed so that the filaments will retain their relative position with respect to each other.

2.17 Drainage Structures: Concrete shall have a minimum strength of 3,000 psi and an air content of 3 to 6 percent. Concrete cover over reinforcing shall be in conformance with ACI 318. Expansion joint filler material shall conform to ASTM D 1751 or D 1752. Mortar shall be composed by volume of one part Portland Cement and two parts sand.

2.18 Precast Reinforced Concrete Manhole Risers and Tops shall conform to ASTM C 478.

2.19 Precast Concrete Segmental Blocks shall conform to ASTM C 139.

2.20 Precast Concrete Manhole Bases shall conform to ASTM C 478.

2.21 Brick shall conform to ASTM C 62 or ASTM C 55.

2.22 Prefabricated Corrugated Metal: Steel manholes and risers shall be fabricated of galvanized and bituminous coated corrugated metal.

2.23 Frames and Covers or Gratings shall be cast gray iron, ASTM A 48, Class 35B or ductile iron, ASTM A 536, Grade 65-45-12.

2.24 Ladders or Ladder Rungs shall be fabricated of cast iron, wrought iron, or galvanized steel.

2.25 Subdrain Filter and Bedding Material shall be washed sand, sand and gravel, crushed stone, crushed stone screenings, or slag composed of hard, tough, durable particles free from adherent coatings.

3.0 EXECUTION:

3.1 Manholes shall be installed complete with frames, ladders, and covers or gratings.

3.2 Filter Fabric: One layer of filter fabric shall be wrapped around open joints and perforated or slotted collector pipes. Trenches to be lined with filter fabric shall be graded to obtain smooth side and bottom surfaces so that the fabric will not bridge cavities in the soil or be damaged by projecting rock.

3.3 Pipelaying: The laying of pipe shall proceed upgrade beginning at the lower end of the pipeline. Pipe shall not be laid in water. Pipe shall be bedded to the established gradeline. Perforations shall be centered on the bottom of the pipe.

3.4 Jointing:

3.4.1 Nonperforated Concrete and Clay Pipe: Pipe shall be laid with 1/8- to 1/4-inch openings between ends of pipe.

3.4.2 Perforated Concrete and Clay Pipe: Pipe shall be laid with closed joints. Plain-end perforated clay pipe sections shall be fastened together with spring wire clips furnished by the pipe manufacturer.

3.4.3 Perforated Bituminized-Fiber Pipe: Pipe shall be installed with either a tapered coupling or a split-collar coupling.

3.4.4 Perforated Corrugated Metal Pipe, or Unpaved Bituminous-Coated, Perforated Corrugated Metal Pipe: The sections of pipe shall be securely fastened together with standard connecting bands furnished by the manufacturer of the pipe.

3.4.5 Drain Tile: Drain tile shall be laid with open joints of approximately 1/8-inch width but not over 1/4-inch width.

3.4.6 Porous Concrete Pipe: Pipe shall be installed with mortar joints.

3.4.7 Bituminous-Coated or Uncoated Semicircular Steel Pipe: Coupling bands shall consist of uncorrugated top and bottom sections bolted together with four bolts.

3.4.8 Bituminous-Coated or Uncoated Corrugated Aluminim Pipe: Use standard connecting bands furnished by the pipe manufacturer.

3.4.9 Acrylonitrile-Butadiene-Styrene (ABS): Solvent cement or elastomeric joints for ABS pipe shall be in accordance with ASTM D 2751.

3.4.10 Polyvinyl Chloride (PVC) Pipe: Joints shall be in accordance with the requirements of ASTM D 3212.

3.5 Backfilling: Filter material shall be placed around and over the pipe. The remainder of the trench shall be filled with overlying backfill material.

SECTION 02720
STORM DRAINS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of storm drains. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Reinforced Concrete Pipe: ASTM C 76 or AASHTO M 170.

2.2 Reinforced Concrete Arch Culvert and Storm Drainpipe: ASTM C 506.

2.3 Reinforced Concrete Elliptical Culvert and Storm Drainpipe: ASTM C 507.

2.4 Nonreinforced Concrete Pipe: ASTM C 14 or AASHTO M 86, Class 1, Class 2, Class 3.

2.5 Reinforced Concrete Box Sections: ACI 346.

2.6 Clay Pipe: AASHTO M 65 or ASTM C 700.

2.7 Corrugated Steel Pipe, Pipe Arch, and Couplings: Pipe and couplings shall conform to ASTM A 760.

2.8 Structural-Plate Steel Pipe, Pipe Arches, and Arches: Plate and bolted assembly shall conform to Fed. Spec. WW-P-405.

2.9 Corrugated Aluminum Alloy Pipe, Pipe Arch, and Underdrains: Pipe shall conform to Fed. Spec. WW-P-402.

2.10 Structural-Plate Aluminum Pipe, Pipe Arches, and Arches: Plate and bolted assembly shall conform to Fed. Spec. WW-P-402.

2.11 Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and Fittings: ASTM D 2751.

2.12 Reinforced Plastic Mortar (RPMP) Sewer Pipe: ASTM D 2992.

2.13 Precast Reinforced Concrete Manholes: ASTM C 478 or AASHTO M 199.

2.14 Reinforced Plastic Mortar (RPM) Manholes: ASTM D 3840.

2.15 Corrugated Polyethylene (PE) Plastic Manholes: ASTM D 3753.

2.16 Glass Fiber-Reinforced Polyester Manholes: ASTM D 3841.

2.17 Prefabricated Corrugated Metal Inlets and Manholes: Manholes and inlets shall be complete with frames and covers, or frames and gratings.

2.18 Manhole Ladders or Steps shall be fabricated of steel or heavy-duty aluminum, minimum 16 inches in width with 3/4-inch diameter or square rungs on 12-inch centers. Steel ladders and inserts shall be galvanized after fabrication.

2.19 Precast Concrete Segmental Blocks shall conform to ASTM C 139, and shall be not more than 8 inches thick nor less than 8 inches long.

2.20 Brick shall conform to ASTM C 62, Grade SW; ASTM C 55, Grade S-I or S-II, or ASTM C 32, Grade MS. Brick structures shall be plastered with 1/2-inch of mortar over the entire outside surface of the walls.

2.21 Walls and Headwalls shall be reinforced concrete, plain concrete, or steel sheeting as indicated.

2.22 Flared End Sections shall be a standard design with pipe manufacturer and manufactured of the same material as specified for the pipe.

2.23 Concrete for Structures: ACI 318.

2.24 Mortar shall be composed of Portland cement, Portland blast-furnace slag, Portland-pozzolan, or masonry cement, as available.

3.0 EXECUTION:

3.1 Excavation:

3.1.1 Trenches: Except where banks are cut back on a stable slope, excavation for trenches shall be sheeted, braced, and shored as necessary for proper laying of pipe. Care shall be taken not to overexcavate. Remove stones as necessary to avoid point bearing.

3.1.2 Storm Sewers: The width of the trench at and below the top of the pipe shall be such that the clear space between the barrel of the pipe and the trench wall shall not exceed 8 inches on either side of the pipe. The width of the trench above that level shall be as wide as necessary for sheeting and bracing and the proper performance of the work.

3.1.3 Appurtenances: Excavation for manholes and similar structures shall be sufficient to leave at least 12 inches in the clear between the outer surfaces and the embankment or timber that may be used to hold and protect the banks.

3.2 Backfilling:

3.2.1 Trenches: Backfill trenches to finish grade with satisfactory materials. Replace pavement, base course, and compact subgrade disturbed by trenching operations in an acceptable manner with materials equal to the adjacent compacted subgrade, base course, and pavement for a minimum distance of 12 inches on each side of the trench and conform to the requirements hereinafter specified.

3.2.2 Lower Portion of Trench: Deposit backfill material in 6-inch maximum thickness layers and compact with suitable tampers to the density of the adjacent soil until there is a cover of not less than 24 inches over lines, unless otherwise noted. The backfill material in this portion of the trench shall be free from stones larger than 3 inches in any dimension and hard clods and conglomerates larger than 6 inches in any dimension.

3.2.3 Remainder of Trench: Except for special materials for pavements and railroads, backfill the remainder of the trench with material that is free of stones larger than 6 inches or 1/2 the layer thickness, whichever is smaller, in any dimension. Deposit backfill material in layers not exceeding the thickness specified.

3.3 Installation:

3.3.1 General: Under no circumstances shall pipe be laid in water. No pipe shall be laid when trench conditions or weather are unsuitable for such work. Diversion of drainage or dewatering of trenches during construction shall be provided as necessary.

3.3.2 Plastic Pipe and Manholes: Install plastic pipe and manholes in compliance with ASTM D 2321, ASTM D 3753, and ASTM D 3839.

3.3.3 Concrete and Clay Pipe: Laying shall proceed upgrade with spigot ends of bell and spigot pipe and tongue ends of tongue and groove pipe pointing in the direction of the flow.

3.3.4 Circular Concrete Pipe with Elliptical Reinforcing: Placement shall be such that reference lines designating top of pipes will not be more than 5 degrees from the vertical plane through the longitudinal axis of the pipe.

3.3.5 Corrugated Metal Pipe and Pipe Arch: Laying shall be with the separate sections joined firmly together with the outside laps of circumferential joints pointing upstream and with longitudinal laps on the sides. Suitable markings or properly placed lifting lugs shall be provided to ensure placement of factory elongated pipe in a vertical plane.

3.3.6 Structural-Plate Steel Pipe, Pipe Arches, and Arches: Tighten bolts on each section progressively and uniformly, starting at one end of the structure after all plates are in place. Repeat the operation to ensure that all bolts are tightened to meet the torque requirement of 200 foot-pounds, plus or minus 50 foot-pounds.

3.3.7 Structural-Plate Aluminum Pipe, Pipe Arches, and Arches: Tighten bolts on each plate progressively and uniformly, starting at one end of the structure after all plates are in place. Repeat the operation to ensure that all bolts are torqued to a minimum of 100 foot-pounds on aluminum alloy bolts and a minimum of 150 foot-pounds on galvanized steel bolts.

3.3.8 Manhole Ladders: Install manhole ladders when the manhole depth exceeds 12 feet. Anchor ladders adequately to the wall by means of steel inserts spaced not more than 6 feet apart vertically. Provide at least 6-1/2 inches of space between wall and inside of rungs.

SECTION 02724
FORCE MAINS AND INVERTED SIPHONS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of force mains and inverted siphons. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS: Piping for force mains shall be ductile iron, steel, polyvinyl chloride (PVC) plastic, filament-wound reinforced or centrifugally cast reinforced thermosetting resin, thermo-setting reinforced plastic mortar pressure pipe, or reinforced concrete.

2.1 Ductile Iron Pipe: AWWA C151, 150 psi working pressure. Pipe shall be cement mortar-lined in accordance with AWWA C104. Joints shall conform to AWWA C111. Flanges shall conform to AWWA C115.

2.2 Polyvinyl chloride (PVC) Plastic Pipe: All pipe, couplings, and fittings shall be manufactured of material conforming to ASTM D 1784, Class 12454B, designated as PVC 1120 in ASTM D 1785.

2.3 Reinforced and Prestressed Concrete Pipe: Steel cylinder reinforced concrete pipe shall conform to AWWA C300, C301, or C303 and shall be designed to withstand a working pressure of not less than 150 psi, with bell and spigot steel joints and gaskets.

2.4 Steel Pipe 3 Inches and Larger, not Galvanized: AWWA C200 with dimensional requirements as given in ANSI B36.10 for pipe 6 inches in diameter and larger, and ASTM A 53 for smaller sizes. Joints shall be mechanical, bell and spigot, or flanged.

2.5 Filament Wound Reinforced Thermosetting Resin Pipe (RTRP-I) for Lines 3 Inches and Larger: Pipe shall conform to ASTM D 2996. The pipe shall be suitable for a normal working pressure of 150 psi at 73 F.

2.6 Centrifugally Cast Reinforced Thermosetting Resin Pipe (RTRP-II) for Lines 3 Inches or Larger: Pipe shall conform to ASTM D 2997.

2.7 Reinforced Plastic Mortar Pressure (RPMP) Pipe for Lines 3 Inches or Larger: Pipe shall conform to ASTM D 3517. Joints shall be bell and spigot type with elastomeric or mechanical gaskets.

2.8 Valves:

2.8.1 Check Valves shall be designed for a minimum working pressure of 150 psi. Valves larger than 2 inches shall be iron body, bronze-mounted, shall have flanged ends, and shall be the non-slam type. Flanges shall be the 125-pound type conforming to ANSI B16.1.

2.8.2 Gate Valves shall be designed for a working pressure of not less than 150 psi. Valves smaller than 3 inches shall be all bronze and shall conform to MSS SP-80, Type 1, Class 150. Valves 3 inches and larger shall be iron body, bronze-mounted, and shall conform to AWWA C500.

2.8.3 Rubber-Seated Butterfly Valves shall conform to the performance requirements of AWWA C504.

2.8.4 Plug Valves: Cast-iron valves shall comply with MSS SP-78. Steel plug valves shall comply with API Spec. 6D.

2.8.5 Pinch Valves shall be double-acting, jam-proof type with unobstructed streamlined flows and built-in operator. The valve shall have flanged ends. Flanges shall be of the 125-pound type complying with ANSI B16.1.

2.8.6 Air Release Valves shall be attached by means of threaded pipe connections.

2.8.6.1 Manual Air Release Valves shall consist of a 3-inch gate valve and 3-inch ductile iron pipe and fittings.

2.8.6.2 Automatic Air Release Valves shall be of the compound lever type capable of withstanding operating pressures of 150 psi.

2.9 Valve Boxes shall be cast iron or concrete. Only concrete boxes will be acceptable in roadways or in areas subject to heavy loads.

2.10 Valve Vaults: Precast concrete units conforming to ASTM C 478.

3.0 EXECUTION:

3.1 Utility Separation: Pressure sewer pipe and water pipe shall be separated by at least 10 feet horizontally.

3.2 Placing and Laying:

3.2.1 RTRP Pipe shall be installed in accordance with ASTM D 3839. PVC shall be installed in accordance with AWWA M23.

3.2.2 Pipe Passing Through Walls of valve pits and structures shall be provided with cast-iron wall sleeves.

3.3 Thrust Blocks: Plugs, caps, tees, and bends deflecting 22-1/2 degrees or more, either vertically or horizontally, on waterlines 6 inches in diameter or larger, and fire hydrants shall be provided with thrust blocking or metal tie rods and clamps or lugs.

3.4 Hydrostatic Tests: The pipeline shall be subjected to both a pressure test and a leakage test.

3.4.1 Pressure Test: After the pipe has been installed and the trench has been partially backfilled, leaving the joints exposed for examination, the pipe shall be filled with water in a manner to expel all air. The pipeline shall be subjected to a test pressure of 100 psi or 150 percent of the working pressure, whichever is greater, for a period of at least one hour.

3.4.2 Leakage Test: A standard one-hour leakage test shall be performed subsequent to or concurrently with the pressure test and shall meet an allowable leakage rate according to the following formula:

$$L = NDP/K, \text{ where}$$

L equals the allowable leakage in gallons per hour, N is the number of field joints in the length of pipeline tested, D is the nominal diameter of the pipe in inches, P is the square root of the average test pressure in psig, and K is equal to 7,400.

SECTION 02725
SAND DRAINS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of sand drains. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Galvanized Perforated Corrugated Metal Pipe: AASHTO M36.

2.2 Perforated Polyvinyl Chloride (PVC) Plastic Pipe: ASTM D 1784.

2.3 Aggregate shall be sand, gravel, crushed rock, or chat that is clean, sound, and of a good quality. Gradation shall conform to the following table:

| | |
|---|---|
| Retained on the 1-inch sieve | 0% |
| Retained on the 3/8-inch sieve | 0-15% |
| Retained on the No. 8 sieve | 40-60% |
| Retained on the No. 30 sieve | 70-95% |
| Retained on the No. 100 sieve | 98-100% |

3.0 EXECUTION:

3.1 Pipe Bedding: Aggregate shall be placed in uniform layers on level excavation.

3.2 Perforated Pipe shall be layed with securely aligned joints to lines and grades, which will allow proper drainage.

3.3 Perforated Pipe shall be embedded with a minimum coverage of two feet of aggregate or as directed.

SECTION 02726
WASTEWATER COLLECTION

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for repair and maintenance of wastewater collection systems. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Bituminized Fiber Pipe and Fittings: ASTM D 1861, except that wye branches and tees may be vitrified clay, concrete, or cast iron.

2.2 Cast-Iron Soil Pipe and Fittings: ASTM A 74, Class SV or XH. Acid-resistant lines shall be Class XH and contain not less than 12 percent silicon.

2.2.1 Rubber Gaskets for Compression Joints: ASTM C 564.

2.2.2 Caulked Joints: Joint packing material shall be twisted jute or oakum, tarred type. Lead shall comply with Fed. Spec. QQ-C-40.

2.3 Clay Pipe and Fittings: Clay Pipe and Fittings shall conform to ASTM C 700. Compression Joints shall conform to ASTM C 425.

2.4 Concrete Pipe: 24 inches in diameter or less, nonreinforced, ASTM C 14, Class 1; greater than 24 inches in diameter, reinforced, ASTM C 76.

2.4.1 Joints less than 36 inches in diameter shall be bell and spigot type; pipe 36 inches or greater in diameter shall be bell and spigot type, tongue and groove type, or modified tongue and groove type. Joints and gaskets shall conform to ASTM C 443.

2.4.2 Portland Cement for Concrete Pipe and Fittings: ASTM C 150, Type IIA or V.

2.5 Plastic Pipe: Plastic pipe shall not be used for sewers larger than 15 inches in diameter.

2.5.1 Acrylonitrile-Butadiene-Styrene (ABS) Composite Piping: ASTM D 2680, Type SC or Type OR, size 8 inches through 15 inches in diameter.

2.5.2 Acrylonitrile-Butadiene-Styrene (ABS) Pipe and Fittings: ASTM D 2751, solvent weld or bell and spigot O-ring joint, size 12 inches or less in diameter.

2.5.3 Polyvinyl Chloride (PVC) Pipe and Fittings: ASTM D 3034, Type PSM with a maximum SDR of 35, size 15 inches or less in diameter, with flexible elastomeric seal joint, elastomeric gasket joint in accordance with ASTM D 3212.

2.5.4 Branch Connections: Branch connections shall be made by use of regular fittings or solvent cemented saddles. Saddles for acrylonitrile-butadiene-styrene (ABS) composite pipe shall comply with Figure 2 of ASTM D 2680, saddles for acrylonitrile-butadiene-styrene (ABS) pipe shall comply with Table 3 of ASTM D 2751, and saddles for polyvinyl chloride (PVC) pipe shall comply with Table 4 of ASTM D 3034.

2.6 Clay Pipe: Standard strength pipe shall conform to AASHTO M 65. Extra strength pipe shall conform to AASHTO M 65 or ASTM C 700. Compression fittings shall comply with ASTM C 425.

2.7 Reinforced Plastic Mortar Pipe: ASTM D 3262. Fittings shall be in accordance with ASTM D 3840. Joints shall be bell and spigot type utilizing an elastomeric gasket.

2.8 Brick for Manholes: ASTM C 62, Grade SW, or ASTM C 32, Grade MS.

2.9 Cement Mortar: ASTM C 270, Type M. Use Type IIA cement.

2.10 Concrete Blocks for Manholes: ASTM C 139.

2.11 Portland Cement: ASTM C 150, Type IIA or V.

2.12 Concrete: ASTM C 94, compressive strength of 4,000 psi.

2.13 Precast Reinforced Concrete Manhole Sections: ASTM C 478.

3.0 EXECUTION:

3.1 Adjacent Facilities: Unless otherwise dimensioned, the sewer shall not be closer horizontally than ten feet to a water-supply main or service line, except that where the bottom of the water pipe will be at least twelve inches above the top of the sewer pipe, the horizontal spacing may be a minimum of six feet. Where gravity-flow sewers cross above water lines, the sewer pipe for a distance of ten feet on each side of the crossing shall be fully encased in 4 inches of concrete or shall be acceptable pressure pipe with no joint closer horizontally than three feet to the crossing.

3.1.1 Roads, Railroads, and Airfields: Sewer pipe shall be suitably encased in a sleeve of rigid conduit under primary access road crossings, railroad crossings, and at airfield runways and taxiways where aircraft are moved under their own power.

3.1.2 Structures: Where sewer pipe is required to be installed within three feet of an existing building or structural foundation, the sewer pipe shall be sleeved.

3.2 Pipe Laying: Pipe laying shall proceed upgrade with the spigot ends of bell and spigot pipe and tongue ends of tongue and groove pipe pointing in the direction of the flow.

3.3 Leakage Tests: Lines shall be tested for leakage by either infiltration tests or exfiltration tests, as appropriate. Leakage shall not exceed 0.2 gallons per inch diameter per 100 feet of pipeline per hour.

3.4 Test for Deflection: When flexible pipe is used, a deflection test shall be made on the entire length of the installed pipeline upon completion of all work, including the leakage test, backfill, and placement of any fill, grading, paving, concrete, or superimposed loads.

3.5 Building Connections shall include the lines to and connection with the building waste drainage piping at a point approximately 5 feet outside the building.

# SECTION 02727
# EROSION CONTROL

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of mesh or netting for erosion control. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Jute Mesh: Fed. Spec. CCC-C-467.

2.2 Plastic Mesh: Manufacturer's recomendation.

2.3 Plastic Netting: Manufacturer's recommendation.

2.4 Polypropylene Mesh: Manufacturer's recommendation.

3.0 EXECUTION:

3.1 Preparation: Grade, compact, fertilize, and seed the area to be protected.

3.2 Installation: Apply blankets either horizontally or vertically to the slope. In ditches, apply blanket in direction of water flow. Lap and anchor blankets according to the manufacturer's instructions.

SECTION 02730
SEWER LINE MANHOLES

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for repair and maintenance of sewer line manholes. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 General: All materials shall be clean, free of defects, corrosion, and damage. All items shall be of proper type, size, design, and characteristics for the use intended. Unless otherwise specified, all items shall be factory made.

2.2 Manhole Brick: Bricks used in the repair of manholes shall comply with ASTM C 32, Grade MS.

2.3 Concrete used in the repair of manholes shall comply with ASTM C 94 with compressive strength of 3,000 psi.

2.4 Portland Cement shall comply with ASTM C 150, Type 5.

2.5 Concrete Blocks for manhole repair shall comply with ASTM C 139, of the size required to match prevailing conditions.

2.6 Cement Mortar shall comply with ASTM C 270, Type M.

2.7 Precast Concrete Sections for manhole repair shall comply with ASTM C 478, utilizing Portland cement.

2.8 Manhole Steps shall be of cast iron construction in compliance with ASTM A 48, Class 20-B or ASTM A 536, with a minimum tensile strength of 35,000 psi.

2.9 Grout shall be of Portland cement, metallic or nonmetallic, nonshrink or expansive type, complying with ASTM C 476 or ASTM C 658.

2.10 Epoxy Mortar shall be utilized to fill all deteriorated joints of brick manholes.

2.11 Castings shall be gray iron, complying with ASTM A 48, Class 20B, or ductile iron, complying with ASTM A 536.

2.12 Frames and Covers shall be for light-duty traffic, with 24-inch entrance diameter, anchored to the manhole structure.

2.12.1 Waterproof Frame and Cover shall be gasket sealed with bolts for lid and shall comply with "Frames and Covers," above. Bolts and nuts shall be steel.

2.12.2 Replacement Covers shall be solid, flat top, of the proper design and load rating, and fit the existing frame without need for adaptors or additional hardware.

2.12.3 Cover Height Adjustment Devices shall be expandable to fit the frame rim size and adjustable vertically to match the required finished grade elevation.

3.0 EXECUTION:

3.1 Preparation:

3.1.1 Cleaning Existing Surfaces: Prior to applying grout, scrape surfaces of all loose material, dry of excess water, and clean of organics, slimes, or dust.

3.1.2 Manhole Crack Preparation: Drill holes in cracks at the extreme ends and at 6- to 9-inch intervals with a masonry bit.

3.2 Installation:

3.2.1 Grouting, Interior of Manhole: Grout and seal interior wall of manhole by hand application, giving a trowel finish.

3.2.2 Grouting, Exterior of Manhole: If pressure grouting from ground surface, insert applicator directly above area to be grouted and inject grout until grout enters manhole through crack. If pressure grouting from inside manhole, insert grout applicator at each drilled hole along the crack and repeatedly pump until grout emerges through the crack and annular space between hole and applicator.

3.2.3 Curing of Grout: Cure Portland cement grout in a damp atmosphere by closing all entrances to the manhole.

# SECTION 02735
# SEWER LINE GROUTING

1.0 DESCRIPTION OF WORK: This specification covers sewer line grouting. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Grout shall be applicable to sewer conditions and as required to seal the pipe from leaks. Type of grout used shall be compatible with the soil and moisture conditions and shall provide watertight seals under all internal and external conditions to which the sewer shall be subjected.

2.2 Chemical Grout shall be acrylamide gel or polyurethane foam.

2.2.1 Acrylamide Gel shall be an aqueous solution of acrylamide and N,N' methylenebisacrylamide powders, with the proper catalyst, such as B-dimethylaminopropionitrile and ammonium persulfate, mixed in the proper proportions and concentrations to achieve the desired results, depending on the field conditions.

2.2.2 Polyurethane Foam Grout shall be an aqueous solution of liquid urethane polymer, with a water-soluble amine accelerator.

2.3 Epoxy Mortar Grout shall comply with ANSI A118.3.

2.4 Portland Cement Grout shall comply with ASTM C 476.

3.0 EXECUTION:

3.1 Preparation:

3.1.1 Alternate Sewage Discharge shall be provided to a downstream manhole.

3.1.2 Preparatory Cleaning: Prior to beginning of grouting work, sewers to be repaired shall be cleaned of all debris, sediments, and tuberculation.

3.2 Installation:

3.2.1 Grouting shall take place at all joints determined to require repair and at cracks and crevices where infiltration or exfiltration is occurring or has a possibility of occurring.

3.2.2 Grouting of Lateral Connections and Manhold External Drops shall consist of pumping grout to fill the entire length of the lateral pipe and manhole drops until the grout exfiltrates through the various leaks. Allowing for proper grout setting time, ream the grouted pipe of excess grout in its entirety. Remove all excess grout without being discharged in the main sewer and dispose of properly.

3.2.3 Manual Grout Application: Grout large sewers allowing the physical entrance of personnel utilizing probe-type applications and injecting the grout material directly in the leaks or through holes drilled at the leaks. Grouting shall continue until all leaks are stopped.

3.2.4 Testing of Grouted Sewers:

3.2.4.1 Air Testing of each individual joint and crevice shall be conducted upon setting of the in-place grout. The test shall be for not less than 30 seconds at each location, at pressures greater than or equal to the hydrostatic head caused by the maximum expected groundwater elevation. Record pressures at each location at five second intervals with an accuracy of 0.05 psi. Repair locations having pressure drops due to air leaks using grout or another approved method, until all leaks are stopped. Retest location after repairs are made.

3.2.4.2 Hydrostatic Testing:

3.2.4.2.1 Upon completion of grouting a section of sewer, the line shall be hydrostatically tested for leaks. Repair leaks using grout or another approved method, until all leaks are stopped. Retest line section after repairs are made.

3.2.4.2.2 Infiltration and Exfiltration Leakage into or out of the sewer shall not exceed the equivalent of 100 gallons per day, per inch of diameter, per mile of sewer from any section between successive manholes. The infiltration test may be used when the ground water is at least 2 feet higher than the pipe crown. Measure leakage with a weir. The exfiltration test shall consist of plugging successive upstream manholes and service connections and filling of line from the upstream manhole with water to a depth of 2 feet or more above the pipe crown or the ground water, whichever is higher.

3.2.4.3 Pneumatic Testing: Upon completion of grouting a section of sewers, the line shall be pneumatically tested for leaks in compliance with ASTM C 828. Repair leaks using grout or another approved method, until all leaks are stopped. Retest line section after repairs are made.

3.2.5 Performance of Grouted Sewers: Grouted sewer lines shall have no more than 100 gallons per inch diameter per mile of sewer per day, infiltration or exfiltration, upon completion of the work. Regrout sections of sewers experiencing more than the allowable leakage or otherwise repair by approved methods.

# SECTION 02737
# SEWER LINE CLEANING

1.0 DESCRIPTION OF WORK: This specification covers sewer line cleaning. Cleaning procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS: All materials shall be clean, free of defects, corrosion, and damage. All items shall be of proper type, size, design, and characteristics for the use intended. Unless otherwise specified, all items shall be factory-made.

2.1 Portable Cleaning Equipment: Equipment used in the cleaning of sewer lines shall be as required to complete the work for the size, length, and conditions of the sewer. Portable and mobile equipment shall comply with Water Pollution Control Federation Manual of Practice No. 7.

2.2 Chemicals shall be of the strength required to perform the work. The chemicals shall not be damaging to pipe materials, manholes, pumping equipment, nor treatment process and shall not be contaminated by foreign substances.

3.0 EXECUTION:

3.1 Preparation:

3.1.1 Protection required to prevent damage to adjacent materials, equipment, fixtures, and finishes shall be provided. Necessary protective clothing and accessories for personnel working with chemicals shall be provided.

3.1.2 Ventilation of Sewers: Contractor shall provide proper ventilation for personnel working in the sewer.

3.1.3 Alternate Sewage Discharge: Contractor shall provide an alternate routing of sewage discharge to a downstream manhole.

3.1.4 Traffic: Contractor shall provide all traffic signs required to safely direct traffic at and around work areas.

3.2 Installation:

3.2.1 Direction of Work: Sewer line cleaning work, with the exception of hydraulic scouring, shall proceed in the downstream direction. Cleaning by hydraulic scouring shall proceed in the upstream direction.

3.2.2 Testing: Upon completion of cleaning operation, test sewer lines for proper operation and observe for a period of 24 hours. Clean out all stoppages and the retest the line for proper operation.

# SECTION 02740
# SEPTIC TANKS AND GREASE TRAPS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for repair and maintenance of septic tanks and grease traps. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS: Concrete Repair Material shall be epoxy type grout in compliance with Fed. Spec. MMM-A-001993.

3.0 EXECUTION:

3.1 Septic Tanks and Grease Traps shall be drained and cleaned.

3.2 Adequate Ventilation shall be provided and precautions against the presence of explosive vapors shall be taken if it is necessary to enter the septic tank.

3.3 Soil Absorption System: Remove and dispose of vegetation roots impeding the flow of water in the soil absorption system properly. Restore all noticeable irregularities in the ground surface, caused by removal, by filling with soil that matches surrounding soil.

3.4 Filling Abandoned Septic Tanks and Grease Traps: Clean and fill abandoned septic tanks and grease traps with compacted soil.

SECTION 02742
SIPHON TANK AND SIPHONS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for the repair and maintenance of sewage treatment plant dosing siphon tanks. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Tank Repair Material shall be epoxy type grout complying with Fed. Spec. MMM-A-001993.

2.2 Concrete Coatings:

2.2.1 Outside and Above Grade shall be epoxy type in compliance with Mil. Spec. MIL-P-24441.

2.2.2 Inside and Below Grade shall be coal-tar epoxy type in compliance with SSPC-PAINT 16.

2.3 Steel Repair Material shall be steel plate or epoxy cement and fiberglass cloth.

2.4 Corroded or Defective Siphons: Replace those parts corroded or defective with new parts compatible with the unit, as recommended by the manufacturer.

2.5 Steel Coatings:

2.5.1 Red-Lead Base Coat shall comply with Fed. Spec. TT-P-86, Type I.

2.5.2 Aluminum Paint shall comply with Fed. Spec. TT-P-38.

3.0 EXECUTION:

3.1 Corroded or Broken Pipe and Fittings: Replace as required.

3.2 Minor Leaks: Repair minor leaks in the tank using material and surface preparation and application methods recommended by the material manufacturer.

3.3 Spalled Areas: Repair as required.

3.4 Cleaning and Coating:

3.4.1 Interior Concrete Surfaces of the tank shall be cleaned with high pressure water or steam to remove all dirt and residue, allowed to dry, and brush sandblasted in compliance with SSPC-SP 7.

3.4.2 The Exterior Concrete Surfaces of the tank shall be cleaned by means of brush sandblasting in compliance with SSPC-SP 7. The surfaces shall be blown down with air to remove the blasting residue and dust, and two coats of epoxy-polyamide paint shall be applied.

3.4.3 Holes and Voids in the concrete surfaces left from the blast cleaning shall be filled by means of troweling and squeeze application of an epoxy filler. The surfacing material shall be allowed to cure overnight, and then two coats of coal-tar epoxy complying with SSPC-PAINT 16 shall be applied.

3.4.4 Submerged Ferrous Metal Surfaces that are exposed to the sewage shall be sandblasted in compliance with SSPC-SP 10 and coated with two coats of coal-tar epoxy.

3.4.5 Ferrous Metal Surfaces that are not submerged shall be cleaned by means of sandblasting in compliance with SSPC-SP 6. Surfaces inaccessible to sandblasting shall be power tool cleaned in compliance with SSPC-SP 3. Surfaces shall be coated with one coat of red-lead base paint. After the base paint has dried sufficiently, two coats of aluminum finish paint shall be applied.

# SECTION 02744
# GREASE INTERCEPTORS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of grease interceptors. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Semi-Automatic Grease Draw-Off: Unit shall be on-floor type, cast iron, porcelain, or painted inside and out, with internal air relief, grease draw-off piping, and valve with flow control fitting. Draw-off piping and nozzle may be interchanged in field to make unit a right- or left-handed installation. Unit shall also have double wall trap with removable baffles and gasketed cover with low pressure chamber. The pipe size of the influent line shall be based on the influent flow rate and grease capacity.

2.2 Manual Grease Draw-Off: Unit shall be on-floor type, partially recessed or flush-with-floor type, cast iron, porcelain, or painted inside and out, with internal air relief and flow control fitting. Unit shall have double wall trap, removable baffles, gasketed cover bearing plumbing, and drainage seal of approval. The pipe size of the influent line shall be based on the influent flow rate and grease capacity.

2.3 Manual Grease Draw-Off, Coated Steel Type: Unit shall be high volume on floor or partially recessed, with internal air relief, double wall trap, removable baffles, gasketed non-skid cover, and flow control fitting. The pipe size of the influent line shall be based on the influent flow rate and grease capacity.

3.0 EXECUTION: The unit shall be placed in the influent line of the waste water disposal and treatment system.

SECTION 02745
IMHOFF TANKS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for repair and maintenance of sewage treatment plant Imhoff tanks. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Coatings:

2.1.1 Epoxy-Filler Compound for concrete surfaces shall comply with Fed. Spec. MMM-A-001993.

2.1.2 Coal-Tar Epoxy shall comply with SSPC-PAINT 16.

2.1.3 Epoxy Paint shall comply with Mil. Spec. MIL-P-24441.

2.1.4 Red-Lead Base Paint shall comply with Fed. Spec. TT-P-86, Type I.

2.1.5 Aluminum Finish Paint shall comply with Fed. Spec. TT-P-38.

2.2 Steel Tank Repair Material for minor leaks shall be a two-component epoxy sealing compound. For badly corroded areas, a steel plate of the same composition and thickness as the original tank shall be used.

2.3 Pipe and Fittings for replacement shall be equivalent to the existing pipe and fittings.

3.0 EXECUTION:

3.1 Preparation: Drain the contents of the tank and dispose of the sludge and sewage.

3.2 Leak Repair:

3.2.1 Concrete Tanks: Repair concrete tank leaks by cleaning and chipping or sandblasting the area of the leak and applying two-component epoxy concrete sealant.

3.2.2 Steel Tanks: Repair steel tank leaks by cleaning, scraping, chipping, or sandblasting the area of the leak and applying epoxy steel sealant. Repair badly corroded areas of steel tanks by cutting out the corroded area and welding a section of new steel plate in place. Welding shall be in compliance with AWS D1.1.

3.3 Pipe and Fittings: Replace pipe and fittings as required.

3.4 Cleaning and Coatings:

3.4.1 Interior Concrete Surfaces of the tank shall be cleaned with high pressure water or steam to remove dirt and residue, allowed to dry, and brush sandblasted.

3.4.2 Holes and Voids in the concrete surfaces left from the blast cleaning shall be filled by means of troweling and squeeze application of epoxy filler. Two coats of coal-tar epoxy shall be applied to the surface after the epoxy has cured.

3.4.3 Submerged Ferrous Metal Surfaces such as piping and equipment that are exposed to the sewage shall be sandblasted and coated with two coats of coal-tar epoxy.

3.4.4 Exterior Concrete Surfaces of the tank shall be cleaned by means of brush sandblast. The surfaces shall be blown down with air to remove the blasting residue and dust, and two coats of epoxy-polyamide paint shall be applied.

3.4.5 Ferrous Metal Surfaces that are not submerged shall be cleaned by means of sandblasting. Coat surfaces with one coat of red-lead base paint. After the base paint has dried sufficiently, apply two coats of aluminum finish paint.

SECTION 02766
SEWER LINE PIPE LINING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of sewer line pipe lining. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Lining Material:

2.1.1 Polyethylene Pipe: Extruded, flexible industrial grade, high density (Type 3 or 4) in 40 foot lengths, complying with ASTM D 2239 and D 2447.

2.1.1.1 Diameter: Outside diameter shall be as large as possible while allowing for ease of pulling into the existing sewers. Pipe dimensions shall comply with ASTM D 2447 and D 2837.

2.1.1.2 Liner Thickness and Class shall be suitable for the use intended. The tolerance on the pipe wall thickness shall be as noted in Table 2 of ASTM D 2447.

2.1.1.3 Gravity Sanitary, Gravity Storm, and Gravity Industrial Sewers shall be Schedule 40.

2.1.1.4 Gravity Thermal Discharge Sewers shall be Schedule 80.

2.1.1.5 Low Pressure Sewers shall be Schedule 40, complying with ASTM D 2239.

2.1.1.6 High Pressure Sewers shall be Schedule 80, complying with ASTM D 2239 and D 2837.

2.1.1.7 Chemical Resistance: Pipe liner shall be resistant to chemical attack, erosion, and corrosion.

2.1.1.8 Fittings shall be fabricated from polyethylene pipe. The polyethylene fittings shall have the same pressure rating as the pipe and shall comply with ASTM D 3261.

2.1.2 Cement-Mortar Lining:

2.1.2.1 Portland Cement shall comply with ASTM C 150, Type 1.

2.1.2.2 Pozzolan Cement shall comply with ASTM C 618 and shall not comprise more than 20 percent of total cement amount, by weight.

2.1.2.3 Sand shall be well graded, clean, free from organic and extraneous matter. One hundred percent shall pass the 16-mesh size screen.

2.1.2.4 Lining Thickness: Cement lining shall be not less than 1/8 inch for pipe sizes 4 to 14 inches, not less than 3/16 inch for pipe sized 16 inches and larger, and not less than 1/4 inch for steel pipe 16 inches and larger.

2.1.3 Reinforced Mortar Pipe Slip-Lining:

2.1.3.1 Gravity Sewers: Slip-lining shall be of glass fiber reinforced polyester mortar pipe, complying with ASTM D 3262.

2.1.3.2 Pressure Sewers (Force Mains): Slip-lining shall be of glass fiber reinforced polyester mortar pipe complying with ASTM D 2517.

2.1.3.3 Diameter: Outside diameter shall be as large as possible while allowing for ease of pulling into existing sewers, as recommended by the manufacturer.

2.1.3.4 Chemical Resistance: Pipe liner shall be resistant to chemical attack, erosion, and corrosion.

2.1.3.5 Fittings: Fittings shall be manufactured of the same materials as is the glass fiber reinforced polyester mortar pipe.

2.1.4 Epoxy-Mortar Lining:

2.1.4.1 Epoxy Compound shall comply with ASTM D 1763.

2.1.4.2 Admixtures shall be well graded with one hundred percent passing the 16-mesh size screen. All admixtures shall improve the workability, density, and strength of the mortar.

2.1.4.3 Lining Thickness: For pipe sizes 4 to 14 inches, epoxy mortar lining thickness shall be not less than 1/8 inch. For pipe sizes 16 inches and larger, epoxy mortar lining shall be not less than 3/16 inch.

2.2 Joint:

2.2.1 Slip-Lining:

2.2.1.1 Polyethylene Pipe Butt Joints: Pipe lengths, fittings, and flanged connections to be joined by thermal butt fusion shall be of the same type, grade, and class of polyethylene compound and supplied by pipe supplier.

2.2.1.2 Flanged Joints shall consist of a polyethylene flange, thermally butt fused to the ends of the pipe. The companion flange shall be steel or cast iron and nylon-coated.

2.2.1.3 Lateral Service Connections: Sidewall connections shall be made with polyethylene pipe sections of the same material, grade, and class as the liner material and shall have the same pressure ratings. Lateral connections shall be watertight.

2.2.2 Reinforced Mortar Lining:

2.2.2.1 Bell and spigot joints shall be the inverted type.

2.2.2.2 Manhole Joints and Connections shall be oakum ring and grout as required.

3.0 EXECUTION:

3.1 Slip-Lining, Polyethylene Pipe:

3.1.1 Insertion of Liner: Liner shall be laid at a constant line and grade as the existing pipe, without undulations or damage. Where the existing pipe is not at constant grade, the liner shall follow as true a constant grade as possible.

3.1.2 Grouting: At manholes, annular space shall be packed with oakum and expansion grout or nonshrink grout as required. At existing line, after liner has been inserted, grout wherever existing pipe has failed structurally.

3.1.3 Concrete Encasement: Crown of liner shall be encased in concrete a minimum thickness of 6 inches for the entire length of the excavated trench and out at least 6 inches each side of the bottom half of the original pipe remaining down to firm soil. Wherever existing concrete encasement has been removed, the liner shall be encased in the same manner as the original pipe.

3.1.4 Thrust Blocks: Concrete thrust blocks shall be provided as required.

3.2 Cement Mortar and Epoxy Mortar Lining:

3.2.1 Cement Mortar Mixing: One part cement to one and one-half parts of sand by volume.

3.2.2 Application of Lining: The lining shall be applied to produce a smooth, uniform thickness throughout the interior of the pipe line.

3.2.3 Curing of the Cement Mortar Lining: Immediately upon completion of the lining of a length of pipe between access openings or at the end of a day's run, the section of pipe shall be closed at each end, the access openings covered to prevent the circulation of air, and the atmosphere kept moist.

3.2.4 Reconnection of Pipes After Lining: Close and make watertight all openings in the sewer lines.

3.2.5 Pressure Test and Leaks: Hydrostatic and leakage test shall be conducted on all pipe that is cleaned and lined.

3.3 Reinforced Mortar Pipe Lining:

3.3.1 Joining of Pipe Ends: Liner sections containing bell and spigot joints shall be joined using an O-ring.

3.3.2 Grouting Work shall be accomplished following the same techniques as described in paragraph Slip-Lining, Polyethylene Pipe.

3.4 Cement Mortar Lining:

3.4.1 Epoxy Mortar Lining: Excessive mortar shall be removed from the manhole walls and bottom. Manhole bottom shall receive special care in making all transitions smooth.

3.4.2 Work at Service Connections: Plugs or caps shall be placed at the access point of the service connection to the sewer and shall be removed once the mortar has set. The completed lining shall not be damaged.

3.5 Reinforced Mortar Pipe Lining: Joining of fiberglass reinforced polyester mortar pipe shall be carried out in the trench, with the first section of liner already inserted.

3.6 Lateral Connections: Service to connections shall be provided for and continued after installation of the lining.

3.7 Testing: Upon completion of lining operation, the sewer line shall be tested for proper operation and shall be observed for a period of 24 hours. All deficiencies shall be corrected.

3.8 Pavement Restoration: All disturbed pavement shall be restored to its original condition and shall match existing adjacent.

3.9 Inspection: Large diameter sewers shall be inspected from inside to ensure that all lateral connections and joints are in proper order. Sewers that have been cement-lined may be inspected for a smooth finish, while plugs and caps are being removed.

SECTION 02774
SEWAGE TREATMENT LAGOONS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for the repair and maintenance of sewage treatment lagoons. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Concrete Block shall comply with ASTM C 129.

2.2 Concrete Grout shall comply with Fed. Spec. MMM-A-001993.

2.3 Riprap Stone shall comply with AREA-01.

2.4 Concrete Repair Material shall comply with Fed. Spec. MMM-A-001993.

2.5 Sand shall comply with ASTM C 33.

2.6 Portland Cement shall comply with ASTM C 150, Type V.

2.7 Rubble shall consist of broken concrete or broken stone.

3.0 EXECUTION:

3.1 Algae Removal shall be by mechanical or manual methods and shall include, but not be limited to, skimming, pumping through a screen, raking, or draining and cleaning the lagoon.

3.2 Slope and Dike Reconstruction shall be made to re-establish the original design configuration and grades. Place riprap, where required, so that its angle of repose is not exceeded.

3.3 Liner Reconstruction and Repair shall be made with materials compatible with the existing liner and compatible with the wastewater and sludge to be contained therein.

3.4 Repairs to Elastomeric Membrane Liners shall be made with like material and shall overlap all cuts, tears, fractures or other defects a minimum of 4 inches. Cut repair pieces square or rectangular. The method of bonding the new material to existing material shall be similar to the original joint banding

method, except when the original joints have failed. In this case, the material supplier shall demonstrate that an alternate jointing system shall be satisfactory to the Contracting Officer. Replace earth or sand cover removed during repair or replacement of plastic liner to the same thickness as the original installation.

3.5 Repairs to Non-Elastomeric Membrane Liners shall be made by cutting out defective areas back to sound liner material and replacing with similar material. Joints shall be watertight.

SECTION 02830
FENCES AND GATES

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of fences and gates. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Ground Rods, Down Conductors, and Connectors:

2.1.1 Ground Rods: Galvanized steel rods, 3/4 inch in diameter by 10 feet in length.

2.1.2 Down Conductors: No. 8 copper wire or equivalent.

2.1.3 Connectors: Pressure type bolted or compression type.

2.2 Foundations shall be concrete with a minimum 28-day strength of 3,000 psi, and shall extend from 3 feet 6 inches below finished grade to 2 inches above finished grade. Tops of foundations shall slope away from posts. Extend gate post foundations to the underside of the bottom hinge. Foundations for line posts shall be 10 inches in diameter. Foundations for terminal and gate posts shall be the diameter of the post plus 8 inches but not less than 12 inches.

3.0 EXECUTION:

3.1 Existing Fence Connections: Wherever new fencing joins an existing fence, either at a corner or at the intersection of straight line fences, a corner post with brace post shall be set at the junction and braced. If the connection is made elsewhere than the corner of the fencing, the last span of the existing fence shall contain a brace span.

3.2 Security Fence: Wherever existing fencing fabric is embedded in concrete or earth, or attached to an earth-embedded galvanized steel sheet, repairs shall be made as follows:

3.2.1 Earth Embedment: Install new fabric or galvanized steel sheet to depth of existing. Attach steel sheet securely to adjacent existing sheeting and new and existing fencing fabric. Thoroughly backfill and compact soil in repair area.

3.2.2 Concrete Embedment: Install fence fabric to the depth of existing fabric. Place concrete to match existing configuration. Clean all exposed fencing of concrete that is a result of new construction.

3.3 Gate Installation: Install, plumb, level, and secure for full opening without interference. Install ground-set items in concrete for anchorage, as recommended by the fence manufacturer. Install and adjust hardware for smooth operation and lubricate where necessary.

3.4 Grounding: Ground on each side of every gate where crossed by high-tension-line crossings, at 1,000 to 1,500 foot intervals along fence in isolated areas, and at 500 to 750 foot intervals when in close proximity (100 feet or less) to public roads, highways, and buildings. Down conductors shall run full height of fence wherever wood posts are used and shall be securely fastened to each strand of wire to provide electrical continuity.

3.5 Field Painting: At the completion of repair work, touch up all surfaces damaged by construction operations. Galvanized surfaces shall be painted with zinc-oxide paint. Wood, steel, vinyl coated, aluminized, and other fencing materials shall be touched up following the manufacturer's recommendations or to match existing finish.

3.6 Final Grading: The final ground surface shall be graded to remove irregularities and maintain the clearance between the bottom of the fence and the ground surface.

3.7 Seeding and Sodding: Seed or sod all lawn areas disturbed by repair and maintenance operations with a plant variety of the same species as that in adjacent areas. Areas where grass does not take hold shall be reseeded or resodded as directed by the Contracting Officer.

SECTION 02831
STEEL CHAIN-LINK FENCING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for repair and maintenance of steel chain-link fencing. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Galvanized Fabric shall comply with Fed. Spec. RR-F-191/1, Type I, of 9 gauge wire and 2-inch mesh.

2.2 Framework: Posts, top rails, and braces shall be galvanized steel pipe in compliance with Fed. Spec. RR-F-191/3, Class 1.

2.3 Gates shall comply with Fed. Spec. RR-F-191/2 and shall be of the same type, size, and shape as the existing. Provide a keeper to automatically engage and hold the gate leaf open until manually released, a center plunger rod, a center stop, vertical lift framework, and sliding track.

2.4 Electric Operator for gates shall include a totally enclosed motor, starter, gear reduction, clutch, limit switch, and housing. Operator shall be controlled by an electric lock. Slide gate operators shall be equipped with magnetic brake, manual disconnect, and chain drive. Swing gate operators shall be equipped with a crank arm.

2.5 Accessories:

2.5.1 Barbed Wire shall comply with Fed. Spec. RR-F-191/4 and shall be two strands of 12-1/2 gauge galvanized steel wire, twisted, with four point barbs spaced five inches apart.

2.5.2 Post Caps: Pressed steel or malleable iron, galvanized, and of the configuration required.

2.5.3 Extension Arms for barbed wire shall extend outward at a 45 degree angle and shall have provision for attaching three strands of barbed wire with the top strand approximately one foot above the fence fabric.

2.5.4 Stretcher Bars: Minimum 3/16-inch by 3/4-inch steel bars, galvanized in compliance with ASTM A 123.

2.5.5 Stretcher Bar Bands: Heavy pressed steel bands, galvanized in compliance with ASTM A 123.

2.5.6 Tension Wire: Spring coil or crimped wire of minimum seven gauge galvanized steel with minimum tensile strength of 80,000 pounds per square inch and coating as specified for the fabric.

2.5.7 Fasteners: Steel wire with an ASTM A 641, Class 1 galvanized coating.

2.5.8 Slat Inserts: California Redwood treated with a stain preservative to maintain appearance.

2.5.9 Boulevard Clamps: Stamped 13 gauge mild steel, galvanized, in compliance with ASTM A 641, Class 1. Clamps for vinyl coated fence shall have the vinyl coating applied over the zinc coating.

3.0 EXECUTION:

3.1 Posts: Set plumb, in straight alignment with other posts, evenly spaced and rigidly set. Set posts to a depth of 3 inches above the bottom of the concrete foundation.

3.2 Rails:

3.2.1 Top Rail: Install continuous through post caps, securely fastening to end, corner, pull, and gate posts with rail end.

3.2.2 Intermediate and bottom rails: Attach to line posts with boulevard clamps and to terminal posts with rail ends.

3.3 Truss Bracing: Securely fasten to end, corner, pull, and gate posts 12 inches below cap and extend to the adjacent line post. Braces shall be trussed from the line post to the bottom of the terminal post with round rods and turnbuckles.

3.4 Fabric:

3.4.1 Repair (Cutting and Patching) of Fabric: Cut out the damaged fabric, position new fabric to line up with existing mesh, and securely fasten to existing fabric.

3.4.2 Replacement of Fabric: Stretch to proper tension and securely fasten to terminal posts using stretcher bars.

3.4.3 Restretching Existing Fabric: Stretch existing fabric indicated to be restretched to proper tension and refasten to posts and rails.

3.5 Barbed Wire: Stretch and secure to extension arms with heavy wire pins.

3.6 Gate Hinges: Install to prevent twisting or turning under action of the gate and to swing through 180 degrees from closed to open position.

SECTION 02832
STEEL ROD AND BAR FENCING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of steel rod and bar fencing. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Pickets shall be of height and style required to match existing, solid mild steel bar, galvanized in compliance with ASTM A 123.

2.2 Framework: Posts and rails shall be of length and style to match existing, solid mild steel, galvanized in compliance with ASTM A 123.

2.3 Gates:

2.3.1 Frame: Galvanized steel, all welded construction.

2.3.2 Truss Rods: Galvanized steel as required for stability, minimum 3/16 inch in diameter.

2.3.3 Hardware: Gate latches, hinges, gate track, trolley, rollers, plunger rod, and locks as required.

2.4 Accessories:

2.4.1 Brackets: Malleable iron or pressed steel of the sizes and configurations required to adequately support attached members, minimum 3/16 inch thick.

2.4.2 Trim: Flat caps for all posts and pickets where required. Caps shall be galvanized cast iron or zinc die castings of thickness standard to the manufacturer.

2.4.3 Sleeves: Where required, sleeves shall be minimum 16-gauge steel tubing of the required configuration to receive post. Sleeves shall be galvanized in compliance with ASTM A 123.

3.0 EXECUTION:

3.1 Pickets: Fasten pickets to rails with clip angles and bolts and nuts.

3.2 Posts: Set posts in sleeves or footings as required to match existing conditions.

3.3 Brackets: Brackets for wall mounting and change of grade shall be securely fastened to wall and/or posts with appropriate fasteners.

3.4 Alignment: Finished fencing shall be in proper alignment with all posts plumb.

3.5 Welding: Comply with AWS D1.1.

3.6 Repair: Items shall be straightened, welded, sufficiently bolted, or otherwise strengthened as required.

SECTION 02833
WROUGHT IRON ROD AND BAR FENCING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of wrought iron rod and bar fencing including ornamental malleable iron fencing. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Pickets shall be 3/8-inch square wrought iron rods of the required length and configuration.

2.2 Gates: Hardware shall be compatible with existing hardware in appearance and function.

2.3 Accessories:

2.3.1 Brackets: Brackets for fastening fencing to walls, floor, posts, and other attachments shall be wrought iron.

2.3.2 Trim: Provide iron trim items as required.

2.3.3 Bolts and Nuts shall be ASTM A 307 and galvanized in compliance with ASTM A 153.

3.0 EXECUTION:

3.1 Pickets shall be welded to rails. Welding shall comply with AWS standards and shall seal the joint against moisture.

3.2 Rails shall be securely fastened to posts with angle brackets.

3.3 Posts shall be set in sleeves or footings to match existing conditions. Posts set in sleeves shall have the annular space between the sleeve and post filled with lead or sulfur.

3.4 Brackets for wall mounting and change of grade shall be securely fastened to wall and/or posts with appropriate fasteners.

3.5 Gates:

3.5.1 Frame: Iron rod and bar rails and pickets shall be welded with full welds into sections in a pattern matching existing fencing. Rail-and-picket sections shall be fastened to posts with angle brackets, bolts, and nuts.

3.5.2 Bracing: Iron rod or bar braces shall be welded in place when required to strengthen the gate.

SECTION 02834
PRE-CAST CONCRETE AND MASONRY FENCING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for repair and maintenance of precast concrete and masonry fencing. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Fence Materials:

2.1.1 Pre-Cast Concrete: Match existing fencing units in all dimensions, patterns, colors, and textures. Units shall comply with ASTM C 145 Grade N, Type 1 for solid units and ASTM C 90 Grade N, Type 1 for hollow units, and ACI 318 as applicable.

2.1.2 Brick: Exposed brick masonry shall comply with ASTM C 216, Grade SW. Brick for below grade shall comply with ASTM C 62, Grade SW. Brick shall be selected for appearance to match existing brick in dimension, color, and texture.

2.1.3 Mortar:

2.1.3.1 Mortar shall comply with ASTM C 270, Type S and shall be 1 part Portland cement (ASTM C 150), 1/2 part lime (ASTM C 207), and 4-1/2 parts sand (ASTM C 144). Sand for joints 1/4 inch or less shall pass a No. 16 sieve. Sand containing any substance that will stain the masonry shall not be used. Waterproofing admixtures shall be approved by the Contracting Officer.

2.1.3.2 Colored Mortar shall be a factory-formulated mixture of masonry cement complying with ASTM C 91 and mortar color.

2.1.4 Masonry Grout: Coarse grout for masonry lintels and for filling cells in masonry units shall consist of 1 part Portland cement, 1/10 part lime, and 1-1/2 parts sand. Fine grout for bedding and grouting steel and for all other applications shall consist of 1 part Portland cement, 1/10 part lime, and 2-1/2 parts sand. Use waterproofing admixture in all grout used in exterior walls.

2.2 Posts:

2.2.1 Line Posts: Line posts shall be of the same materials and configuration as existing posts with reinforcing as required.

2.2.2 Terminal and Corner Posts: Match existing terminal and corner posts in configuration and adequately reinforce.

2.2.3 Gate Posts: Gate posts shall have all attachments for gates firmly embedded and shall be of sufficient strength to withstand stresses applied by the gate.

2.3 Rails: Rails shall be of the same materials and configuration as existing rails with all accessories for firmly attaching to posts.

2.4 Gates:

2.4.1 Frame: Constructed of 2 x 4 wood members with attached pickets. Configuration of gate shall match that of existing gates.

2.4.2 Gate Bracing shall consist of a single 2 x 4 running diagonally across the gate to opposite corners of the frame. High end of brace shall be at hinge edge of gate.

2.4.3 Hardware: Hinges, latches, and other hardware shall be hot-dipped galvanized steel in compliance with ASTM A 153 and of configurations to match existing hardware.

2.4.4 Padlock: Padlocks shall comply with ASTM F 883.

2.5 Accessories:

2.5.1 Special Shapes: Special shapes, including copings and post caps, shall be as required to match existing units to be replaced.

2.5.2 Reinforcement: Masonry reinforcement, anchors, and ties shall comply with the following requirements:

2.5.2.1 Reinforcement Bars shall comply with ASTM A 615, Grade 40.

2.5.2.2 Joint Reinforcement shall be prefabricated from zinc-coated cold drawn steel wire in compliance with ASTM A 641. Provide prefabricated pieces for corners and intersections of walls. Reinforcement shall be truss type, approximately two inches narrower than the nominal thickness of wall.

2.5.2.3 Wire-Mesh Ties shall be 16-gauge or larger zinc-coated steel wire woven into 1/2-inch mesh and cut in strips one inch narrower than the width of walls in which they are used. Zinc-coating shall comply with ASTM A 641.

2.5.2.4 Wire Brick Ties shall be fabricated from 3/16-inch diameter zinc-coated steel wire complying with ASTM A 641.

2.5.3 Attached Items: Light fixtures and miscellaneous items attached to the fencing shall be provided with appropriate means for securely fastening to fence components.

2.5.4 Bolts and Nuts shall be ASTM A 307 and galvanized in compliance with ASTM A 153.

2.6 Foundations:

2.6.1 Material: Where foundation work is required for maintenance and repair, the new foundation shall match the existing foundation in materials and design.

2.6.2 Depth: Foundations shall extend below frost line or to the depth of existing foundations, whichever is greater.

3.0 EXECUTION:

3.1 General:

3.1.1 All Scaffolding and Falsework shall be ample strength and well secured. Masonry work exceeding 10 feet in height shall be properly braced and supported until masonry is self-supporting.

3.1.2 Where Fresh Masonry Joins Partially or Totally Set Masonry, clean the exposed surface of the set masonry to obtain the best possible bond with the new work. Remove all loose masonry units and mortar.

3.2 Mixing Mortar and Grout:

3.2.1 Mix in a Mechanical Batch Mixer for a minimum of 5 minutes after all materials have been added.

3.2.2 Mix Grout in compliance with ASTM C 476. Grout shall have a consistency at time of placement to yield a slump of 10 to 11 inches as determined by ASTM C 143.

3.3 Reinforcement:

3.3.1 Install Horizontal Continuous Joint Reinforcement in all unit masonry fences. Reinforcement shall start not more than 8 inches above the masonry supporting surface and end within the top full mortar joint, or to match existing conditions and shall be spaced at maximum 16-inch centers vertically.

3.3.2 Joint Reinforcement shall be placed approximately 1/2 inch from masonry faces.

3.3.3 At intersections, bond each course with wire mesh ties or prefabricated joint reinforcement spaced not to exceed 16 inches vertically.

3.3.4 Install Vertical Reinforcement bars of the size indicated on the drawings in the hollow cores of masonry units as required. Fill all cells containing reinforcement for the full height of the reinforcement with grout.

3.4 Precast Concrete:

3.4.1 Bond shall be laid to match existing pattern. Lay hollow concrete masonry units with full mortar coverage on horizontal and vertical face shells. Webs shall also be bedded in all courses of posts, in starting course on footings and solid foundation walls and around cells that are to be reinforced or filled with grout.

3.4.2 All Exposed Mortar Joints shall be tooled with a round jointer to produce smooth, dense, concave joints, except as otherwise required to match existing mortar joints.

3.5 Brick:

3.5.1 Bond shall be laid out to maintain joints to uniform thickness throughout.

3.5.2 Brick shall be laid with completely filled mortar joints to match existing. Mortar beds shall be spread smooth. The ends of brick shall be buttered with sufficient mortar to fill the end joint.

3.5.3 All Exposed Mortar Joints shall be tooled with a round jointer to produce smooth, dense, concave joints.

3.6 Pointing and Cleaning: Upon completion, all new joints shall be carefully pointed, filling all holes. Cut out defective joints and repoint them with mortar. Keep all exposed masonry clean and free of mortar as the work progresses. Clean masonry surfaces using fiber brushes and trisodium phosphate solution; acid shall not be used for any masonry cleaning. Rinse surfaces with clean water immediately after cleaning.

SECTION 02835
PERMANENT WOOD FENCING

1.0 DESCRIPTION OF WORK: The specification covers the furnishing and installation of materials for repair and maintenance of permanent wood fencing. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Pickets:

2.1.1 Size: Wood for pickets shall match the existing fencing in material, configuration, dimensions, texture, and finishes.

2.1.2 Attachment: Hot-dipped galvanized nails complying with Fed. Spec. FF-N-105 shall be used to fasten pickets to rails.

2.2 Framework:

2.2.1 Line Posts: 4 x 4 of required length to match existing post height and extend into the ground as required to assure rigid installation.

2.2.2 Terminal and Corner Posts: 4 x 4 of required length.

2.2.3 Gate Posts: 4 x 6 and of the length required for firm embedment to resist gate action.

2.2.4 Top Rail: 2 x 4 of length required to span between posts.

2.2.5 Where Bracing is Required, it shall match top and bottom rails in dimension and finish.

2.2.6 Metal Posts and Rails: Solid mild steel galvanized in compliance with ASTM A 123 of the length and style required to match existing.

2.3 Gates:

2.3.1 Frame: 2 x 4 members with attached pickets. Configuration of gate shall match that of existing gates.

2.3.2 Bracing: Single 2 x 4 running diagonally across the gate to opposite corners of the frame.

2.3.3 Hardware: Hinges, latches, and other hardware shall be hot-dipped galvanized and of configurations to match existing hardware. Bolts and nuts shall comply with ASTM A 307 and galvanized in compliance with ASTM A 153.

2.4 Finish: All wood fence members shall be given a pressure preservative treatment in a closed retort. The treatment shall comply with Fed. Spec. TT-W-00571. Wood cut or sawed after treatment shall have the cut surfaces well brush-coated with the preservative used in the treatment. Paint to match existing after treatment and installation.

3.0 EXECUTION:

3.1 Posts: Hold in line in a true vertical position by temporary bracing until backfilling is completed. Compact by hand tamping or other suitable methods to a density comparable to that of adjacent ground. Posts of fencing that are higher than four feet and exposed to strong winds and posts at all gates shall be of heavy construction and shall be embedded in concrete.

3.2 Rails: Install at the height and in the manner required to match existing fencing, and secure to post with fasteners similar to existing.

3.3 Pickets: Space, attach, and position to match existing pattern and attachment methods.

3.4 Accessories: Install to match existing conditions.

SECTION 02836
SNOW AND OTHER TEMPORARY FENCING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of snow and other temporary fencing. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Pickets:

2.1.1 Size: Wood pickets shall be 3/8 inch thick, 1-1/2 inches wide, and 48 inches high.

2.1.2 Coating: Red oil paint or stain.

2.1.3 Spacing: Approximately two inches apart.

2.1.4 Attachment: Bind together with three double strands of wire.

2.2 Framework:

2.2.1 Materials: Wire shall be 13 gauge galvanized steel, complying with ASTM A 641.

2.2.2 Types: The framework shall consist of three parallel double strands of wire twisted between pickets to hold them securely in place.

2.2.3 Wire Connectors: Wire for attaching fabric to metal posts shall be nine gauge.

2.2.4 Staples and Nails shall comply with Fed. Spec. FF-N-105. Staples and nails shall be zinc-coated and of sufficient length for purpose required.

2.3 Gates:

2.3.1 Frame: Frames shall consist of two parallel horizontal wooden members with pickets attached at two-inch spacing.

2.3.2 Bracing: Two wooden members placed diagonally on the gate between the frame boards.

2.3.3 Hardware shall include two strap hinges, latching device, and stop bar, all of zinc-coated steel, in compliance with ASTM A 153.

2.4 Supports:

2.4.1 Steel: Line posts and uprights shall be drive type, T sections, and provided with suitable anchor plate. The sections shall be hot-rolled steel complying with ASTM A 702, galvanized in compliance with ASTM A 123. The T sections shall have the following minimum sizes:

| Post Length (Feet) | Post Weight (Pounds) |
|---|---|
| 5 | 7.32 |
| 5 1/2 | 7.99 |
| 6 | 8.65 |
| 6 1/2 | 9.32 |
| 7 | 9.98 |
| 7 1/2 | 10.64 |
| 8 | 11.31 |
| 9 | 12.64 |
| 10 | 13.97 |

2.4.2 Wood: Posts shall be cut from cedar, Douglas fir, pine, or other approved species of timber. Posts shall be peeled, treated, dressed, and cured. All wood posts and braces shall be given a pressure preservative treatment in a closed retort. The treatment shall comply with Fed. Spec. TT-W-00571. Wood cut or sawed after treatment shall have the cut surfaces well brush-coated with the preservative used in the treatment.

2.4.3 Braces: Steel braces shall have same configuration as line posts and uprights without the anchor plate. Wood braces shall be treated No. 2 or better grade, Douglas fir or southern yellow pine. Braces shall meet all of the requirements for wood posts.

2.4.4 Location: Posts shall be evenly spaced to adequately support the fence framework.

3.0 EXECUTION:

3.1 Wood Posts: Hold in line in a true vertical position by temporary bracing until backfilling is completed. Compact by hand tamping or other suitable methods to a density comparable to that of adjacent ground.

3.2 Steel Posts: Hold in a vertical position and drive to the required depths by an approved post driver. Post tops shall not be damaged during driving.

3.3 Corner, Brace, Or End Panels: Construct corner, brace, or end panels at the beginning and terminal ends, at gate openings, at all intersections, and at all corners or changes in horizontal alignment of fences, in existing fence on both sides of junction with new fence (except when junction is at a corner already braced), and on both sides of cattle guards.

3.4 Pull Posts shall be constructed when the distance of unbraced fencing exceeds 640 feet. Pull posts shall be spaced equidistant in the fence at intervals of 640 feet or less.

3.5 Framework Installation: Stretch to proper tension and securely fasten to posts. Top and bottom wires of fabric shall be tied or stapled to each post. Tie or staple every other wire to alternating posts. Every wire shall be tied or stapled to corner, pull, end, and gate posts. Wire for tied fabric shall be nine gauge.

3.6 Picket Replacement: Where required, new pickets shall be securely fastened into the existing wire framework using 13 gauge galvanized wire.

3.7 Restretching Existing Fabric: Fabric designated to be restretched shall be restretched to proper tension and refastened to posts. Excess fabric extending beyond the post shall be removed.

SECTION 02837
FARM-TYPE WIRE FENCING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for the repair and replacement of farm-type wire fencing. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Fabric shall be galvanized steel wire complying with ASTM A 116.

2.2 Framework:

2.2.1 Steel:

2.2.1.1 Posts shall comply with ASTM A 702, T-section, zinc-coated.

2.2.1.2 Stays shall be 9-1/2 gauge twisted wire, galvanized in compliance with ASTM A 641, Class 3.

2.2.2 Wood: Posts shall be cut from cedar, Douglas fir, pine, or other approved species of timber. Posts shall be peeled, treated, dressed, and cured and shall contain no unsound knots. All posts shall match existing post dimensions. All wood posts and braces shall be given a pressure preservative treatment in a closed retort. The treatment shall comply with Fed. Spec. TT-W-00571. Wood cut or sawed after treatment shall have the cut surfaces well-coated with the preservative used in the treatment.

2.3 Braces: Steel braces shall have the same configuration as line posts and uprights without the anchor plate. Braces shall meet all of the requirements for wood posts.

2.4 Connectors:

2.4.1 Wire for Attaching Fabric to Posts shall be 12-1/2 gauge or coarser, galvanized in compliance with ASTM A 641, Class 3.

2.4.2 Staples and Nails shall comply with Fed. Spec. FF-N-105. Staples and nails shall be zinc-coated and of sufficient length for purpose required.

2.5 Gates:

2.5.1 Tubular Steel:

2.5.1.1 Frame shall be a minimum of 1-3/8 inch outside diameter tubular steel, braced with a sturdy center bar and diagonal adjustable brace wire to prevent sagging. Gates shall be fitted with hinges. All material shall be hot-dipped zinc-coated.

2.5.1.2 Fabric for Gates shall be as specified for the fence and shall be securely tied to the framework at top, bottom, and sides with 9-gauge wire.

2.5.2 Angle Iron:

2.5.2.1 Frame shall be fabricated of angle iron with cross ties and stays of light angle iron. Frame shall be zinc-coated in compliance with ASTM A 120 or A 153.

2.5.2.2 Fabric for Gates shall be as specified for the fence and shall be securely tied to the framework at top, bottom, and sides with 9-gauge wire.

2.5.3 Wood: Provide a 3/8-inch minimum diameter galvanized steel truss rod and turnbuckle.

2.6 Barbed Wire:

2.6.1 Barbed Wire shall comply with ASTM A 121 and shall be made from 2 strands of 12-1/2 gauge galvanized steel wire, twisted, with four-point barbs spaced five inches apart. Wire shall have Class 2 zinc coating.

2.7 Hardware:

2.7.1 Gate Hardware shall include the following:

2.7.1.1 Bottom Hinge shall be designed to carry the weight of the gate.

2.7.1.2 The Upper Hinge shall be adjustable.

2.7.1.3 Lock with Chain shall be 1-3/4 inch size complying with ASTM F 883.

2.7.1.4 Keeper shall automatically engage and hold the gate leaf open until manually released.

2.7.1.5 Center Plunger Rod.

2.7.1.6 Center Stop.

2.7.1.7 Vertical Lift.

2.7.1.8 Sliding Track.

2.7.2 Lightning Arresters, Insulators and Insulator Clamps, Fasteners, Signs, and Other Accessories shall be provided and installed as required.

3.0 EXECUTION:

3.1 Wood Posts: Hold in line in a true vertical position by temporary bracing until backfilling is completed. Compact by hand tamping or other suitable methods to a density comparable to that of adjacent ground. Refasten all braces, gates, hardware, fabric, and other accessories.

3.2 Steel Posts: Steel posts shall be held in a vertical position and driven to the required depths by an approved post driver. Tops of posts shall not be damaged by driving operation.

3.3 Corner, Brace, or End Panels: Corner, brace, or end panels shall be constructed at the beginning and terminal ends, at gate openings, at all intersections, at all corners or changes in horizontal alignment of fences, in existing fence on both sides of junction with new fence, (except when junction is at a corner already braced), and on both sides of cattle guards.

3.4 Pull Posts shall be constructed when the distance of unbraced fencing exceeds 640 feet. Pull posts shall be spaced equidistant in the fence at intervals of 640 feet or less.

3.5 Wire Installation: Barbed and/or woven wire fabric shall be stretched to proper tension and securely fastened to posts. Top and bottom wires of fabric shall be tied or stapled to each post. Tie or staple every other wire to alternating posts. Every wire shall be tied to corner, pull, end, and gate posts. Wire for tying woven wire fabric and barbed wire shall be 9-gauge.

3.6 Restretching Existing Fabric: Fabric indicated to be restretched shall be restretched to proper tension and refastened to posts. Excess fabric extending beyond the post shall be removed.

3.7 Alignment: Finished fencing shall be plumb and in proper alignment with posts, and all wire work shall be taut.

SECTION 02840
ELECTRICAL TRAFFIC CONTROL SIGNALS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of electrical traffic control signals. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 General: Replacement equipment items shall be regularly manufactured products.

2.2 Concrete Poles: Cement ASTM C 150; aggregate ASTM C 33; minimum compressive strength 6,000 psi when tested in compliance with AASHTO T22. Tensioning steel shall comply with ASTM A 603. Strands shall not be tensioned above 70 percent of the rated ultimate strength. Epoxy compound for sealing hollow cores shall comply with ASTM D 1763.

2.3 Galvanized Conduit Nipples: UL 514B.

2.4 Ground Wire: Cast-in-concrete pole, No. 6 stranded bare wire, ASTM A 603.

2.5 Wood Poles: ANSI 05.1, waterborne preservative-treated in compliance with AWPA C3, Retention Zone 1.

2.6 Structural Steel: ASTM A 36.

2.7 Steel Pipe: ASTM A 53.

2.8 Steel Bars: ASTM A 576.

2.9 Wire Strand: ASTM A 475.

2.10 Zinc Coatings: Members, ASTM A 123; fasteners, ASTM A 153.

2.11 Mast Arms for Supporting Traffic Signals: ASTM A 36; aluminum alloy 3003, or alloy alcad 3004 complying with ASTM B 209.

2.12 Concrete for Pull Boxes: ASTM C 94, 3,000 psi.

2.13 Cast-Iron Covers: ASTM A 48.

2.14 Signal Lens: Manufactured in compliance with Article 5 and 6, ITE Technical Report Number 1.

2.15 Loop Wire for Vehicle Detectors: No. 14 AWG or No. 12 AWG, stranded copper wire, type TTHN, THWN, or THW, ASTM B3.

2.16 Grout: One part cement complying with ASTM C 150 and two parts sand complying with ASTM C 33.

2.17 Conduit: Polyvinyl chloride, UL 651, Schedule 40 or galvanized rigid metal, ASTM B3.

2.18 Ground Wire: Soft drawn copper, bare, stranded, ANSI C7.1.

2.19 Electrical Work: NFPA No. 70.

3.0 EXECUTION:

3.1 Scheduling and Coordination: The Contractor shall ensure that required notices have been given and that power interruptions have been scheduled and approved.

3.2 Traffic: Provide temporary traffic signs at and around work area. Signs and locations shall be as approved by the Contracting Officer.

3.3 Vehicle Detector Assemblies, Loop Type: Saw out existing loops to be replaced to their full depth. Install and seal loop wire. Splice and solder loop wire and lead-in cable and wrap a minimum of two wraps with silicone tape and heavy-duty electrical tape. Install sealant in compliance with the manufacturer's recommendations. Excavate and remove existing lead-in cable to be replaced, and install new lead-in cable in place and connect to cabinet ground.

SECTION 02850
TRAFFIC SIGNS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of traffic signs. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Sign Foundations:

2.1.1 Replacement Foundation Footing Concrete shall be a mixture of cement complying with ASTM C 150 and aggregate complying with ASTM C 33. Compressive strength shall be 2,800 psi at 28 days.

2.1.2 Sulfur Mortar shall comply with ASTM C 287.

2.1.3 Reinforcing Steel shall comply with ASTM A 615.

2.2 Sign Supports shall be of the "break-away" type. Supports shall be strong enough to resist applicable wind forces without damage, but shall be designed to experience a brittle rupture type failure or a "quick separation" type joint.

2.2.1 Sign Support, Aluminum:

2.2.1.1 Replacement Castings shall be Alloy A356.0-T6 in compliance with ASTM B 108.

2.2.1.2 Replacement Structural Members shall comply with ASTM B 308.

2.2.1.3 Replacement Bars, Rods, Shapes, and Tubes shall comply with ASTM B 221, alloy 6061-T6.

2.2.1.4 Replacement Bolts, Nuts, and Screws shall match items being replaced and shall be alloy 2024-T4 with anodic coating complying with ASTM B 580, or 6061-T6 in compliance with ASTM B 211. Bolt heads shall be hexagon. Bolt threads shall be Class 2, 2A, or 2B in compliance with ANSI B18.2.1. Nuts shall be hexagon shaped in compliance with ANSI B18.2.2.

2.2.1.5 Replacement washers shall be furnished from sheet metal complying with ASTM B 209, alloy alclad 2024-T3 or T4.

2.2.2 Sign Support, Steel:

2.2.2.1 Replacement Structural Members shall comply with ASTM A 36.

2.2.2.2 Replacement Bars shall comply with ASTM A 108.

2.2.2.3 Replacement Pipe shall comply with ASTM A 53 standard weight.

2.2.2.4 Replacement Fasteners shall comply with ASTM A 307 and ASTM A 325.

2.2.2.5 Replacement Anchor Bolts for anchoring base plates to concrete bases and nuts and washers shall be galvanized in compliance with ASTM A 153.

2.2.3 Sign Support, Wood:

2.2.3.1 Replacement Wood Sign Post shall be of the species listed in AASHTO M168, dressed four sides and having a pyramidal top cut before being treated.

2.2.3.2 Replacement Sign Post shall be pressure treated with creosote or creosote-tar solution complying with AWPB LP-55.

2.3 Sign Face:

2.3.1 Replacement Plywood Sign Face shall be grade HDOAB G-1 EXTERIOR, in compliance with DOC PS 1. Material shall be cut to size in compliance with ANSI D6.1E.

2.3.2 Replacement Galvanizing Steel Sign Face shall comply with USDOT FHA MUTCD.

2.4 Reflective Sheeting shall be enclosed lens unless otherwise directed by the Contracting Officer.

2.4.1 Enclosed Lens Reflective Sheeting shall comply with Fed. Spec. L-S-300.

2.4.2 Reflective Sheeting shall comply with FP-79 minimum reflective intensity. Measurements shall comply with Fed. Spec. L-S-300.

2.4.3 Color shall be matched visually and within the limits shown on the Color Tolerance Charts issued by the Federal Highway Administration. The diffuse day color of the reflective sheeting shall be determined in compliance with ASTM E 97.

2.4.4 Film:

2.4.4.1 General: Reflective sheeting shall be sufficiently flexible to be easily cut to shape and permit application over, and conformance to, moderate shallow embossing characteristic of certain sign borders and symbols.

2.4.4.2 Surface: Sheeting surface shall be smooth and flat, shall facilitate cleaning and wet performance, and shall exhibit 85 degrees glossmeter rating of not less than 40, as specified in ASTM D 523. The sheeting surface shall withstand cleaning with gasoline, VM&P Naphtha, mineral spirits, turpentine, methanol, and xylol.

2.5 Demountable Sign Face Materials:

2.5.1 Acrylic Plastic Reflectors: Replacement demountable sign letters, digits, arrows, borders, and alphabet accessories shall be reflectorized and shall consist of acrylic plastic reflectors supported by embossed aluminum frames. They shall comply with the Standard Alphabet for Highway Signs, of the Federal Highway Administration, Series E.

2.5.2 Design and Fabrication: The letters shall be modified as necessary to accommodate the required reflectors. All items except border strips shall be fabricated from 0.040-inch minimum sheet aluminum. Border strips shall be of 0.032-inch minimum sheet aluminum. Mounting holes shall be provided within the frames to permit the use of screws, rivets or other acceptable fasteners. The size and spacing of the reflector holes shall provide maximum night legibility and visibility of the finished cutout figure.

2.5.3 General Requirements: The reflectors shall be of acrylic plastic meeting the requirements of Fed. Spec. L-P-380, Type I, Class 3. The reflectors shall be yellow or colorless. The lens shall consist of a smooth front surface, free from projections or indentations other than for identification, and a rear surface bearing a prismatic configuration that will effect total internal reflection of light.

2.5.4 Reflective Sheeting:

2.5.4.1 Demountable Sign Letters, Digits, Arrows, Borders, and Alphabet Accessories, when so specified, shall be reflectorized with reflective sheeting supported by flat aluminum backing and shall comply with the Standard Alphabet Highway Signs of the Federal Highway Administration.

2.5.4.2 Design and Fabrication: Letter design shall be Series E, modified for legibility. All items except border strips shall be fabricated from 0.040-inch sheet aluminum, 6061-T6 alloy, with mounting holes to permit use of screws, rivets, or other acceptable fasteners.

2.6 Highway Delineators, Enclosed Lens Type: Replacement reflectors shall be of acrylic plastic and a minimum of 3 inches in diameter. They shall be mounted in a heavy-duty housing with a back plate. The reflector shall consist of a clear and transparent plastic lens, which shall be colorless, and a plastic back of the same material, fused to the lens under heat and pressure around the entire perimeter to form a homogeneous unit, permanently sealed against dust, water, and water vapor. The acrylic plastic shall comply with Fed. Spec. L-P-380, Type I, Class 3.

2.7 Highway Delineators, High Intensity Type:

2.7.1 Replacement Reflectorized Delineators shall consist of a reflective sheeting compound of glass spheres, embedded in a weatherproof, synthetic, noncellulose material. The overall size of the plastic reflectors shall be 4 inches by 5 inches, with a reflective area of at least 17.5 square inches.

2.7.2 Delineators shall be silver-white when viewed with reflected light.

2.8 Highway Delineators Including Posts and Attachments:

2.8.1 Reflective Sheeting: Replacement reflective sheeting for delineators shall match delineators being replaced.

2.8.2 Delineator Posts and Accessories shall be of steel or aluminum. They shall have the necessary holes for attachment of the delineator housing. The assembly shall be furnished with the necessary bolts, nuts, and washers for attaching to the posts.

2.8.3 Insulating Materials: Neoprene, for separation of aluminum and steel parts, shall contain at least 60 percent, by volume, of pure neoprene. Other material may be used, subject to the approval of the Contracting Officer as to pliability and ability to withstand wear caused by stretching or distortion.

2.8.4 Reflector Units for guardrail installation shall match existing reflector being replaced in size and color.

2.8.5 Highway Delineators shall be supplemented with directional guidance signs as directed by the Contracting Officer. Signs shall be the chevron alignment type and shall comply with ANSI D6.1E, Type W 1-8.

2.9 Painting Panels for Nonreflectorized Background:

2.9.1 Replacement Metal Panels for sign categories not required to be reflectorized shall have a nonreflectorized background composed of one spray coat of primer and two finish coats of baked enamel.

2.9.2 Finish Coats shall be baked alkyd resin enamels meeting Fed. Spec. TT-E-529, Class B, of a composition that affects the finished background surface. When thoroughly dry, the colors shall match those described in the current Highway Blue Color Tolerance Chart, PR Color No. 3, or in Highway Green Color Tolerance Chart, PR Color No. 4, of the Federal Highway Administration.

2.9.3 Wood Signs shall have two coats of oil paint complying with Fed. Spec. TT-P-52. Message paint shall be a single coat of oil paint. All colors shall comply with ANSI D6.1E.

2.10 Sign Wash Detergent shall comply with ASTM D 3399.

3.0 EXECUTION:

3.1 Footings for Signs, Posts, and Supports:

3.1.1 Backfill Material shall be at or near optimum moisture and neither dry nor saturated. It shall be tamped thoroughly in place.

3.1.2 Concrete Footings may be cast in place or precast. Hand mixing of concrete will be permitted where the quantity does not exceed one-half cubic yard.

3.2 Erection of Signs and Sign Supports: Sign posts shall be erected vertically. Posts erected in sleeves shall be anchored with sulphur mortar. Mortar shall comply with ASTM C 287. Sign faces shall be positioned to be generally perpendicular to the line-of-sight for the observer. Reflectorized signs shall be inspected at night. If specular reflection is apparent on any sign, its position shall be adjusted by the Contractor to eliminate the condition.

3.3 Delineators and Hazard Markers: Delineator posts shall be driven to a depth of 30 inches.

3.4 Removal of Existing Signs and Posts:

3.4.1 Damaged, Obsolete, or Change of Purpose Signs and Posts shall be removed and delivered to a storage area designated by the Contracting Officer. Post hole shall be backfilled, tamped, and made level with the adjacent surface. Disturbed paving, sidewalks, and grassed areas shall be replaced with matching material of same quality and quantity as existing.

3.4.2 Signs and Posts to be Replaced shall be removed and replaced by new signs and posts in identical locations. Backfill around post shall be thoroughly compacted to hold posts securely in a vertical position.

SECTION 02860
PLAYING FIELDS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for repair and maintenance of playing fields. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Fills required to bring the subgrade of playing surfaces up to required elevation shall be placed in horizontal layers of not more than 8 inches in loose thickness. The top layer of all fills and excavated areas under the playing surfaces shall be compacted to 95 percent CE 55 maximum density. Each lower layer shall be compacted to at least 90 percent of MIL-STD-621, Method 100, CE 55 maximum density.

2.2 Sand-Clay Playing Surfaces shall consist of a stone foundation course, a clay foundation course, a wearing course and, where equipped, a drainage filter course, constructed on the prepared subgrade.

2.2.1 Stone Foundation Course: A layer at least 3 inches thick of 3/4- to 1-1/2 inch crushed stone shall be spread over the subgrade or over the drainage filter course constructed thereon and shall be given preliminary compaction by rolling, followed by a filler consisting of 1/4- to 1/2-inch crushed stone to fill voids in the underlying stone. The stone foundation course shall be compacted to a minimum of 90 percent of CE 55 maximum density.

2.2.2 Clay Foundation Course: Selected inorganic fat clay (CH) shall be evenly spread on the stone foundation course to produce a compacted layer not less than 3 inches thick. The clay layer shall be compacted to a minimum of 90 percent of CE 55 maximum density.

2.2.3 Wearing Course: The approved inorganic clay-silt mixture of approximately 50 percent each of clay and silt shall be screened through a 1/4-inch mesh screen. The wearing course shall be mixed in proportions of 1 part sand to 2 parts clay-silt by volume. The wearing course shall be compacted to at least 90 percent of CE 55 maximum density and shall range from 1 to 1-1/2 inches in thickness.

2.2.4 Drainage Filter Course: The drainage filter course shall consist of a well-graded aggregate course encased in a geotextile material and laid in such a

manner to allow water to freely drain from the playing surfaces. The geotextile material shall be a woven or non-woven filter material with a minimum permeability of 0.02 cm/sec. The material shall be resistant to mildew, ratting, insects, rodents, and chemicals normally encountered in a subsurface drainage system.

2.3 Bituminous Concrete Playing Surfaces shall consist of a base course, prime coat, bituminous leveling course, tack coat, surface course, color coating and, where required, a drainage filter course, all constructed on a prepared subgrade. The stabilized-aggregate base course shall be compacted at optimum moisture to at least 95 percent CE 55 maximum density. Marshall stability shall not be less than 500 pounds and the flow shall not be greater than 20/100 inch. The bituminous mixture shall be compacted until the voids in the total mix are reduced to less than 4.0 percent by volume.

2.3.1 Thickness of Courses: Base course shall be 4 inches thick after compaction. Leveling course shall be 1-1/2 inches thick after compaction unless directed otherwise. Surface course shall be 1 inch thick after compaction.

2.3.2 Color Coating and Marking Paint: After curing of the bituminous surface course, the entire playing surface shall be covered with a color coat as required.

2.4 Portland Cement Concrete Playing Surfaces:

2.4.1 Aggregate: The nominal aggregate size shall be 1-1/2 inches to No. 4 sieve size and shall conform to ASTM C 33.

2.4.2 Portland Cement: The cement shall conform to ASTM C 150, Type IA or IIA; or ASTM C 595, Type IP-A.

2.4.3 Thickness: Horizontal Portland cement concrete playing surfaces shall consist of concrete slabs 4 inches thick.

2.5 Maintenance of Sand-Clay Surfaces: Prior to final acceptance, the Contractor shall make one application of 3/4 pound of calcium chloride per square yard to the sand-clay surface of the entire playing area.

2.6 Portable Outdoor Bleachers:

2.6.1 Bleachers shall be designed to support a uniformly distributed live load of 100 pounds per square foot of gross horizontal projection and a horizontal wind load of 30 lbs/sq ft of gross vertical projection. All seat and foot plank members shall be designed to support not less than 120 pounds per linear foot.

2.6.2 Wood Seating and Walk Boards shall be preservative-treated and painted.

2.7 Steel Basketball Poles: Minimum diameter 3-1/2 inches; galvanized pipe.

2.8 Running Track: Gravel and cinders over stone base; compaction to 90 percent of CE 55 maximum density. One hundred percent by weight of the gravel and cinders shall pass the 3/4-inch screen, and 90 percent of the gravel and cinders shall be retained on the No. 4 screen.

3.0 EXECUTION: (Section not used).

SECTION 02861
RECREATIONAL FACILITIES

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of miscellaneous/recreational facilities. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Materials shall be resistant to corrosion and degradation by ultraviolet rays. Hardware and fittings shall be at least as corrosion-resistant as the the materials fastened.

2.1.1 Steel Plates, Pipe, Tubing, Sheets, Wire Ropes, Chains, and Miscellaneous Shapes shall be stainless steel or galvanized steel, even if painted or coated with vinyl or other protective finish. All open pipe and tube ends shall have rain caps.

2.1.2 Wood shall be all-heart cedar, cypress, or redwood or shall be treated with a non-toxic preservative. Wood shall not be used where it will be in direct contact with the ground, unless approved by the Contracting Officer.

2.1.3 Fiberglass shall be smooth fiberglass-reinforced polyester with gelcoat coating and shall meet the following minimum physical properties: 22,000 psi flexural strength, 15,000 psi tensile strength, and 20,000 psi compressive strength.

2.1.4 Aluminum shall be anodized.

2.1.5 Foundations shall be 3,000 psi compressive strength concrete, reinforced as required. Provide embedded anchorage items as required.

2.2 Playground Equipment, shall include, but not be limited to, see-saws, slides, swings, whirlers, and monkey bars, shall be prefabricated and designed to withstand the anticipated structural loads.

2.2.1 Exposed Surfaces shall be smooth (except where required to be nonslip) seamless, and nonsplintering.

2.2.2 Steps, Platforms, and Other Flat Surfaces Subject to Foot Traffic shall be non-slip, but not abrasive and shall be formed to exclude or drain away water.

2.2.3 Fastening shall be flush, concealed, or otherwise formed or located to prevent injury to children playing on the equipment.

2.2.4 Slides shall have stainless steel sliding surfaces.

2.3 Bike Racks shall be mounted, and sections (if rack is sectional) shall be attached with tamper-proof fasteners.

2.4 Fiberglass Shelters shall be reinforced with steel, aluminum, or wood framework as required. Shelter roof shall be sloped to drain. Fiberglass edges shall be returned so that they

are not exposed. Shelters shall be prefabricated and designed to withstand the anticipated live, dead, and wind loads.

2.5 Fire Rings shall be Iron Mountain Forge Model Number 120-X or approved equal.

2.6 Pedestal Grills shall be Iron Mountain Forge Model Number 220-X or approved equal.

2.7 6' Long, Galvanized Frame, Aluminum Top and Seat Picnic Table shall be Iron Mountain Forge Model Number 238-6GA or approved equal.

2.8 6' Long, Galvanized Frame, Vinyl Clad Top and Seat Picnic Table shall be Iron Mountain Forge Model Number 238-6GV or approved equal.

3.0 EXECUTION: Recreational facilities shall be installed plumb, aligned, and securely anchored to the ground. Adjust equipment with moving parts until operation is smooth and easy.

# SECTION 02921
# TOPSOIL

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of topsoil. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Topsoil shall be the existing surface soil stripped and stockpiled on the site.

2.2 pH Adjusters:

2.2.1 Agricultural Limestone shall have a minimum calcium carbonate equivalent of 90 percent.

2.2.2 Other Liming Materials shall have a minimum calcium carbonate equivalent of 80 percent.

2.2.3 Aluminum Sulfate shall be commercial grade.

2.3 Soil Conditioners and Amendments:

2.3.1 Peat shall be a natural product conforming to ASTM D 2607.

2.3.2 Sand shall be clean and free of toxic materials.

2.3.3 Vermiculite shall be horticultural grade and free of any toxic materials.

2.3.4 Rotted Manure shall be unleached stable or cattle manure containing no chemicals or ingredients harmful to plants.

2.3.5 Rotted Sawdust shall be free of chips, stones, sticks, soil, and toxic substances.

2.3.6 Gypsum shall be 90 percent pure and free of any toxic materials.

2.4 Fertilizer shall be commercial grade, free flowing, uniform in composition and shall conform to applicable State and Federal regulations. Granular fertilizer shall conform to Fed. Spec. O-F-241, Type I, Level B.

2.5 Soil Fumigant shall be 97 percent methyl bromide and 3 percent chloropicrin.

2.6 Mulch shall be straw, hay, or fiber mulch applied simultaneously with grass seed and fertilizer.

2.6.1 Straw shall be stalks from oats, wheat, rye, barley, or rice that are free from noxious weeds, mold, or other objectionable material.

2.6.2 Hay shall be native hay, sudan-grass hay, broomsedge hay, or other herbaceous mowings, free from noxious weeds, mold, or other objectionable material.

2.6.3 Wood Cellulose Fiber for use with hydraulic application of grass seed and fertilizer shall consist of specially prepared wood cellulose fiber or a combination of wood cellulose and recycled newsprint fibers.

2.7 Asphalt Adhesive for application with straw or hay mulch shall be cutback asphalt conforming to ASTM D 2028, or emulsified asphalt conforming to ASTM D 977.

2.8 Herbicide and Pesticide use must comply with all applicable State and Federal laws.

3.0 EXECUTION:

3.1 Placing Topsoil: Topsoil shall be distributed uniformly and spread evenly to an average thickness of 3 inches, with a minimum thickness of 2 inches. Soil compacted by construction equipment or soil on compacted cut slopes of grades shall be pulverized to a minimum depth of 2 inches by disking or plowing before applying topsoil.

3.2 Application of Soil Conditioners: All fertilizers, pH adjusters, and soil conditioners shall be incorporated into the soil to a depth of at least 4 inches.

3.3 Application of Soil Amendments: Soil amendments shall be spread uniformly over the soil and thoroughly incorporated into the existing soil to a depth of 8 inches.

3.4 Mulch shall be spread uniformly in a continuous blanket, using 1-1/2 tons per acre.

SECTION 02933
SODDING AND SEEDING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of seed and sod. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Seed shall be the latest season's crop and shall be delivered in original sealed packages bearing the producer's guaranteed analysis for percentages of mixtures and pure live seed. Seed shall be labeled in conformance with U.S. Department of Agriculture rules and regulations under the Federal Seed Act and applicable state seed laws. Weed seed shall not exceed 1 percent by weight of the total mixture.

2.2 Sod shall be nursery grown, field sod, certified sod, or approved sod as classified in the ASPA Guideline Specifications to Turfgrass Sodding.

2.3 Sprigs shall be healthy living stems, stolons, or rhizomes and attached roots of grass without adhering soil. Sprigs shall include two to three nodes, shall be 4 to 6 inches long, and shall be obtained from approved sources where the sod is heavy and dense. Harvesting and planting operations shall be coordinated to prevent exposure of sprigs to the sun for more than 30 minutes before covering and moistening.

2.4 Water shall not contain elements toxic to plant life.

3.0 EXECUTION:

3.1 Preparation: Except on slopes steeper than 2 horizontal to 1 vertical, the soil shall be tilled to a depth of at least 4 inches. On slopes between 2 horizontal to 1 vertical and 1 horizontal to 1 vertical tillage, depths shall be 2 inches. On slopes steeper than 1 horizontal to 1 vertical, no tillage will be permitted.

3.2 Application:

3.2.1 Planting Seasons and Conditions: Planting shall not be done when the ground is frozen, snow covered, or in an unsatisfactory condition for planting.

3.2.2 Seed shall be broadcast uniformly. The seed shall be covered to an average depth of 1/4 inch.

3.2.3 Immediately After Seeding, the entire area shall be firmed with a roller and the soil moistened to a depth of 6 to 8 inches.

3.2.4 Sodding shall be accomplished in accordance with the ASPA Guideline Specifications to Turfgrass Sodding.

3.2.5 When Spot Sodding, the sod shall be cut into plugs 2 inches square or 2 inches in diameter. The individual pieces of sod shall be placed on 12-inch centers and pressed firmly into the soil by foot pressure or by tamping.

3.2.6 After Sod Pieces Have Been Placed in Position, the sodded area shall be rolled or tamped so that air pockets are eliminated.

3.2.7 Water Shall Be Applied to the sodded areas at a rate sufficient to ensure thorough wetting of the soil to a depth of at least 4 inches.

3.2.8 Sprigging: Sprigs shall be planted in such quantity as to provide a minimum of 25 viable sprigs or 108 linear inches of viable sprigs per square yard of areas.

3.2.8.1 Immediately After Sprigging Operations Have Been Completed, the planted area shall be firmed with a cultipacker or a roller.

3.2.8.2 Water Shall Be Applied at the time of sprigging operations wetting the soil to a depth of 4 inches.

3.2.9 Protection of Turfed Areas: Immediately after seeding, sodding, or sprigging, the area shall be protected against traffic or other use by erecting barricades, as required, and approved signs shall be placed at appropriate intervals until final acceptance.

SECTION 02940
LANDSCAPE IRRIGATION SYSTEM

1.0 DESCRIPTION OF WORK: This specification covers the complete irrigation system including: pipe, tubing, fitting, bubbler and emitter heads, control units, and all appurtenances necessary for an operating system. The system shall be Contractor designed, and installed with Contracting Officer approval.

2.0 PRODUCTS:

2.1 Piping and Fittings:

2.1.1 Copper Tubing: ASTM B 88, Type K; solder joint fittings, ASME B16.22 and B16.18 using 95-5 tin antimony solder.

2.1.2 PVC Pipe: ASTM D 1785, PVC 1120, Schedule 40 or 80, or ASTM D 2241, PVC 1120 SDR 21, Class 200; threaded or socket type, solvent cemented.

2.1.3 Polyethylene Pipe: ASTM D 2239, PE3406, SDR 15; insert fittings shall be used with stainless steel clamps.

2.1.4 Tubing for use with drip emitters shall be either polyethylene or polybutylene and shall have a minimum working pressure of 100 psi at 37 C.

2.2 Risers for Pop-up Bubbler Heads shall be of the double-swing joint type.

2.3 Application Devices shall be as specified herein.

2.3.1 Pop-up spray heads shall conform to Fed Spec WW-H-001220, Type II, class as required for the spray pattern needed.

2.3.2 Shrubbery sprinkler heads shall be brass nozzle type with adjustable conical spray coverage for permanent aboveground mounting or riser or pop-ups, height compatible with ground cover.

2.3.3 Bubbler heads shall be of the umbrella type in which the flow is evenly distributed around the perimeter of a flat plate on top of the bubbler. The bubbler shall be so adjustable as to provide half or full circle patterns and operating range of 20 psi to 90 psi. The flow rate shall be adjustable for gallonage and pressure by an easily accessible regulating screw.

2.3.4 Drip emitters shall be made of rigid, black, ultraviolet-resistant plastic. Each emitter head shall consist of at least two distinct pieces and be designed for easy and complete disassembly for cleaning. The emitters shall be capable of clog-free operation using water filtered through a 30-mesh screen. Emitters shall be multi-headed and shall be spaced to vary with soil conditions and wetted irrigation area.

2.4 Valves:

2.4.1 Gate valves less than 3 inches shall conform to MSS SP-80, Type 1, Class 150, with threaded or soldered ends.

2.4.2 Gate valves 3 inches and larger shall conform to AWWA C509, with flanged ends.

2.4.3 Pressure Reducing Valves: One valve shall be installed with each solenoid control valve. The valves shall be hydraulically operated, pilot operated, globe or angle type, and may be actuated either by diaphragm or piston. Valve bodies shall be bronze and shall conform to MSS SP-80, Type 1, Class 150. Valve stem shall be stainless steel. Valve discs and diaphragms shall be synthetic rubber. Valve seats shall be bronze. Pilot controls shall be bronze with stainless steel working parts.

2.4.4 Solenoid control valves shall be heavy-duty, all brass construction suitable for 150 psi working pressure and shall be a globe-type diaphragm valve of normally closed design.

2.4.5 Manual drain valves less than 2-1/2 inches shall be MSS SP-80, Type 3, Class 150, with soldered or threaded ends. Manual drain valves 2-1/2 inches and larger shall be MSS SP-85, Type II, Class 250, with threaded or flanged ends.

2.4.6 Automatic drain valves shall be brass or plastic, spring-loaded ball drip type, 150 pounds, and threaded ends, designed to close at 6 foot pressure head with positive seal at 3 psi pressure or greater, and be open to drain at less than 3 psi pressure.

2.4.7 Reduced pressure principle assemblies, double check valve assemblies, atmospheric (nonpressure) type vacuum breakers, and pressure type vacuum breakers shall be tested, approved, and listed in accordance with FCCHR-01. Backflow preventers with intermediate atmospheric vent shall be in accordance with ASSE 1012. Reduced pressure principle backflow preventers shall be in accordance with ASSE 1013.

2.5 Accessories:

2.5.1 Valve keys for manually operated valves shall be 1/2 inch diameter by 3 feet long, tee handles and keyed to fit valves.

2.5.2 Valve Boxes: Boxes shall be reinforced concrete pipe with cast-iron cover. Plastic valve boxes and covers, 9 in. inside diameter and self-draining, may be used as an option when approved by the Contracting Officer and in accordance with ASTM D 638. The word "IRRIGATION" shall be cast on cover.

3.0 EXECUTION:

3.1 Placing and Laying: Pipe shall not be laid in water or when trench conditions are otherwise unsuitable for the work. Water shall be kept out of the trench until the material in the joints has hardened or until caulking or jointing is completed. When work is not in progress, open ends of pipe, fittings, and valves shall be securely closed so that no substance will enter the pipes or fittings. Pipe ends left for future connections shall be valved, plugged, or capped, and anchored as shown or as directed.

3.2 Testing:

3.2.1 Hydrostatic Tests: After all new piping and risers are in place and prior to the installation of heads, each control valve shall be opened separately and the system shall be thoroughly flushed. After flushing, risers shall be capped and the entire system shall be subjected to a hydrostatic pressure test for a period of four hours. No testing shall be done until the last joint has had at least 12 hours to set. Leaking joints, cracked or defective pipe or valves shall be cut out and replaced and the complete test repeated until satisfactory results are obtained as approved by the Contracting Officer.

3.2.2 Operational Test: After the hydrostatic test, heads shall be installed and the system completed and tested to demonstrate functional efficiency. The entire system shall be operated on a normal basis for at least one month. Deficiencies such as clogging of emitters shall be corrected by the Contractor.

SECTION 02950
PLANTINGS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of plantings. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Plants:

2.1.1 Plants shall be nursery grown or plantation grown stock conforming to ANSI Z60.1 and shall bear botanical names listed in the publication for Standardized Plant Names.

2.1.2 Planting Stock shall be well-branched and well-formed, sound, vigorous, healthy, and free from disease, sun-scald, windburn, abrasion, and harmful insects or insect eggs and shall have healthy, normal, and unbroken root systems.

2.1.3 Balled and Burlapped Plants and balled and potted plants shall have ball sizes and ratios conforming to ANSI Z60.1.

2.1.4 Bare-Root Plants shall be dug with the root system substantially intact but with the earth carefully removed.

2.1.5 Container Grown Plants shall have sufficient root growth to hold the earth intact when removed from containers but shall not be root bound.

2.2 Inert Membranes:

2.2.1 Polyethylene shall conform to ASTM D 2103 and shall be 4 mils thick and black in color.

2.2.2 Roofing Felt shall conform to ASTM D 250, Type II.

2.2.3 Fiberglass Mat shall be of lime borosilicate glass fibers with an average fiber diameter of 8 to 12 microns and 2- to 4-inch strands of fiber bonded with phenol formaldehyde resin. The mat shall be 100 percent textile glass fiber.

2.3 Granular Fill for Plant Pit and Bed Drainage: Granular fill for filling over excavations and for bedding of pipes shall consist of uniformly graded sand,

stone, gravel, or stone screenings free from an excess of soft or unsound particles or other objectionable matter.

2.4 Mulch shall be free from deleterious materials and shall be stored so as to prevent inclusion of foreign materials.

2.5 Trunk Wrapping Material: Tree wrap shall be two thicknesses of crinkled paper cemented together with a layer of bituminous material.

2.6 Guying and Staking Material: Stakes for tree support and ground stakes shall be treated with preservative and sized for their usage. Accessories for guying and staking shall include wire and cable, turnbuckles, eyebolts, and deadmen as the project requires.

2.7 Edging Material for plantings shall be composed of wood, metal, or plastic, as the project requires.

2.8 Antidessicant shall be an emulsion that will provide a film over plant surfaces permeable enough to permit transpiration and will not damage the plant.

2.9 Herbicides and Pesticides used must comply with all applicable state and federal laws and be registered with the U.S. Environmental Protection Agency.

3.0 EXECUTION:

3.1 Clearing and Grading: Clearing shall consist of the satisfactory removal and disposal of brush, snags, and rubbish occurring within the area designated.

3.2 Protection of Existing Vegetation: If lawns have been established prior to planting operations, the surrounding turf shall be covered before excavations are made in a manner that will protect turf areas. Existing trees, shrubbery, and beds that are to be preserved shall be barricaded in a manner that will effectively protect them during planting operations.

3.3 Turf Removal: Where planting beds occur in existing turf areas, the turf shall be removed to a depth that will ensure the removal of the entire root system.

3.4 Plant Pits shall be dug to produce vertical sides and flat, uncompacted bottoms.

3.5 Planting Seasons and Conditions: Planting shall be done when the ground is not frozen, snow covered, or in an otherwise unsuitable condition for planting.

3.6 Setting Plants: Balled and burlapped and container-grown plants shall be handled and moved only by the ball or container. Plants shall be set plumb and held in position until sufficient soil has been firmly placed around roots or ball.

3.7 Fertilization: After establishment of finished grade around plants, all pit and bed areas shall be topdressed with fertilizer at rates recommended by the manufacturer. Fertilizer shall be applied to existing trees at rates recommended by the manufacturer.

3.8 Watering: All watering shall be done in a manner that will provide uniform coverage but will not cause erosion or damage to the finished surface. Sufficient water shall be applied to penetrate the planting bed to a depth of 4 inches.

3.9 Wrapping: The trunks of deciduous trees shall be wrapped immediately after planting.

3.10 Staking and Guying: Plants 4 to 6 feet tall shall be single staked. Plants over 6 feet tall shall be double staked. Hose chafing guards shall be used where wire would contact the plant.

3.11 Pruning: New plant material shall be pruned as required. Trimmings shall be removed from the site. Cuts 1/2 inch in diameter and larger shall be painted with tree wound dressing.

3.12 Maintenance During Installation: Maintenance operations shall begin immediately after each plant is planted and shall continue as required until final acceptance.

SECTION 03105
CONCRETE FORMWORK

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of structural cast-in-place concrete formwork. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Form Materials shall conform to ACI 301 and shall be made especially for concrete form use.

2.1.1 Corrugated or Formed Steel Sheets: ASTM A 361, G90 Coating, with depth of corrugations not less than 1/2 inch.

2.1.2 Plywood: DOC PS 1 "B-B (Concrete Form) Plywood", Class I, Exterior Grade. Minimum thickness shall be 3/4 inch.

2.1.3 Asbestos Cement Formboard: ASTM C 220, 1/4 inch thick, Type U or Type F.

2.1.4 Cylindrical Columns and Supports: Round-section members with paper or fiber tubes, constructed of laminated plies using water-resistant adhesive with wax-impregnated exterior.

2.1.5 Pan Type: 16-gauge steel with 1/4-inch thick concrete form hardboard conforming to AHA A135.4, or fiberglass at least 0.11 inch thick.

2.1.6 Lumber: Straight, uniform width and thickness and free from knots, offsets, holes, dents, and other surface defects. Minimum thickness shall be 1 inch.

2.1.7 Void Forms: Moisture-resistant treated paper faces, biodegradable.

2.2 Formwork Accessories:

2.2.1 Form Ties: Form ties shall be metal, factory-fabricated, removable or snap-off and will leave holes not less than 1/4 inch nor more than 1 inch in diameter and not more than 1 inch deep.

2.2.2 Form Coating shall be industrial colorless material that will not stain concrete, absorb moisture, or impair natural bonding.

2.2.3 Fillets for Chamfered Corners shall be wood strips or rigid plastic type.

2.2.4 Dovetail Anchor Slots shall be galvanized steel material with release-tape-sealed slots and bent tab anchors, securable to concrete formwork.

2.2.5 Flashing Reglets shall be galvanized steel with release-tape-sealed slots and alignment splines for joints, securable to concrete formwork.

2.2.6 Anchorages, Spikes, Nails, and Lag and Through Bolts shall be as required to maintain formwork in place.

3.0 EXECUTION:

3.1 Inspection: Forms shall be cleaned and reconditioned between usages. Temporary ports shall be provided in formwork to facilitate cleaning and inspection.

3.2 Preparation:

3.2.1 Formwork Shall Be Constructed to maintain tolerances in accordance with ACI 301.

3.2.2 Form Coating Shall Be Applied prior to placing reinforcing steel, anchoring devices, and embedded items. Do not apply form coating where concrete surfaces are scheduled to receive special finishes.

3.2.3 Chamfer Strips Shall Be Provided on external corners that will be exposed.

3.3 Form Removal: Forms shall be removed in a progressive manner that will prevent injury to the concrete.

SECTION 03205
CONCRETE REINFORCEMENT

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of concrete reinforcement. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendation. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Reinforcement Materials:

2.1.1 Billet-Steel Reinforcing Bars: ASTM A 615, minimum Grade 40 steel, plain or deformed bars, uncoated or galvanized finish.

2.1.2 Rail-Steel Reinforcing Bars: ASTM A 616, Grade 50 and 60 steel, plain or deformed bars, uncoated or galvanized finish.

2.1.3 Axle-Steel Reinforcing Bars: ASTM A 617, minimum Grade 40 steel, plain or deformed bars, uncoated or galvanized finish.

2.1.4 Welded Steel Wire Fabric: ASTM A 185 for plain type and ASTM A 497 for deformed type fabric.

2.1.5 Stirrup Steel: ASTM A 82.

2.1.6 Dowel Steel: ASTM A 675, Grade 80 or ASTM A 499. Steel pipes, if used for dowels, shall be closed at each end with mortar, metal, or plastic cap and shall conform to ASTM A 53, Schedule 80.

2.2 Reinforcement Accessories:

2.2.1 Wire Ties: 16 gauge black annealed wire.

2.2.2 Chairs, Bolsters, Bar Supports, and Spacers shall be provided in conformance with ACI SP-66. Supports for formed surfaces exposed to view shall be plastic protected wire or stainless steel. Precast concrete, if used for bar supports, shall be wedge-shaped, not larger than 3-1/2 inches by 3-1/2 inches in thickness and with an embedded hooked tie wire for anchorage.

3.0 EXECUTION:

3.1 Regulations:

3.1.1 Reinforcement Detailing and Placement shall conform to ACI 318.

3.1.2 Laps or Splices shall conform to ACI 318.

3.1.3 Welding shall comply with AWS D1.4.

3.2 Installation:

3.2.1 Reinforcement shall be free from loose or flaky rust and mill scale.

3.2.2 In Slabs, Beams, and Girders, reinforcing steel shall not be spliced at points of maximum stress.

3.2.3 Dowels and Tie-Bars in slabs on grade shall be placed at right angles to construction joints.

3.2.4 Wire Fabric Reinforcement shall be continuous between expansion, construction, and contraction joints in slabs on grade and between expansion joints in other slabs.

3.2.5 Reinforcing Bars shall not be continuous through expansion joints but shall be 2 inches clear from the joint.

SECTION 03255
CONCRETE ACCESSORIES

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installatin of concrete accessories. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Joint Materials:

2.1.1 Rubberized Asphalt Compound: ASTM D 1190.

2.1.2 Polyurethane-Base Elastomeric: Fed. Spec. TT-S-230.

2.1.3 Asphalt Compound: ASTM D 1190.

2.1.4 Liquid Neoprene: Fed. Spec. SS-S-200.

2.2 Sealer: Fed. Spec. TT-S-00227.

2.3 Waterstop:

2.3.1 Polyvinyl Chloride: 1,750 psi minimum tensile strength, working temperature range from minus 51 F to plus 175 F, ribbed flaps on one side only.

2.3.2 Extruded Neoprene: 2,000 psi minimum tensile strength, 60 Shore A hardness, flush or recessed from joint.

3.0 EXECUTION:

3.1 Preparation: All surfaces of joints to which sealer is to be bonded shall be absolutely clean, dry, and free of loose concrete, dirt, oil, or other foreign material.

3.2 Application:

3.2.1 All Joints shall be in accordance with ACI 318.

3.2.2 Accessible Edges of expansion joint shall be sealed with sealer.

3.2.3 The Ambient Temperature shall be between 50 and 100 F when the primer and joint sealing compound are applied.

3.2.4 Contraction Joints shall have a minimum width of 1/8 inch and a depth o 1/4 the slab thickness or 1-1/2 inches minimum, whichever is greater.

3.2.5 Construction Joints shall be doweled construction.

3.2.6 Expansion Joint Filler shall be installed below the finished floor with a temporary wood strip to form a groove not less than 3/4 inch deep.

3.2.7 Waterstops shall be installed so as to form a continuous water-tight diaphram.

SECTION 03305
CAST-IN-PLACE CONCRETE

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of cast-in-place concrete. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Concrete Admixtures:

2.1.1 Air-Entraining Admixture: ASTM C 260.

2.1.2 Accelerating Admixture (Calcium Chloride): ASTM D 98.

2.1.3 Water-Reducing or Retarding Admixture: ASTM C 494.

2.2 Concrete Mixture:

2.2.1 Cement: ASTM C 150.

2.2.2 Normal Weight Aggregate: ASTM C 33.

2.2.3 Water: Potable, free from deleterious substances.

2.2.4 Proportion of Cement, Aggregate, and Water shall comply with ACI 318.

2.2.5 Concrete shall have a compressive strength (28 day) as indicated on the drawings. Entrained air by volume shall be 6 percent, and the slump shall be a maximum of 4 inches and a minimum 1 of inch. All reinforcing steel shall be Grade 60.

2.3 Concrete Accessories:

2.3.1 Bonding Agent shall be two component epoxy resin, two component polysulphide-epoxy, polysulphide polymer epoxy, or polysulphide polymer epoxy resin.

2.3.2 Vapor Barrier shall consist of 6-mil polyethylene sheet, complying with ASTM C 171, or heavy kraft papers laminated together with glass fiber and overcoated with polyethylene.

2.3.3 Floor Hardener:

2.3.3.1 Metallic Floor Hardener: Magnesium fluosilicate and zinc fluosilicate with water.

2.3.3.2 Non-Metallic Floor Hardener shall be used when hardened floor is subject to light or medium floor traffic.

3.0 EXECUTION:

3.1 Concrete Placement:

3.1.1 Formwork, Reinforcing Steel, and Embedment Items shall be inspected before placing concrete.

3.1.2 Concrete Placement shall comply with ACI 304 and 301.

3.1.3 Cold Weather Placing shall be in compliance with ACI 306. Concrete mixture temperature shall be not less than 50 F.

3.1.4 Hot Weather Placing shall be in compliance with ACI 305. Concrete mixture temperature shall be not more than 80 F.

3.2 Concrete Finishes shall comply with ACI 301.

3.2.1 Float Finish shall be applied to monolithic slab surfaces receiving trowel finish or slab surfaces to be covered with membrane or elastic waterproofing.

3.2.2 Trowel Finish: Power-driven troweling or hand troweling shall be applied to monolithic slab surfaces to be exposed to view and slab surfaces covered with resilient flooring.

3.2.3 Broom Finish shall be applied to exterior concrete platforms, stairs, ramps, etc.

3.2.4 Rough Slab Finish: Slabs shall be screeded with straight edges so that no coarse aggregate is visible and slab is suitable to receive fill and mortar setting beds.

SECTION 03320
CONCRETE TOPPING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of concrete floor toppings. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Cement: Portland cement, ASTM C 150, Type I or III.

2.2 Sand: ASTM C 33.

2.3 Coarse Aggregate: ASTM C 33, maximum size 3/8 inch.

2.4 Granolithic Material: Emery, hard mineral, or non-staining metallic material finely ground to produce non-skid surface.

3.0 EXECUTION:

3.1 Integral Topping: Topping shall be a one part cement, one part sand, and two parts aggregate mix to produce a hard topping with a minimum 28-day compressive strength of 5,000 psi.

3.1.1 Surface of Base Slab shall be roughened before placing topping.

3.1.2 Spread Topping Mixture evenly over base, bring to required depth, and strike off level with a straightedge. Consolidate surface by power-float finishing.

3.1.3 Hard-Trowel-Finish slab topping.

3.1.4 Control Joints in Topping shall be located directly above joints in base slab.

3.2 Granolithic Finish: Topping shall be a one part cement, one part sand, and 1-1/2 parts aggregate mix. Topping shall be placed same as integral topping.

3.2.1 Prior to Final Troweling, granolithic material shall be spread evenly over the topping surface.

3.2.2 Granules shall be worked into the surface to provide complete bonding with the topping but also to provide an abrasion-resistant, non-skid surface.

SECTION 03351
EXPOSED AGGREGATE CONCRETE

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of exposed aggregate finish on concrete. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Cement: ASTM C 150, Type I Portland cement.

2.2 Admixtures: ASTM C 494, ASTM C 260.

2.3 Aggregate: ASTM C 33.

2.4 Water: Clean, potable.

2.5 Cleaning Agent: Commercial grade muriatic acid, mixed 1 part acid to 10 parts water.

2.6 Bonding Agent: Polyvinyl acetate emulsion.

2.7 Surface Aggregate: As directed.

3.0 EXECUTION:

3.1 Concrete Shall Be Placed and Vibrated to ensure that concrete is consolidated and that all voids are filled.

3.2 Formed Concrete:

3.2.1 Leave Forms in Place until removal can be effected without damage to the shape or strength of the concrete but, in no case, in less than 24 hours. Longer time periods will be required when lower ambient temperatures are experienced.

3.2.2 Immediately After Removal of Form Work, remove surface cement paste from around aggregate by either washing with water and scrubbing with a stiff bristle brush, wetting and scrubbing surface with acid etch solution, or sandblasting surface.

3.2.3 Cover Concrete and continue curing procedures.

3.3 Slabs:

3.3.1 Allow Concrete to Cure until slab can be loaded without structural damage but, in no case, in less than 24 hours.

3.3.2 Uncover Slab and remove surface cement paste from around aggregate, using methods described for the removal of paste from formed concrete.

3.3.3 Cover Concrete and continue curing procedures.

3.4 Exposure: Do not expose more than 40 percent of aggregate surface.

3.5 Surface-Applied Aggregate:

3.5.1 Evenly Distribute the Aggregate on the prepared concrete surface.

3.5.2 Work Aggregate into Surface to form permanent bond.

3.5.3 Provide Proper Curing Conditions for exposed aggregate surface.

SECTION 03352
RUSTICATED CONCRETE FINISHES

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of rusticated concrete finishes. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Overlaid Plywood: DOC PS 1, B-B High Density Overlaid Concrete Form, Class I.

2.2 Plywood: DOC PS 1, B-B (Concrete Form) Plywood, Class I, Exterior Grade or better, mill-oiled and edge-sealed, with each piece bearing legible inspection mark.

2.3 Chamfer Strips: Clear white pine with surface against concrete to be planed, metal, PVC, or rubber.

3.0 EXECUTION:

3.1 Form Construction: Forms shall be constructed to provide required sizes, shapes, lines, and dimensions and to provide continuous, straight, smooth exposed surfaces. Forms shall be fabricated for easy removal without hammering or prying against concrete surfaces. The number of joints shall be minimized. Joints shall be made watertight to prevent leakage of cement paste. Provisions shall be made for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, inserts, and other features required in the work.

3.2 Form Coatings: Forms shall be oiled with form-coating compounds that will not bond with, stain, nor adversely effect concrete surfaces, and will not impair subsequent treatments of concrete surfaces.

3.3 Finish: Fins and other projections shall be completely removed and smoothed. A smooth rubbed finish shall be provided not less than one day after form removal.

SECTION 03353
SOLID BOARD CONCRETE FINISHES

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of solid board concrete finishes. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Overlaid Plywood: DOC PS 1, B-B High Density Overlaid Concrete Form, Class I.

2.2 Plywood: DOC PS 1, B-B (Concrete Form) Plywood, Class I, Exterior Grade or better, mill-oiled and edge-sealed, with each piece bearing legible inspection mark.

2.3 Fiberboard: AHA A135.4, tempered, waterproof, screenback, concrete form hardboard.

3.0 EXECUTION:

3.1 Form Construction: Forms shall be constructed to provide required sizes, shapes, lines, and dimensions and to provide continuous, straight, smooth, exposed surfaces. The number of joints shall be minimized. Joints shall be made watertight to prevent leakage of cement paste.

3.2 Form Coatings: Forms shall be oiled with form-coating compounds that will not bond with, stain, nor adversely affect concrete surfaces, and will not impair subsequent treatments of concrete surfaces.

3.3 Finish: Fins and other projections shall be completely removed and smoothed. A smooth rubbed finish shall be provided not later than one day after form removal.

SECTION 03354
FLEXURAL CONCRETE

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for repair and maintenance of flexural concrete. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Cement: ASTM C 150.

2.2 Fine and Coarse Aggregates: ASTM C 33.

2.3 Admixtures:

2.3.1 Air-Entraining Agents: ASTM C 260.

2.3.2 Retarders: ASTM C 494.

2.3.3 Pozzolans: ASTM C 618.

2.4 Mixture Proportions: The concrete shall possess the required 28-day flexural strength and shall be tested in accordance with ASTM C 293 and ASTM C 192.

3.0 EXECUTION:

3.1 Placing: Concrete shall be deposited in the forms or in front of slip-form pavers within 45 minutes from the time all ingredients are charged into the mixing drum. Concrete shall be deposited as close as possible to its final position. The placement of the concrete shall be continuous and at a uniform rate without unscheduled stops. Concrete shall be consolidated with mechanical vibrating equipment immediately after spreading.

3.2 Finishing Operations shall be started immediately after placement of the concrete. Finishing shall be by the machine method except that, where directed, the hand method will be permitted on odd slab widths or shapes and in event of breakdown of the mechanical equipment to finish concrete. The sequence of operations shall be as follows: finishing, floating, straightedging, texturing or troweling, and, where directed, edging of joints.

3.3 Curing: Concrete shall be protected against loss of moisture and rapid temperature changes for at least 7 days from the beginning of the curing operation. Unhardened concrete shall be protected from rain and flowing water. Protection shall be provided as necessary to prevent cracking due to temperature changes during the curing period.

SECTION 03362
SPECIALLY PLACED CONCRETE

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of pumped concrete. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Concrete Pumps shall pump a minimum of 100 cubic yards of concrete per hour.

2.1.1 Piston Type: Pump shall draw alternately from a hopper into the discharge pipe by a piston, operated mechanically or hydraulically.
2.1.2 Pneumatic Type: Air pressure shall force the concrete into the discharge pipe.

2.1.3 "Squeeze" Type: Pump-powered rollers shall deform a concrete-filled flexible tube to push the concrete into the discharge pipe.

2.2 Discharge Lines:

a. 3- to 6-inch steel pipe.

b. 5-inch aluminum pipe with acceptable coating.

c. 4- to 5-inch rubber hose.

2.3 Hopper: 15 to 20 cu ft concrete capacity.

3.0 EXECUTION:

3.1 Slump Loss shall be less than one inch while passing through the pumping system.

3.2 When Concrete Must be Pumped long distance, a relay system shall be installed (one pump feeds into the hopper of another pump).

3.3 Placing Concrete by Pumping Methods shall comply with ACI 304.2R.

# SECTION 03363
# SECOND-POUR CONCRETE

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of second-pour concrete. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS: Second-pour concrete shall match the materials and mix used for first-pour concrete. Use of second-pour concrete shall be in pre-planned situations in which a small section of the first pour must be interrupted for purposes of expediting construction. Alternating- section pours of large slabs or walls shall not be considered first- or second-pour concrete. Second-pour concrete planning shall be approved by the Contracting Officer.

3.0 EXECUTION:

3.1 Preparation:

3.1.1 All Bulkheads and Keyways used as limits of the first pour shall be removed and contact surfaces prepared to receive the second-pour concrete.

3.1.2 All Forms, Reinforcing, and Embedments installed for the first pour that will be utilized in the second-pour shall be cleaned and prepared.

3.2 Erection:

3.2.1 All Additional Forms, Reinforcing, and Embedments required for the second-pour concrete shall be installed.

3.2.2 The Second-Pour Concrete shall be placed in the manner specified for the first-pour concrete.

3.2.3 The Curing Procedures used for the first-pour concrete shall be used for the second-pour concrete unless otherwise directed or approved by the Contracting Officer.

SECTION 03375
CONCRETE CURING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for concrete curing. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Impervious Sheet Materials: ASTM C 171.

2.2 Burlap: Fed. Spec. CCC-C-467.

2.3 Membrane-Forming Compound: ASTM C 309, Type I.

3.0 EXECUTION: Concrete shall be cured by protection against loss of moisture and rapid temperature change for a period of not less than 7 days for normal concrete or 3 days for high early strength concrete in accordance with ACI 301 procedures.

3.1 Absorptive Cover shall be placed to provide coverage of concrete surfaces and edges, with 4-inch lap over adjacent absorptive covers.

3.2 Horizontal Surfaces shall be cured by ponding, by covering with a 2-inch minimum thickness of continuously saturated sand, or by covering with polyethylene sheet,saturated burlap, or waterproof paper.

3.3 Formed Surfaces shall be cured by moist curing with forms in place for full curing period. Wooden forms shall be kept wet at all times during curing.

3.4 Unformed Surfaces, such as slabs and other flat surfaces, shall be cured by application of appropriate curing compound.

3.5 Membrane-Curing Compound shall not be applied where a protective coat or waterproofing is to be expected.

SECTION 03480
MISCELLANEOUS PRECAST ITEMS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of miscellaneous precast items. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Precast Items shall include, but not be limited to, stairs, planters, picnic tables, including base, seats ant tops, handrails, splash blocks, and bumper curbs and shall be supplied by a manufacturer normally engaged in the fabrication of these items.

2.2 Fabrication: PCI MNL-117.

2.3 Each Unit shall be complete and self-contained.

2.4 Items shall be fabricated from concrete with a minimum strength of 3,000 psi and shall be reinforced as required to withstand both construction loads and design loads.

2.5 Stairs shall be supplied in complete runs.

3.0 EXECUTION:

3.1 Preparation:

3.1.1 Provide Anchors, Devices, and Openings required to install precast units.

3.1.2 Precast Units shall be hoisted at points provided by the manufacturer and in manner that avoids damage to the units.

3.1.3 Temporarily Brace Precast Units in proper position and alignment until permanent anchorage and supports are in place.

3.2 Erection:

3.2.1 Anchor Units in final position by bolting, welding, grouting, or as otherwise directed. Remove temporary shims, wedges, and spacers as soon as possible after anchoring is completed.

3.2.1.1 At Bolted Connections use lock washers or other acceptable means to prevent loosening of nuts.

3.2.1.2 At Welded Connections, apply rust-inhibitive coating on damaged areas, identical to shop-applied material. Use galvanizing repair coating on galvanized surfaces.

3.2.2 Cleaning: Clean exposed facings to remove dirt and stains that may be on units after erection and completion of joint treatments. Do not use cleaning materials or processes that could change the character of exposed concrete finishes.

SECTION 03510
GYPSUM CONCRETE DECKS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of gypsum concrete decks. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Gypsum Concrete: ASTM C 317, Class A.

2.2 Formboards:

2.2.1 Sheetrock: ASTM C 36.

2.2.2 Mineral Fiber Board: ASTM C 612.

2.2.3 Cement Fiber Board: ASTM E 1264, Type IX, Fire Class A.

2.2.4 Glass Fiber Board: Lightweight, rigid, composed of pressed glass fibers.

2.3 Bulb Tees: Hot-rolled from high-strength rail steel, ASTM A 499.

2.4 Reinforcing Mesh:

2.4.1 Welded Wire Fabric: ASTM A 185, galvanized, 12 x 48-W O.5 x W O.5.

2.4.2 Woven Wire Fabric: ASTM A 82, galvanized, 19 gauge wire, 2-inch hexagonal mesh.

3.0 EXECUTION:

3.1 Support System: Sub-purlins shall be spaced to support formboard and rigidly attached to main supports. Formboards shall fit snugly at sub-purlins and at wall, curbs, and openings.

3.2 Reinforcement: Lay wire fabric continuously over subpurlins. Do not lap side of reinforcement.

3.3 Gypsum Concrete: Gypsum concrete shall be placed continuously without interruption until entire panel or section is complete. Immediately after placement, screed, level, and trowel smooth.

SECTION 03520
INSULATING CONCRETE ROOF DECKS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of insulating concrete roof decks. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Portland Cement: ASTM C 150, Type I or III.

2.2 Aggregate: ASTM C 332, Type I, perlite or vermiculite.

2.3 Water: Clean, potable.

2.4 Admixture: Air-entraining, ASTM C 260.

2.5 Reinforcement: Welded wire fabric, ASTM A 185, galvanized, 12 x 48 - W 0.5 x W 0.5.

3.0 EXECUTION:

3.1 Reinforcing Mesh: Place reinforcing mesh at right angles to structural supports, with end laps at least 6 inches and no side laps. Cut to fit around roof openings and projections. Terminate mesh at control joints.

3.2 Place Lightweight Insulating Concrete, using equipment and procedures to avoid segregation of mix and loss of air content. Deposit and screed in a continuous operation until an entire panel or section of roof area is completed. Do not vibrate or work mix except for screeding or floating. Leave top surface in acceptable condition to receive subsequent roofing application.

3.3 Begin Curing Operations immediately after placement, and air cure for not less than 3 days.

SECTION 03521
PRECAST LIGHTWEIGHT ROOF SLABS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of precast lightweight roof deck concrete channels, concrete planks, and gypsum planks. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Channel Slabs: Slabs shall be composed of Portlant cement and lightweight aggregate with minimum compressive strength 3,750 psi. Legs shall be reinforced with deformed bars; web shall have welded wire fabric reinforcement.Channels shall support a 30 psf live load plus a 20 psf superimposed dead load.

2.2 Planks: Planks shall be composed of Portland cement and lightweight aggregate with a minimum compressive strength of 3,750 psi. Planks shall be reinforced with welded wire fabric. Planks shall support a 30 psf live load plus a 20 psf superimposed dead load.

2.3 Gypsum Planks shall be suitable for the intended use, factory-laminated to 2-inch thickness, 2-foot wide panels. Planks shall be continuously supported along sides.

2.4 Subpurlins shall be bulb-tees, hot-rolled from high-strength rail steel, ASTM A 499.

2.5 Grout shall be lightweight concrete or gypsum concrete.

3.0 EXECUTION:

3.1 Concrete Channels and Planks shall be securely attached to support steel or concrete by metal clips or other approved attachments; minimum support bearing shall be 4 inches. Open joints between channels or planks shall be filled with lightweight concrete grout. Planks with tongue and groove edges may not require grouting.

3.2 Gypsum Planks shall be snugly fitted between bulb-tee subpurlins. Subpurlins shall be tack-welded or screw-attached to supporting steel or weld bar cast in supporting concrete. Joints at bulb-tees shall be grouted with gypsum grout.

# SECTION 03530
# CEMENTITIOUS WOOD FIBER ROOF DECK SYSTEMS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of cementitious wood fiberboard and tees for roof decks. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Cementitious Wood Fiber Planks shall be precast units composed of extra long wood fiber pressure bonded with Portland cement. Plank edges shall be either tongue and groove or rabbeted to receive bulb-tee subpurlins.

2.2 Bulb-Tees: Hot-rolled from high-strength rail steel, ASTM A 499.
2.3 Grout: Lightweight concrete.

3.0 EXECUTION:

3.1 Subpurlin System: Planks shall be fitted between bulb-tees. Bulb-tees shall be securely fastened to supporting members. Spaces between planks at subpurlins shall be filled with lightweight concrete grout. Systems of planks and subpurlins shall support a 30 psf live load and a 10 psf superimposed dead load.

3.2 Tongue and Groove System: Planks shall be erected directly on supporting members and securely attached with metal clips or other approved fasteners. The tongue and groove of both ends and sides of plank shall be snugly fitted to eliminate open cracks.

SECTION 03605
GROUT

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of grout for bases and joints. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Premixed Grout shall contain cement, sand, and admixtures to produce a non-shrinking grout with the addition of potable water. Expansion shall be limited to 0.10 percent at 28 days.

2.1.1 Metallic Grout shall be non-rusting, containing finely graded metallic aggregate with a compressive strength of 12,000 psi at 28 days.

2.1.2 Non-Metallic Grout shall have a compressive strength of 13,000 psi at 28 days.

2.1.3 Fluid Grout shall be a non-metallic grout with flowable consistency.

2.2 Field-Mixed Grout: Grout shall contain 1 part cement to 3 parts sand by volume, with the water content such that a mass of mortar tightly squeezed in the hand will retain its shape but will crumble when disturbed.

3.0 EXECUTION:

3.1 Baseplates shall be grouted with non-shrinking grout. Grout shall be placed so that all spaces and cavities below the top of base plates are completely filled without voids. Forms shall be provided where structural components of base plates will not confine the nonshrinking grout.

3.2 Joints shall be filled with field-mixed grout by tamping or ramming with a bar or rod until the joint is completely filled. Grout surface shall be smooth-finished and level with the adjoining material.

SECTION 03705
CONCRETE RESTORATION AND CLEANING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for repair and maintenance of concrete. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Epoxy Resin: Two-part epoxy adhesive containing 100 percent solids.

2.1.1 Bond Strength: ASTM C 882, 2,700 psi.

2.1.2 Tensile Strength: ASTM D 638, 6,600 psi.

2.1.3 Elongation: ASTM D 638, two percent.

2.1.4 Flexural Strength: ASTM D 790, 8,000 psi.

2.1.5 Compressive Strength: ASTM D 695, 10,000 psi.

2.2 Bonding Agent: Polyvinyl acetate emulsion, water-resistant when applied and cured.

2.3 Concrete:

2.3.1 Portland Cement: ASTM C 150.

2.3.2 Sand: ASTM C 33.

2.3.3 Coarse Aggregate: ASTM C 33.

2.3.4 Water: Clean and potable.

2.3.5 Air-Entraining Admixture: ASTM C 260.

2.3.6 Water-Reducing and Retarding Admixture: ASTM C 494.

2.4 Cleaning Agent: Commercial muriatic acid, mixed one part to ten parts potable water.

2.5 Reinforcing Steel: ASTM A 615, Grade 40 or 60.

3.0 EXECUTION:

3.1 Cleaning:

3.1.1 Clean Concrete Surfaces of dirt, laitance, corrosion, oil, stains, or other contamination. Surface cleaning shall be accomplished by one or more of the following methods as appropriate for the contamination: wire brush using plain water or acid, sandblasting, high pressure steam cleaning with or without chemical additives, high pressure water, high pressure air, or scrub brush and detergent. When acids or chemicals are used, surface shall be thoroughly rinsed and neutralized. Care shall be taken when sandblasting to not etch the surface.

3.1.2 Deteriorated or Spalled Concrete:

3.1.2.1 Completely Remove all loose, deteriorated, or unsound concrete down to sound concrete.

3.1.2.2 Where Removal Exceeds 1/4 inch or where resurfacing of the entire area is not anticipated, concrete shall be removed to a minimum depth of 2 inches. If cover for reinforcing bars is 2 inches or less, remove concrete to completely expose the reinforcing in the repair area. Remove concrete to a minimum of 1 1/2-inches clear beyond reinforcing. Edges of the repair area shall be cut sharp, perpendicular to the face of the concrete surface, and at least 1 inch deep. Make the perimeter cut with a concrete saw and in a manner to not cut the reinforcing. Clean reinforcing of all rust and scale. Clean repair area of all loose or foreign material using high pressure air or water.

3.2 Resurfacing:

3.2.1 Resurfacing for concrete floors shall be with either epoxy coating or cementitious materials.

3.2.1.1 Epoxy Resurfacing shall be applied to a clean hard surface to a minimum thickness of 1/8 inch.

3.2.1.2 Cementitious Material Resurfacing shall be a minimum of 1 inch thick. Mix shall be one part Portland cement, one part sand, and 1-1/2 parts coarse gravel not exceeding 3/8-inch size crushed rock. Apply bonding compound and immediately place new surfacing. Curing shall be by burlap blanket method. Blankets shall be kept thoroughly saturated and in intimate contact with the concrete.

3.2.2 Resurfacing of Columns: Resurfacing of spalled or deteriorated column surfaces shall be with epoxy grout prepared with the addition of sand to epoxy resin

to obtain a mix consistency that will not sag when placed in thin layers on vertical surfaces. Trowel finish.

3.3 Concrete Rehabilitation:

3.3.1 Concrete Patching:

3.3.1.1 Surface Shall Be Prepared as specified for deteriorated concrete cleaning.

3.3.1.2 Any Existing Reinforcing Bars that have a loss of more than 25 percent of their cross section through corrosion shall be replaced. Clean reinforcing bars by sandblasting or wire brushing.

3.3.1.3 Patch with Portland Cement Concrete if average patch thickness is 2 inches or greater; if less than 2 inches, patch with epoxy grout. Use bonding compound when placing Portland cement concrete patch.

3.3.2 Crack Repair:

3.3.2.1 Epoxy Resin Adhesive Injection: Provide temporary surface seal on crack with entry ports spaced equal to the approximate thickness of the concrete. Inject adhesive into ports under pressure. Continue from port to port until crack is filled, working from bottom to top. Remove temporary seal and clean surface.

3.3.2.2 Epoxy Grout: The crack shall be cut out at the surface in a V-shape that extends to approximately 2 to 3 inches in width. Thoroughly blow out crack with high pressure air and wet with clean water. Completely fill the crack beyond the V-shaped portion with epoxy grout. The mix shall be thin enough to run freely into the crack for horizontal surfaces. Vertical cracks shall require a stiff mix tamped into place to fill all voids. Trowel finish.

SECTION 03720
BRIDGE PIERS, ABUTMENTS, AND ANCHORS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for the repair and maintenance of bridge piers, piles, cassions footings, abutments, and anchors. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Treated Timber Piles: Comply with the state's standard specifications.

2.2 Steel H-Piles: ASTM A 36.

2.3 Steel Pipe Piles: ASTM A 252, Grade 1.

2.4 Precast Reinforced Concrete Piles: Comply with the state's standard specifications.

2.5 Precast Prestressed Concrete Piles: Comply with the state's standard specifications.

2.6 Steel Sheet Piling: ASTM A 328.

2.7 Wales, Plate Washers, and Tie Rods: ASTM A 36.

2.8 High Strength Steel Bolts, Nuts, and Washers: ASTM A 325.

2.9 Electrodes: AWS A5.1 or AWS A5.5.

3.0 EXECUTION:

3.1 Preparation:

3.1.1 Traffic Control: When traffic is maintained on bridge under repair or is directed over a temporary run-around, furnish, erect, and maintain all barricades, flags, torches, lights, guardrails, temporary pavement markings, and traffic control signs required for the protection of the public and for the direction of traffic. Number, type, color, size, and placement of all traffic control devices and the use of a flagman shall comply with USDOT FHA MUTCD "Traffic Controls for Highway Construction and Maintenance Operations." All traffic control devices in advance of the construction limits shall also be the responsibility of the Contractor.

3.1.2 Clearing and Dewatering: Scalp the area around timber pile bents and abutments. Remove from the vicinity all weeds and bushes as necessary to eliminate fire hazards. Keep work areas clear of water by using cofferdams, diversion channels, or other approved methods. Submit details of methods to be used to the Contracting Officer for approval prior to beginning work.

3.2 Maintenance and Repair Methods:

3.2.1 General: Preparation for pile driving, penetration of piles, tolerance in driving, splicing of piles, cut-offs, determination of bearing values, treatment of pile heads, and test piles shall comply with the state's standard specifications and these specifications. Drive new pile in the location and batter as directed. Pile shall not be pulled into location after driving.

3.2.2 Existing Timber Piles: Replace or repair decayed portions of piles as directed.

3.2.3 Existing Steel Piles: Remove corroded material by sandblasting or wire brushing. Strengthen the web and flanges of the corroded section by the addition of structural carbon steel or high strength steel and encase the piles in Class A concrete.

3.2.4 Caissons and Piers: Construct new caissons and piers in compliance with the Recommended Specifications of the Association of Drilled Shaft Contractors, Inc.

3.2.5 Footings: Repair spalling and rounding off of side spaces, transverse cracks, and deteriorated concrete as directed. Install additional reinforcing and drilled anchors where required. Provide formwork as required to restore concrete to its original shape to the extent practicable. New concrete shall cure at least 3 days prior to removal of forms and restoration of the stream channel to its proper course.

3.2.6 Concrete Abutments, Pile Bents, Walls, and Piers: Repair spalling, scaling, and pop-outs as directed. Remove concrete to a depth of 1-1/2 inches minimum clear distance behind the layer of reinforcing. Install additional reinforcing and drilled anchor rods as required. Replace concrete as described above for footings.

3.2.7 Bearing Seats: Remove all debris from around bearings and bearing seats. Widen bearing seat and repair spalling, scaling, and pop-outs as directed. New concrete that will be in direct contact with a bearing shall be 4,000 psi concrete with 4 to 6 percent entrained air and 4 inch maximum slump if patch thickness is greater than 4 inches or non-shrink grout if patch thickness is less than 4 inches.

3.2.8 Steel Piers, Pile Abutments, Walls, and Pile Bents: Remove corroded material by sandblasting or wire brushing. Strengthen plates and shapes of corroded sections by the addition of structural carbon steel or high strength steel. Reweld or bolt loose connections as directed. Remove and replace loose bolts or rivets.

3.2.9 Repair of Displaced Sheet Pile: Remove displaced sheet pile and drive new pile in position of the original pile before it became displaced. Remove and replace deteriorated backing material. Backing material shall be approved by the Contracting Officer. Where directed, drive new sheet piling and add backing material in the void between old and new sheet piling.

3.2.10 Anchorage System: Repair tie rods and deadmen as directed.

SECTION 03730
CONCRETE BRIDGE COMPONENTS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for repair and maintenance of concrete bridge components. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Portland Cement: ASTM C 150, Type I or Type III.

2.2 Air-Entraining Admixtures: ASTM C 260.

2.3 Water-Reducing and Retarding Admixtures: ASTM C 494.

2.4 Water: Potable water, free from injurious amounts of oil, acid, salt, alkali, organic matter, or other deleterious substances.

2.5 Aggregate: ASTM C 33.

2.6 Concrete Curing Materials:

2.6.1 Membrane Curing Compound: Comply with ASTM C 309, Type I. Curing compound shall not be used where bituminous concrete surfaces will be added unless certified not to affect adherence of the surface.

2.6.2 Vapor Barrier: A .004-inch thick polyethylene film complying with ASTM C 171.

2.6.3 Burlap: Fed. Spec. CCC-C-467.

2.7 Reinforcement:

2.7.1 Reinforcement Bars: ASTM A 615, Grade 40 or 60.

2.7.2 Welded Wire Fabric: ASTM A 185 for plain fabric; ASTM A 496 for deformed wire fabric.

2.7.3 Accessories: Comply with CRSI "Manual of Standard Practice of Reinforced Concrete Construction."

2.7.4 Prestressing Steel Strand: ASTM A 416, Grade 250.

2.8 Formwork:

2.8.1 Form Ties: Watersealing snap-in type with a minimum working strength of 3,000 psi.

2.8.2 Plywood for Forms and Liners: DOC PS 1, minimum grade B-B High Density Concrete Form Overlay, Class I.

2.8.3 Formwork Lumber: Straight and clean. All nails shall be withdrawn and surfaces in contact with concrete shall be thoroughly cleaned before reuse.

2.9 Epoxy Bonding Compound: A 100 percent solids, moisture insensitive, epoxy resin system complying with Fed. Spec. FF-G-450.

2.10 Concrete Sealer: A colorless liquid complying with Fed. Spec. TT-C-800.

2.11 Poured Joint Sealers:

2.11.1 Cold-Poured Joint Sealer: CE CRD-C-527.

2.11.2 Hot-Poured Joint Sealer: AASHTO M173.

3.0 EXECUTION:

3.1 Preparation:

3.1.1 General: Provide scaffolding, falsework, and cofferdams as required for access to the work.

3.1.2 Traffic Control: When traffic is maintained on bridge under repair or is directed over a temporary run-around, furnish, erect, and maintain all temporary pavement markings and traffic control signs required for the protection of the public and for the direction of traffic. Number, type, color, size, and placement of all traffic control devices and the use of a flagman shall comply with USDOT FHA MUTCD "Traffic Controls for Highway Construction and Maintenance Operations." All traffic control devices in advance of the construction limits shall also be the responsibility of the Contractor.

3.1.3 Formwork: ACI 347 and ACI 318. Use plywood or metal forms for exposed surfaces. All exposed external corners of concrete shall be chamfered.

3.1.4 Reinforcement:

3.1.4.1 Fabrication: ACI 315 and ACI 318.

3.1.4.2 Cover: Concrete protection for reinforcement shall comply with AASHTO Standard Specifications for Highway Bridges, Section 1.5.6.

3.1.5 Concrete Mixtures:

3.1.5.1 General: The proportions of cement, aggregate, and water shall be selected by the Contractor in compliance with ACI 318 to provide a plastic and workable mix. Concrete shall be mixed in compliance with ASTM C 94. Concrete not otherwise indicated shall be Class A Concrete. Final mix proportions shall be subject to the approval of the Contracting Officer.

3.1.5.2 Class A Concrete shall have a strength of 4,000 psi after 28 days and a maximum slump of 4 inches. Concrete shall contain 7 bags cement per cubic yard and 4 to 6 percent entrained air by volume.

3.1.5.3 Class B Concrete shall have a strength of 4,000 psi after 28 days, contain 8 bags of cement per cubic yard, and have a maximum slump of 4 inches. Concrete shall be 3/8 inch maximum aggregate size and contain 6 to 9 percent entrained air by volume.

3.1.5.4 Class C Concrete shall have a strength of 4,000 psi after 28 days, contain 8 bags of cement per cubic yard, and have a maximum slump of 4 inches. Concrete shall be 1-1/2 inch maximum aggregate size and contain 6 to 9 percent entrained air by volume.

3.1.5.5 Patching Mortar shall be a mix of 1 part cement and 2 parts fine aggregate.

3.1.5.6 Grout for Bonding New Concrete to old shall consist of equal parts by weight of Portland cement and sand, mixed with sufficient water to form a stiff slurry.

3.1.5.7 Non-Shrink Grout shall have a strength of 9,000 psi after 28 days. Mixtures to be placed in excess of 1 inch thick may include 3/8 inch pea gravel.

3.2 <u>Installation</u>:

3.2.1 Placing Concrete:

3.2.1.1 Deposit Concrete as close as practicable to its final position to avoid segregation of materials. Do not retemper or remix concrete that has reached its initial set.

3.2.1.2 Under Water: All concrete deposited under water shall be mixed in the proportions specified except that 10 percent additional cement shall be used in the mix. Concrete deposited under water shall be placed in still water and shall be carefully placed in its final position by means of a tremie and shall not be disturbed after being deposited. The tremie shall consist of a 10 inch or larger watertight tube. The discharge end shall be kept below the top of the deposited concrete until the batch is discharged. The flow shall be continuous and in no case shall be interrupted until the work is complete.

3.2.2 Consolidating Concrete: Where practicable, thoroughly compact concrete with internal vibrators having a frequency of 8,000 vibrations per minute. Do not laterally move concrete with the vibrator. Where vibrators cannot be used, hand spade or rod concrete. Do not vibrate concrete placed under water.

3.2.3 Protection and Curing: Concrete shall be cured for not less than 7 days for normal concrete or 3 days for high early strength concrete. Comply with ACI 305 and ACI 306 for protecting and curing concrete in hot and cold weather.

3.2.4 Tests:

3.2.4.1 Compressive Strength: Secure two specimens for each day's pour in compliance with ASTM C 172. Laboratory cure the specimens in compliance with ASTM C 31. Make compressive strength tests at the ages of 7 and 28 days in compliance with ASTM C 39.

3.2.4.2 Slump Tests: Make two slump tests each day. Tests shall comply with ASTM C 143.

3.2.4.3 Air Entrainment Tests: Make two air entrainment tests each day. Tests shall comply with ASTM C 231.

3.3 <u>Maintenance and Repair Methods</u>:

3.3.1 Repair of Deteriorated Concrete:

3.3.1.1 Remove Deteriorated or Unsound Concrete down to sound concrete and to a minimum depth of 2 inches. If cover for reinforcing bars is 2 inches or less, remove concrete to completely expose the reinforcing in the repair area. Remove concrete to a minimum of 1-1/2 inches clear beyond reinforcing. Edges of the repair area shall be cut sharp, perpendicular to the face of the concrete surface, and at least 1 inch deep. Clean reinforcing of all rust and scale. Clean repair area of all loose or foreign material.

3.3.1.2 Formwork shall be of such size and shape to restore the original lines of the structure. If jacketing is used for repair of deteriorated columns, piers, or piling, jacket forms shall be held in position by spacers and bands.

3.3.1.3 Provide Bonding Coat of either epoxy-resin or Portland cement mortar bonding course.

3.3.1.4 Patch with Class A Concrete if average patch thickness is 4 inches or greater; use Class B concrete if average patch thickness is less than 4 inches.

3.3.2 Repair of Transverse Cracks: Cut the crack in the shape of a "V" at the surface to approximately 2 to 3 inches wide. Completely fill the crack beyond the V-shaped portion with an epoxy bonding compound or epoxy grout. Apply epoxy bonding compound to the V-shaped portion of the crack and fill with a stiff mix of patching mortar.

3.3.3 Patching PCC Bridge Deck:

3.3.3.1 Saw Cut along all areas to be patched not bounded by existing joints. Cuts shall be vertical and at right angles to the pavement. Make cuts to a depth of 3/4 inch or the top of reinforcing, whichever is less.

3.3.3.2 Completely Remove loose and unsound concrete in the patch area. In no case remove less than 3/4 inch. Exercise care to prevent injury to load transmission devices, tie bars, or adjacent concrete to remain in place.

3.3.3.3 Reinforcing: All existing reinforcement bars shall remain in place except any existing reinforcing bars that have a loss of more than 25 percent of their cross section through corrosion shall be replaced.

3.3.3.4 Provide Bonding Coat of either epoxy-resin or Portland cement grout bonding course to all surfaces of existing concrete is to be in contact with new concrete.

3.3.3.5 After the Grout Bonding Course has been applied, place Class B concrete in patches less than 2 inches deep and Class C concrete in patches 2 inches or deeper. Consolidate concrete. Finish the concrete to the elevation of the adjacent surface. The surface of the new concrete shall be broomed to produce a light, corrugated texture.

3.3.3.6 Cure the Concrete by the burlap blanket method, AASHTO M182. Do not apply a waterproofing membrane or overlay until concrete has been allowed to dry 3 days after completion of curing.

3.3.4 Sealing Cracks and Joints in PCC Bridge Deck: Remove excess existing bituminous sealer, dirt, stones, or other foreign matter from the concrete surface along cracks and joints. The sealing material shall be placed so that joints are completely filled from the bottom to top. Place sufficient compound in the joint so that the compound will be flush with the surface of the adjacent surfacing upon completion of the pouring operation. Dust the sealant lightly with Portland cement, finely pulverized limestone dust, pulverized calcium carbonate, calcium silicate, or other finely divided inert material or cover with a tape that will adhere to the concrete.

SECTION 04202
UNIT MASONRY

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of facing brick, concrete block, glazed concrete unit masonry, sound-absorbing unit masonry, clay wall tile, sound-absorbing structural glazed tile, glass unit masonry, and vitrified clay flue liners. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Facing Brick:

2.1.1 Facing Brick Units shall be of standard size, texture, and color and shall conform to ASTM C 216, Grade SW.

2.1.2 Glazed Brick Units shall be of standard size and color and shall conform to ASTM C 216, Grade S.

2.2 Concrete Block:

2.2.1 Solid Load-Bearing Concrete Block: ASTM C 145.

2.2.2 Hollow Load-Bearing Concrete Block: ASTM C 90.

2.2.3 Nonload-Bearing Concrete Block: ASTM C 129, Type I.

2.2.4 Patterned Concrete Block: Compatible with existing in dimension and appearance.

2.2.5 Architectural or Decorative Concrete Block: Split face units shall be hollow concrete masonry units conforming to the applicable requirements of ASTM C90. Color, pattern, and texture shall be compatible with existing or as selected by the contracting officer.

2.3 Glazed Concrete Unit Masonry:

2.3.1 Factory-Applied, Pre-Faced, Concrete Masonry Units shall be of standard shapes and sizes conforming to ASTM C 90, Grade N or Type 1.

2.3.2 Facing Components shall conform to ASTM C 744.

2.3.3 Units shall be smooth and colored with satin gloss finish.

2.4 Sound-Absorbing Unit Masonry:

2.4.1 Sound-Absorbing Masonry Units shall be of standard shapes and sizes conforming to ASTM C 90 or ASTM C 129, as applicable.

2.4.2 Slots in the Masonry Unit Cavities shall be narrow slots in empty cavities or wide slots with fibrous fillers in cavities, as applicable, for desired sound transmission absorption.

2.4.3 Prefinished Units shall have ground-face or glazed surface.

2.5 Clay Wall Tile:

2.5.1 Load-Bearing Wall Tile hollow units shall be of standard shapes and sizes conforming to ASTM C 34, Grade LB or LBX.

2.5.2 Nonload-Bearing Wall Tile shall be of standard shapes and sizes conforming to ASTM C 56, Grade NB.

2.5.3 Clay Wall Tile Color shall conform to ASTM C 212 or ASTM C 126.

2.5.4 Plaster Base Finish shall conform to ASTM C 34 and ASTM C 56.

2.6 Sound-Absorbing Structural Glazed Tile: Sound-absorbing tile units shall be of standard shapes and sizes conforming to ASTM C 212 or ASTM C 126. The required Sound Transmission Class (STC) shall be in accordance with ASTM E 90.

2.7 Glass Unit Masonry:

2.7.1 Glass Block Hollow Units shall be classified for 3/4 hour of fire exposure in accordance with UL Fire Exposure Classification 9 (UL-9): "Fire Test for Window Assemblies."

2.7.2 Insulation R-Values for the following unit face sizes shall be: 6 inches by 6 inches equals R-2; 8 inches by 8 inches equals R-1.96; and 12 inches by 12 inches equals R-1.92.

2.7.3 Unit Face Pattern shall be of a standard design to provide desired light transmission, brightness, and privacy.

2.7.4 Mortar shall be Type S in accordance with ANSI A41.1 and ASTM C 270.

2.8 Refractories: Vitrified clay flue lining shall be rectangular, round, or modular, of standard sizes, and shall conform to ASTM C 315.

2.9 Mortar Materials and Mixing:

2.9.1 Hydrated Lime: ASTM C 207, Type S or N.

2.9.2 Admixtures: Fed. Spec. SS-C-1960/1 and consisting of water-repellant stearates and pozzolanic plasticizers in powder form.

2.9.3 Portland Cement shall comply with ASTM C 150, Type I or II. Masonry cement shall comply with ASTM C 91.

2.9.4 Coarse Aggregate for Masonry Grout shall comply with ASTM C 404. Do not use aggregate containing any substance that will stain masonry.

2.9.5 Sand shall comply with ASTM C 144 or ASTM C 33, paragraph 3.1.

2.9.6 Mortar shall comply with ASTM C 270 and in the proportions, measured in parts by volume, as required for the application.

2.10 Masonry Accessories:

2.10.1 Reinforcement Bars for lintels, bond beams, pilasters, and other masonry reinforcement shall comply with ASTM A 615, Grade 40.

2.10.2 Joint Reinforcement shall be prefabricated from zinc-coated cold drawn steel wire complying with ASTM A 641, Class 2 or 3 coating. Side wires shall be 8-gauge deformed wire; truss rods shall be 9-gauge smooth or deformed wire.

2.10.3 Wire-Mesh Ties shall be 16-gauge or larger diameter, zinc-coated steel wire woven into 1/2-inch mesh and cut into strips 1 inch narrower than the width of walls in which they are used. Zinc-coated wire shall comply with ASTM A 641, Class 2 or 3 coating.

2.10.4 Rigid Steel Anchors shall be a minimum of 1 inch x 1/4 inch x 26 inches long with each end turned up not less than 2 inches. Anchors shall be zinc-coated complying with ASTM A 123.

2.10.5 Seals and Gaskets for Control and Expansion Joint shall be of closed cell natural or synthetic rubber.

2.11 Water-Repellent Materials for Concrete Block shall be solvent type silicone complying with Fed. Spec. SS-W-110; transparent, nonstaining, 5 percent silicone resin.

3.0 EXECUTION:

3.1 Water Repellent Application shall be spray or brush in a single coat, using not less than one gallon for each 80 square feet covered. A flood coating with a rundown of material on the surface of from 6 inches to one foot shall be produced.

# SECTION 04205
# SCAFFOLDING - TUBULAR STEEL

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of tubular steel scaffolding. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS: Tubular steel or aluminum scaffolding system shall comply with OSHA Safety and Health Standards, Section 29 CFR, 1926/1910.

3.0 EXECUTION: (Section not used.)

SECTION 04210
BRICKWORK

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of brickwork. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Face Brick: Compatible with existing in mechanical characteristics, permeability, and appearance and shall comply with ASTM C 216.

2.2 Common Brick: Compatible with existing in mechanical characteristics, permeability, and appearance and shall comply with ASTM C 62.

2.3 Concrete Brick: ASTM C 55.

2.4 Mortar Materials and Mixing:

2.4.1 Hydrated Lime: ASTM C 207, Type S or N.

2.4.2 Admixtures: Fed. Spec. SS-C-1960/1 and consisting of water-repellent stearates and pozzolanic plasticizers in powder form.

2.4.3 Portland Cement shall comply with ASTM C 150, Type I or II. Masonry cement shall comply with ASTM C 91.

2.4.4 Coarse Aggregate for Masonry-Grout shall comply with ASTM C 404. Do not use aggregate containing any substance that will stain masonry.

2.4.5 Sand shall comply with ASTM C 144.

2.4.6 Colored Masonry Cement shall be a factory formulated mixture complying with Fed. Spec. SS-C-1960/1.

2.4.7 Mortar shall comply with ASTM C 270 and in the proportions, measured in parts by volume, as required for the application.

2.5 Masonry Accessories:

2.5.1 Reinforcement Bars for lintels, bond beams, pilasters, and other masonry reinforcement shall comply with ASTM A 615, Grade 40.

2.5.2 Joint Reinforcement shall be prefabricated from zinc-coated, cold drawn steel wire complying with ASTM A 641, Class 2 or 3 coating. Side wires shall be 8-gauge deformed wire; truss rods shall be 9-gauge smooth or deformed wire.

2.5.3 Wire-Mesh Ties shall be 16-gauge or larger diameter, zinc-coated steel wire woven into 1/2-inch mesh and cut into strips 1 inch narrower than the width of walls in which they are used. Zinc-coated wire shall comply with ASTM A 641, Class 2 or 3 coating.

2.5.4 Rigid Steel Anchors shall be a minimum of 1 inch x 1/4 inch x 26 inches long with each end turned up not less than 2 inches. Anchors shall be zinc-coated complying with ASTM A 615, Class 2 or 3.

2.5.5 Seals and Gaskets for Control and Expansion Joint shall be of closed cell natural or synthetic rubber.

2.5.6 Nylon Rope for weep holes shall be 3/8 inch diameter by 12 inches long.

2.5.7 Wire Brick Ties shall be fabricated from 3/16-inch diameter zinc-coated steel wire conforming to ASTM A 641, Class 2 or 3 coating. Ties shall be at least 4 inches wide and embedded 4 inches into backup material.

2.6 Flashing:

2.6.1 Through-Wall Flashing shall be one of the following:

2.6.1.1 Five-Ounce Copper Sheet shall comply with ASTM B 370, cold-rolled temper, coated both sides with a factory-applied elastic asphalt compound complying with ASTM D 449.

2.6.1.2 Ten-Ounce Rib-Formed Copper Sheet shall comply with ASTM B 370, cold-rolled temper, with ribs approximately 3/16-inch high and spaced not more than 3 inches apart.

2.6.1.3 Rib-Formed 32-Gauge, Type 302 or 304 Stainless Steel Sheet shall comply with ASTM A 167. Deformations shall be approximately 3/16 inch high and shall be spaced not more than 3 inches apart.

2.6.2 Flashing beneath coping stone shall be one of the following:

2.6.2.1 Stainless Steel Sheet shall comply with ASTM A 167, Type 302 or 304, finish No. 2P, dull, 26-gauge.

2.6.2.2 Copper Sheet shall comply with ASTM B 370, cold-rolled temper, 16-ounce per square foot.

2.6.2.3 Aluminum-Sheet shall comply with ASTM B 209, alloy 3003, temper H-14, .032 inch thick.

2.6.2.4 Galvanized Steel Sheet, 26-gauge, shall comply with ASTM A 527, and coating shall comply with ASTM A 525, designation G90.

2.7 Caulking and Sealants shall comply with Fed. Spec. TT-S-00227, Type II, Class A or Fed. Spec. TT-S-00230, Type II, Class A.

2.7.1 Backup Material for sealants shall be closed-cell resilient urethane or polyvinyl-chloride foam, closed-cell polyethylene foam, closed-cell sponge of vinyl or rubber, polychloroprene tubes or beads, polyisobutylene extrusions, oilless dry jute, or rope yarn.

2.7.2 Bond Preventative Material shall be pressure sensitive polyethylene tape, aluminum foil, or wax paper.

2.8 Water-Repellent Materials for Facing Brick Masonry shall be solvent type silicone complying with Fed. Spec. SS-W-110; transparent, nonstaining, 5 percent silicone resin.

3.0 EXECUTION:

3.1 Brick shall be laid with completely filled mortar joints in line with and of equal width to existing jointing.

3.2 3/8-inch Nylon Weep Rope, 24 inches apart, shall be provided in the head mortar in the first course above the top of steel lintels, shelf angles, and ledge supports and where flashings and waterproofing terminate in horizontal joints.

3.3 Water Repellent Application shall be spray or brush in a single coat, using not less than one gallon for each 100 square feet covered. A flood coating with a rundown of material on the surface of from 6 inches to one foot shall be produced.

SECTION 04215
EXPOSED AGGREGATE SURFACE CONCRETE WALLS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of exposed aggregate surface concrete walls. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Concrete Materials and Mixing:

2.1.1 Portland Cement: ASTM C 150, Type I or IA.

2.1.2 Shrinkage-Compensating Cement: Portland cement containing a stable expansive chemical compound such as calcium sulfoaluminate.

2.1.3 Aggregate: ASTM C 33; aggregate for exposed aggregate concrete shall match existing, if appropriate.

2.1.4 Admixtures: Submit manufacturer's literature for all fixtures proposed for the work.

2.1.5 Curing Compounds: ASTM C 309, Type 1.

2.1.6 Epoxy Bonding Agent: ASTM C 932.

2.2 Concrete Formwork, Reinforcement, and Accessories:

2.2.1 Formwork: Plywood form and liners shall be minimum grade B-B High Density Concrete Form Overlay, Class I, complying with APA.

2.2.2 Reinforcement:

2.2.2.1 Reinforcement Bars: ASTM A 615, Grade 40 or Grade 60.

2.2.2.2 Welded Wire Fabric: ASTM A 185. Where welded wire fabric is needed, use No. 6 gauge wire at 6-inch spacing in each direction.

2.2.2.3 Accessories for proper installation of reinforcement shall comply with CRSI "Manual of Standard Practice for Reinforced Concrete Construction."

2.2.2.4 Reinforcement Fabrication shall comply with ACI 318 and ACI 315.

2.3 Curing and Climatic Conditions:

2.3.1 Comply with ACI 306 and ACI 305 for protecting and curing concrete in cold and hot weather.

2.3.2 Immediately after finishing, begin curing slatwork by covering with constantly saturated moisture retaining fabrics, impervious sheeting, or membrane curing compounds.

2.3.3 Apply membrane curing compounds as required.

3.0 EXECUTION:

3.1 Preparation when Attaching to Existing Surfaces:

3.1.1 Remove All Defective Material by chipping and cutting to sound concrete in order to secure a solid foundation.

3.1.2 Square Cut or undercut the edges to a minimum depth of one inch to form a key.

3.1.3 Cut Concrete out from behind exposed reinforcing bars and rods.
3.1.4 All exposed reinforcing shall be cleaned of rust and primed.

3.2 Installation:

3.2.1 Formwork Requirements:

3.2.1.1 Formwork shall comply with ACI 347. Joints in forms shall be horizontal or vertical.

3.2.1.2 Use plywood, fiberglass, or metal forms.

3.2.2 Reinforcement shall be repaired when rusted through. Rods at least 12 inches long shall be wired to the failed rods. In closing gaps, rods shall lap existing rods by at least 12 inches or 30 diameters, whichever is greater.

3.2.3 Mixing and Transporting Concrete: Ready-mixed concrete shall be mixed and delivered to the project in compliance with ASTM C 94. Job-mixed concrete shall comply with the requirements of ACI 318.

3.2.4 Mixing Epoxy-Resin Patching Mortar: Mix thoroughly with a power mixer at low speeds (150 - 400 rpm) until material attains uniform color and consistency (minimum time of two to three minutes at 70 F).

SECTION 04251
TERRA COTTA

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of terra cotta. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Terra Cotta: Hard-burned, nonload-bearing clay building units.

2.2 Material for Setting Terra Cotta:

2.2.1 Cement shall be Portland cement complying with ASTM C 150, Type I or Type IA.

2.2.2 Sand for Mortar shall be tested in compliance with ASTM C 40 and C 117. Sand shall have a fineness modulus between 2.0 and 2.5.

2.2.3 Lime shall comply with ASTM C 5.

2.2.4 Hydrated Lime, if allowed, shall comply with ASTM C 206.

2.3 Mortar for the resetting of terra cotta shall be composed of one part Portland cement, 3 1/2 parts sand, and 1/2 part lime putty by volume.

3.0 EXECUTION:

3.1 Restoration of Terra Cotta Surface:

3.1.1 Remove All Loose Chips or flaking pieces from the surface. Cut mortar out of all joints to a depth of 3/8 inch from the face of the terra cotta.

3.1.2 Build Up Voids and Irregularities in the surface using successive coats of an epoxy caulk consisting of a 2-component 100 percent flexible-cured, thixotropic epoxy suitable for vertical surfaces.

3.1.3 Give All Patched Surfaces of the terra cotta two coats of an epoxy glaze consisting of 2-component, 100 percent epoxy, high-solids content, flexible cured, interior-exterior, high-gloss glaze.

3.2 Replacement of Terra Cotta:

3.2.1 Terra Cotta Units required to be replaced shall be carefully removed to avoid disturbing adjacent units.

3.2.2 Set Replacement Units plumb, level, true to line, and in a manner to match existing terra cotta.

3.3 Sealing Terra Cotta Joints:

3.3.1 Remove Joint Material to a depth of 3/8 inch or to the depth of sound material.

3.3.2 Clean the Joints thoroughly.

3.3.3 Regrout Joints and tool surface to match appearance of adjacent floor.

SECTION 04405
STONEWORK

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of stonework. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Indiana Limestone: ASTM C 568, Category II.

2.2 Field Stone: Compatible with existing.

2.3 Marble: ASTM C 503.

2.4 Building Sandstone: Compatible with existing.

2.5 Structural Granite: ASTM C 615.

2.6 Masonry Accessories:

2.5.1 Fastenings for Stone: Furnish and install all anchors, dowels, clamps, clips, bolts, and other attachments necessary to fasten and anchor stone in place. Steel wire shall be zinc-coated in compliance with ASTM Specification A 641 for Class 2 coating. Stainless steel shall be used to fabricate the sizes, shapes, and types of all anchoring and fastenings, except wire.

2.5.2 Slots for Dovetail Anchors shall be of 24-gauge commercial galvanized sheet metal, formed to give double anchorage for shoulder to forms.

2.5.3 Dovetail Anchors for fastening masonry to concrete shall be compatible with anchor slots.

2.6 Epoxy Mortar Patching Materials:

2.6.1 Epoxy Adhesive shall be a two-component epoxy consisting of epoxy resin and hardener and complying with the following performance requirements:
2.6.1.1 Tensile Elongation: 2.5 percent minimum per ASTM D 638.

2.6.1.2 Tensile Strength: 3,500 psi minimum per ASTM D 638.

2.6.1.3 Compressive Strength: 6,000 psi minimum per ASTM D 695.

2.6.1.4 Water Absorption (24 hours): 0.5 percent ASTM D 570.

2.6.2 Stone Filler shall be stone of the same type and color as the stone being patched and shall be ground to approximately the texture of coarse sand.
2.6.3 Pigments shall be of the type that will not react with the epoxy adhesive.

2.6.4 Thickening Powder shall be silicon carbide powder or asbestos powder.

3.0 EXECUTION:

3.1 Preparation:

3.1.1 Removal of Deteriorated Material: Chip out all deteriorated stone in areas to be patched to sound material. Square cut or undercut edges to a minimum 1-inch depth to form a key for patching material.

3.1.2 Cleaning: Clean area to be patched and dry thoroughly.

3.2 Installation:

3.2.1 Patching Stone:

3.2.1.1 Within 30 minutes after mixing epoxy adhesive, apply mortar to the area to be patched. Build up mortar beyond the adjacent surface to allow grinding to match existing surface textures.

3.2.1.2 Allow patching mortar to cure for a minimum of 24 hours before grinding or chiseling.

3.2.2 Replacing Stone:

3.2.2.1 Cut Replacement Stone accurately to shape and dimensions with joints and bonding as required.

3.2.2.2 Exterior Sill Stones, Panels, Copings, Cornice, and Similar Stones with exposed top surfaces shall be cut to set on their natural beds and shall have a wash on the top surface.

3.2.3 Setting Stone:

3.2.3.1 Where stone is backed up with concrete or concrete blocks, coat the face of the backup material with an approved non-staining asphalt complying with ASTM D 449, Type D.

3.2.3.2 Provide expansion or control joints in stonework as required.

3.2.3.3 Install pressure sensitive polyethylene tape or aluminum foil bond breaker complying with Fed. Spec. QQ-A-1876, prime edges of stone, and fill remainder of joint with caulking and sealing compound.

3.2.4 Pointing and Cleaning:

3.2.4.1 Upon completion, all joints shall be carefully pointed.

3.2.4.2 Clean stone surfaces using fiber brushes and trisodium phosphate solution.

SECTION 04505
MASONRY RESTORATION

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for general masonry restoration. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Abrasive Blasting Material shall be a combination of friable, finely graded, clean particles, containing approximately 97.8 percent silicates and other minerals by weight. The material shall contain no free silica nor any crushed or quarried sand.

2.1.1 Sieve analysis for wet blasting aggregate shall be:

| Sieve Mesh | Percent Retained Min. | Max. |
|---|---|---|
| 28 | 5 | 15 |
| 35 | 22 | 32 |
| 48 | 73 | 90 |

2.1.2 Aggregate for Dry Blasting: The size of aggregate for dry blasting shall be determined by careful material analysis for the given application.

2.2 Mortar Materials:

2.2.1 Hydrated Lime: ASTM C 207, Type S or N.
2.2.2 Cement:

2.2.2.1 Portland Cement: ASTM C 150, Type I or II.

2.2.2.2 Masonry Cement: ASTM C 91.

2.2.2.3 Cement shall not have more than 0.60 percent alkali (sodium oxide) nor more than 0.15 percent water soluble alkali in the combination of lime and cement.

2.2.3 Aggregate:

2.2.3.1 Coarse Aggregate: ASTM C 404 and not containing any substance that will stain the masonry.

2.2.3.2 Sand for Use with Masonry: ASTM C 144. Sand shall not contain any substance that will stain masonry.

2.2.3.3 Sand for Use with Stone: ASTM C 33.

2.2.4 Admixtures: Fed. Spec. SS-C-1960/1 consisting of water-repellent stearates and pozzolanic plasticizers in powder form. Salt, anti-freeze liquid, accelerator, or other admixtures shall not be used.

2.2.5 Colored Masonry Cement: Fed. Spec. SS-C-1960/1, Type II. Mortar colors shall be high purity, chemically inert, color-fast, and alkali-proof mineral oxides. Color shall not exceed 15 percent of the cement weight; carbon black shall not exceed 3 percent of the cement weight.

2.2.6 Water shall be clean, fresh, and free from injurious amounts of oil, acid, salt, alkali, organic matter, or other deleterious substances.

2.2.7 Mortar Proportions shall be as follows:

| Portland Cement | Hydrated Lime | Sand |
|---|---|---|
| 1 | 1 | 6 |

Add pigments if required.

2.3 Grout: Grout shall be a flexible, non-shrink, non-staining grout specifically formulated for use in masking and grouting.

2.4 Masking Material shall be a special masking tape, compatible with the grout technique.

2.5 Caulking and Sealants shall comply with Fed. Spec. TT-S-00227, Type II, Class A or Fed. Spec. TT-S-00230, Type II, Class A.

2.6 Backup Material for sealants shall be closed-cell resilient urethane or polyvinyl-chloride foam, closed-cell polyethylene foam, closed-cell sponge of vinyl or rubber, polychloroprene tubes or beads, polyisobutylene extrusions, oilless dry jute, or rope yarn.

2.7 Bond Preventive Material shall be pressure sensitive polyethylene tape, aluminum foil complying with Fed. Spec. QQ-A-1876 or wax paper complying with Fed. Spec. A-A-883.

3.0 EXECUTION:

3.1 Preparation:

3.1.1 General: Clean masonry surfaces free from efflorescence, mildew, fungus, graffiti, vines, tentacles, and all other blemishes. Wire brushing or sandblasting will not be allowed for paint removal.

3.1.2 Deteriorated Material: For repointing, tuck pointing, masking, and grouting, cut out old mortar in brickwork to a minimum depth of 1/2 inch and cut out old mortar in stonework to a minimum depth of 1 inch. Deteriorated material shall be removed to the full depth of mortar disintegration. Following cleaning, blow joints clean to remove all dust, dirt, and remaining loose aggregate.

3.2 Masonry Cleaning:

3.2.1 Washing: A specialized aeration type nozzle shall be used to project water at 1,000 or 1,200 psi pressure. Any evidence of masonry material damage or removal shall be cause for immediate work stoppage.

3.2.2 Steam Cleaning: Scrub all surfaces to be cleaned with a mild soap or detergent. Apply steam at a pressure of 10 to 30 psi to thoroughly flush and remove all foreign matter and to neutralize and rinse away all cleaning solutions.

3.2.3 Chemical Cleaning:

3.2.3.1 Acidic Products shall be used only on acid-tolerant materials such as granite, sandstone, and unglazed brick.

3.2.3.2 Alkaline Cleaners shall be used only an acid-sensitive materials such as limestone and marble.

3.2.3.3 Surfactants shall be used only on polished granite or glazed brick.

3.2.4 Abrasive Blasting:

3.2.4.1 Wet Aggregate Blasting shall be performed using a specialized nozzle that combines specified aggregate, clean water and air. Water pressure shall not exceed 150 psi. Air pressure shall not exceed 70 psi. After cleaning, rinse surfaces to remove aggregate and loosened soil.

3.2.4.2 Dry Aggregate Blasting shall be continuous bombardment of the masonry surface with a finely divided aggregate. Air pressure shall be between 20 and 100 psi. After cleaning, rinse surfaces to remove aggregate and loosened soil.

3.2.5 Repointing and Tuckpointing:

3.2.5.1 Pointing of Brickwork: Compact new mortar in deep cuts in successive layers until a uniform joint depth throughout has been attained. After deep joints have been leveled, fill all joints with mortar and pack the back corners of the joint.

3.2.5.2 Painting of Stonework: Compact new mortar in deep cuts in successive layers until a uniform joint depth throughout has been attained. After dep joints have been leveled, fill joints with a layer of mortar 1/2 inch deep and pack the back corners of the joint. Approximately 1 hour later, apply another layer of mortar completely filling the joint.

3.2.5.3 Tooling: Tool the joint to match the appearance of the adjacent mortar joints with a round jointer to produce smooth, dense, concave joints.

3.2.6 Masking and Grouting:

3.2.6.1 Masking: Mask the face of each individual masonry unit, keeping the edge of the tape 1/16 inch away from all edges of the masonry unit to allow an overlap of the grouting material onto the masonry.

3.2.6.2 Grouting: Completely fill all joints, cracks, and voids with grout.

3.2.6.3 Cleaning: Keep all exposed masonry clean and free of mortar as work progresses. Clean masonry surfaces using fiber brushes and trisodium phosphate solution. Rinse surfaces with clean water immediately after cleaning.

SECTION 05120
STRUCTURAL STEEL

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of structural steel. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work. The contractor shall be responsible for all temporary shoring and/or bracing needed to support the construction. The structure may not be stable until all elements are in place.

2.0 PRODUCTS:

2.1 Structural Steel:

2.1.1 Carbon Grade Steel: ASTM A 36.

2.1.2 High-Strength Low-Alloy Steel: ASTM A 572.

2.1.3 Corrosion-Resistant High-Strength Low-Alloy Steel: ASTM A 242 or A 588.

2.1.4 Quenched and Tempered Alloy Steel: ASTM A 514.

2.1.5 Structural Tubing: ASTM A 500, Grade B or ASTM A 501.

2.1.6 Steel Pipe: ASTM A 53, Type E or Type S, Grade B.

2.2 Connections:

2.2.1 High-Strength Bolts: ASTM A 325 or A 490 including nuts and washers.

2.2.2 Carbon Steel Bolts: ASTM A 307, Grade A.

2.2.3 Carbon Steel Nuts: ASTM A 563, Grade A, Square or Hex Style.

2.2.4 Plain Washers, Other Than Those in Contact with High-Strength Bolts: ANSI B18.22.1, Type B.

2.3 Finish: Galvanized, ASTM A 123 and ASTM A 153 or ASTM A 386 or shop primer Fed. Spec. TT-P-86, Type I or II, or TT-P-645.

2.4 Fabrication: Fabrication shall be in accordance with the applicable provisions of the AISC Specification for the Design, Fabrication, and Erection of Structural Steel for Buildings. Fabrication and assembly shall be done in the shop to the greatest extent possible. Ends shall be square within the tolerances for milled ends specified in ASTM A 6. Ungalvanized structural steelwork, except surfaces to be field welded or friction bolted, shall be prepared for painting in accordance with the AISC Specification for the Design, Fabrication, and Erection of Structural Steel for Buildings and primed with the specified paint. All welding shall be in accordance with AWS D1.1 and shall be performed by certified welders for the type of welds and positions indicated.

3.0 EXECUTION: Erection of structural steel shall be in accordance with the applicable provisions of the AISC Specification for the Design, Fabrication, and Erection of Structural Steel for Buildings.

3.1 Connections: Anchor bolts and other connections between the structural steel and foundations shall be provied and shall be properly located and built into connecting work.

3.2 Base Plates and Bearing Plates: Column base plates for columns and bearing plates for beams, girders, and similar members shall be provided. Base plates and bearing plates shall be provided with full bearing after the supported members have been plumbed and properly positioned, but prior to placing superimposed loads. Separate setting plates under column base plates will not be permitted. The area under the plate shall be dry-packed solidly with bedding mortar.

3.3 Galvanized Field Connections: Galvanized steel shapes shall be bolted connections only using galvanized bolts, nuts, and washers. No field welding of galvanized steel will be permitted.

3.4 Welded Connections: Field welded structural connections shall be completed before load is applied. Quality of welds shall be as described in AWS D1.1. Welds determined to be defective shall be repaired at no additional expense to the government. All welds shall receive a visual examination. In addition to visual examination, fracture critical members shall receive other non destructive tests such as ultrasonic, radiographic and magnetic particle. Specific welds to receive this testing shall be as indicated on the drawings.

3.5 Field Priming: After erection of ungalvanized structural steel, the field bolt heads and nuts, field welds, and any abrasions in the shop coat shall be cleaned and primed with paint of the same quality as that used for the shop coat.

SECTION 05121
STEEL BRIDGE COMPONENTS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for repair and maintenance of steel bridge components. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Structural Carbon Steel: ASTM A 36.

2.2 High Strength Steel:

2.2.1 High-Strength Low-Alloy Columbium-Vanadium Steel: ASTM A 572.

2.2.2 High-Strength Low-Alloy Structural Steel with 50,000 psi Minimum Yield: ASTM A 588.

2.2.3 High-Yield Strength Quenched and Tempered Alloy Steel Plate: ASTM A 514.

2.2.4 Structural Steel for Bridges: ASTM A 709.

2.2.5 High Strength Low-Alloy Structural Steel: ASTM A 242.

2.3 Turned and Ribbed Bolts: High carbon steel turned and ribbed bolts shall comply with ASTM A 307.

2.4 High Strength Steel Bolts, Nuts, and Washers: ASTM A 325.

2.5 Electrodes for manual or arc welding shall comply with AWS A5.1 or AWS A5.5.

2.6 Steel Forging: ASTM A 668 and of the class specified.

2.7 Steel Castings: AASHTO M192 and of the class specified.

2.8 Gray Iron Castings: AASHTO M105 and of the class specified.

2.9 Malleable Castings: ASTM A 47, Grade 32510 or 35018.

2.10 Rolled Copper-Alloy Plates: ASTM B 100, Alloy 510.

2.11 Lead Plates: Comply with the requirements for common desilverized lead of ASTM B 29.

2.12 Stud Shear Connectors: ASTM A 108, Grade 1015, 1017, or 1020, either semi- or fully killed.

2.13 Rollers and Pins: ASTM A 36.

2.14 Anchor Bolts:

2.14.1 Cast-In-Place: ASTM A 307.

2.14.2 Power Driven: Stainless steel with minimum penetration in concrete of 6 times bolt diameter.

2.15 Rails: Section 4.2, Specifications for Steel Rails of AREA-01.

3.0 EXECUTION:

3.1 Preparation:

3.1.1 When traffic is maintained on bridge under repair or is directed over a temporary run-around, furnish, erect, and maintain all barricades, flags, torches, lights, guardrails, temporary pavement markings, and traffic control signs required for the protection of the public and for the direction of traffic. Number, type, color, size, and placement of all traffic control devices and the use of a flagman shall comply with USDOT FHA MUTCD "Traffic Controls for Highway Construction and Maintenance Operations." All traffic control devices in advance of the construction limits shall also be the responsibility of the Contractor.

3.1.2 Structural Metal Work shall comply with the following:

a. AISC Code of Standard Practice.

b. AWS Structural Welding Code as modified by the AASHTO Standard Specifications for Welding of Structural Steel Highway Bridges.

c. AREA-01.

d. AASHTO Standard Specifications for Highway Bridges.

3.1.3 Fabrication: Form shapes with sharp lines and angles and finish with smooth surfaces. Drill or ream bolt holes 1/16 inch larger than the diameter of the bolt. Provide welded shop connections wherever possible.

3.2 Maintenance and Repair Methods:

3.2.1 Erection: Bearing surfaces and surfaces to be in permanent contact shall be clean and free from dirt and scale. Ream holes that must be enlarged to admit bolts.

3.2.2 Correction of Loose Connections: Remove loose rivets by cutting rivet heads off and removing the shank or by drilling. Torches shall not be used. Remove loose bolts in bolted connections. Bolts shall not be retightened. Thoroughly remove rust and scale around bolt and rivet holes by sandblasting or wire brushing. Install a new high strength bolt of the same size as the removed bolt or rivet, unless the hole has become enlarged and a larger bolt can be used. Tighten bolts by the turn-of-nut method.

3.2.3 Repair of Corroded Material: Remove all rust and corrosion by and blasting or wire brushing. Strengthen corroded members by the addition of structural carbon steel or high strength steel.

SECTION 05160
STEEL TRUSSES

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for repair and maintenance of steel trusses. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Steel Trusses:

2.1.1 Structural Carbon Steel: ASTM A 36, unless otherwise indicated.

2.1.2 High-Strength Low-Alloy Structural Steel: ASTM A 242, Grade 42.

2.2 Steel Forgings: Forgings that are to be welded shall comply with Supplementary Provision S4 of ASTM A 668.

2.3 Fasteners:

2.3.1 High Strength Bolts, Nuts and Plain Hardened Washers: ASTM A 325.

2.3.2 Anchor Bolts: ASTM A 307.

2.4 Filler Metal for Welding: Electrodes for manual arc welding shall comply with AWS A5.1 or AWS A5.5.

2.5 Field Repair of Shop Primer: Fed. Spec. TT-P-86.

3.0 EXECUTION:

3.1 Structural Metals:

3.1.1 Comply with AISC "Specifications for Design, Fabrication and Erection of Structural Steel for Buildings" and "Code of Standard Practice," both as modified herein.

3.1.2 Piping and electrical wiring conflicting with erection of members shall be removed and placed in a new position approved by the Contracting Officer. Provide temporary utilities and coordination to prevent outages during this period.

3.1.3 Shop and field connections shall be high strength steel bolted unless otherwise indicated.

3.1.4 All metal parts shall be shop-fabricated. Assemblies shall be fitted together in the shop and delivered complete and ready for installation. Welds shall be made by operators who have been previously qualified in compliance with AWS standards to perform the type of work required. Welds exposed to view shall be dressed smooth.

3.1.5 Before members are assembled or installed, bearing surfaces to be in permanent contact shall be clean and free from dirt, scale, and corrosion. Immediately after cleaning add a prime coat of red lead paint. Drifting to enlarge holes will not be permitted. Holes that must be enlarged to admit bolts shall be reamed. Poor matching of holes caused by either shop errors or erection errors shall be cause for rejection by the Contracting Officer. Steel erected under this contract shall be cleaned of any dirt, mud, or grease and left in a condition to receive coatings.

3.2 Strengthening of Deteriorated Members: Remove corrosion by wire brushing, sanding, or other approved method. Strengthen as directed.

3.3 Correction of Loose Connections: Remove loose rivets by cutting rivet heads off and removing the shank. If necessary, remove the rivet shank by drilling. Remove loose bolts in bolted connections. Bolts shall not be retightened. Install a new high strength bolt of the same size as the removed bolt or rivet, and tighten by the turn-of-the-nut method.

3.4 Repair of Bearings and Anchor Bolts: Remove corrosion by wire brushing, sanding, or other approved method. Additional repair requirements shall be as directed.

3.5 Repair of Tie Rods and Bracing: Tighten loose tie rods to the snug tight condition. Remove corrosion by wire brushing, sanding, or other approved method. Strengthen as directed.

# SECTION 05205
# STEEL JOISTS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of steel joists. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Open Web Steel Joists: Steel joists shall conform to Steel Joist Institute SJI-01, K-Series. Joists shall be designed to support the loads given in the standard load table of SJI-01.

2.2 Longspan Steel Joists and Deep Longspan Steel Joists: Steel joists shall conform to SJI-01, LH-Series or DLH-Series. Joists shall be designed to support the loads given in the standard load tables of SJI-01.

2.3 Accessories and Fittings: Accessories and fittings, including end supports and bridging, shall be in accordance with the standard specifications under which the members were designed.

2.4 Shop Painting: Joists and accessories shall be shop-painted with a rust-inhibiting primer paint.

3.0 EXECUTION: Joists shall be accurately set, and end anchorage shall be compatible with the bearing surface and the expansion requirements. Joist bridging and anchoring shall be secured in place prior to the application of any construction loads. Any temporary loads shall be distributed so that the carrying capacity of any joist is not exceeded. Loads shall not be applied to bridging. Abraded, corroded, and field-welded areas shall be cleaned and touched up with the same type of paint used in the shop painting.

# SECTION 05305
# STEEL DECK

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of steel roof and floor deck. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Deck Units: Deck material shall be ASTM A 611, Grade C for painted deck and ASTM A 446, Grade A for galvanized deck. Deck units shall conform to the SDI Design Manual for Composite Decks, Form Decks, Roof Decks, and Cellular Metal Floor Deck with Electrical Distribution. Units shall be fabricated of 22-gauge or thicker steel and shall be galvanized with ASTM A 525, G90 coating class or painted with one coat of manufacturer's standard paint.

2.2 Accessories: Metal accessories shall be of the same material as the deck and have minimum gauge as follows: saddles, 18-gauge; welding washers, 10-gauge; cant strip, 22-gauge; other metal accessories, 20-gauge; unless otherwise indicated.

2.3 Closure Plates: Voids above interior walls shall be closed with 22-gauge sheet metal where directed. Open deck cells at parapets, end walls, eaves, and openings through floors and roofs shall be closed with 22-gauge sheet metal.

2.4 Miscellaneous Steel Shapes: ASTM A 36.

3.0 EXECUTION:

3.1 Erection of deck and accessories shall be in accordance with the SDI Design Manual for Composite Decks, Form Decks, Roof Decks, and Cellular Metal Floor Deck with Electrical Distribution. The deck units shall be placed on secure supports, properly adjusted, and aligned at right angles to supports before being permanently secured in place. The maximum uniform distributed storage load shall not exceed the design live load.

3.2 Attachment: The deck units shall be welded or fastened with screws, powder-actuated fasteners, or pneumatically driven fasteners to supports in accordance with requirements of the SDI Design Manual for Composite Decks, Form Decks, Roof Decks, and Cellular Metal Floor Deck with Electrical Distribution.

3.3 Repair of Coatings: Welds and deck finish damage shall be touched up with an approved galvanizing repair paint for galvanized surfaces or the same type used for shop primer for painted surface.

3.4 Openings Through Deck: Holes and openings required shall be drilled or cut, reinforced, and framed for rigidity and sufficient load-carrying capacity. Holes less than 6 inches across require no reinforcement. Openings 6 to 12 inches across shall be reinforced by 22-gauge steel sheet at least 12 inches wider and longer than the opening and be fastened to the steel deck a maximum of 12 inches on center. Openings larger than 12 inches shall be reinforced by steel angles onopposite sides of the opening and at a right angle to the deck ribs. Both sides of the angles shall be fastened to each rib. Angles shall extend at least two ribs beyond each side of the opening.

SECTION 05501
ANCHOR BOLTS AND EXPANSION ANCHORS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of anchor bolts and expansion anchors. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Anchor Bolts and Nuts: ASTM A 307; Hot-dipped galvanized, ASTM A 153.

2.2 Flat Washers: ANSI B18.2.1, of the same material as bolt.

2.3 Expansion Anchors:

2.3.1 Lead Shield Type: Fed. Spec. FF-S-325, Group I, Type 1, Class 1.

2.3.2 Wedge Type: Fed. Spec. FF-S-325, Group II, Type 4, Class 1or 2.

2.3.3 Self-Drilling Type: Fed. Spec. FF-S-325, Group III, Type 1.

2.4 Fabrication:

2.4.1 Anchor Bolts shall be "J" type for use in concrete or hooked type for use in masonry. All bolts shall be hot-dipped galvanized and furnished complete with nut and washer.

2.4.2 Expansion Anchors shall be of standard manufacture and unless otherwise specified shall be galvanized or cadmium-plated in accordance with Fed. Spec. FF-S-92.

3.0 EXECUTION:

3.1 Anchor Bolts shall either be cast in new concrete or regrouted in place with non-shrinking grout.

3.2 Expansion Anchors shall be of the type best suited for the work. Embedment shall be as directed but in no case less than six times the bolt diameter. Minimum distance between the anchor center line and the edge of

concrete shall not be less than 4-1/2 times the diameter of the hole in which anchor is installed.

SECTION 05510
METAL STAIRS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of metal stairs. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Steel Plates, Shapes, and Bars: ASTM A 36.

2.2 Steel Bar Grating: ASTM A 569.

2.3 Gray Iron Castings: ASTM A 48, Class 30.

2.4 Malleable Iron Casting: ASTM A 47.

2.5 Cast Aluminum: ASTM B 26 or B 108.

2.6 Metal Pan Treads: Pressed or structural steel pans, ASTM A 446, Grade B, shop coated, with a minimum depth of 2 inches for concrete fill.

2.7 Cast Metal Treads shall have an integral non-skid surface.

2.8 Grating and Metal Pan Treads shall have cast metal non-skid nosings.

2.9 Finish: Steel plates, shapes, bars, and grating shall be galvanized in accordance with ASTM A 386 or primed with fabricator's standard shop primer as directed.

2.10 Fabrication: Stair units shall be shop welded or bolted. Units shall be shop-assembled to ensure fit. Stairs are to be shipped in the largest units practical to reduce field erection time. All fabrication shall conform to AISC Manual and ASTM A 6.

3.0 EXECUTION:

3.1 Erection: Erect stairs level and plumb. Treads shall be level both front to back and across the width. Stair units shall be securely fastened to floors and landings. Field erection shall be in accordance with AISC Manual except that connections shall be bolted only.

3.2 Repair of Coatings: Connections and abrasions in the shop coating shall be touched up with an approved galvanizing repair paint or primer to match shop primer.

# SECTION 05520
# PIPE AND TUBE RAILINGS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of handrailings and ladders. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Post and Rails: Steel pipe, ASTM A 53, Type E or S, Grade B, Schedule 40.

2.2 Bars and Rungs: ASTM A 36.

2.3 Finish: Galvanized, ASTM A 123 or shop primer, Fed. Spec. TT-P-86, Type I or II; TT-P-645.

2.4 Fabrication:

2.4.1 Handrailings shall be smooth, with all projecting joints and sharp corners ground smooth. Welded joints shall be flush type. Members shall be neatly coped and continuously welded at all junctions of posts and rails. Flattening of the rail or post ends at junctions of posts and rails will not be permitted. Fittings or other connectors shall not be used at junctions of posts and rails.

2.4.2 Ladders: Rails shall be angle or flat bars. Rungs shall be round or square bars and shall project through rails. Welds shall be continuous.

2.4.3 Cages shall be provided as directed and shall be fabricated from flat bars. Vertical bars shall be inside supporting hoops. Bars shall be welded at each intersection.

3.0 EXECUTION: Hand rails and ladders shall be erected in accordance with the AISC Manual. Hand rails shall be rigidly attached to structure to provide unyielding obstruction. Ladders shall be bolted to structure unless otherwise directed.

SECTION 05530
GRATING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of grating. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Aluminum Grating, Banding, and Kick Plate: Rectangular, pressure-locked bearing bars, ASTM B 221, 6063-T6, mill finish.

2.2 Steel Grating:

2.2.1 Grating: Rectangular, welded, ASTM A 569.

2.2.2 Bands and Kick Plate: ASTM A 36.

2.2.3 Finish: Galvanized, ASTM A 123 or painted with fabricator's standard shop primer.

2.3 Fabrication: Rectangular floor grating shall be in accordance with the Metal Bar Grating Manual published by the National Association of Architectural Metal Manufacturers (NAAMM). Where openings are directed in the grating, sections shall be laid out so that section edges will be centered on the openings. All openings shall be provided with kick plate or banding or required. All raw edges of grating shall be banded unless directed otherwise.

3.0 EXECUTION:

3.1 Erection: Grating shall be anchored in place with welded stud bolts and saddle clips or other acceptable fasteners.

3.2 Touchup shall be either with an approved galvanizing repair paint or a primer to match shop primer.

SECTION 05540
CASTINGS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of castings. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedure shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Frames, Covers, and Steps:

2.1.1 Gray Iron: ASTM A 48, Class 30.

2.1.2 Steel: ASTM A 36; Galvanized, ASTM A 123.

2.1.3 Aluminum: ASTM B 26, 356-T6.

2.2 Corner Protection: Steel angles with anchors, ASTM A 36; Galvanized, ASTM A 123.

2.3 Ventilation Boxes: Extruded Aluminum, ASTM B 221, 2063-T6.

2.4 Bituminous Paint: SSPC-Paint 12 (cold-applied asphalt mastic).

3.0 EXECUTION:

3.1 Frames, Steps, Corner Protection, or Other Castings to be embedded in concrete shall be accurately positioned and securely anchored to forms prior to placement of concrete.

3.2 Castings to be located in masonry or other building material shall be temporarily braced and held firm to ensure accurate placement in final construction.

3.3 Aluminum Surfaces that will be in contact with grout, concrete, masonry, wood, or dissimilar metals shall be coated with a heavy coat of bituminous paint.

SECTION 05550
MISCELLANEOUS METAL BRIDGE COMPONENTS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for repair and maintenance of miscellaneous metal bridge components. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Structural Carbon Steel: ASTM A 36.

2.2 High Strength Steel Bolts, Nuts, and Washers: ASTM A 325.

2.3 Electrodes: Electrodes for manual or arc welding shall comply with AWS A5.1 or AWS A5.5.

2.4 Anchor Bolts:

2.4.1 Cast-In-Place: ASTM A 307.

2.4.2 Power Driven: Stainless steel. When set in concrete or masonry, the minimum penetration shall be 6 times the diameter of the shank.

2.5 Grid Flooring: ASTM A 36, galvanized, skid-resistant, unless otherwise directed.

2.6 Aluminum for Railings:

2.6.1 Aluminum Alloy Extruded Rail: ASTM B 221, Alloy 6061-T6 or 6351-T5.
2.6.2 Cast Aluminum Railing Posts: AASHTO M193, Alloy A444-T4.

2.7 Stainless Steel Hardware for Railings:

2.7.1 Stainless Steel Machine Bolts and Cap Screws: ASTM A 193, Grade B8 or B8M, Class 2A threads, except the minimum tensile strength shall be 100,000 psi.

2.7.2 Stainless Steel Threaded Bars: ASTM A 276, Type No. 302, Condition B, Class 2B threads.

2.7.3 Stainless Steel Flat Washers and Lock Washers: ASTM A 240, Type 302.

2.7.4 Carbon and Alloy Steel Nuts: ASTM A 194, Grades 6 and 6F.

2.8 Steel Pipe for Railings and Posts: ASTM A 53, Grade B, or ASTM A 120, black or galvanized.

2.9 Steel Plate Beam Guardrail:

2.9.1 Guardrail: AASHTO M180, Class A, Type 1.

2.9.2 Bolts, Nuts, and Washers: ASTM A 307, galvanized in compliance with ASTM A 153.

2.9.3 Post Connectors: ASTM A 36, galvanized in compliance with ASTM A 123.

2.10 Cables and Accessories for Cable Guardrail: AASHTO M30, Class A, Type I.

2.11 Metal Posts: ASTM A 36 galvanized in compliance with ASTM A 123.

2.12 Wood Posts: Comply with the specifications for treated wood posts contained in the state's standard specifications.

2.13 Steel Traffic Treads: Not less than 3/16 inch thick, exclusive of the raised portions, not less than 24 inches wide, and the individual sections not more than 15 feet long. Treads shall have a non-skid surface with alternate projections at right angles to each other. The raised portions shall be formed in the rolling and not by punching or pressing from the underside. Treads shall be punched 7/16 inch for lag screws or bolts. The holes shall be placed not less than 1-1/4 inches nor more than 1-1/2 inches from the edge of the tread. The spacing of holes on both sides of the tread shall not be more than 15 inches and on both ends of each section not more than 6 inches. The weight of the treads shall be approximately 8-3/4 pounds per square foot.

3.0 EXECUTION:

3.1 Preparation:

3.1.1 Traffic Control: When traffic is maintained on bridge under repair or is directed over a temporary run-around, furnish, erect, and maintain all barricades, flags, torches, lights, guardrails, temporary pavement markings, and traffic control signs required for the protection of the public and for the direction of traffic. Number, type, color, size, and placement of all traffic control devices and the use of a flagman shall comply with USDOT FHA MUTCD "Traffic Controls for Highway Construction and Maintenance Operations." All traffic control devices in advance of the construction limits shall also be the responsibility of the Contractor.

3.1.2 Structural Metal Work shall comply with the following:

a. AISC Code of Standard Practice.

b. AWS Structural Welding Code as modified by the ANSI/AASHTO/AWS D1.5.

c. AREA-01, Chapter 15 .

d. AASHTO Standard Specifications for Highway Bridges.

3.1.3 Fabrication: Form shapes with sharp lines and angles and finish with smooth surfaces. Drill or ream bolt holes 1/16 inch larger than the diameter of the bolt. Provide welded shop connections wherever possible. Fabricate rail elements parallel to gradeline. Posts shall be normal to parapet.

3.1.3.1 Steel Railing: Rails and posts shall be jointed by either mechanically fastened flush fittings or welding. Grind welds smooth and flush. Lay flex beam railing in the direction of traffic.

3.1.3.2 Aluminum Railing: Join railings and posts by either slip type fittings, mechanically fastened fittings, or inner-wedge system. Fastenings shall be stainless steel, set flush or recessed.

3.2 Erection:

3.2.1 Connections: Bearing surfaces and surfaces to be in permanent contact shall be clean and free from dirt and scale. Ream holes that must be enlarged to admit bolts. Field correction of fabrication errors shall be made only with approval of the Contracting Officer.

3.2.2 Coat Aluminum Surfaces that will be in contact with dissimilar materials as follows:

a. Contact with Steel: One coat of zinc chromate primer, Fed. Spec. TT-P-645 or one coat of a suitable nonhardening joint compound, Fed. Spec. TT-S-00227.

b. Contact with Wood, Fiberboard, Masonry, or other Porous Material: Alkali-resistant bituminous paint, ASTM D 2939.

c. Aluminum Embedded in Concrete: One coat of zinc chromate primer, Fed. Spec. TT-P-645, alkali-resistant bituminous paint, ASTM D 2939, or wrapped with a suitable plastic tape.

3.3 Maintenance and Repair Methods:

3.3.1 Open Grid Bridge Floor: Realign grids that are not in proper alignment. Replace broken clips connecting grids to grid support system. Reweld cracked or broken welds between grid and grid support system. Remove and replace deficient rectangular grid decking as directed.

3.3.2 Concrete Filled Grating: Repair or remove and replace grating as directed. Replace concrete with 4,000 psi concrete with 4 to 6 percent entrained air.

3.3.3 Railing:

3.3.3.1 Remove damaged and deteriorated railing and install new railing as directed.

3.3.3.2 Anchor Bolts and Connections: Tighten all loose nuts. Replace all corroded anchor bolts with drilled anchor bolts to concrete, ASTM A 307 bolts to steel for steel railing, and stainless steel bolts for aluminum railing.

3.3.4 Repair of Corroded Material: Remove all rust and corrosion by sandblasting or wire brushing. Strengthen corroded members by the addition of structural carbon steel or high strength steel.

SECTION 05720
ORNAMENTAL HANDRAIL AND RAILINGS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of ornamental handrail and railings. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Tubing, Bars, and Shapes:

2.1.1 Aluminum: ASTM B 221, 6063-T6, T-52.

2.1.2 Steel: ASTM A 36, A 500, A 501.

2.1.3 Bronze: ASTM B 135, Alloy C23000.

2.1.4 Stainless Steel: ASTM A 554, Grade MT304; ASTM A 312, Grade TP304; ASTM A 167, Type 304.

2.1.5 Brass: ASTM B 135, Alloy C28000 and ASTM B 455, Alloy C38500.

2.2 Castings:

2.2.1 Aluminum: ASTM B 26, 356-T6.

2.2.2 Steel: Gray Iron, ASTM A 48, Class 30; Malleable Iron, ASTM A 47.

2.2.3 Bronze: ASTM B 584, Alloy C92300.

2.2.4 Stainless Steel: ASTM A 743, Grade CF8 or CF20.

2.2.5 Brass: ASTM B 584, Alloy C85700.

2.3 Wood Handrails shall be hardwood handrail of species and profile selected from manufacturer's standards, bonded to metal subrail, with manufacturer's standard transparent finish, unless otherwise directed.

2.4 Fasteners: Furnish fasteners of basic metal and alloy, matching finished color and texture as the metal being fastened, unless otherwise directed. Unless otherwise directed provide Phillips flat-head screws for exposed fasteners.

2.5 Bituminous Paint: SSPC-Paint 12 (cold-applied asphalt mastic).

2.6 Fabrication: Stainless steel and steel handrails shall have welded connections. Aluminum handrails shall be either welded or non-welded. Bronze and brass handrail shall have non-welded connections.

2.6.1 Welded Connections: Fabricate handrails and railings of materials indicated for interconnections of members by welding. Preassemble railing units, to maximum extent practicable, consistently with shipping and handling limitations. Welding shall comply with applicable AWS specifications, using method appropriate for metal and finish indicated. Grind exposed welds smooth and flush to match and blend with adjoining surfaces.

2.6.2 Nonwelded Connections: Fabricate railings and handrails for interconnection of members by means of railing manufacturer's standard concealed mechanical fasteners and fittings unless otherwise directed. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.

2.6.3 Protective Lacquer: Metal handrails shall be shop-coated with clear non-yellowing lacquer, of type recommended for protection of the finished metal surface.

3.0 EXECUTION:

3.1 Corrosion Protection: Coat concealed surfaces of aluminum that will be in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.

3.2 Expansion Joints: Provide expansion joints at locations directed or at intervals not to exceed 40 feet. Provide internal sleeve type slip-joint extending 2 inches beyond joint on either side; fasten internal sleeve securely to one side, locate joint within 6 inches of post.

3.3 Provide Anchorage Devices and Fasteners where necessary for securing ornamental metal items to in-place construction, including threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws, and other connectors as required.

3.4 Form Tight Joints with exposed connections accurately fitted with uniform reveals and spaces for sealants and joint fillers. Where cutting, welding, and grinding are required for proper shop fitting and jointing of the work, restore finishes to eliminate any evidence of such corrective work.

SECTION 05730
ORNAMENTAL SHEET METAL

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of ornamental sheet metals. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Materials:

2.1.1 Steel Sheet: ASTM A 527, galvanized.

2.1.2 Aluminum Sheet: ASTM B 209, Alloy 5052-H32.

2.1.3 Extruded Aluminum: ASTM B 221, Alloy 6063-T6, T-52.

2.1.4 Bronze: ASTM B 455, Alloy C38500 and ASTM B 135, Alloy C8000.

2.1.5 Stainless Steel: ASTM A 554, Grade MT304; ASTM A 312, Grade TP304; ASTM A 167, Type 304.

2.2 Wall Louvers: Weather-resistant type, with bird screens and made to withstand a wind load of not less than 30 lb/sf. Wall louvers shall bear the AMCA certified rating program seal for air performance and water penetration in accordance with AMCA-500 and AMCA-511. The rating shall show a water penetration of 0.20 or less at 800 fpm.

2.2.1 Extruded Aluminum Louvers: Fabricated of extruded 6063-T6 or 6063-T52 aluminum with a wall thickness of not less than 0.080 inch thick.

2.2.2 Formed Metal Louvers: Formed of zinc-coated steel sheet not thinner than 16 U.S. gauge, or aluminum sheet not less than 0.08 inch thick.

2.2.3 Mullions: Same material and finish as louvers.

2.2.4 Screens and Frames: Minimum 1/4-inch square mesh and minimum 16-gauge aluminum bird screen. Mount screens in removable, rewirable frames of same material and finish as the louvers.

2.3 Door Louvers: Inverted "Y" or "V" sightproof type not less than 1-3/8 inch thick with matching metal trim. Louvers for exterior doors shall be weather-resistant type.

2.3.1 Extruded Aluminum Door Louvers: Minimum 0.050 inch thick 6063-T6 or 6063-T52 aluminum alloy. Frame and trim shall be clamp-in "L" type.

2.3.2 Formed Metal Door Louvers: Minimum 20 U.S. gauge steel sheet or minimum 0.050 inch thick sheet aluminum. Trim shall be beveled "Z" molding both sides.

2.3.3 Screens and Frames: Screen shall be aluminum, RR-W-365, Type VII. Mount screens in removable, rewirable frames of same material and finish as the louvers.

2.4 Fasteners: Stainless steel screws and fasteners as required.

2.5 Finishes:

2.5.1 Aluminum: Factory-applied anodic coating or organic coating.

2.5.1.1 Anodic Coating: AA-M10-C22-A31, Architectural Class II, clear finish or AA-M10-C22-A32, Architectural Class II, integral color finish.

2.5.1.2 Organic Coating: AAMA 605.2, 0.8 mil minimum dry film thickness, baked enamel finish.

2.5.2 Steel: Factory-applied coating, rust-inhibitive primer and baked enamel finish coat, 1 mil minimum total dry film thickness.

2.6 Motorized Louvers: Electric motor shall be completely encased in the louver sill. Motor shall be U.L. approved, 120 volt, 60 hertz with a transformer.

3.0 EXECUTION:

3.1 Copper or Copper-Bearing Alloys: Paint copper or copper-bearing alloys in contact with dissimilar metal with heavy-bodied bituminous paint or separate with inert membrane.

3.2 Aluminum: Where aluminum contacts metal other than zinc, paint the dissimilar steel with a primer and two coats of aluminum paint.

3.3 Metal: Paint metal in contact with mortar, concrete, or other masonry materials with alkali-resistant coatings such as heavy-bodied bituminous paint.

3.4 Wood: Paint wood or other absorptive materials that may become repeatedly wet and in contact with metal with two coats of aluminum paint or acoat of heavy-bodied bituminous paint.

SECTION 05805
EXPANSION CONTROL

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of building expansion joint covers. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Frames and Covers:

2.1.1 Aluminum: ASTM B 221, 6063-T6.

2.1.2 Bronze: ASTM B 455, Alloy C 38500.

2.1.3 Stainless Steel: ASTM A 167, Type 304.

2.2 Resilient Filler: Neoprene, elastomeric, or extruded vinyl.

2.3 Bituminous Paints: SSPC-Paint 12 (cold-applied asphalt mastic).

2.4 Fabrication: Shop assemble components and package with anchors and fittings. Provide joint components in single lengths whenever practical.

3.0 EXECUTION:

3.1 Corrosion Protection: Coat concealed surfaces of aluminum that will be in contact with grout, concrete, masonry, wood, or dissimilar metals with a heavy coat of bituminous paint.

3.2 Installation: Rigidly anchor expansion assembly to both sides of expansion joints to prevent misalignment.

SECTION 05830
BRIDGE EXPANSION DEVICES, BEARINGS, AND ANCHORS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for repair and maintenance of bridge expansion devices, bearings, and anchors. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Joint Filler:

2.1.1 Preformed Bituminous: AASHTO M33.

2.1.2 Preformed Fiber and Preformed Bituminous Inorganic Fiber: AASHTO M213.

2.1.3 Preformed Cork: AASHTO M153, Type II.

2.1.4 Preformed Self-Expanding Cork: AASHTO M153, Type III.

2.1.5 Preformed Sponge Rubber: AASHTO M153, Type I.

2.1.6 Preformed Closed Cell Plastic: Low density, extruded, closed cell expanded polyethylene plastic foam that is chemically inert.

2.2 Cold-Poured Joint Sealer: CE CRD-C-527.

2.3 Hot-Poured Joint Sealer: AASHTO M173.

2.4 Preformed Elastomeric Compression Joint Sealer: AASHTO M220.

2.5 Neoprene Expansion Joints:

2.5.1 Elastomer shall have the following physical properties:

a. Tensile Strength (ASTM D 412): 1,800 psi minimum.

b. Elongation at Break (ASTM D 412): 400 percent minimum.

c. Hardness (ASTM D 2240): 40 to 50 points Durometer A.

2.5.2 Sealant: A two-component polysulfide liquid sealant complying with Fed. Spec. TT-S-00227, Type II.

2.6 Fabric Bearing Pads shall consist of a fabric and rubber body made with unvulcanized rubber and unused fabric fibers. The rubber body shall be natural polyisoprene or polychloroprene. Average hardness shall be 80 to 90 Shore A Durometer. Ultimate breakdown limit under compressive loading shall be no less than 7,000 psi. Tolerance on thickness shall be plus or minus 1/16 inch.

2.7 Graphited Asbestos Bearing Pads: Asbestos fibers bonded together with synethic rubber elastomer. One face of each pad shall be impregnated with graphite. The surface hardness shall be 95-100 Shore A Durometer. Tolerance on thickness of pads shall be plus or minus 1/16 inch. Graphited surfaces shall be in contact.

2.8 Bronze Bearings and Expansion Plates: AASHTO M107, Alloy B.

2.9 Rolled Copper-Alloy Bearings and Expansion Plates: AASHTO M108, Alloy 510.

2.10 Bearing and Expansion Plates: Sliding bearings shall have a surface roughness value not exceeding 125 per ANSI B46.1.

3.0 EXECUTION:

3.1 Traffic Control: When traffic is maintained on bridge under repair or is directed over a temporary run-around, furnish, erect, and maintain all barricades, flags, torches, lights, guardrails, temporary pavement markings, and traffic control signs required for the protection of the public and for the direction of traffic. Number, type, color, size, and placement of all traffic control devices and the use of a flagman shall comply with USDOT FHA MUTCD "Traffic Controls for Highway Construction and Maintenance Operation." All traffic control devices in advance of the construction limits shall also be the responsibility of the Contractor.

3.2 Maintenance and Repair Methods:

3.2.1 Expansion Devices:

3.2.1.1 Remove all dirt and debris from joints to be repaired. Adjust joint width accurately for temperature at time of setting. Cut joint filler to fit exactly and completely fill the joint.

3.2.1.2 Expansion Devices, Including Elastomeric and Steel: Repair or replace as directed.

3.2.2 Bearing Devices:

3.2.2.1 General: Remove all debris from the bearing seats. Tighten loose connections. Loose high strength bolts shall be removed and replaced.

3.2.2.2 Steel Components: Remove rust and corrosion by sandblasting or wire brushing.

3.2.2.3 Bearing Devices, Including Bearing Plates, Roller Expansion Bearings, Rocker Expansion Bearings, Pins and Hanger Bearings, and Anchor Bolts: Repair or replace as directed.

SECTION 05920
WATER TREATMENT PLANT DEBRIS RACKS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation materials for repair and maintenance of debris racks for water treatment plant intake structures. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Manually Cleaned Racks: Repair or replacement parts for manually cleaned racks shall be galvanized or alloy steel rods, bars, or structural shapes. Galvanized material shall comply with ASTM A 153 and B 633. Alloy steel material shall comply with ASTM A 193, A 480; and A 564, as applicable.

2.2 Fasteners shall comply with ASTM A 307 or A 325 for bolts and A 502 for rivets.

3.0 EXECUTION:

3.1 Silt Removal: Cofferdams and temporary bypass inlets shall be provided to allow dewatering. Water level shall be lowered, and silt and debris shall be pumped, shoveled, or otherwise removed from around rack.

3.2 Repair or Replacement of Structural Members, Rods, and Shapes shall be by welding or riveting, as applicable to the existing construction. All welding shall be in compliance with AWS D1.1.

SECTION 06111
LIGHT WOODEN STRUCTURES FRAMING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for light wooden structures framing. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Grading and Marking: Materials shall bear the grademark, stamp, or other identifying marks indicating grades of material and rules or standards under which they were produced, including requirements for qualifications and authority of the inspection organization, usage of authorized identification, and information included in the identification. The inspection agency for lumber shall be certified by the Board of Review, American Lumber Standards Committee, to grade species used. Except for structural laminated members, plywood, and lumber, bundle marking or certificates will be permitted in lieu of marking each individual piece. Species and grades are listed in Table 1 at the end of this section.

2.2 Sizes: Lumber sizes shall conform to the requirements of the rules or standards under which produced, and unless otherwise specified, lumber shall be surfaced on four sides.

2.3 Moisture Content: At the time lumber and other materials are delivered and when installed in the work their moisture content shall be as follows:

2.3.1 Treated and Untreated Lumber 2 Inches or Less in Thickness, Except Roof Planking: 19 percent maximum.

2.3.2 Treated and Untreated Lumber Over 2 Inches in Thickness, Except Roof Planking: 25 percent maximum.

2.3.3 Roof Planking 2 Inches or More in Thickness: 15 percent maximum.

2.3.4 Materials Other Than Lumber: In accordance with standard under which product is produced.

2.4 Wood Member Design:

2.4.1 Trussed Rafters: As an option to standard rafters, trussed rafters may be provided. Connections shall be made with light metal plate connectors. Light metal plate connected wood trusses shall be designed in conformance with TPI Design Specifications for Metal Plate Connected Wood Trusses and fabricated in conformance with the TPI Quality Standard for Metal Plate Connected Wood Trusses.

2.4.2 Non-stress Graded Members shall include plates, caps, bucks, studs, framing for skirting and other miscellaneous framing, blocking, nailers, sleepers, and grounds. Members shall be standard grade or No. 2 grade except studs may be stud grade. Non-stress member grades shall conform to the National Grading Rule for Dimension Lumber established in conformance with the rules or standards under which produced and as applied in individual grading rules of applicable grading agencies.

2.4.3 Structural Glued Laminated Members shall be in accordance with AITC A 190.1. Members shall be sealed with a penetrating sealer and wrapped in accordance with AITC 111.

2.5 Preservative Treatment: Lumber not over 5 inches thick and plywood, when in contact with soil, shall be treated in accordance with AWPB LP-22, LP-33, or LP-44; when specified to be painted or used in built-up roofing systems, AWPB LP-2 or LP-22; and for all other purposes, AWPB LP-2, LP-3, or LP-4. Except as otherwise specified, lumber over 5 inches thick shall be pressure preservative-treated in accordance with AWPA C2. Structural glued laminated timber shall be treated in accordance with AWPA C28. Wood treated with oil-borne preservatives shall be clean, free from surface oil, and properly seasoned for use in building construction. Wood treated with water-borne preservatives shall be marked with the word "Dry." Creosote or coal-tar solutions shall not be used. Surfaces of lumber that will be exposed shall not be incised. Exposed areas of treated wood that are cut or drilled after treatment shall receive a field treatment in accordance with AWPA M-4. Items of all-heart material of cedar, cypress, or redwood will not require preservative treatment, except when in direct contact with soil. Unless otherwise specified, all wood members exposed to weather or in contact with soil, water, masonry, or concrete, and all wood framing members directly above soil when the bottom elevation is 18 inches or less above soil shall be pressure preservative-treated. The following items will always be treated:

a. All wood members set into concrete regardless of location, including flush-with-deck wood nailers for roofs.

b. All wood members in contact with slabs-on-grade, including wood floor sleepers over waterproofed slab surface.

c. All wood members in contact with foundation walls.

d. Furring strips used on walls or partitions below grade.

e. Furring strips used on exterior walls above grade.

f. All wood members used for rough framing of openings in exterior concrete or masonry walls.

g. All wood members used in exterior exposed construction such as steps, platforms, walkways, railways, and framing for skirting and other miscellaneous framing.

h. Nailing strips used over fiberboard or gypsumboard wall sheathings as a base for wood shingles.

2.6 Fire-Retardant Treatment: Fire-retardant treated wood shall be pressure-treated in accordance with AWPA C20 for lumber and AWPA C27 for plywood. Treatment and performance inspection shall be by an independent and qualified testing agency that establishes performance ratings. Each piece or bundle of treated material shall bear identification of the testing agency to indicate performance in accordance with such rating. Treated materials to be exposed to rain wetting shall be subjected to an accelerated weathering technique in accordance with ASTM D 2898 prior to being tested for compliance with AWPA C20 or C27.

3.0 EXECUTION:

3.1 All Nailing shall be in accordance with the Recommended Nailing Schedule as contained in NFOPA Manual for Wood Frame Construction.

3.2 Installation of Timber Connectors shall conform to applicable requirements of the NFOPA National Design Specification for Wood Construction.

3.3 Members shall be framed for passage of ducts and pipes and shall be cut, notched, or bored in accordance with applicable requirements of the NFOPA Manual for Wood Frame Construction.

3.4 Framing shall be kept at least 2 inches away from chimneys and 4 inches away from fireplace backwalls.

3.5 Leveling of Joists, Beams, and Girders on Masonry or Concrete shall be with slate or steel; on wood or metal, leveling shall be without shims.

| Grading Rules | Species | No. 1 | No. 2 |
|---|---|---|---|
| NHLA | Red Oak | X | |
| NELMA | Northern Pine | | X |
| | Eastern Hemlock-Tamarack | | X |
| SPIB | Southern Pine | X | |
| WCLB | Douglas Fir-Larch | | X |
| | Hem-Fir | | X |
| WWPA | Douglas Fir-Larch | | X |
| | Hem-Fir | | X |
| | Douglas Fir-South | | X |

SECTION 06115
SHEATHING, SIDING, AND SUBFLOORING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of sheathing, siding, and subflooring. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 General: Materials shall bear the grademark, stamp, or other identifying marks indicating grades of material and rules or standards under which produced. Such identifying marks on material shall be in accordance with the rule or standard under which the material is produced, including requirements for qualifications and authority of the inspection organization, usage of authorized identification, and information included in the identification. The inspection agency for lumber shall be certified by the Board of Review, American Lumber Standards Committee, to grade species used. Bundle marking or certificates will be permitted in lieu of marking each individual piece, except for structural laminated members, plywood, and lumber. Size and moisture content shall conform to requirements of the rules or standards under which materials are produced.

2.2 Plywood shall be in accordance with DOC PS 1, Grade C-D for wall sheathing and Grade C-D with exterior glue for roof sheathing, unless otherwise specified.

2.3 Roof Decking Design Stresses shall be as specified for structural members. Decking shall be tongue and groove, V-jointed, and matched and dressed where exposed. As an option, fabricated, laminated lumber decking with interlocking tongue and groove joints may be provided.

2.4 Sheathing shall be of either fiberboard, gypsum board, plywood, V-structural-use panels, or wood for wall sheathing; and either plywood, structural-use panels, or wood for roof sheathing and skirting for temporary structures including access doors through skirting as required.

2.4.1 Fiberboard shall be in accordance with ASTM C 208, sheathing grade, or ASTM D 2277; asphalt-impregnated or asphalt-coated to be water-resistant but vapor permeable.

2.4.2 Gypsum Board shall be in accordance with ASTM C 79.

2.4.3 Structural-Use Panels shall meet the qualification requirements of APA Performance Standards and Policies for Structural-Use Panels. Panels shall conform to

APA Product Guide for Performance Rated Panels for Sheathing, Exp 1 or 2, or Ext; or Structural I or II Rated Sheathing, Exp 1 or Ext.

2.4 4 Wood shall be center-matched, ship-lapped, or square-edge, except exposed roof sheathing shall be V-jointed, matched and dressed. Species and grade shall be in accordance with Table 1 at the end of this section.

2.5 Shear Wall Panels shall be of plywood or sheathing conforming to APA Product Guide for Performance Rated Panels for Sheathing, Exp 1 or 2, or Ext; or Structural I or II Rated Sheathing, Exp 1 or Ext.

2.6 Subflooring shall be of either plywood, structural use panels, or wood.

2.6.1 Plywood shall conform to DOC PS 1; Grade C-D for uses not otherwise specified, Grade C-D with exterior glue for reception of underlayment as wood flooring, underlayment grade with exterior glue or C-C (Plugged), and exterior grade for use as a combination subfloor-underlayment under resilient flooring.

2.6.2 Structural-Use Panels shall be APA Rated structural-use panels qualified for subflooring or combination subfloor-underlayment under APA Performance Standards and Policies for Structural-Use Panels.

2.6.3 Wood shall be center-matched, ship-lapped, or square-edge. Species and grade shall be in accordance with Table 1 at the end of this section.

2.6.4 Adhesive shall conform to APA AFG-01.

2.7 Underlayment shall be either hardboard, particleboard, or plywood.

2.7.1 Hardboard shall be in accordance with ANSI A135.4, service class, sanded on one side, 1/4-inch thick and 4 feet wide.

2.7.2 Particleboard shall be in accordance with ANSI A208.1, Grade 1-M-1, 1/4-inch thick, and 4 feet by 4 feet.

2.7.3 Plywood shall be in accordance with DOC PS 1, underlayment grade with exterior glue, or C-C (Plugged) exterior grade, 3/8-inch thick and 4 feet wide.

2.8 Moisture Barrier of Building Paper shall be asphalt-saturated felt conforming to ASTM D 226, Type I or polyethylene sheeting shall conform to ASTM D 2103, 4 mil thick.

3.0 EXECUTION:

3.1 Nailing shall be in accordance with the Recommended Nailing Schedule as contained in NFOPA Manual for Wood Frame Construction.

3.2 Sheathing Installation:

3.2.1 Fiberboard sheathing shall be applied with edges 1/8 inch apart at joints, fitted snugly at abutting frames of openings, and nailed or stapled. Sheets 2 feet wide shall be applied horizontally with the tongued groove up and with vertical joints over supports and staggered. Sheets 4 feet wide shall be applied vertically, extended over top and bottom plates, and with all vertical and horizontal joints over supports.

3.2.2 Gypsum Board Sheathing shall be applied with edges in light contact at joints and nailed. Sheets 2 feet wide shall be applied horizontally with tongued edge up and with vertical joints over supports and staggered. Sheets 4 feet wide shall be applied vertically, extended over top and bottom plates, and with all vertical and horizontal joints over supports.

3.2.3 Plywood Sheathing shall be applied with edges 1/8 inch apart at side joints, 1/16 inch apart at end joints, and nailed at supported edges at 6 inches on center and at intermediate supports 12 inches on center. Nailing of edges shall be 3/8 inch from the edges. Wall sheathing shall extend over top and bottom plates. If applied horizontally, the vertical joints shall be made over supports and staggered. Wall sheathing over which wood shingles are to be applied shall be applied horizontally. Roof sheathing shall have face grain at right angles to supports with end joints made over supports and staggered.

3.2.4 Structural-Use Panels shall be applied with edges 1/4 inch apart at side joints, 1/8 inch apart at end joints, and nailed at supported edges at 6 inches on center and at intermediate supports 12 inches on center. Nailing of edges shall be 3/8 inch from the edges. Wall sheathing shall extend over top and bottom plates and, if applied horizontally, the vertical joints shall be made over supports and staggered. Wall sheathing over which wood shingles are to be applied shall be applied horizontally. Roof sheathing shall have end joints made over supports and staggered.

3.2.5 Wood Sheathing: End joints shall be made over framing members and so alternated that there will be at least two boards between joints on the same support. Each board shall bear on at least three supports. Boards shall be nailed at each support using two nails for boards 8 inches and less in width and three nails for boards more than 8 inches in width.

3.3 Subflooring Installation: A clearance of 1/4 inch shall be provided at walls. Plywood subflooring and structural-use panel subflooring may be installed with adhesive conforming to APA AFG-01 and nails spaced at 12 inches on center. Installation of subflooring with adhesives shall be in accordance with APA Design/Construction Guide: Residential and Commercial. Each plywood or structural-use panel shall have end joints made over supports and staggered. Where finish flooring of different thicknesses is used in adjoining areas, wood strips of the thickness required to bring the finish flooring surfaces to the same plane shall be used under the subfloor panels. Plywood subflooring shall be

applied with the face grain at right angles to the supports, with edges 1/8 inch apart at side joints and 1/16 inch apart at end joints. Structural-use panel subflooring shall be applied over two or more supports with the long dimension across supports and with edges 1/4 inch apart at side joints and 1/8 inch apart at end joints. Wood subflooring shall bear on at least three supports.

3.4 Installation of Underlayment shall be applied with edges 1/32 inch apart at joints and a clearance of 1/4 inch at walls. Joints at underlayment shall not be located directly over parallel joints at subflooring. Power driven wire staples of lengths recommended by the underlayment manufacturer may be used in lieu of nails. Any surface roughness at nail heads or joints shall be lightly sanded to blend with the undisturbed surface. When plywood combination subfloor-underlayment is used in lieu of separate layers, it shall be installed as specified for plywood subfloor, except all joints shall be made over supports with edge joints spaced 1/8 inch apart and end joints spaced 1/16 inch apart. When plywood combination subfloor-underlayment is tongued and grooved, only end joints shall require support. Tongued and grooved combination subfloor-underlayment shall be applied with joints spaced 3/32 inch apart.

3.5 Installation of Shear Wall Plywood or Structural-Use Panels shall be installed with the long dimension parallel or perpendicular to the supports. Blocking shall be provided behind edges not located over supports.

3.6 Moisture Barrier shall be applied over all wood wall sheathing, over studs to directly receive horizontal siding or board siding, over any wall sheathing to receive an unbacked stucco base, and over square edge wood subflooring to receive wood strip flooring. Moisture barrier over sheathing shall be applied horizontally, starting at the bottom, lapped 6 inches at edges and ends, and nailed at laps 16 inches on center. Moisture barrier over subfloor shall be applied as the strip flooring installation progresses and lapped 2 inches at edges and ends.

SPECIES AND GRADE
Subflooring, Roof Sheathing, Wall Sheathing, Furring

| Grading Rules | Species | Standard | Const Comm | No.2 Board | No.2 Comm | No.3 Comm |
|---|---|---|---|---|---|---|
| NHLA | Cypress | | | | | X |
| NELMA | Northern White Cedar | | | | | X |
| | Eastern White Pine | X | | | | X |
| | Northern Pine | X | | | | X |
| | Balsam Fir | | | | | X |
| | Eastern Hemlock-Tamarack | | | | | |
| NHPMA | Eastern White Pine | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Northern Pine | | | | | |
| | Balsam Fir | | | | | |
| | Eastern Hemlock-Tamarack | | | | | |
| RIS | Redwood | | | X | | |
| SCMA | Cypress | | | | | X |
| SPIB | Southern Pine | | | | X | |
| WCLB | Douglas Fir-Larch | X | | | | |
| | Hem-Fir | X | | | | |
| | Sitka Spruce | X | | | | |
| | Mountain Hemlock | X | | | | |
| | Western Cedar | X | | | | |
| WWPA | Douglas Fir-Larch | | | | | X |
| | Hem-Fir | | | | | X |
| | Idaho White Pine | | | | | X |
| | Lodgepole Pine | | | | | X |
| | Ponderosa Pine | | | | | X |
| | Sugar Pine | | | | | X |
| | Englemann Spruce | | | | | X |
| | Douglas Fir South | | | | | X |
| | Mountain Hemlock | | | | | X |
| | Subalpine Fir | | | | | X |
| | Western Cedar | | | | | X |

SECTION 06135
WOOD TRUSSES

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for maintenance and repair of wood trusses. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Structural Glue-Laminated Timber shall comply with ANSI/AITC A190.1. Lumber for laminating shall be of a stress grade providing glue-laminated members with allowable stress values of 2,000 psi in bending, 1,600 psi in tension, 1,500 psi in compression parallel to grain, and 385 psi in compression perpendicular to grain for dry condition of service.

2.1.1 Adhesives shall meet requirements for dry condition of service.

2.1.2 Appearance of Members shall be Industrial Grade. Plywood shall comply with DOC PS 1.

2.1.3 Surfaces of Members shall be sealed with a penetrating sealer. Members shall be delivered individually wrapped. Do not unwrap until members are installed and adequate protection is provided.

2.2 Timber Connections:

2.2.1 Split-Ring Connectors shall be SAE 1010 hot-rolled carbon steel. Rings shall be of standard manufacture and shall fit snugly into pre-cut groove.

2.2.2 Shear Plate:

2.2.2.1 Pressed Steel Type shall be SAE 1010 hot-rolled carbon steel. Shear plates shall be of standard manufacture.

2.2.2.2 Malleable Iron Type: Casting shall comply with ASTM A 47, Grade 35018. Casting shall be of standard manufacture.

2.3 Fasteners:

2.3.1 Nails: Fed. Spec. FF-N-105.

2.3.2 Anchor Bolts, Lag Bolts, and Miscellaneous Bolts and Screws: ASTM A 307. Type, size, and finish shall be best suited for the intended use.

2.4 Saw Lumber:

2.4.1 Lumber shall be one of the following species and commercial grades:

2.4.1.1 Douglas Fir or Larch: Select structural (1500 f) or better.

2.4.1.2 Southern Pine: No. 1 (1500 f) or better.

2.4.1.3 Western Hemlock: Select structural (1500 f) or better.

2.4.2 Sizes, Grading and Marking shall comply with the requirements of the rules or standards under which produced, and unless otherwise indicated, lumber shall be surfaced on four sides. Dressed sizes shall be accepted as the minimum net sizes conforming to nominal sizes. Lumber shall be free from warp. All timber materials shall bear a grademark or other identifying marks indicating grades of material and standards under which produced. If lumber is treated, treatment and retention shall be indicated.

2.5 Preservative Treatment: All lumber shall be preservative-treated unless otherwise indicated. Pressure treat with water borne salt preservative. The retention shall be a minimum of 0.25 pounds per cubic foot. Treatment shall comply with Fed. Spec. TT-W-00571 and AWPA P5. Give all cuts and abrasions 2 brush coats of the same preservative as used at the factory.

2.6 Moisture Content: The moisture content of wood shall not exceed 15 percent at the time of treatment or installation.

3.0 EXECUTION:

3.1 Wiring Conflicts: Piping and electrical wiring conflicting with erection of members shall be removed and placed in a new position approved by the Contracting Officer. Provide temporary utilities and coordination to prevent outages during this period.

3.2 Connections: Drive nails and spikes with just sufficient force to set the heads flush with the surface of the wood. Drill bolt holes a maximum of 1/16 inch larger than the diameter of the bolt. A washer not less than a standard cut washer, or in lieu thereof a metal plate or strap, shall be between the wood and the bolt head and between the wood and the nut. Lag screw holes for the unthreaded portion of the shank shall be the same diameter as the shank and the same depth as the length of the unthreaded shank. The lead hole for the threaded portion of the shank shall be properly sized for species of lumber involved. Insert the threaded portion of the lag screw into its lead hole by turning with a wrench.

3.2.1 Nails: Use 8-penny or larger nails for nailing through 1-inch thick lumber and for toe nailing 2-inch thick lumber; use 16-penny or larger nails for nailing through 2-inch thick lumber. Size and spacing of nails shall comply with NFOPA Specification for Stress-Graded Lumber and its Fastenings.

3.2.2 Wood Screws: Lead holes for withdrawal resistance shall have a diameter of 70 percent of the root diameter of the wood screw. Lead holes for lateral resistance shall have a diameter of 7/8 of the root diameter of the wood screw. The part of the hole receiving the shank shall be about 7/8 the shank diameter. Insert screws in the lead holes by turning with a screw driver or other tool.

3.2.3 Timber Connections: Install the split ring and shear plate in grooves cut by the Contractor.

3.3 Truss Connections and Splices: Tighten all loose bolts and screws, adding washers as required. Remove and replace severely corroded or deteriorated bolts and screws.

3.4 Repair of Bearings and Anchor Bolts: Remove corrosion by wire brushing, sanding, or other approved method. Additional repair requirements shall be as directed.

3.5 Repair of Excessive Truss Deflection: Install tension turnbuckles or install a strengthening system as required to correct deflection.

SECTION 06145
TIMBER BRIDGE COMPONENTS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for repair and maintenance of timber bridge components. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Timber for Bridges shall comply with the specifications for timber bridges contained in the state's standard specifications.

2.2 Preservative Treatment shall comply with the specifications for preservative treatment contained in the state's standard specifications. All timber shall be treated unless specified otherwise.

2.3 Hardware and Castings:

2.3.1 Castings: Cast steel shall comply with ASTM A 27, Grade 70-36, or gray iron castings shall comply with AASHTO M105 Class No. 30, unless otherwise specified.

2.3.2 Hardware:

2.3.2.1 Machine Bolts, Drift-Bolts, and Dowels may be either wrought iron or rolled steel. Machine bolts shall have the square heads and nuts unless otherwise specified.

2.3.2.2 Cast Washers shall be made of malleable or gray iron. The outside diameter shall not be less than 3 1/2 times the bolt diameter and its thickness equal to the bolt diameter. Plate washers shall be made of wrought iron or rolled steel. The outside diameter shall not be less than 3 1/2 times the bolt diameter, and they shall not be less than 1/4 inch thick.

2.3.2.3 Nails and Spikes shall comply with Fed. Spec. FF-N-105.

2.3.2.4 Finish: Unless otherwise specified, all hardware for treated timber bridges shall be galvanized or cadmium-plated. Galvanizing shall comply with ASTM A 123 or A 153. Cadmium plating of steel shall comply with ASTM B 766.

2.4 Timber Connectors shall be ring type or plate type and shall be galvanized in compliance with ASTM A 123 or A 153.

2.4.1 Split Ring: SAE 1010 hot-rolled carbon steel of standard manufacture.

2.4.2 Tooth Ring: Stamped cold form 16-gauge steel sheet complying with SAE 1010 hot-rolled carbon steel of standard manufacture.

2.4.3 Shear-Plate Timber Connectors:

2.4.3.1 Pressed Steel Type shall be SAE 1010 hot-rolled carbon steel of standard manufacture.

2.4.3.2 Malleable Iron Type shall be ASTM A 47, Grade No. 36018 of standard manufacture.

2.5 Structural Glue-Laminated Timber shall comply with ANSI/AITC A190.1. Lumber for laminating shall be of such stress grade as to provide glue-laminated members with allowable stress values of 2,000 psi in bending, 1,600 psi in tension, 1,500 psi in compression parallel to grain, and 385 psi in compression perpendicular to grain for dry condition of service.

2.5.1 Adhesives shall meet requirements for wet condition of service.

2.5.2 Surfaces of Members shall be sealed with a penetration sealer or sealed with a sealer coat.

2.6 Ties: Comply with Section 3.1.1 of AREA-01 Manual. Ties shall be treated with creosote, creosote-petroleum solution, or pentachlorophenol in compliance with Section 3.9 of AREA-01 .

2.7 Asphalt Cement shall comply with AASHTO M20, penetration grade 85-100.

2.8 Surface Coat Aggregate shall be ASTM D 692, except the gradation shall be as follows:

| Sieve Size | Percent Passing (Wt.) |
|---|---|
| 1/2 in. | 100 |
| 3/8 in. | 94-100 |
| No. 4 | 15-45 |
| No. 16 | 0-4 |

3.0 EXECUTION:

3.1 Preparation:

3.1.1 Traffic Control: When traffic is maintained on bridge under repair or is directed over a temporary run-around, furnish, erect, and maintain all barricades, flags, torches,

lights, guardrails, temporary pavement markings, and traffic control signs required for the protection of the public and for the direction of traffic. Number, type, color, size and placement of all traffic control color, size, and placement of all traffic control devices and the use of a flagman shall comply with USDOT FHA MUTCD "Traffic Controls for Highway Construction and Maintenance Operations." All traffic control devices in advance of the construction limits shall also be the responsibility of the Contractor.

3.1.2 Treated Timber: Give all cuts, abrasions, and holes made after treatment 2 applications of 60 percent creosote oil and 40 percent roofing pitch or brush coat with 2 applications of hot creosote oil and covered with hot roofing pitch. Any unfilled holes, after being treated with preservative oil, shall be plugged with treated plugs.

3.2 Erection:

3.2.1 Holes:

3.2.1.1 Drift Bolts and Dowels: Bore holes for round drift bolts and dowels with a bit 1/16 inch less in diameter than the bolt or dowel to be used. The diameter of holes for square drift bolts or dowels shall be equal to the least dimension of the bolt or dowel.

3.2.1.2 Machine Bolts and Rods: Bore holes for field fabrication with a bit the same diameter as the bolt. Holes for fabrication prior to treatment shall be 1/16 inch larger than the bolt diameter.

3.2.1.3 Lag Screws: Bore hole with a bit not larger than the body of the screw at the base of the thread.

3.2.2 Nuts and Washers: Use a washer of the size and type specified under all bolt heads and nuts except carriage bolts. The nuts of all bolts shall be locked by scoring threads after they have been finally tightened.

3.2.3 Countersinking: Paint all recesses in treated timber formed for countersinking with hot creosote oil. Fill recesses likely to collect injurious materials with hot pitch.

3.2.4 Framing: All lumber and timber shall be accurately cut and framed to a close fit in such manner that the joints will have even bearing over the entire contact surfaces. Place stringers in position so that knots near edges will be in the top portions of the stringer. Screw type fastenings shall be screwed into place for the entire length of the fastener. Install the split ring and the shear plate in grooves cut by the Contractor. Force the toothed ring into the contact surfaces of the timbers jointed by means of pressure equipment.

3.2.5 Nailing: Nails and spikes shall be driven with just sufficient force to set the heads flush with the surface of the wood.

3.3 Maintenance and Repair Methods:

3.3.1 Timber Deck:

3.3.1.1 Remove Existing Plank Floor Deck and Fasteners and replace with new planks and fasteners. Lay the floor planks at 45 degrees to centerline of roadway. When more than one length of plank is required, stagger joints between abutting ends at least 3 feet in any two adjacent lines of plank.

3.3.1.2 Standard Wrought Washers shall be used under the heads of all lag screws and under the heads or nuts of all machine bolts. Where machine bolts are used for fastening the floor plank all nuts used shall be locknuts. Countersink heads of all lag screws and bolts in the surface of the floor. Fill recesses formed for countersinking with hot pitch.

3.3.1.3 Bituminous Surface Coat: Clean the floor of foreign materials. Apply asphalt cement at a temperature of 275 F to 350 F and at a rate of approximately 1/4 gallon per square yard of surface. The deck shall be dry at the time of bitumen application. Cover the entire surface with a thin coating of aggregate in a sufficient quantity to take up any free bitumen.

3.3.2 Hardware: Remove all corrosion by sandblasting or wire brushing. Replace all loose bolts and screws, adding washers as required. Replace deteriorated hardware.

3.3.3 Metal Tread Plates: Remove and replace treads as directed. Before installing treads, remove high spots and rough spots in the plank floor so that the treads will be in contact with the floor for their full length and width. Treads shall be laid in a heavy mop coat of asphalt filler. Treads shall be laid with a space of 1/4 inch between adjacent ends and shall be fastened by means of 3/8-inch galvanized bolts. Where bolts cannot be used, use 3/8-inch by 3-inch galvanized lag screws.

3.3.4 Timber Railroad Bridge Deck: Remove defective ties and guardrail, including fasteners, and replace with similar ties, guardrail, and fasteners as directed.

3.3.5 Repair of Structural Timber Members: Repair, including removal and replacement, shall be as directed.

SECTION 06220
MILLWORK

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of millwork. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 General: All millwork products shall be marked with manufacturer's identification and grade, in compliance with Architectural Woodwork Institute (AWI) quality grade. Products shall conform to applicable requirements of AWI Architectural Woodwork Quality Standards, Guide Specifications, and Quality Certification Program and Woodwork Institute of California (WIC) Manual of Millwork.

2.2 Millwork: Millwork shall include the following representative examples of architectural woodwork:

a. Exterior cornices, fasciae, and soffits.

b. Trim for exterior and interior openings.

c. Frames for exterior and interior doors and other openings.

d. Casework.

e. Wood shelving.

2.3 Wood Moisture Content: Lumber for millwork shall be kiln-dried to an average moisture content range of 9 percent to 13 percent for exterior work and 6 percent to 11 percent for interior work.

2.4 Grade of Work: Interior millwork surfaces that are to receive transparent finishes shall be premium grade of the species selected. Millwork surfaces that are to be painted shall be custom grade of the species selected.

2.5 Fire-Retardant Marking: Each unit of fire-retardant treated wood and plywood shall be marked with the producer's label and UL label showing grade and rating.

2.6 Preservative Treatment: Exterior millwork and designated interior millwork shall be preservative-treated in accordance with NWWDA I.S.4. Use a preservative that will not interfere with the designated finish. Apply brush coat on surfaces cut after treatment.

3.0 EXECUTION: Millwork shall be installed plumb, level, true, and straight with no distortions. Millwork that abuts adjoining work shall be scribed and cut to fit. Millwork shall be installed with a minimum number of joints, coped at returns, mitered at corners, and shall comply with quality standards for joinery.

SECTION 06410
CABINETS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of cabinets. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:
2.1 Cabinets shall comply with ANSI/NKCA A161.1.

2.2 Countertops shall comply with ANSI A161.2.

2.3 Materials:
2.3.1 Particleboard shall be ANSI A208.1 mat-formed particleboard, Grade 1-M-2 with minimum density of 40 lbs/cu ft, internal bond of 60 psi; and minimum screwholding capacity of 225 lbs on faces and 200 lbs on edges.

2.3.2 Plastic Laminate shall be NEMA LD 3.

2.3.3 Hardwood Plywood shall be HPMA FE.

2.3.4 Hardwood Lumber shall be clear, dry, sound, and free of defects, First Grade Lumber (NHLA).

2.3.5 Hardboard shall be ANSI A135.4, Class 1, tempered.

2.3.6 Decorative Boards shall be low pressure melamine plastic laminate composite panels.

2.3.7 Medium Density Fiberboard shall be ANSI A208.2.

2.4 Transparent Finish Construction Wood Cabinet:
2.4.1 Solid Lumber and Plywood Face Veneer shall be selected for compatible grain and color of the species.

2.4.2 Semi-Exposed Materials:

2.4.2.1 Solid Lumber: Dry, sound, selected to eliminate appearance defects, of any species of hardwood or softwood, with color and grain characteristics similar to exposed portions.

2.4.2.2 Plywood: Species to match color and grain of exposed members; with particleboard core or veneer core.

2.4.3 Style of Face Construction: Provide base, wall, and full height units with drawer fronts, doors, and fixed panels overlaying and concealing face frames of cabinet body, as required.

2.4.4 Face Frame Style: Provide base, wall, and full height units with face frames of cabinets exposed around drawer fronts and doors.

2.4.4.1 Drawer Fronts and Doors: Surface applied or recessed flush with cabinet front, as required.

2.4.4.2 Flush Style Door Construction: Lumber core plywood, 5-ply with hardwood face veneers and crossbanding.

2.4.4.3 Flush Style Drawer Fronts: Same construction as door, or solid or glued-up lumber, not less than 1/2 inch thick.

2.4.4.4 Stile and Rail Drawer Fronts and Doors: Of design selected, with stiles and rails of solid lumber, 3/4 inch thick for doors and 5/8 inch thick for drawer fronts.

2.5 Countertop Construction:

2.5.1 Exposed Surfacing Material: High pressure plastic laminate, 0.050 inch thick, general purpose type (GP50); except where postformed countertop configuration is required, when 0.042 inch thick, postforming type (PF42) shall be used.

2.5.2 Substrate (Core) for Exposed Surfacing Material: Particleboard.

2.5.3 Countertop Configuration: Provide countertops with front styles (nose), cove, and backsplash style, as required.

2.5.4 Countertop Thickness: Not less than 1-1/2 inches with substrate (core) not less than 3/4 inch thick.

2.6 Cabinet Hardware: ANSI/BHMA A156.9.

2.7 Accessories: Provide designated accessories.

3.0 EXECUTION: (Section not used.)

SECTION 06420
WOOD PANELING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of wood paneling. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 General: Paneling shall bear a stamp, brand, or other identifying mark indicating quality, construction and compliance with the grading rules of the respective grading and inspecting agency for the species and product indicated. Marking shall be placed on blind sides only.

2.2 Plywood Paneling shall be of softwood or hardwood veneers, as designated. Plywood shall comply with PS 1 and ANSI A199.1. Hardwood plywood shall comply with PS 51.

2.3 Board Type Paneling shall be of softwood or hardwood, as designated. Softwood shall comply with PS 20. Hardwood shall comply with National Hardwood Lumber Association rules.

2.4 Hardboard Products Type Paneling shall have a flame spread rating of 25 or less and a smoke developed rating of 50 or less when tested in accordance with ASTM E 84.

3.0 EXECUTION:

3.1 Preparation: Backprime material when exposed to moisture and high relative humidity.

3.2 Installation:

3.2.1 Plywood Paneling: Where grain character or color variations are noticeable, select and arrange panels on each wall for best match of adjacent panels. Install in accordance with manufacturer's instructions.

3.2.2 Board Type Paneling: Arrange in random-width pattern unless boards are of uniform width. Install in accordance with manufacturer's instructions.

3.2.3 Hardboard Products Type Paneling: Install in accordance with manufacturer's instructions.

# SECTION 07110
# BITUMINOUS WATERPROOFING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of bituminous waterproofing. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Asphalt Waterproofing:

2.1.1 Primer: Asphalt waterproofing material shall comply with Fed. Spec. SS-A-701.

2.1.2 Bitumen: A heavy-bodied bituminous compound of trowel consistency, heavily reinforced with fiber, complying with Fed. Spec. SS-C-153, Type I.

2.2 Tar Waterproofing:

2.2.1 Primer: Creosote complying with ASTM D 43.

2.2.2 Bitumen: Coal-Tar Pitch complying with ASTM D 450.

3.0 EXECUTION:

3.1 Primer:

3.1.1 Diluted Asphalt: Apply by brush or power spray in a continuous unbroken film, free from pinholes or other surface breaks.

3.1.2 Creosote: Apply by brush, roller, or power spray.

3.2 Bitumen:

3.2.1 Asphalt: Apply a 1/16 inch coating by trowel in a continuous unbroken film. Wait 24 hours and apply a second 1/16 inch coating.

3.2.2 Coal-Tar Pitch: Apply with mop or roller in a continuous, unbroken film, free from pinholes over any exposed surface area. Wait 24 hours and apply second coat.

SECTION 07111
BITUMINOUS MEMBRANE WATERPROOFING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of bituminous membrane waterproofing. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Asphalt Membrane Waterproofing:

2.1.1 Primer: Asphalt waterproofing compound complying with Fed. Spec. SS-A-701.

2.1.2 Joint Covering: Asphalt saturated felt, complying with ASTM D 250.

2.1.3 Membrane: Burlap fabric, complying with ASTM D 1327; open mesh fiberglass, smooth, evenly woven to permit complete penetration of asphalt compound complying with ASTM D 1668, Type I; or asphalt-coated or saturated felt, complying with ASTM D 250.

2.1.4 Bitumen: A heavy-bodied bituminous compound of trowel consistency complying with Fed. Spec. SS-C-153, Type I.

2.1.5 Protection: A rigid or semi-rigid board for protection of membrane waterproofing from penetration by sharp objects during backfilling and later settlement. The board shall be an asphaltic core board or asphalt-saturated fiberboard complying with ASTM C 208. Thickness shall be 1/8 inch.

2.2 Tar Membrane Waterproofing:

2.2.1 Primer: Creosote complying with ASTM D 43.

2.2.2 Joint Covering: Coal-tar saturated felt, complying with ASTM D 227.

2.2.3 Membrane: Burlap fabric complying with ASTM D 1327; open mesh fiberglass, smooth, evenly woven to permit complete penetration of coal-tar compound; or coal-tar coated or saturated felt.

2.2.4 Bitumen: Coal-tar pitch complying with ASTM D 450.

2.2.5 Protection: A rigid or semi-rigid board for protection of membrane waterproofing from penetration by sharp objects during backfilling and later settlement shall

be provided. The board shall be an asphaltic core board or asphalt saturated fiberboard. If used with coal-tar products, the board shall be faced with a polyethylene film to separate dissimilar materials. Thickness shall be 1/8 inch.

3.0 EXECUTION:

3.1 Installation:

3.1.1 Primer:

3.1.1.1 Diluted Asphalt: Apply by brush or power spray in a continuous unbroken film, free from pinholes or other surface breaks.

3.1.1.2 Creosote: Apply by brush, roller, or power spray.

3.1.2 Bitumen and Membrane:

3.1.2.1 Reinforce all inside and outside corners, joints, cracks, or places where stresses are likely to occur, with no less than two plies of fabric in alternate coats of bitumen.

3.1.2.2 All penetrations through the wall such as pipes, conduits, etc., shall be sealed with two additional plies.

3.1.2.3 Apply the specified number of plies of membrane material in alternate coats of bitumen.

3.1.2.4 For vertical applications, secure membranes near the top of each course.

3.1.2.5 Coat last ply of membrane with a thorough coat of bitumen.

3.2 Protection: As the membrane is completed, apply the protection course. Apply the protection board in a solid coating of asphalt or coal-tar pitch. All coatings must be dry before application of the protection board. Apply protection board by the lap method (lap each sheet 6 inches over preceeding sheet) or by the batten method (butt each sheet then apply a 6-inch strip of protection board in adhesive over all joints).

# SECTION 07115
# PLASTIC SHEET WATERPROOFING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of plastic sheet waterproofing. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Butyl Sheet shall be an impermeable butyl rubber membrane 1/16 inch thick having a tensile strength of 1,200 psi minimum, complying with ASTM D 412, and an elongation of 300 percent minimum, complying with ASTM D 412. Butyl sheet shall be resistant to ozone and remain flexible to 40 F below zero.

2.2 Neoprene Sheet shall be an impermeable, self-extinguishing, ozone-resistant material 1/16 inch thick. Neoprene shall have a tensile strength of 1,500 psi minimum, complying with ASTM D 412, and an elongation of 250 percent minimum, complying with ASTM D 412.

2.3 Ethylene Propylene Diene Monomers (EPDM) Sheet shall be an impermeable membrane resistant to ozone and ultraviolet. EPDM shall have a tensile strength of 1,400 psi minimum, complying with ASTM D 412, and an elongation of 300 percent minimum, complying with ASTM D 412.

2.4 Vinyl Sheet shall be heavy-duty polyvinyl chloride sheet, complying with ASTM D 3083.

2.5 Primers: As required.

2.6 Adhesives:

2.6.1 Adhesive for Cold Application shall be a non-setting bitumen cut-back asphalt.

2.6.2 Adhesive for Hot Application shall be asphalt complying with ASTM D 312, Type III.

2.7 Butt Joint Tape: Elastomeric vapor barrier in 6-inch wide rolls. Tape shall be self-adhesive and require no additional adhesive.

3.0 EXECUTION:

3.1 Primer: Apply primer by brushing or spraying uniformly over surface to receive membrane. Allow primer to dry before applying membrane.

3.2 Membrane:

3.2.1 At Footings, shape the membrane to conform to the surface by cutting a strip of sufficient width to seat over the footing and at least six inches up the wall.

3.2.2 On Vertical Surfaces, apply adhesive to both wall and membrane.

SECTION 07120
FLUID-APPLIED WATERPROOFING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of fluid-applied waterproofing. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Two-Component Polyurethane: Two component, self-curing urethane system to form a seamless, permanently flexible and waterproof coating. Compound shall be a light-weight, 99 percent solids, liquid-applied system.

2.2 Single Component Polyurethane: One-part moisture cured elastomeric urethane for adhesion to concrete or wood. Compound shall be hard, flexible material with resistance to weather, gas, oil, and salt water having a temperature range of -65 F to +200 F.

2.3 Two-Component Polyurethane Rubber Base: Liquid-applied, elastomeric two component urethane rubber, 100 percent solids materials containing no coal-tar or asphaltic extenders. After proper mixing, with activators that are supplied as a unit, it shall cure to an elastomeric urethane rubber.

2.4 Two-Component Polysulfide Base Liquid Polymer: Two-component, chemically-curing, high-solids compound containing liquid polysulfide polymer. Product shall be furnished in two components: Part 1, consisting of the cure agent and suitable reinforcing agents; Part 2, the base component, incorporating liquid polysulfide polymer.

2.5 Modified Polyurethane Coal-Tar (Spray Grade): Two-part product, consisting of: Part 1, a blend of polyurethane resins, and Part 2, containing a selected blend of coal-tars, catalysts, and modifiers. The cured membrane shall be a seamless, low modulus, high elongation, physically and chemically resistant synthetic rubber.

2.6 Modified Polyurethane Coal-Tar (Trowel Grade): One component polyurethane coal-tar modified compound that forms a continuous seamless, flexible, impervious membrane when applied to vertical or horizontal surfaces.

2.7 Elastomeric Sheet Reinforcing: Smooth, evenly woven, open mesh glass fiber fabric weighing 1/4 ounce per square foot and which permits complete penetration of waterproofing compounds.

2.8 Protection Board: Rigid or semi-rigid board for protection of membrane waterproofing shall be an asphaltic core board or an asphalt saturated fiberboard complying with ASTM C 208. Protection board shall be 1/8 inch thick. If used with coal-tar products, the board shall be faced with a polyethylene film to separate dissimilar materials.

3.0 EXECUTION:

3.1 Two-Component Polyurethane:

3.1.1 Prime surfaces as required.

3.1.2 Spray machine mixed membrane coating directly onto the prepared surfaces to the desired thickness.

3.1.3 Apply the second spray coat after application of the first coat.

3.2 Single Component Polyurethane:

3.2.1 Prime surfaces as required.

3.2.2 Application shall be spray-applied.

3.2.3 Below grade exterior applications shall receive two coats.

3.3 Two-Component Polyurethane Rubber Base:

3.3.1 Prime surfaces as required.

3.3.2 Apply compound by hand trowel to a thickness of 1/16 inch.

3.3.3 Before membrane is completely cured, place protection board over the surface.

3.4 Two-Component Polysulfide Base Liquid Polymer:

3.4.1 Fill all joints and cracks over 1/8 inch in width with a polysulfide polymer base sealant. Apply a bond breaker over the joint and cover with 100 mil coating of the elastomeric material.

3.4.2 Apply membrane by spray in a continuous unbroken film. Surface coverage shall be at the rate of approximately 20-25 square feet per gallon to produce a thickness of 60 mils.

3.5 Modified Polyurethane Coal-Tar (Spray Grade):

3.5.1 Prime surfaces with required primer.

3.5.2 Apply with proper spray equipment in a continuous unbroken film. Application rate shall be approximately 25 sq. ft. per gallon to produce a thickness of 60 mils.

3.6 Modified Polyurethane Coal-Tar (Trowel Grade):

3.6.1 Prime surfaces with required primer.

3.6.2 Mix and apply with hand trowel in a continuous unbroken film.

3.6.3 Place protection board after membrane has attained its initial set.

3.7 Elastomeric Sheet Reinforcing for Fluid-Applied Waterproofing: Trowel fabric into first coat of membrane while membrane material is soft and pliable. Install sheet reinforcing in compliance with membrane compound manufacturer's requirements.

3.8 Protection Board:

3.8.1 Apply protection board over membrane while membrane material is still tacky.

3.8.2 Apply protection board by the lap method.

SECTION 07125
METAL WATERPROOFING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of metal waterproofing. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Lead Sheet and Strip shall be fabricated from 99 percent pure soft lead or lead alloy containing six to seven percent antimony. Four or eight pound per square foot lead shall be used for all work.

2.2 Copper Sheet and Strip shall be fabricated of 16 or 20 ounce per square foot tough-pitch copper. Copper shall be either hot-rolled soft copper or cold-rolled copper. Copper shall have a lead coating of 15 pounds per 100 square feet of copper (7-1/2 pounds on each face of copperplate).

2.3 Solder: Solder shall be 50 percent lead and 50 percent tin solder with a resin flux.

2.4 Bituminous Paint shall be high quality proper bodied bituminous (asphalt) compound of brush or spray consistency. Compound shall contain a hydrophilic wetting agent to ensure proper adhesion. Bituminous paint shall comply with Fed. Spec. SS-A-701.

3.0 EXECUTION:

3.1 Lead Pan Waterproofing:

3.1.1 Preparation: All surfaces on which lead is to be applied shall be smooth; rough projections shall be eliminated. Lead surfaces in contact with uncured concrete, mortar, or in other corrosive locations shall be given a coat of bituminous paint prior to installation.

3.1.2 Small Holes and Spot Repairs shall be accomplished by soldering the leak spots.

3.1.3 Large Damaged Areas shall be cut out and replaced with lead sheet or strip of the proper weight lead. Apply a coating of bituminous paint to the affected area after the new sheet or strip lead has been soldered in place.

3.1.4 Joints: Use optimal size of sheet or strip to compensate for expansion. Pre-tin all soldered joints and clean immediately after soldering. All joints shall be soldered.

3.1.5 Corners: Wall sheets shall end short of corners. Mold full sheet around corners and joint with wall sheets each side of corner.

3.2 Copper Waterproofing:

3.2.1 Preparation: All surfaces on which copper is to be applied shall be smooth; rough projections shall be eliminated. Give copper surfaces in contact with uncured concrete, mortar, dissimilar metals, or in other corrosive locations a coat of bituminous paint prior to installation.

3.2.2 Fabrication: Prefabricate shapes as required. Copper sheet and strip shall be bent only to rounded angles with no sharp creases.

3.2.3 Small Holes and Spot Repairs shall be accomplished by soldering.

3.2.4 Large Damaged Areas shall be cut out and replaced with copper sheet or strip of proper weight. Apply a coating of bituminous paint to the affected area after the new sheeting or strip copper has been soldered in place.

3.2.5 Joints: Use optimal size sheet or strip to compensate for expansion. Pre-tin all soldered joints and clean immediately after soldering.

SECTION 07130
BENTONITE CLAY WATERPROOFING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of bentonite clay waterproofing. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Preformed Bentonite Clay Panels and Tubes:

2.1.1 Panels shall be made of dry bentonite granules packed into the corrugated flutes of biodegradable kraft boards. Panels shall be four feet square by 3/16 inch thick and weigh 18 pounds.

2.1.2 Tubes shall be a water soluble polyvinyl alcohol container filled with dry granular bentonite and hermetically sealed. Tubes shall be two-inch diameter by two-foot lengths and weigh approximately three pounds.

2.2 Bentonite Gel: Clay composition of hydrated aluminum silicate, which swells upon absorption of water into a thick gel.

2.3 Joint Seal: A hydrated bentonite gel for trowel application to concrete for sealing construction joints, form tie voids, and wall penetrations.

2.4 Joint-Pak Containers: A biodegradable kraft container filled with dry bentonite granules for preformed concrete joints in below grade foundation walls. Standard joint-paks shall be 1-1/4 x 1-1/4 inches, weighing approximately 1.1 pounds. Provide triangular-shaped cross section 2-3/8 x 2-3/8 x 2-3/8 inches x 2 feet long, weighing approximately 3 pounds for inside corner joints.

2.5 Chemically Modified Bentonite For Spray Application: High pressure spray combining bentonite clay with a modified asphalt binder that adheres the bentonite to vertical surfaces. Clay content shall be 1-1/2 pounds per square foot.

2.6 Moisture Barrier: 4 mil polyethylene sheeting complying with ASTM D 2103.

2.7 Protection Board: Multi-ply, semi-rigid board composed of a mineral fortified asphaltic core between a layer of asphalt saturated liner and a weathercoated glass mat

liner with polyethylene film facing. Protection board shall be 4 feet by 8 feet by 1/8 inch.

2.8 Masonry Nails: 2-inch minimum by No. 9 fluted masonry nails with 1-inch minimum diameter disks complying with Fed. Spec. FF-N-105 for fastening panels to concrete and masonry walls.

3.0 EXECUTION:

3.1 Maintenance and Repair Methods:

3.1.1 Preformed Bentonite Panels:

3.1.1.1 Prior to Installation of Panels, parge all joints and cracks with joint seal to 1/8-inch minimum depth and 3-inch minimum width. Apply panels with masonry nails, joint seal, or approved mastic. Fold and attach panels around corners with corrugations horizontal. Lap all adjoining panel edges 1 1/2 inches and stagger vertical joints of succeeding courses.

3.1.1.2 Install Polyethylene Sheeting immediately after panels are installed to provide temporary protection to bentonite panels against moisture. Overlap sheeting four inches. Apply sheeting with adhesive.

3.1.1.3 Install Protection Board with the asphalt-saturated felt face against the waterproofing for protection from damage by maintenance and repair activities including backfilling.

3.1.1.4 Bentonite Tubes: Place bentonite tubes along the base of the first panel course on sidewall applications to provide protection at the footing-foundation joint.

3.1.2 Chemically Modified Bentonite Spray:

3.1.2.1 Remove Damaged Material if damage is extensive, and completely clean area of application.

3.1.2.2 If Small Spot Repair is all that is required, cover damaged area with bentonite panel or pour loose dry granular bentonite adjacent to the damage.

3.1.2.3 For Large Scale Repair Work, apply a spray coating of minimum 3/8-inch bentonite to the damaged surface.

3.1.2.4 At Foundation-Footing Joint Spray, application shall be two inches thick in a cove or cant configuration.

3.1.2.5 Spray Joints with a double thickness, resulting in a membrane 3/4 inch to one inch thick. For small areas, joint seal may be trowel-applied.

3.1.3 Miscellaneous Joint Seals:

3.1.3.1 Bentonite Gel shall be trowel-applied to concrete for sealing construction joints, form tie voids, and wall penetrations.

3.1.3.2 Bulk Granular Bentonite may be poured at the base joints of walls and foundations.

3.1.3.3 Press Joint-Pak Containers filled with dry granular bentonite into preformed joint cavities next to PVC waterstop in joints between two concrete pours.

SECTION 07160
BITUMINOUS DAMPPROOFING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of bituminous dampproofing. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Asphalt Dampproofing:

2.1.1 Primer: Fed. Spec. SS-A-701.

2.1.2 Cement, Bituminous Plastic: ASTM D 449. A heavy-bodied asphalt emulsion of brush or power spray consistency.

2.1.3 Asphalt: ASTM D 449. Hot asphalt or asphalt emulsions for mop application.

2.2 Tar Dampproofing:

2.2.1 Primer: Creosote complying with ASTM D 43.

2.2.2 Bitumen: Coal-tar pitch complying with ASTM D 450.

3.0 EXECUTION:

3.1 Preparation: Remove all materials completely, exposing the base surfaces to which the dampproofing materials are to be applied.

3.2 Installation:

3.2.1 Application of Dilute Asphalt Emulsion Primer: Brush or spray in a continuous unbroken film, free from pinholes or other surface breaks.

3.2.2 Application of Creosote Primer: Apply with a brush or roller to entire surface.

3.2.3 Interior and Exterior Cold Application: Brush or spray apply without thinning in a continuous unbroken film, free from pinholes or other surface breaks. Apply to entire primed area.

3.2.4 Exterior Hot Application:

3.2.4.1 Coal-Tar Pitch: Apply over exposed surface area with mop or roller in a continuous, unbroken film, free from pinholes.

3.2.4.2 Asphalt: Mop two coats of hot asphalt over the entire primed area. Use not less than 25 pounds per 100 square feet.

SECTION 07170
SILICONE DAMPPROOFING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of silicone dampproofing. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of material shall be as required to support the work.

2.0 PRODUCTS: Silicone water repellent (5 percent solution) shall be a clear, ready to use liquid consisting of polymerized silicone resins and penetrating hydrocarbon solvents specifically formulated to repel water. Silicone solution shall comply with Fed. Spec. SS-W-110.

3.0 EXECUTION:

3.1 Precautions: Immediately remove any solution that comes in contact with glass surfaces. Protect glass surfaces with polyethylene.

3.2 Installation: Apply silicone solution by brush or a low pressure spray unit. If pumped from a barrel, use an agitator. Apply in one or two coats so that the surface is flooded to the point of maximum absorption. Start at top and work down, providing a continuous rundown of 6 to 12 inches during application. Start at top with second coat as soon as drop has been made.

SECTION 07175
WATER-REPELLENT COATING DAMPPROOFING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of water-repellent coating dampproofing. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 General: The materials shall be colorfast, non-yellowing, and impervious to the following solutions:

Water.
One percent soap solution.
Salt solutions.
Most dilute acids.
Most alkalies.
Urine.
Color fast and non-yellowing.

2.2 Acrylic Sealers: Clear, water-white, non-staining sealing compound shall consist of a blend of penetrating and film-forming materials in a petroleum distillate and a methylacrylate resin and shall have a flash point (tag open cup) of 82 F minimum. The product must breathe and have the ability to be later recoated without any special treatment.

2.3 Polymeric Resins: Clear, colorless, inorganic polymer water repellents for impregnating and hardening the surfaces. The product must breathe and have the ability to be later recoated without any special treatment.

2.4 Polyester Resins: A mixture of modified polyester resins.

2.5 Butyrate Resins: Clear liquid, one component mixture of selected butyrate resins in a mineral spirit base.

3.0 EXECUTION:

3.1 Preparation: Prior to application of dampproofing, fill voids, cracks, and holes with cement mortar.

3.2 Installation: Coating may be applied by conventional spray equipment, airless spray equipment, brush, or roller.

SECTION 07180
CEMENTITIOUS DAMPPROOFING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of cementitious dampproofing. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Portland Cement: ASTM C 150, Type I cement shall be used when the special properties of other types are not required.

2.2 Sand: Washed silica sand graded within the following limits:

| Sieve | Percent Passing |
|---|---|
| No. 4 | 95 to 100 |
| No. 8 | 80 to 100 |
| No. 16 | 50 to 85 |
| No. 30 | 25 to 60 |
| No. 50 | 10 to 30 |
| No. 100 | 2 to 10 |

2.3 Water: Clean, fresh, and free from injurious amounts of oil, acid, salt, alkali, organic matter, or other deleterious substances.

2.4 Bonding Agent:

2.4.1 A Re-Emulsifiable One-Component Liquid Resinous Emulsion shall be used where area is not subject to constant dampness.

2.4.2 A Two-Component Epoxy Resin Compound shall be used in areas under damp conditions.

2.5 Waterproofing Admixtures: A calcinated solution of colloidal resinates that increases impermeability, workability, and compressive strength of mortar.

3.0 EXECUTION:

3.1 Preparation: Remove all materials completely, exposing the base surfaces to which the dampproofing materials are to be applied.

3.2 Installation:

3.2.1 Bonding Agent: Apply as required.

3.2.2 Bearing Surface: Parge or apply a coating of the cementitious mixture to the areas to be dampproofed, using a brush or trowel. Minimum thickness shall be 1/4 inch.

SECTION 07192
BITUMINOUS VAPOR BARRIER FOR ROOFS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of bituminous vapor barriers. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Asphalt Primer: ASTM D 41.

2.2 Bitumen:

2.2.1 Asphalt: ASTM D 312, Type III, steep asphalt.

2.2.2 Coal-Tar Pitch: ASTM D 450, Type A, for slopes up to and including 1/2 inch per foot.

2.3 Bituminous Cement: Fed. Spec. SS-C-153.

2.3.1 Type I: For use with asphalt saturated felts.

2.3.2 Type II: For use with coal-tar saturated felts.

2.4 Vapor Barrier Membrane:

2.4.1 Asphalt Saturated Organic Felt: ASTM D 226, No. 15, asphalt saturated organic fiber felt weighing approximately 13 pounds per square.

2.4.2 Asphalt Saturated Inorganic Felt: ASTM D 250, No. 15, asphalt saturated asbestos fiber felt weighing approximately 13 pounds per square.

2.4.3 Coated Base Sheet: ASTM D 2626, asphalt saturated organic fiber roofing felt, both faces coated with asphalt including mineral stabilizers and mineral surfacing, weighing not less than 37 pounds per square.

2.4.4 Coal-Tar Saturated Felt: ASTM D 227, No. 15 coal-tar pitch saturated organic felt weighing minimum of 13 pounds per square.

2.4.5 Sheathing Paper: Rosin-sized sheathing paper weighing not less than 5 pounds per square or saturated felt weighing approximately 7-1/2 pounds per square.

2.5 UL Listing: Bituminous vapor barrier materials of roofing systems which have been tested for application and slopes and are listed by Underwriters' Laboratories, Inc. (UL) for Class A or Class B external fire exposure shall be provided. Bituminous vapor barrier materials shall bear the Classification marking (UL) on bundle, package, or container indicating that materials have been produced under UL's Classification and Follow-Up Service.

2.6 FM Listing: Bituminous vapor barrier materials of roofing systems that have been evaluated by Factory Mutual System for fire spread, wind uplift, and hail damage are listed in the "Factory Mutual Approval Guide" for Class 1 construction. Bituminous vapor barrier materials bearing FM's examination and follow-up inspection service shall be provided.

3.0 EXECUTION:

3.1 Preparation:

3.1.1 Concrete Decks: Prior to installation of vapor barrier, apply asphalt primer at the rate of 1 gallon per square over area to receive vapor barrier.

3.1.2 Precast Concrete Decks: Prior to installation of vapor barrier, cover joints between precast units with a 4-inch to 6-inch widestrip of roofing felt embedded in, and coated with, bituminous cement. Prime deck surface to receive vapor barrier with asphalt primer applied at rate of 1 gallon per square.

3.1.3 Wood Deck: Prior to installation of vapor barrier, apply one layer of sheathing paper over areas to be surfaced with vapor barrier.

3.2 Installation:

3.2.1 Laying Felts: Lay vapor barrier free of wrinkles or bubbles, at right angles to the slope of the deck.

3.2.2 Mopping: Solid mop heated bitumen under and between felts.

3.2.3 Embedment in Bitumen: Broom in felts with 18-inch or 20-inch wide soft fiber type broom.

3.2.4 Nailing Felts: Drive nails and fasteners for securing roofing flush through flat metal disks.

3.2.5 Embedding Vapor Barrier at Roof Edge: Embed vapor barrier felts in 9-inch wide solid coat of bituminous plastic cement.

3.3 Installation to Non-Nailable Deck:

3.3.1 Asphalt Saturated Felt System: Vapor barrier system shall consist of two-ply asphalt saturated felts embedded in solid moppings of asphalt applied at rate of 15 to 20 pounds per square per ply.

3.3.2 Coal-Tar Saturated Felt System: Vapor barrier system shall consist of two-ply coal-tar saturated felts embedded in solid moppings of coal-tar pitch applied at rate of 20 to 30 pounds per square per ply.

3.3.3 Coated Base Sheet System: Vapor barrier system shall consist of two-ply coated base sheet embedded in solid moppings of asphalt applied at rate of 20 pounds per square per ply.

3.4 Installation to Nailable Deck:

3.4.1 Asphalt Saturated Felt System: Vapor barrier system shall consist of two-ply asphalt saturated felt, first ply laid dry and second ply embedded in solid mopping of asphalt applied at rate of 15 to 20 pounds per square.

3.4.2 Coal-Tar Saturated Felt System: Vapor barrier system shall consist of two-ply coal-tar saturated felts, first ply laid dry and second ply embedded in solid mopping of coal-tar pitch applied at rate of 20 to 30 pounds per square.

3.4.3 Coat Base Sheet System: Vapor barrier system shall consist of two-ply coated base sheet. Apply first ply dry. Embed second ply in solid coating of asphalt applied at the rate of 15 to 20 pounds per square.

3.4.4 Attachment to Existing Vapor Barrier Membrane: Install a 25-inch wide strip of vapor barrier felt; lap existing membrane 6 inches.

SECTION 07193
LAMINATED SHEET VAPOR BARRIER FOR ROOFS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of laminated sheet vapor barrier for roofs. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Vapor Barrier:

2.1.1 Reinforced Paper Laminate: Two layers of high strength kraft papers laminated together with asphalt, reinforced with glass fiber, with vapor transmission rating of 0.2 perm or less when tested in accordance with ASTM E 96.

2.1.2 Polyethylene Sheet Laminate: Two layers of high strength kraft papers, laminated, with polyethylene sheet between, with vapor transmission rating of 0.2 perm or less when tested in accordance with ASTM E 96, Procedure A.

2.2 Adhesive: Water-resistant adhesive with a nontoxic vehicle. Adhesive shall be vapor barrier manufacturer's recommended product and shall be compatible with contact surfaces.

2.3 Asphalt: ASTM D 312, Type III, steep asphalt.

2.4 Vapor Barrier Joint Strips: Vapor barrier material cut into strips, approximately 6 inches wide.

2.5 UL Listing: Laminated sheet vapor barrier materials of roofing systems which have been tested for application and slopes and are listed by Underwriters' Laboratories, Inc. (UL) for Class A or Class B external fire exposure shall be provided. Laminated sheet vapor barrier materials shall bear the Classification marking (UL) on bundle, package, or container indicating that materials have been produced under UL's Classification and Follow-Up Service.

2.6 FM Listing: Laminated sheet vapor barrier materials of roofing systems which have been evaluated by Factory Mutual system for fire spread, wind uplift, and hail damage are listed in the "Factory Mutual Approval Guide" for Class 1

construction. Laminated sheet vapor barrier materials bearing FM's examination and follow-up inspection service shall be provided.

3.0 EXECUTION:

3.1 Preparation: Surfaces to receive vapor barrier membrane shall be smooth, with no protruding surfaces that would puncture membrane.

3.2 Installation:

3.2.1 Application of Vapor Barrier with Adhesive: Lay vapor barrier sheet directly on deck in ribbons of adhesive approximately 1/2 inch wide and spaced 6 inches on center.

3.2.2 Application of Vapor Barrier with Asphalt: Lay vapor barrier sheet directly on deck in solid coat of asphalt applied at rate of 15 to 25 pounds per square.

3.2.3 Laps: Side laps shall be not less than 2 inches, and end laps shall be not less than 6 inches.

3.2.4 Nailable Decks: Nail lapped areas, spacing nails maximum of 12 inches on center.

3.2.5 Sealing Joints: Seal joints in vapor barrier system and seal to other surfaces at extremities of coverage with vapor barrier strips.

SECTION 07194
POLYVINYL SHEET VAPOR BARRIER FOR ROOFS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of polyvinyl sheet vapor barriers. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Vapor Barrier: Polyvinyl chloride sheet, minimum 4 mils thick, with vapor transmission rating of 0.2 perm or less when tested in compliance with ASTM E 96.

2.2 Adhesive: Water-resistant adhesive with a nontoxic vehicle specially prepared for application of polyvinyl sheet membrane to roof decks.

2.3 Vapor Barrier Tape: Aluminum foil, minimum 1 mil thick, laminated between two sheets of polyester film with pressure-sensitive adhesive on one face, vapor transmission of 0.015 perm or less.

2.4 Vapor Barrier Joint Strips: Vapor barrier material cut into strips, approximately 6 inches wide.

2.5 UL Listing: Polyvinyl sheet vapor barrier materials of roofing systems which have been tested for application and slopes and are listed by Underwriters' Laboratories, Inc. (UL) for Class A or Class B external fire exposure shall be provided. Polyvinyl sheet vapor barrier materials shall bear the Classification marking (UL) on bundle, package, or container indicating that materials have been produced under UL's Classification and Follow-Up Service.

2.6 FM Listing: Polyvinyl sheet vapor barrier materials of roofing systems which have been evaluated by Factory Mutual system for fire spread, wind uplift, and hail damage are listed in the "Factory Mutual Approval Guide" for Class 1 construction. Polyvinyl sheet vapor barrier materials bearing FM's examination and follow-up inspection service shall be provided.

3.0 EXECUTION:

3.1 Preparation: Surfaces to receive vapor barrier membrane shall be smooth, with no protruding surfaces that would puncture membrane.

3.2 Installation:

3.2.1 Installation of Basic Membrane: Lay polyvinyl sheet directly on deck in solid covering of approved adhesive.

3.2.2 Nailable Decks. Nail lapped areas, spacing nails maximum of 12 inches on center.

3.2.3 Sealing Joints. Seal joints in vapor barrier system and seal to other surfaces at extremities of coverage with vapor barrier tape or vapor barrier strips.

SECTION 07196
BITUMINOUS VAPOR BARRIERS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of bituminous vapor barriers. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Asphalt Vapor Barrier: Provide one of the following:

2.1.1 A Proper-Bodied Bituminous Coating of Brush or Spray Consistency for application to interior masonry walls above or below grade, containing a hydrophilic agent which assures proper adhesion. Compound shall comply with ASTM D 449.

2.1.2 A Soft, Adhesive "Self-Healing" Hot Mop Type Asphalt that flows readily under the mop and is not susceptible to wide temperature ranges. Compound shall comply with ASTM D 449, Type B. Used with a cold-applied primer complying with ASTM D 41.

2.2 Tar Vapor Barrier: Primer shall be coal-tar pitch complying with ASTM D 43 Type B for use below ground level under uniformly moderate temperature conditions, both during the process of installation and during service. The coal-tar pitch shall be homogeneous and shall comply with the requirements prescribed in Table I, ASTM D 450.

2.3 Reinforcing shall be tar-saturated felt complying with ASTM D 227 or glass mat complying with ASTM D 1668.

3.0 EXECUTION:

3.1 Preparation: Remove all materials completely, exposing the base surfaces to which the dampproofing materials are to be applied.

3.2 Installation: Below grade applications shall receive two coats. Allow 24 hours between coats.

3.3 Reinforcing Method: Reinforce all inside and outside corners, joints, cracks, or places where stresses are likely to occur with no less than 2 plies of felt or glass mat.

SECTION 07197
LAMINATED SHEET VAPOR BARRIERS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of laminated sheet vapor barriers. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Bonded Multi-Ply Flexible Core Board:

2.1.1 Board with Core Plies of Polyvinyl Chloride shall consist of a core sheet of polyvinyl chloride suspended between two layers of pure-blown, high melt point asphalt and sandwiched between two asphalt saturated felt liners. The felt liners shall be covered with an asphalt weathercoat.

2.1.2 Semi-Rigid Asphalt Board shall consist of an asphalt core sandwiched between two saturated felt liners to which an independent weather-coating is bonded.

2.1.3 Self-Adhesive Multi-Ply Flexible Board shall consist of a 1/16-inch thick waterproof highly flexible elastomeric material with a release paper on one side. The membrane shall be bonded to a reinforcing carrier sheet, vinyl center sheet, additional bitumen, and a protective weathercoating.

2.2 Bonding Agent:

2.2.1 Hot Asphalt for bonding to vertical surfaces or sealing joints shall be a mopping asphalt with a softening point in the range of 180 to 200 F and complying with ASTM D 312, Type III.

2.3 Butt Joint Tape: Elastomeric vapor barrier shall be in 6-inch wide rolls. Tape shall be self-adhesive and require no additional adhesive.

3.0 EXECUTION: Remove all materials completely, exposing the base surfaces to which the dampproofing materials are to be applied.

SECTION 07198
PLASTIC SHEET VAPOR BARRIERS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of plastic sheet vapor barriers. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Polyethylene Sheet shall comply with ASTM D 2103.

2.2 Butyl Sheet shall be an impermeable butyl rubber membrane 1/16 inch thick having a tensile strength per ASTM D 412 of 1,200 psi minimum and an elongation per ASTM D 412 of 300 percent minimum. Butyl sheet shall be resistant to ozone and remain flexible to 40 degrees F below zero.

2.3 Neoprene Sheet shall be an impermeable, self-extinguishing, ozone-resistant material, 1/16 inch thick. Neoprene shall have a tensile strength per ASTM D 412 of 1,500 psi minimum and an elongation per ASTM D 412 of 250 percent minimum.

2.4 Ethylene Propylene Diene Monomer (EPDM) Sheet shall be an impermeable membrane resistant to ozone and ultra-violet radiation. EPDM shall have a tensile strength per ASTM D 412 of 1,400 psi minimum and a elongation per ASTM D 412 of 300 percent minimum.

2.5 Vinyl Sheet shall be a heavy-duty polyvinyl chloride sheet complying with ASTM D 3083.

2.6 Primers shall be as required.

2.7 Adhesives:

2.7.1 Adhesive for Cold Application shall be a non-setting bitumen cutback asphalt.

2.7.2 Adhesive for Hot Application shall be asphalt complying with ASTM D 312, Type III.

2.8 Butt Joint Tape shall be an elastomeric vapor barrier in 6-inch wide rolls. Tape shall be self-adhesive and require no additional adhesive.

3.0 EXECUTION:

3.1 Preparation: Remove all materials completely, exposing the base surfaces to which the dampproofing materials are to be applied.

3.2 Installation:

3.2.1 Primer: Apply primer by brushing or spraying uniformly over surface to receive membrane.

3.2.2 Membrane:

3.2.2.1 At footings, shape the membrane to conform to the surface.

3.2.2.2 Apply adhesive to both the footing and to the membrane.

3.2.2.3 On vertical surfaces, apply adhesive to both wall and membrane.

3.2.2.4 Seal joints between adjacent sheets centering 6-inch sealing tape over the joint.

# SECTION 07210
# BATT AND BLANKET BUILDING INSULATION

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of batt and blanket building insulation. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Mineral Fiber Insulation shall comply with ASTM C 665, Type II.

2.2 Reflective Insulation shall comply with ASTM C 665, Type III.

2.3 Membrane Covering: All vapor permeable back surface coverings, membrane coverings, or facings affixed to insulation in compliance with ASTM E 84 shall have a flame spread rating not greater than 25 and a smoke developed rating not greater than 50 when tested.

2.4 Separately Applied Vapor Barriers:

2.4.1 General: Separate vapor barrier material shall have a permeability of 1.0 perm or less, in compliance with procedure "A" of ASTM E 96.

2.4.2 Ground Cover for Crawl Spaces: Ground cover for crawl space applications shall have a permeability of 0.5 perm or less, in compliance with ASTM E 154.

3.0 EXECUTION:

3.1 Preparation:

3.1.1 Separately Applied Vapor Barriers: All surfaces on which separately applied vapor barrier material is to be applied shall be free of any projections that might puncture the vapor barrier material.

3.1.2 Masonry Wall Applications: Provide wood fastening strips for fastening rigid insulation to masonry walls.

3.2 Installation. Install insulation to a thickness necessary to provide the designated or directed R-value.

3.2.1 Exterior Walls:

3.2.1.1 Insulate each space between framing members completely with batt or blanket type insulation sized to fit the full width of the space.

3.2.1.2 Install Insulation having an affixed facing with the facing toward the interior (warm-in-winter) side of the construction.

3.2.1.3 Install Reflective Insulation with an air space of not less than 3/4 inch, adjacent to the reflective facing, when insulation thickness permits.

3.2.1.4 Crawl Spaces (Unvented): Contractor shall cut vent openings in exterior walls of crawl spaces, frame as necessary to reinforce the openings, and install wood or aluminum louvers and screening.

3.2.1.5 Crawl Spaces (Vented): Insulate each space between framing members completely with batt or blanket type insulation sized to fit the full width of the space.

3.2.1.6 Ceiling: Insulate each space between framing members completely with batt or blanket type building insulation, sized to fit the full width of the space. Install insulation around, not over, all recessed lighting fixtures in ceiling construction. Install insulation so as to permit air passage from eave vents to air space above insulation.

# SECTION 07211
# LOOSE OR GRANULAR FILL INSULATION

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of loose or granular fill insulation. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Mineral Fiber Insulation shall comply with Fed. Spec. HH-I-1030, Type I, Class A or B.

2.2 Perlite Insulation shall comply with ASTM C 549, treated for water repellancy.

2.3 Vermiculite Insulation shall comply with ASTM C 516, Type II, treated for water repellancy.

3.0 EXECUTION:

3.1 Preparation:

3.1.1 Cavity Applications: Close off all openings in cavities to receive loose or granular fill insulation, except at the top so as to permanently prevent insulation from escaping.

3.1.2 Ceiling Applications: Wherever loose or granular fill insulation is to be applied over dropped soffit or other large cavities exposed to the attic, install fiberboard or other suitable material between framing members over soffit cavity to support insulation.

3.2 Installation:

3.2.1 Install insulation to a thickness necessary to provide the designated R-value.

3.2.2 Install insulation to completely fill all required ceiling and horizontal areas.

SECTION 07212
RIGID INSULATION

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of rigid insulation. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Mineral Fiberboard Insulation shall comply with Fed. Spec. HH-I-558, Form A, class as specified.

2.2 Polystyrene Plastic Board Insulation shall comply with ASTM C 578, Type II.

2.3 Urethane Plastic Board Insulation shall comply with Fed. Spec. HH-I-530, Type I, Class 2.

2.4 Cellular Glass Block Insulation shall comply with ASTM C 552, Type I.

2.5 Organic Fiberboard Insulation shall comply with ASTM C 208. Organic Fiberboard Insulation shall be chemically treated to resist decay, fungus growth, and insect attack.

2.6 Corkboard Insulation shall comply with ASTM C 640.

2.7 Glass Fiberboard Insulation shall comply with Mil. Spec. MIL-I-742.

3.0 EXECUTION:

3.1 Preparation: All surfaces to which rigid insulation will be mastic-mounted shall be free from all materials that will prevent proper adhesion.

3.2 Installation: Install insulation to a thickness necessary to provide the designated R-value.

SECTION 07213
PERIMETER INSULATION

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of perimeter insulation. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Polystyrene Insulation Board shall comply with ASTM C 578, Type I.

2.2 Urethane Insulation Board shall comply with Fed. Spec. HH-I-530, Type I, Grade 2, Class 1. Urethane insulation board shall have a minimum density of 1.7 pounds per cubic foot.

2.3 Insulation Thickness shall be 1 inch, except where otherwise specified or directed.

2.4 Surface Burning Characteristics: Insulation shall have a maximum flame spread index of 25, in compliance with ASTM E 84.

2.5 Plastic Cement shall comply with Fed. Spec. SS-C-153.

2.6 Asphalt-Saturated Felts shall comply with ASTM D 226, Type I.

2.7 Adhesive or Mastic for bonding insulation shall comply with applicable fire-resistance requirements for the insulation being installed.

3.0 EXECUTION:

3.1 Preparation: The Contractor shall remove all materials and construction necessary to gain access to the work.

3.2 Installation: Apply insulation to the full thickness required over the entire area to be insulated.

3.3 Reconstruction: Restore existing slabs, construction, and finishes that have been removed for the installation of insulation or damaged to their original condition.

3.4 Restoration of Landscaping: Restore landscaping that is disturbed to its original condition.

SECTION 07215
SPRAYED-ON INSULATION

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of sprayed-on insulation. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Urethane Foamed-in-Place Insulation shall be a spray-applied two-component material that when mixed together in proper proportions produces a rigid closed cell foam material.

2.1.1 Physical Properties of cured foam shall be as follows:

2.1.1.1 Nominal Density shall be 1.5 to 2.5 lbs/cu ft (ASTM D 1622).

2.1.1.2 Closed Cell Content shall be 90 percent minimum.

2.1.1.3 Compressive Strength, parallel to rise, shall be 40 psi.

2.1.1.4 Thermal Conductivity (k factor) Btuh/psf/F/in. shall be 0.17 when aged 90 days at 14 F dry heat (ASTM C 518).

2.1.1.5 Vapor Transmission shall be 3.0 perm-inch.

2.1.1.6 Water Absorption shall be 3.0 percent.

3.0 EXECUTION:

3.1 Substrates shall be cleaned prior to application of sprayed-on insulation.

3.2 Openings in Roofs to receive foamed-in-place insulation shall be closed sufficiently to prevent escape of insulation.

3.3 Protect Installed Insulation from harmful weather exposures and possible physical abuses including fire hazards.

SECTION 07223
ROOF INSULATION AND UNDERLAYMENT
CELLULAR GLASS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of cellular glass. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Cellular Glass Block Insulation: ASTM C 552, Type I, rigid, closed cell, noncombustible, foamed glass blocks. Sizes shall be manufacturer's standard sizes and required thickness, edges square.

2.2 Cellular Glass Board Insulation: ASTM C 552, Type IV, rigid, closed cell, noncombustible, foamed glass boards, with laminated kraft paper faces.

2.2.1 Board Sizes: Manufacturer's standard sizes and required thickness with 1/4-inch bevel on long edges at bottom of board.

2.2.2 Tapered Unit Sizes: Manufacturer's standard sizes and taper.

2.2.3 Flame Spread Rating: Insulation shall have maximum flame spread rating of 25 when tested in compliance with ASTM E 84.

2.3 UL Listing: Cellular glass roof insulation and underlayment materials of roofing systems which have been tested for application and slopes and are listed by Underwriters' Laboratories, Inc. (UL) for Class A or Class B external fire exposure shall be provided. Cellular glass roof insulation and underlayment materials shall bear the Classification marking (UL) on bundle, package, or container indicating that materials have been produced under UL's Classification and Follow-Up Service.

2.4 FM Listing: Cellular glass roof insulation and underlayment materials of roofing systems which have been evaluated by Factory Mutual system for fire spread, wind uplift, and hail damage are listed in the "Factory Mutual Approval Guide" for Class 1 construction. Cellular glass roof insulation and underlayment materials bearing FM approval marking on bundle, package, or container indicating that the material has been subjected to FM's examination and follow-up inspection service shall be provided.

3.0 EXECUTION:

3.1 Installation: Place beveled edge of board units to the deck surface in same direction continuously throughout each course.

3.2 Insulation shall be installed to a thickness necessary to provide the designated R-value.

SECTION 07224
ROOF INSULATION AND UNDERLAYMENT
MINERAL FIBER

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of mineral fiber. Products shall match existing material and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS: Insulation board shall be Fed. Spec. HH-I-526, rigid inorganic fiberboard formed with fillers and water-resistant binders.

2.1 Glass Fiberboard: Mineral fiber insulation boards formed of glass fibers shall be bonded together with asphalt and surfaced on top surface with glass-fiber reinforced asphalt mat.

2.2 Mineral Fiberboard: Mineral fiber insulation boards formed of rock or slag processed into fiber shall be bonded together with asphalt and surfaced on top surface with asphalt saturated felt.

2.3 Flame Spread Rating: Insulation shall have maximum flame spread rating of 25 when tested in compliance with ASTM E 84.

2.4 UL Listing: Mineral fiber roof insulation and underlayment materials of roofing systems which have been tested for application and slopes and are listed by Underwriters' Laboratories, Inc. (UL) for Class A or Class B external fire exposure shall be provided. Mineral fiber roof insulation and underlayment materials shall bear the Classification marking (UL) on bundle, package, or container indicating that materials have been produced under UL's Classification and Follow-Up Service.

2.5 FM Listing: Mineral fiber roof insulation and underlayment materials of roofing systems which have been evaluated by Factory Mutual system for fire spread, wind uplift, and hail damage are listed in the "Factory Mutual Approval Guide" for Class 1 construction. Mineral fiber roof insulation and underlayment materials bearing FM approval marking on bundle, package, or container indicating that the material has been subjected to FM's examination and follow-up inspection service shall be provided.

3.0 EXECUTION: Install insulation to a thickness necessary to provide the designated R-value.

SECTION 07225
ROOF INSULATION AND UNDERLAYMENT
COMPOSITE BOARD

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of composite board. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Composite Board Insulation shall consist of two insulation boards chemically bonded together. Top board shall be expanded rigid polyurethane foam board complying with Fed. Spec. HH-I-530; top surface shall be surfaced with one layer of asphalt saturated felt or glass fiber mat. Second layer shall be one of the following materials:

2.1.1 Inorganic Perlite Mineral Aggregate Board: ASTM C 728.

2.1.2 Inorganic Glass Fiberboard: Fed. Spec. HH-I-526.

2.1.3 Mineral Fiberboard: Fed. Spec. HH-I-526.

2.2 Flame Spread Rating: Insulation shall have maximum flame spread rating of 25 when tested in compliance with ASTM E 84.

2.3 Edge Sealant: Mastic sealant of type recommended by insulation manufacturer.

2.4 UL Listing: Composite board roof insulation and underlayment materials of roofing systems which have been tested for application and slopes and are listed by Underwriters' Laboratories, Inc. (UL) for Class A or Class B external fire exposure shall be provided. Composite board roof insulation and underlayment materials shall bear the Classification marking (UL) on bundle, package, or container indicating that materials have been produced under UL's Classification and Follow-Up Service.

2.5 FM Listing: Composite board roof insulation and underlayment materials of roofing systems which have been evaluated by Factory Mutual system for fire spread, wind uplift, and hail damage are listed in the "Factory Mutual Approval Guide" for Class 1 construction. Composite board roof insulation and

underlayment materials bearing FM approval marking on bundle, package, or container indicating that the material has been subjected to FM's examination and follow-up inspection service shall be provided.

3.0 EXECUTION:

3.1 Installation: Install composite insulation boards with urethane surface up.

3.2 Insulation shall be installed to a thickness necessary to provide the designated R-value.

SECTION 07226
ROOF INSULATION AND UNDERLAYMENT
EXPANDED PERLITE BOARD

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of expanded perlite board. Products shall match existing material and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall beas required to support the work.

2.0 PRODUCTS:

2.1 General: Board shall be ASTM C 728, rigid, noncombustible board formed of expanded perlite aggregate and fibers combined with water-resistant mineral binders. Boards shall have integral top surface coating of insulation manufacturer's standard type.

2.2 Flame Spread Rating: Insulation shall have maximum flame spread rating of 25 when tested in compliance with ASTM E 84.

2.3 UL Listing: Expanded perlite board roof insulation and underlayment materials of roofing systems which have been tested for application and slopes and are listed by Underwriters' Laboratories, Inc. (UL) for Class A or Class B external fire exposure shall be provided. Expanded perlite board roof insulation and underlayment materials shall bear the Classification marking (UL) on bundle, package, or container indicating that materials have been produced under UL's Classification and Follow-Up Service.

2.4 FM Listing: Expanded perlite board roof insulation and underlayment materials of roofing systems which have been evaluated by Factory Mutual System for fire spread, wind uplift, and hail damage are listed in the "Factory Mutual Approval Guide" for Class 1 construction. Expanded perlite board roof insulation and underlayment materials bearing FM approval marking on bundle, package, or container indicating that the material has been subjected to FM's examination and follow-up inspection service shall be provided.

3.0 EXECUTION:

3.1 Insulation Board shall be covered with wood board walkways where transport of materials will result in damage to the insulation. Remove walkways ahead of roofing operations.

3.2 Insulation shall be installed to a thickness necessary to provide the designated R-value.

SECTION 07227
ROOF INSULATION AND UNDERLAYMENT
FIBERBOARD

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of fiberboard. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 General: ASTM C 208, Rigid, organic fiberboard derived from wood, cane, or other vegetable fibers, formed with fillers and water-resistant binders.

2.2 Asphalt Impregnation: Insulation board shall be impregnated with asphalt, applied at rate not to exceed 4 percent by weight.

2.3 Bituminous Coating: Insulation board shall be surfaced with manufacturer's standard bituminous coating.

2.4 Flame Spread Rating: Insulation shall have maximum flame spread rating of 25 when tested in compliance with ASTM E 84.

2.5 UL Listing: Fiberboard roof insulation and underlayment materials of roofing systems that have been tested for application and slopes and are listed by Underwriters' Laboratories, Inc. (UL) for Class A or Class B external fire exposure shall be provided. Fiberboard board roof insulation and underlayment materials shall bear the Classification marking (UL) on bundle, package, or container indicating that materials have been produced under UL's Classification and Follow-Up Service.

2.6 FM Listing: Fiberboard roof insulation and underlayment materials of roofing systems that have been evaluated by Factory Mutual system for fire spread, wind uplift, and hail damage are listed in the "Factory Mutual Approval Guide" for Class 1 construction. Fiberboard board roof insulation and underlayment materials bearing FM approval marking on bundle, package, or container indicating that the material has been subjected to FM's examination and follow-up inspection service shall be provided.

3.0 EXECUTION: Install insulation to a thickness necessary to provide the designated R-value.

SECTION 07256
SPRAYED-ON FIREPROOFING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of sprayed-on fireproofing. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS: Products shall be provided that have been tested in accordance with ASTM E 119, UL 263, ANSI A2.1, or NFPA 251 for fire-resistance and rated by UL or other industry-recognized agency for the required resistances.

2.1 Spray-Applied Fireproofing: Materials shall conform to the requirements of ASTM E 1042, Type I, Category A. Spray-applied fireproofing materials shall not contain asbestos.

2.1.1 Water shall be clean, fresh, potable, and free from amounts of oils, acids, alkalies, and organic matter that would be injurious to the fireproofing.

2.2 Performance Requirements: Spray-applied fireproofing material shall conform to the following requirements:

2.2.1 Deflection: Spray-applied fireproofing shall not crack, spall, or delaminate when tested in accordance with ASTM E 759.

2.2.2 Cohesion/Adhesion: Spray-applied fireproofing material shall have a minimum cohesive/adhesive force of 80 psf when tested in accordance with ASTM E 736.

2.2.3 Bond-Impact: Spray-applied fireproofing material shall not crack, spall, or delaminate when tested in accordance with ASTM E 760.

2.2.4 Compressive Strength: The minimum compressive strength shall be 500 psf based upon the average load of 10 percent deformation or at ultimate load, whichever is less as tested in accordance with ASTM E 761.

2.2.5 Air Erosion: Gain in weight of the collecting filter shall not exceed 0.025 gram per square foot when tested in accordance with ASTM E 859.

2.2.6 Corrosion Resistance: No evidence of corrosion, after testing in accordance with ASTM E 937, for metal surfaces to be covered.

2.3 Fire Hazard Classification:

2.3.1 Surface Burning Characteristics: Spray-applied fire-proofing material shall have a flame spread of 25 or less, a smoke developed rating of 50 or less, and a fuel contributed rating of 50 or less when tested in accordance with ASTM E 84.

2.4 Fire Resistance Rating for building elements shall be as indicated and shall conform to the fire rated assemblies as listed in the UL Fire Resistance Directory.

2.5 Substrate Primers: Provide type that is compatible with condition of each substrate to be fireproofed, including shop primers applied by metal fabricators/erectors, and is compatible with bonding adhesives and fireproofing materials.

2.6 Metal Lath: Except as otherwise indicated, provide 3.4-pound (per sq yd) expanded galvanized diamond steel lath, with reinforcing members and clips and other anchorage devices as appropriate for substrate and complying with selection requirements of applicable fire endurance tests. Provide corner beads and other lathing accessories of standard design and weight, where required.

3.0 EXECUTION:

3.1 Surface Preparation: Surfaces to be fireproofed shall be thoroughly cleaned of all dirt, grease, oil, paint, rust, and mill scale or other contaminants that will interfere with the proper bonding of the sprayed fireproofing to the substrate. Ceiling areas to be fireproofed shall be cleared of all obstructions interfering with the uniform application of the spray-applied fireproofing. Hardware such as support sleeves, inserts, clips, hanger attachment devices and the like shall be installed prior to the application of the fireproofing.

3.2 Surface Acceptability: Surfaces to receive sprayed fireproofing shall be inspected prior to application of fireproofing material and certified to be clean and in acceptable condition for application of spray-applied fireproofing.

3.3 Application: Prior to spray application, surfaces not to receive spray-applied fireproofing, including instruments, gauges, and equipment shall be covered to prevent contamination by splatter, rebound, and overspray. Exterior openings in areas to receive spray-applied fireproofing shall be covered

prior to and during application of fireproofing with tarpaulins or other approved material. Fireproofing material shall be applied to a thickness as required to obtain the specified fire resistance rating and to provide a fire-protective coating of uniform density and texture. Fireproofing shall be applied in accordance with the procedure recommended by the manufacturer. Fireproofing applied to underside of steel roof deck or steel floor assemblies shall be installed only after respective roof or floor construction is complete. No roof or floor traffic shall be allowed during application and during curing period. Sealer shall be applied to clean, dry fireproofed surfaces in accordance with manufacturer's recommendations.

3.4 Cleanup: Surfaces not indicated to receive fireproofing shall be thoroughly cleaned of all sprayed material.

SECTION 07311
ASPHALT SHINGLES

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of asphalt shingles. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Nails shall be nonferrous metal or zinc-coated steel long enough to penetrate at least 3/4 inch into the deck sheathing.

2.2 Roll Roofing:

2.2.1 Smooth Surfaced: ASTM D 224, Type II.

2.2.2 Mineral Surfaced: Fed. Spec. SS-R-630 and provided with 2-inch selvage.

2.3 Shingles shall meet requirements of Underwriters' Laboratories, Inc., for Class C wind-resistant shingles by equaling or exceeding the requirements of UL 55A and UL 997. Shingles shall be square-butt strips of uniform thickness or of thick-butt style, 12 by 36 inches, and either 2-tab or 3-tab design.

2.4 UL Listing: Asphalt and composition shingle materials of roofing systems which have been tested for application and slopes and are listed by Underwriters' Laboratories, Inc. (UL) for Class A or Class B external fire exposure shall be provided. Asphalt shingle materials shall bear the Classification marking (UL) on bundle, package, or container indicating that materials have been produced under UL's Classification and Follow-Up Service.

2.5 FM Listing: Asphalt shingle materials of roofing systems which have been evaluated by Factory Mutual system for fire spread, wind uplift, and hail damage are listed in the "Factory Mutual Approval Guide" for Class 1 construction. Asphalt shingle materials bearing FM's examination and follow-up inspection service shall be provided.

3.0 EXECUTION:

3.1 Preparation: Loose, curled, broken, or lifted asphalt shingles shall be nailed down or replaced, if required, to provide a solid nailing base. Protruding or loose nails shall be removed or nailed down.

3.2 Installation:

3.2.1 Application of Roofing When Existing Roofing is Removed:

3.2.1.1 Underlayment: Apply one layer of 15-pound asphalt-saturated felt to roof-deck sheathing.

3.2.1.2 Underlayment: Apply two layers of 15-pound asphalt-saturated felt applied to roof-deck sheathing. A solid coating of bituminous cement shall be applied between the layers of underlayment.

3.2.1.3 Shingles: Apply shingles over underlayment allowing 5-inch butt exposure, and in no case shall there be less than 2-inch head lap.

3.2.1.4 Hips and Ridges shall be formed with 9- by 12-inch individual shingles.

3.2.1.5 Valleys:

3.2.1.5.1 Closed Woven-Shingle Valleys shall have a single-layer lining of smooth-surfaced or mineral-surfaced roll roofing, 36 inches wide.

3.2.1.5.2 Roll Roofing Valley shall be two thicknesses of mineral-surfaced roll roofing.

3.2.2 Application of Roofing Over Existing Asphalt Shingles: Shingles shall be applied over old shingles with butt exposure, except for starter course, equal to old shingles, and in no case shall there be less than 2-inch head lap.

3.2.3 Roof Patching and Replacement: Match existing shingles in design, weight, texture, pattern, and color.

# SECTION 07314
# SLATE SHINGLES

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of slate shingles. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Nails shall be large head slater's nails, either hard copper wire nails, cut copper, cut brass, or yellow metal and shall be long enough to penetrate at least 1 inch into the deck sheathing.

2.2 Slate Shingles shall comply with ASTM C 406 and shall be of matching or designated size, thickness, color, and texture.

2.3 Asphalt-Saturated Organic Felt shall comply with ASTM D 226.

3.0 EXECUTION:

3.1 Underlayment: Apply one layer of 30-pound asphalt-saturated felt to roof-deck sheathing.

3.2 Slating:

3.2.1 Starter Course: Apply starter course at eave on cornice line with same thickness slate as main roofing material. Slate shall be approximately 3 inches longer than exposure of first course and shall be installed over a 1/4-inch thick treated wood cant.

3.2.2 First and Succeeding Courses: Apply slate over underlayment with 6-1/2 inch butt exposure with minimum 3-inch head lap. Slate shall project 1 inch at eaves and 1/2 inch at gable ends. Each course shall break joints with preceding course by minimum 3 inches.

3.2.3 Nailing: Fasten each slate with two nails. Do not drive far enough to produce a strain on the slate. Exposed nails shall be permissible only in top courses where unavoidable, and exposed nail heads shall be covered with bituminous cement.

SECTION 07321
CLAY ROOFING TILES

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of clay roofing tiles. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Mortar: Mixture of Portland cement, sand, and pigment.

2.2 Nails: Copper or noncorrosive metal.

2.2.1 Ring Type Nails: Used on plywood sheathing.

2.2.2 Slater's Nails: Minimum of 1-1/2 inches long and shall be used on board sheathing.

2.3 Asphalt-Saturated Organic Felt shall comply with ASTM D 226.

2.4 Roofing Tiles shall be a clay or shale product that is burned to a hard dense structure, glazed or nonglazed on exposed surfaces.

3.0 EXECUTION:

3.1 Underlayment: Apply one layer of 30-pound asphalt-saturated felt to roof-deck sheathing.

3.2 Application of Slab Shingle Tiles: Install a 3/4-inch by 1-inch cant strip along eave. On top of cant install under-eave tiles, projecting 1 inch over the rear edge of gutter and flush with the gable edge. Install first course of roofing tiles flush with butt edge of under-eave tile and extend 2 inches over the gable ends. Lay field tiles in straight courses with 2-inch head lap and secure with roofing nails in all holes provided in tiles. Lay all tiles within one foot of hips, ridges, and abutting vertical surfaces in bituminous cement.

3.3 Application of Interlocking Tiles: Install cant strip or under-eave fittings as required by tile configuration. On top of cant or under-eave fitting, install first course of roofing tiles projecting 1 inch over rear edge of gutter. Lay roof tiles with straight butt lines, interlocked into adjoining tiles with a 3-inch headlap and

secure with nails in all holes provided in tiles. Provide gable rake fittings at all gables.

3.4 Application of Spanish and Mission Tiles: Install cant strip over eave closure fittings and nailing strips as required by configuration of tiles. Set eave closures back 2 inches from lower edge of eave. Lay tiles in straight vertical lines up roof and with uniform exposure to weather. Give all tiles minimum lap of 3 inches, and extend eave tiles 1 inch over edge of gutters. Fit all tiles properly and secure with nails in all holes provided. Nails shall be long enough to penetrate at least 1 inch into wood base. Cement and nail cover tiles to gable rakes with bituminous cement, all the way up the gables. When eave closures and top fixtures are not required, cement eaves and joint at ridge with mortar.

3.5 Replacing Individual Spanish or Mission Roofing Tiles: Remove broken tiles by cutting nails with a ripper. Insert new tiles of the same color and size as broken one by troweling Portland cement mortar on new tile surface that will be lapped by tile in course above and on surface that will lap tile in course below. Fasten new tile in place with metal strap or wire.

SECTION 07322
CONCRETE ROOFING TILES

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of concrete roofing tiles. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Mortar: Mixture of Portland cement, sand, and pigment.

2.2 Nails: Copper or noncorrosive metal.

2.2.1 Ring Type Nails: Used on plywood sheathing.

2.2.2 Slater's Nails: Used on board sheathing.

2.3 Roofing Tiles: Waterproof concrete product reinforced with steel wire. Each tile shall be manufactured with nail holes. Standard rake, closures, hip, and ridge fittings same color as tile, shall be provided.

2.4 Asphalt-Saturated Organic Felt shall comply with ASTM D 226.

3.0 EXECUTION:

3.1 Underlayment: Apply one layer of 30-pound asphalt-saturated felt to roof-deck sheathing.

3.2 Application of Slab Shingle Tiles: Apply 1-inch by 1/2-inch cant strip 1/2 inch from edge of eave. On top of cant, install a starter strip of tiles projecting 1 inch over rear edge of gutters and 1 inch beyond gable ends. Install the first course of tiles flush with edges of starter strip. Lay field tiles in straight courses with a 2-inch head lap and secure with two large-head roofing nails. Lay all tiles within 1 foot of hips, ridges, and abutting vertical surfaces in bituminous cement.

3.3 Application of Interlocking Tiles: Install cant strip or under-eave fittings as required by tile configuration. On top of cant, or under-eave fitting, install first course of roof tile projecting 1 inch over the rear edge of gutter. Lay roof tiles with straight butt lines interlocked into adjoining tiles with a 3-inch headlap and secure with nails in all holes provided in the tiles. Provide gable rake fittings at all gables.

SECTION 07410
PREFORMED ROOFING AND SIDING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of preformed roofing and siding panels. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Aluminum Roof Panels: Fabricated from roll-formed panels of aluminum alloy in accordance with ASTM B 209, tempered as required for forming operation, with a minimum thickness of 0.032 inch. Thickness of panels shall be the standard thickness as required for roofing span and design loading.

2.1.1 Color-Coated Finish. One of the following standard factory-applied, baked-on coatings:

2.1.1.1 Acrylic Enamel Coating: Epoxy primer and acrylic enamel top coat, dry film thickness not less than 0.2 mil for primer and 0.8 mil for topcoat.

2.1.1.2 Fluoropolymer Coating: Full strength 70 percent polyvinylidene fluoride finish, dry film thickness not less than 1.0 mil over a minimum 0.2 mil baked-on modified epoxy primer.

2.1.1.3 Siliconized Polyester Coating: Epoxy primer and silicone-modified polyester enamel topcoat, dry film thickness not less than 0.2 mil for primer and 0.8 mil for topcoat.

2.1.2 Factory Prime Coating: Factory-applied baked-on epoxy primer coat, not less than 0.2 mil dry film thickness applied after pretreatment.

2.1.3 Natural Finish: Stucco embossed finish, plain mill-finished or special alloy-clad sheet (Alclad), as required.

2.1.4 Corrugated Panels shall be standard 7/8 inch deep with corruga-tion crests at 2.67 inches on centers with either interlocking ribs or overlapping side laps at side joints, as required.

2.1.5 V-Beam Panels shall be standard V-shaped ribbed panels, nomin-ally 4-7/8 inches on centers and 1-3/4 inches deep with either interlocking ribs or overlapping side laps at side joints, as required.

2.2 Steel Roof Panels shall be factory-painted steel metal panels which shall be zinc-coated steel conforming to ASTM A 446, Grade A, G90 zinc coating designation. Roof covering shall be 22 galvanized sheet gauge or thicker. Steel roof panels shall be factory prime-coated and color-coated with one of the color coatings specified for aluminum roof panels.

2.2.1 Corrugated Panels shall have similar dimensional and side joint characteristics as specified for aluminum roof panels.

2.2.2 Box Rib Panels shall be standard units, approximately 1-1/2 inches deep with 1-3/8 inch wide flutes and 5 box ribs at 7-13/64 inches on centers for a 36-inch wide coverage.

2.2.3 Four-Inch Ribbed Panels shall be standard units approximately 1 inch deep with 9 box ribs at 4 inches on centers for a panel width of 37-1/2 inches.

2.3 Standing Seam Roofing:

2.3.1 General: Roof-covering panels shall be fabricated of zinc-coated steel conforming to ASTM A 446, G90 coating designation or aluminum-coated steel conforming to ASTM A 463, Type 2. Roof covering shall be 24 galvanized sheet gauge or thicker. Panels shall have configurations designed for mechanically formed lock seams for securing adjacent sheets. Sealant for standing seams shall be factory-applied. Width of sheets shall provide not less than 12 inches of coverage in place. Height of standing seam shall be not less than 2-1/2 inches for slopes less than 3 inches in 12 inches, and not less than 1-3/4 inches for slopes 3 inches in 12 inches or greater.

2.3.2 Color Coating: Color finish shall consist of either a synthetic resin base coating applied to a pretreated and primed surface or a dry film coating material bonded to the metal substrate with adhesive. Dry film thickness of color coat shall be not less than 0.8 mil for exterior surface finish.

2.3.3 Accessories shall include flashing, trim, caps, and similar accessories of not less than the minimum thicknesses specified for roofing. Accessories of zinc-coated steel used with aluminum-coated steel shall be painted. Molded closure strips shall be closed-cell or solid-cell synthetic rubber, neoprene, or polyvinyl chloride premolded to match configuration of the covering.

2.3.4 Panel Clips shall be of two-piece construction with movable tabs. Clips shall provide for at least 2 inches of panel movement. Tabs shall be designed to be folded into the lock seam.

2.3.5 Fasteners shall be zinc-coated steel or corrosion-resisting steel.

2.3.5.1 Screws shall be not less than No. 14 diameter if self-tapping type and not less than No. 12 diameter if self-drilling and self-tapping type.

2.3.5.2 Blind Rivets shall be stainless steel.

2.3.5.3 Bolts shall be not less than 1/4-inch diameter, shouldered or plain shank, as required, with proper nuts.

2.4 Aluminized Steel Roof Panels:

2.4.1 General: Roof panels shall be formed of Type II aluminized sheet in accordance with ASTM A 463. Thickness shall be not less than 22-gauge material.

2.4.2 Aluminized steel corrugated panels shall be similar to standard profiles and dimensional and side joint characteristics as specified for aluminum roof panels and steel roof panels.

2.5 Plastic Roof Panels:

2.5.1 General: Preformed translucent plastic roof panels shall be glass fiber-reinforced polyester plastic panels conforming to ASTM D 3841.

2.5.2 Non-Fire Rated Translucent Plastic Roof Panels shall be manu-factured of acrylic modified resins with either a smooth or embossed finish. Glass reinforcement shall be not less than 27 percent by weight and resins approximately 73 percent by weight and shall be of high quality light-stabilized polyester, modified with acrylic monomer.

2.5.3 Low Flame Spread Translucent Plastic Roof Panels shall be manufactured of light-stabilized, fire-retardant polyester approximately 75 percent by weight and modified with acrylic monomer. Glass reinforcement shall be not less than 25 percent by weight. Panels shall be classified by Underwriters' Laboratory with a flame spread of not greater than 25 when tested in accordance with ASTM E 84. Finish shall be smooth or embossed as required.

2.5.4 Corrosion-Resistant Opaque Panels shall be manufactured of resins composed of high quality light-stabilized polyester, modified with acrylic monomer. Where required, panels shall be the fire-retardant type classified by Underwriters' Laboratories, with a flame spread not greater than 25 when tested in accordance with ASTM E 84.

2.5.5 High Strength Opaque Fire-Retardant Panels suitable for walkable roof service shall be composed of high quality light-stabilized, fire-retardant polyester, modified with acrylic monomer. Glass reinforcement shall be a minimum of 38 percent, composed of woven continuous strand and chopped strand glass. Interior and exterior surfaces shall have a surface veil. Finish shall be embossed. All panels shall be classified by Underwriters' Laboratories, with a flame spread not greater than 25 when tested in accordance with ASTM E 84.

2.6 Aluminum Siding Panels: Aluminum siding panels shall be similar to aluminum roofing panels. Four-inch ribbed panels shall be approximately 1 inch deep with 9 box ribs at 4 inches on centers for a panel width of 37-1/2 inches.

2.7 Steel Siding Panels shall be similar to steel roofing panels, including finish and profiles (except box rib profile). Thickness shall be 24 galvanized sheet gauge or thicker.

2.8 Insulated Siding Panels:

2.8.1 Factory-assembled Sandwich Panels:

2.8.1.1 General: Interior and exterior panels shall be shop-assembled, fabricated of hot-dipped, zinc-coated, roll-formed steel sheet, ASTM A 446, Grade A, except where higher strength is required forperformance, and G90 zinc coating. Thickness of interior and exterior panels shall be determined for wall spans and design loading as required.

2.8.1.2 Insulation shall be standard glass fiber blanket insulation complying with ASTM C 665, Type I, with a k-value of 0.27 at 75 F and a density of not less than 1.5 lbs/cu ft.

2.8.1.3 Assembled Panel System shall have standard continuous gasket at male legs isolating metal-to-metal contact. Panels shall be factory-caulked.

2.8.1.4 All Related Closures, Flashings, and Copings shall be manu-factured from same gauge material as exterior face metal panel and shall be properly engineered to job conditions.

2.8.1.5 Finish of Exterior Panels shall be factory prime-coated and color-coated with one of the color coatings specified for aluminum panels. Finish of interior panels shall be prime coat with a color coat as required.

2.8.2 Field-Assembled Sandwich Panels:

2.8.2.1 Interior Wall Facing Units shall be hot-dipped, zinc-coated, single rib design steel sheet, ASTM A 446, Grade A, G90 zinc coating. Interior wall facing units may be of 0.024 inch or thicker aluminum. Interior units shall be roll-formed in unit widths of 12 inches with 1-1/2 inch ribs or 24 inches with 2-inch ribs. Interlocking joints shall be provided between units. Interior wall units shall present a flush inside wall surface.

2.8.2.2 Insulation: Rigid or semi-rigid board insulation shall con-form to Fed. Spec. HH-I-558, Form A, Class 1 or 2. Blanket insulation shall conform to Fed. Spec. HH-I-558, Form B, Type I, Class 6. Insulation shall have a flame spread not in excess of 25 and a smoke developed rating not in excess of 50 when tested in accordance with ASTM E 84. Insulation shall be of sufficient thickness to provide the designated U-value.

2.8.2.3 Exterior Panel Materials shall be mill-embossed finished aluminum, galvanized steel, galvanized and painted steel, or stainless steel.

2.8.2.3.1 Aluminum Sheets shall be ASTM B 209. Where required, stucco embossed finish shall be provided. Where required, provide Alclad aluminum alloy-clad sheets where exposed without applied coatings.

2.8.2.3.2 Steel Panels shall be metal panels of zinc-coated steel conforming to ASTM A 446, Grade A, G90 zinc coating. Where color coating is required, finish shall be factory prime-coated and color-coated with one of the color coatings specified for aluminum roof panels.

2.8.2.3.3 Stainless Steel Panels shall be fabricated from ASTM A 167, sheet stock types 302 or 304 stainless steel with No. 2B surface finish. Where exposure to corrosive atmospheres or coastal areas is required, stainless steel panels shall be fabricated from ASTM 167, sheet stock type 316, with No. 2B surface finish.

2.9 Solid Vinyl Siding shall comply with ASTM D 3679, Class 2.

3.0 EXECUTION:

3.1 General: Installation shall include all standard fasteners, flashings, sealants, gaskets, closure strips, trim, and insulation associated with roofing and siding. Provide expansion joints where required.

3.2 Field-Assembled Sandwich Panel Siding shall include installation of subgirts. All panels shall be erected with flutes and ribs running vertically.

3.3 Factory-Assembled Sandwich Panels shall be erected by means of standard concealed clip attachments.

3.4 Solid Vinyl Siding shall include all accessories required for a complete installation.

SECTION 07463
ASBESTOS CEMENT ROOFING AND SIDING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of asbestos cement roofing and siding. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Wall Covering and Roof Covering: Corrugated asbestos cement panels shall conform to ASTM C 221, Type A, natural gray color.

2.2 Accessories: Accessories of asbestos cement used as supplementary or finishing pieces shall conform to ASTM C 221. Molded closure strips shall be bituminous saturated fiber, closed-cell or solid-cell synthetic rubber or neoprene, or polyvinyl chloride premolded to match the configuration of the covering.

2.3 Fasteners: Fasteners exposed to weather shall be gasketed or have gasketed washers to weatherproof the penetration. Gaskets shall be neoprene, other elastomeric material, or lead approximately 1/8 inch thick. Bolts and drive screws shall be zinc-plated steel. Self-tapping screws shall be cadmium-coated or 300 series corrosion-resisting steel. Bolt clips shall be galvanized steel of standard design appropriate for the application.

2.4 Insulation Materials: Insulation shall be of sufficient thickness to provide the designated roof and wall U-values through the completed construction, when determined for winter conditions in accordance with recognized methods in agreement with the ASHRAE Handbook & Product Directory, Fundamentals. Insulation shall have a facing providing a permeability as required when tested in accordance with ASTM E 96. Facing shall be either of reinforced foil with a vinyl finish or sheet vinyl, except unreinforced foil may be used in concealed locations. Facings and finishes shall be factory-applied. Insulation, including facings and finishes, shall have a flame spread not in excess of 25 and a smoke developed rating not in excess of 50 when tested in accordance with ASTM E 84.

2.4.1 Rigid or Semi-Rigid Board Insulation shall conform to Fed. Spec. HH-I-558, Form A, Class 1 or Class 2. Exposed insulation shall have a white non-dusting and non-shedding finish.

2.4.2 Blanket Insulation shall conform to Fed. Spec. HH-I-558, Form B, Type I, Class 6.

2.5 Insulation Retainers: Insulation retainers shall be type, size, and design necessary to hold the insulation adequately. Metallic retaining members shall be nonferrous or have a nonferrous coating. Nonmetallic retaining members, including adhesives used in conjunction with mechanical retainers or at insulation seams, shall have a fire resistance classification not less than that permitted for the insulation.

2.6 Wall Liners: Wall liners shall be 0.024-inch or thicker aluminum or 26 galvanized sheet gauge or thicker steel. Wall liners shall be formed or patterned to prevent waviness and distortion and shall extend from the floor to height as required. Matching metal trim shall be provided at the base of wall lining, top of wall liner, around openings in walls and roof and over interior and exterior corners.

2.6.1 Steel Wall Liners shall be zinc-coated steel conforming to ASTM A 446, G 90 coating designation, or aluminum-coated steel conforming to ASTM A 463, Type 2.

2.6.2 Aluminum Wall Liners shall conform to ASTM B 209, temper as required for the forming operation.

2.6.3 Sealant shall be as recommended by the roofing and siding manufacturer.

3.0 EXECUTION:

3.1 Wall Covering and Roof Covering: Sheets shall be laid the straight or staggered joint method as required. Wall covering shall be applied with edge corrugations turned in and the longitudinal configurations in the vertical position. Roof covering shall be applied with the edge corrugations turned down and the longitudinal configurations in the direction of the roof slope. End laps shall be made over framing members with fasteners into framing members approximately 3 inches from the end of the overlapping sheet. Side laps and end laps of roof and wall covering and joints at accessories shall be sealed. Holes for fasteners shall be drilled only in the high part of the corrugation. Fasteners shall be driven normal to the surface and to a depth to seat the gasketed washers properly without overdriving and cracking the crests. Automatic end-welded studs shall not be used for applying wall and roof sheets. Cutting of sheets shall be accomplished with a saw equipped with a vacuum or a water jet and in accordance with OSHA 1910.1001 and 1926.103.

3.2 Molded Closure Strips shall be installed wherever covering sheets terminate in open-end configurations, exclusive of flashings.

3.3 Insulation shall be installed between covering and supporting members. Blanket insulation shall have facing at joints lapped and fastened in a manner that will provide tight joints. Exposed rigid or semi-rigid insulation in ceilings shall be fastened securely without loose joints and unsightly sags. Insulation retainers shall be fastened securely in place.

3.4 Wall Liners: Additional framing and accessories shall be provided as necessary for the installation of the wall liners.

SECTION 07510
BUILT-UP ROOFING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of built-up roofing. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Primer: Asphalt, ASTM D 41; coal-tar, ASTM D 43.

2.2 Bitumen:

2.2.1 Asphalt: ASTM D 312, Type I on slopes from 1/4 inch per foot up to and including 1/2 inch per foot, Type II or Type III on slopes above 1/2 inch per foot up to and including 1 inch per foot, Type III on slopes above 1 inch per foot and including 3 inches per foot.

2.2.2 Coal-Tar Bitumen for slopes from 1/4 inch per foot up to and including 1/2 inch per foot: ASTM D 450, Type III, unless Type I is approved by the Contracting Officer.

2.2.3 Cold-Process Asphalt Emulsion: A mechanical mixture of minute particles of asphalt and special clays suspended in water.

2.3 Cants: Treated fiberboard, ASTM C 208; wood blocking treated with waterborne preservative, AWPB LP-2; or foamglass. Cants shall have maximum 5-1/2 inch face dimensions at a 45 degree incline to roof plane and lengths as long as practical.

2.4 Felt:

2.4.1 Organic-Fiber Felt:

2.4.1.1 Plies: ASTM D 226, Type I, asphalt-saturated; or ASTM D 227, Type I, coal-tar saturated.

2.4.1.2 Asphalt-Saturated Base Sheet: No. 40 felt, ASTM D 2626,Type I or II.

2.4.2 Glass-Fiber Felt:

2.4.2.1 Plies: ASTM D 2178, Type III or IV where average January temperature is above 40 F and Type IV where average January temperature is below 45 F.

2.4.2.2 Asphalt-Impregnated Combination Base Sheet: ASTM D 2178, Type V.

2.4.3 Venting Base Sheet: Asphalt-saturated and coated base sheet with granular surfacing and embossed channels (or grooves) on bottom surface.

2.4.4 Cold-Process System Felts: Coated organic, glass-fiber, or a combination of both.

2.5 Flashings: Bituminous and sheet metal as required.

2.6 Flashing Cement: Bituminous plastic cement complying with Fed. Spec. SS-C-153, Type I for use with asphalt-saturated felts and Type II for use with coal-tar saturated felts.

2.7 Cold-Process Cement: Solvent-based cement that evaporates slowly in cool damp weather, more rapidly in hot dry weather, and is standard with the cold-process glass-fiber reinforced asphalt emulsion roofing system manufacturer.

2.8 Mastic: Solvent-based mastic that evaporates slowly in cool damp weather, more rapidly in hot dry weather, and is standard with the cold-process mastic roofing system manufacturer.

2.9 Nails and Mechanical Fasteners: Industry standard, noncorrosive material, shape and size required for substrate.

2.10 Surfacing Materials:

2.10.1 Aggregate: Crushed stone, gravel, or crushed slag conforming to ASTM D 1863. Subject to approval, other materials may be used when blended to the grading requirements of ASTM D 1863.

2.10.2 Smooth Surfacing:

2.10.2.1 Fibrated, clay-stabilized, water thinned asphalt emulsion with non-asbestos reinforcing, ASTM D 1227, Type IV (clay-type).

2.10.2.2 Reflective Coating: ASTM D 2824, Type I if non-fibrated, Type II if fibrated.

2.10.3 Mineral Surfacing: Mineral surface cap sheet complying with ASTM D 3909.

2.11 Sheathing Paper: ASTM D 549, 5-pound rosin-sized paper.

2.12 Wood Nailers and Edge Blocking: Non-stress graded wood members, treated with waterborne preservative in compliance with AWFB LP-2.

2.13 Walkway Protection Boards: Mineral surfaced bituminous composition boards, approximately 1/2 inch thick, manufactured specifically for hot bituminous application on built-up roofing as a protection course for foot traffic.

2.14 Roofing Systems:

2.14.1 Nailable Deck, Asphalt/Organic Felt Membrane With Aggregate Surfacing: NRCA Specification Plate No. 31-NAOA, Diagram B for light-weight insulating concrete decks and Diagram A for other nailable decks.

2.14.2 Nailable Deck, Asphalt/Glass-Fiber Felt Membrane:

2.14.2.1 With Aggregate Surfacing: NRCA Specification Plate No. 32-NAGA, Diagram B for lightweight insulating concrete decks and Diagram A for other nailable decks.

2.14.2.2 With Smooth Surfacing: NRCA Specification Plate No. 32-NAGA except for substitution of smooth surfacing for aggregate surfacing.

2.14.2.3 With Mineral Surfacing: NRCA Specification Plate No. 32-NAGA except for deletion of one ply of felt and substitution of mineral surfacing for aggregate surfacing.

2.14.3 Nailable Deck, Coal-Tar/Organic Felt Membrane with Aggregate Surfacing: NRCA Specification Plate No. 33-NCOA, Diagram B for light-weight insulating concrete decks and Diagram A for other nailable decks.

2.14.4 Insulated Deck, Asphalt/Organic Felt Membrane with Aggregate Surfacing: NRCA Specification Plate No. 41-IAOA; Diagram B for insulation substrate of composite board, polyisocyanurate foam board, or polyurethane foam board; Diagram A for other insulation substrates.

2.14.5 Insulated Deck, Asphalt/Glass-Fiber Felt Membrane:

2.14.5.1 With Aggregate Surfacing: NRCA Specification Plate No. 42-IAGA; Diagram B for insulation substrate of composite board, poly-isocyanurate foam board, or polyurethane foam board; Diagram A for other insulation substrates.

2.14.5.2 With Smooth Surfacing: NRCA Specification Plate No. 42-IAGA except for addition of one ply of felt and substitution of smooth surfacing for aggregate surfacing.

2.14.5.3 With Mineral Surfacing: NRCA Specification Plate No. 42-IAGA except for substitution of mineral surfacing for aggregate surfacing.

2.14.6 Insulated Deck, Coal-Tar/Organic Felt Membrane with Aggregate Surfacing: NRCA Specification Plate No. 43-ICOA; Diagram B for insulation substrate of composite board, polyisocyanurate foam board, or polyurethane foam board; Diagram A for other insulation substrates.

2.14.7 Concrete Deck, Asphalt/Organic Felt Membrane with Aggregate Surfacing: NRCA Specification Plate No. 51-CAOA, Diagram A or B as directed.

2.14.8 Concrete Deck, Asphalt/Glass-Fiber Felt Membrane:

2.14.8.1 With Aggregate Surfacing: NRCA Specification Plate No. 52-CAGA, Diagram A or B as directed.

2.14.8.2 With Smooth Surfacing: NRCA Specification Plate No. 52-CAGA except for addition of one ply of felt and substitution of smooth surfacing for aggregate surfacing.

2.14.8.3 With Mineral Surfacing: NRCA Specification Plate No. 52-CAGA except for substitution of mineral surfacing for aggregate surfacing.

2.14.9 Concrete Deck, Coal-Tar/Organic Felt Membrane with Aggregate Surfacing: NRCA Specification Plate No. 53-CCOA; Diagram A or B as directed.

2.14.10 Temporary Roofing: NRCA Specification 10-TR; Diagram TR-N for nailable decks, Diagram TR-C for non-nailable decks (except steel) and Diagram TR-SI for steel decks.

2.14.11 Cold-Process Built-Up Membrane Roofing:

2.14.11.1 Glass-Fiber Reinforced Asphalt Emulsion System: Minimum two layers of coated ply felts with smooth surfacing (asphalt emulsion).

2.14.11.2 Mastic System: Coated ply felts (three plies on slopes less than 1 inch per foot and two plies on slopes greater than 1 inch per foot) embedded into a spray application of mastic with embedded mineral granule surfacing.

2.15 UL Listing: Built-up roofing systems and component materials of roofing systems that have been tested for application and slopes and are listed by Underwriters' Laboratories, Inc. (UL) for Class A or Class B external fire exposure shall be provided. Roof covering materials shall bear the Classification marking (UL) on bundle, package, or container indicating that materials have been produced under UL's Classification and Follow-Up Service.

2.16 FM Listing: Built-up roofing systems and component materials of roofing systems that have been evaluated by Factory Mutual system for fire spread, wind uplift, and hail damage are listed in the "Factory Mutual Approval Guide" for Class 1 construction. Built-up roofing systems and component materials bearing FM approval marking on bundle, package, or container indicating that the material has been subjected to FM's examination and follow-up inspection service shall be provided.

3.0 EXECUTION:

3.1 Preparation:

3.1.1 Mineral Surfaced Cap Sheet: Cut sheet in 12- to 18-foot lengths and leave to flatten prior to application.

3.1.2 Temporary Roofing: Remove temporary roofing completely prior to installation of permanent roofing.

3.1.3 Weather Limitations: Do not apply roofing when it is excessively windy, wet, or when the ambient temperature is less than 40 F.

3.1.4 Heating Bitumen: Asphalt shall not be heated above 475 F. Coal tar shall not be heated above 400 F. Application temperatures shall be measured at the mop bucket and/or mechanical applicator.

3.2 Application:

3.2.1 NRCA-Specified Roofing Systems shall be applied in accordance with the NRCA specifications.

3.2.2 Smooth Surfacing: Glaze-coat entire surface of completed built-up roof membrane with hot mopping of Type III asphalt, applied at same rate and concurrent with interply moppings. Allow asphalt coating to age a minimum of 7 days, then apply top coating of asphalt emulsion at an average rate of 2.5 gallons per square. If roof is to receive reflective coating, it shall be applied promptly after application and initial cure (next day) of emulsion coating at an average rate of 1.25 gallons per square.

3.2.3 Mineral Surfacing: Promptly after completion of ply-sheet membrane (same day where possible), apply one lapped course of cap sheet. Set cap sheet in uniform mopping of same hot bitumen used in ply-sheet courses, at an average rate of 15 lbs per square. Lap ends a minimum of 6 inches.

3.2.4 Cold-Process Roofing Systems:

3.2.4.1 Glass-Fiber Reinforced Asphalt Emulsion: Nail or spot-mop the first ply felt. Apply additional plies with cold-process cement brushed, sprayed, or rolled on at the rate of approximately 1-1/2 gallons per square. If precipitation is expected within 48 hours, a solid mopping of hot asphalt shall be used instead of cold-process cement. Over the base sheet assembly, the asphalt emulsion shall be spray-applied with a three-nozzle gun that has a glass fiber cutter that disperses glass fibers 3/4 inches long into the emulsion as it is spray-applied. Reinforced asphalt emulsion shall be sprayed at the rate of approximately 9 gallons of emulsion and 3 pounds of glass-fiber reinforcement per square. If the roof is designated to receive a reflective coating, it shall be applied as soon as the asphalt emulsion membrane is firm enough to support roof traffic without indentations forming in the film.

3.2.4.2 Mastic System: Embed ply felts in mastic sprayed at a rate of approximately 2-1/2 gallons per square per coat. Embed mineral surfacing in top coat of mastic.

3.3 Accessories and Flashings: Install flashings as recommended by the NRCA Roofing and Waterproofing Manual and the SMACNA Architectural Sheet Metal Manual. Set walkways in additional pour-coat of hot bitumen after aggregate surfacing of built-up roofing membrane.

3.4 Surface Maintenance of Existing Aggregate Surfaced Roofs:

3.4.1 Preparation: Sweep surface and remove all loose and poorly embedded existing aggregate before applying new surface materials.

3.4.2 Primer: Apply thin coat of asphalt primer over affected areas. Allow to dry thoroughly before applying flood coat.

3.4.3 Flood Coat: Apply hot bitumen of type compatible with existing roofing materials, at a rate of 60 pounds per square for Type III asphalt and 75 pounds per square for coal tar.

3.4.4 Aggregate Surfacing: While bitumen is hot, embed clean surfacing aggregate of type to match existing, applied at a rate of 400 pounds per square for gravel, 300 pounds per square for slag, and 400 pounds per square for crushed stone.

3.5 Maintenance and Repair Patching (Hot-Applied Roofing):

3.5.1 Blisters: Make two cuts at right angles to each other, extending cuts 12 inches beyond edge of defective areas and to substrate surface. Fold back cut areas and allow substrate and membrane to dry. Wet insulation shall be removed and replaced with dry insulation matching the original. When dry, apply solid bitumen mopping over opened area and fold cut sections of membrane into bitumen. Totally embed membrane in bitumen.

3.5.2 Splits: Cut out membrane at least 12 inches on each side and extending 18 to 24 inches on each side and extending 18 to 24 inches beyond each end of split area. Dry lay a 6-inch wide strip of roofing felt, cemented over split area. Apply uniform coat of bitumen over dry felt, extending to embedded aggregate in all directions.

3.5.3 Disintegrated and Damaged Felts: Cut and remove disintegrated, damaged, and loose felts to extent necessary to provide sound materials. Cut out wet felts and allow wet surfaces to completely dry before in-stalling patch materials. Replace removed felts with equal plies of felt. Felts shall be solidly mopped into place in hot bitumen and shingled into existing plies to extent possible.

3.5.4 Additional Plies: Finish defective areas by applying at least two additional plies of roofing felt, embedded in hot bitumen. Extend edges of first ply a minimum of 9 inches beyond affected area on all sides and second ply 18 inches beyond affected area on all sides.

**SECTION 07520**
**POLYMER-MODIFIED ASPHALT BUILT-UP ROOFING**

**1.0 DESCRIPTON OF WORK: This specification covers the furnishing and installation of a class "A" fire rated 12 Year Built Up Roofing System conforming to a manufacturer's standard, prefabricated, reinforced polymer-modified fiberglass sheets (base sheet & 3 plies), SEBS asphalt, gravel ballast with insulation, flashing, and accessories as specified and indicated. The manufacturer shall have a minimum of 10 years experience in manufacturing of the proposed roofing system for similar applications. Roofing Contractor shall warrant workmanship for a period of two (2) years from date work is accepted in additional to all manufacturer's or supplier warranties. Demolition and removal of materials shall be as specified and as required to support the work. Work shall conform to NRCA, SMACNA industry standards and material manufacturer's recommendations.**

**2.0 PRODUCTS:**

**2.1 Primer: Asphalt, ASTM D 41.**

**2.2 Bitumen:**

**2.2.1 Asphalt: Modified-Asphalt (SEBS), ASTM D 312, Type III for slopes up to 25 percent (1/4 inch per foot vertical/horizontal) and Type IV for slopes up to 50 percent (1/2 inch per foot vertical/horizontal) or as specified by roof material manufacturer.**

**2.2.2 Mastic: Cement shall conform to ASTM D 4586 and as recommended by roof materials manufacturer.**

**2.3 Cants: Treated fiberboard, ASTM C 208; wood blocking treated with waterborne preservative, AWPA C9 listed in AWPA P5. Cants shall have maximum 5-1/2 inch face dimensions at a 45 degree incline to roof plane and lengths as long as practical. Field cut ends of wood cants shall be field treated with AWPA M4.**

**2.4 Felts:**

**2.4.1 Fiberglass Felts:**

**2.4.2 Plies: ASTM D 2178, Type IV Sheets shall be a polymer modified asphalt of styrene butadiene styrene (SBS); or SBS which has been further modified with styrene ethylene butadiene styrene (SEBS). Sheets shall be reinforced with fiber made from glass, polypropylene, or polyester. as recommended by the manufactured by Allied Signal, Manville, GAF Corporation, Siplast or equal.**

**2.5 Flashing:**

**2.5.1 Base Flashing: Flashing shall be White, SBS/SEBS polymer modified asphalt, mineral surfaced cap ply as recommended by material manufacturer.**

**2.5.2 Metal Flashing: Metal flashing as specified and as required.**

**2.5.3 Flashing Cement: MBR type only (asbestos free), compatible for use with SBS/SEBS polymer modified built-up roof system.**

**2.5.4 Cap Flashing Underlayment Membrane: Protective underlayment, SBS/SEBS modified asphalt flashing material with polyester face, paper backed, with adhesive. TAMKO, Moisture Guard Plus or equal.**

**2.6 Nails and mechanical Fasteners:**

**2.6.1 Roof Nails: Galvanized or non-ferrous type, size as required to suite application and as recommended by roof materials manufacturer.**

**2.6.2 Mechanical Fasteners for Flexible Flashing: Masonry, specially heat treated, stress relived, I-1/4 inch; Masonry nails manufactured by Simplex Nails, Inc. or equal. Wood blocking, high carbon, zinc coated steel, annular threaded shank nails; with minimum 1 inch x 30 gauge metal disk; Roofing nails manufactured by Simplex Nails, Inc or equal.**

**2.6.3 Mechanical Fasteners for Insulation to Steel Deck: #14 screw with corrosive resistant coating (able to pass 30K cycles) with compatible disk; sufficient screw shank length to penetrate steel deck in accordance with manufacturer's instruction for base layer of insulation. Plastic disks shall have provision for recessed fastener head.**

**2.6.4 Mechanical Fasteners for Metal Flashing: As recommended by materials manufacturer.**

**2.7 Surfacing Materials: Surfacing shall be light colored, crushed stone or gravel conforming to ASTM D 1863.**

**2.8 Adhesive: Adhesive shall be approved type recommended by the roofing membrane manufacturer.**

**2.9 Walkway Surfaces: Walkways shall be mineral asphalt planks, Minimum ¾ inch thick, ASTM D517 as specified or as recommended by roof membrane manufacturer.**

**2.10 Wood Nailers and Edge Blocking: As specified and as required, Non-stress graded wood members, treated with waterborne preservative in compliance with AWFB LP-2.**



**2.11 Insulation: As specified and as required, insulation shall be compatible with roof membrane as recommended by material manufacturer and installed in accordance with FM I-90, NRCA and manufacturer recommendations.**

**2.12 Metal Flashing, Gravel Guards, Gutters, and Downspouts and accessories: As specified and as required.**

**2.13 Coating: As specified; aluminum coating shall conform to ASTM D 2824 Type I or III, or shall be as recommended by roof membrane manufacturer.**

**2.14 Pitch Pan: As specified and indicated; Pitch pans shall have rain cap and shall be filled with a 2 part pourable sealant. Sealant shall conform to ASTM D 529, Firestone Rubber-guard sealer S-10 or equal.**

**3.0 EXECUTION**

**3.1 Preparation Requirements: The substrate construction of any bay or section of building shall be clean before roofing work is begun thereon. Vents and other items penetrating the roof shall be secured in position and properly prepared for flashing. Nailers, curbs and other items attached to roof surface shall be in place before roofing is begun.**

**3.2 Installation of Cants: Cants shall be installed in the angles formed between the roof and walls or other vertical surfaces. Cants shall be laid in a solid coat of bituminous cement just prior to laying the base sheet or membrane. Cants shall be continuous, and shall be installed in lengths as long as practicable.**

**3.3 Condition of Surfaces: Surfaces shall be inspected and approved immediately prior to application of roofing and flashing. The roofing and flashing shall be applied to a smooth and firm surface free from ice, frost, visible moisture, dirt, projections, and foreign materials. Prior to application of primer on pre-cast concrete decks, joints shall be covered with 4 inch strip of roofing felt, embedded in and coated with bituminous cement.**

**3.4 Application of Roofing System: Application shall be in accordance with NRCA specifications and roofing materials manufacturer recommendations and warranties.**

**3.5 Mechanical Application Devices: Mechanical application devices shall be mounted on pneumatic-tired wheels, and shall be designed and maintained to**

**operate without damaging the insulation, roofing membrane, or structural components.**

**3.6 Priming: Concrete, masonry and metal surfaces to receive bitumen shall be uniformly coated with primer at a rate of not less than 0.4 liters per square meter, 1 gallon per square and allowed to dry.**



**3.7 Heating of Asphalt: Asphalt shall not be heated higher than 75 degrees F above EVT or 50 degrees F below the flash point or 525 degrees F (maximum) whichever is lower. EVT and flash point temperatures of asphalt in the kettle shall be conspicuously posted on the kettle. Heating kettle shall be provided with automatic thermostatic control and an accurate thermometer. Kettle operator shall be in attendance at all times during the heating to ensure that the maximum temperature specified is not exceeded. An asphalt tanker shall be treated as a kettle.**

**3.8 Asphalt Application: Asphalt shall be applied within 25 degrees F below or above the EVT, or 400 degrees F, whichever is higher. Application temperatures shall be measured at the mop bucket or mechanical applicator. Bitumen at a temperature below the recommended temperature shall be returned to the kettle.**

**3.9 Application of Base Sheet: Base sheet shall be applied, shingle fashion, in a continuous operation, with side laps in accordance with manufacturer's printed instructions. End laps shall be not less than 6 inches and staggered a minimum of 24 inches. Base sheets shall be applied at right angles to the slope (except on curved or steep deck) and laps shall be face down the slope. Venting base sheet shall be mechanically fastened in conformance with manufactured printed instructions. Non vented base sheet on insulation shall be applied in hot mopping of not less than 20 pounds nor more than 35 pounds of modified asphalt per square and shall be embedded in the hot asphalt with squeegee or broom to eliminate air pockets and ensure complete adhesion. Operator shall avoid heavy application of squeegee to glass-fiber sheets.**

**3.10 BUR Felts Application: Felt plies shall be installed as recommended by the membrane manufacturer. Each sheet in each ply shall be fully adhered to the underlying surface. Sheet edges shall lie flat, with no fish-mouths or wrinkles. Installation shall begin at the low point of the roof and progress to the high point with each sheet installed in shingle fashion. Each sheet shall be unrolled to provide 4 inch side laps and 6 inch end laps. End laps shall be staggered not less than 24 inches. Laps shall not coincide with laps of base layer except at lines of permanent termination. Sheets shall be adhesive-bonded in SBS/SEBS asphalt as specified in manufacturer's approved written instructions.**

**3.11 Termination at Perimeters: The BUR felts shall extend up abutting surfaces at least 4 inches or 2 inches above top of the cant.**

**3.12 Mechanical Fastening of Insulation: Nails and fasteners for securing base or membrane sheet to wood nailers or deck shall be flush driven through disk. Screw fasteners with disk as specified by the membrane manufacturer shall be used on concrete or metal deck. Nailers and fasteners shall be spaced to meet I-90 wind uplift requirements and within tolerance specified by the manufacturer. Penetration of nails and fasteners will not be permitted through the exposed surface of the membrane.**



**3.13 Protection of Applied Roofing: At end of day's work or whenever precipitation is imminent, the terminated edge of the roofing shall be sealed with two full width strips of roofing felt set in and coated with bitumen cement or hot mopped asphalt. One half-width of strip shall be extended up and over the finished roofing and other half-width extended out and onto the bare roof deck or existing membrane. Sealing strips shall be removed before continuing installation of the roofing. To facilitate sealing, termination edges may be straightened with pieces of insulation board and shall be removed when work is resumed.**

**3.14 Flashing: Flashing shall be provided over cants, in the angles formed at walls and other vertical surfaces, and where required to make work watertight. All penetrations shall receive flashing as required. Polymer mineral surfaced flashing shall be used, except where metal flashing is required or specified. Metal cap flashing shall have peal and stick rubber membrane (ice dam) flashing applied between cap wall and metal flashing.**

**3.15 Walkways: Walkways shall be mineral-surfaced asphalt planks, back mopped and embedded in the flood coat prior to aggregate surfacing and shall be located as indicated are as required.**

**3.16 Surfacing: After roofing membrane has been laid and flashing installed, the roof surface, except cants, shall be flood coated uniformly with 60 pounds SBS/SEBS hot asphalt per square, and while asphalt is still hot, aggregate surface material shall be spread on the hot bitumen at the rate of 400 pounds per square.**

**3.17 Inspection: The Contractor and applicator shall establish and maintain an inspection procedure to assure compliance of the installed roofing system. The materials manufacturer shall certify, inspect and issue written warranties. Any work found not in compliance shall be promptly removed or repaired in an approved manner. Inspection shall include, bit not limited to, the following:**

**3.17.1 Observation of environmental conditions; number and skill level of roofing workers; start and end time of various tasks; condition of substrate.**

**3.17.2 Verification of compliance of materials before, during and after installation.**

**3.17.3 Inspection of condition of equipment and accuracy of thermometers and metering devices.**

**3.17.4 Inspection of flashing, cants, and curbs.**

**3.17.5 Inspection of membrane placement, widths of starter sheets, laps, proper use of squeegee, and mechanical fastening.**



**3.17.6 Inspection of application of bitumen, aggregate, and walkways.**

**3.17.7 Inspection of embedded of aggregate for required weight and coverage.**

**3.17.8 Sampling and analysis as directed.**

**3.17.8 Inspection of all metal work to include flashing, gutters and downspouts.**

**3.17.9 Final inspection that roof system is watertight and complete.**

**End of Section**

SECTION 07530
SINGLE PLY ROOFING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of single ply roofing. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Roll Roofing: ASTM D 371, Type II, for mineral surfaced; ASTM D 224, Type II, for smooth surfaced.

2.2 Elastic Sheet Roofing: Elastic sheet material shall be EPDM, hypalon, neoprene, polyvinyl chloride, chlorinated polyethylene, polyisobutylene, or modified bitumen (reinforced or unreinforced), as required. Provide products that are fully compatible with indicated substrates or provide separation materials as required to eliminate contact between incompatible materials. The elastic sheet roofing shall meet the following requirements based on type of installation.

2.2.1 For Loose-Laid Ballasted System: Manufacturer's standard thickness but not less than 45 mils, 1,400 psi minimum tensile strength (ASTM D 412), 250 percent elongation (ASTM D 412), vapor permeable, ultraviolet and ozone resistant, low temperature brittleness of -40 F (ASTM D 746).

2.2.2 For Mechanically Fastened System: Manufacturer's standard thickness but not less than 60 mils, 1,600 psi minimum tensile strength (ASTM D 412), minimum tear resistance of 150 lbs/lin in (ASTM D 624), 300 percent elongation (ASTM D 412), ultraviolet and ozone resistant, low temperature brittleness of -40 F (ASTM D 746), standard color.

2.2.3 For Fully Adhered System: Manufacturer's standard thickness but not less than 60 mils, 1,400 psi minimum tensile strength (ASTM D 412), 250 percent minimum elongation (ASTM D 412), ultraviolet and ozone resistant, low temperature brittleness of -40 F (ASTM D 746), standard or special color, as required.

2.3 Fluid-Applied Roofing: Fluid-applied materials shall be sprayed-in-place urethane roofing with two-coat elastomeric silicone rubber protective coating.

2.3.1 Urethane Foam:

| PROPERTY | ASTM TEST METHOD | VALUE |
|---|---|---|
| Density, pcf overall | D 1622 | 2.5 min., 3.5max. |
| Compressive Strength psi parallel to rise | D 1621 | 40.0 min. |
| Thermal Conductivity (k factor) Btu/hr/ sq ft/degrees F/in. | C 177 | new 0.11 max.<br>aged 0.15 max.<br>(6 months) |

2.3.2 Elastomeric Protective Coating: Two-coat silicone rubber system, bonded to urethane foam:

| PROPERTY | ASTM TEST METHOD | VALUE |
|---|---|---|
| Tensile Strength, psi | D 412 | 500-600 |
| Elongation, percent | D 412 | 100-150 |
| Hardness | D 2240 | 45 |

2.4 Roofing Installation Accessories:

2.4.1 Roll Roofing:

2.4.1.1 Roofing Nails shall be 12-gauge galvanized with minimum 3/8-inch diameter head and 7/8-inch long shank.

2.4.1.2 Cement shall be cold process asphalt as recommended by material manufacturer.

2.4.2 Elastic Sheet Roofing:

2.4.2.1 Ballast for Loose-Laid Ballasted Systems shall be washed round riverbed gravel, ranging in size from 3/4 inch to 1-1/2 inches in diameter.

2.4.2.2 Mechanical Fasteners used with mechanically fastened system shall be screws, nails, battens, accessory components, and adhesives as appropriate for the substrate.

2.4.2.3 Adhesive for Fully Adhered System shall be compatible with substrate and project conditions and formulated to withstand a minimum 60 psf uplift force.

2.4.2.4 Protective Color Coat as required for mechanically fastened and fully adhered systems shall be ozone-resistant, liquid-applied hypalon.

2.4.2.5 Flashing Material shall be compatible with the membrane.

2.4.2.6 Membrane Seaming System shall be of manufacturer's standard materials for sealing lapped joints, including edge sealer to cover exposed spliced edges.

2.4.2.7 Cant Strips and Flashing Accessories shall be compatible with membrane, including adhesive tapes, flashing cements, and sealants.

2.4.2.8 Slip Sheet for protection of membrane from incompatible substrate shall be as recommended by membrane manufacturer.

2.4.2.9 Walkway Protection Boards, where required, shall be prefabricated concrete pavers containing no asphalt or coal-tar derivatives, suitable for use without cracking or breaking.

2.4.3 Fluid-Applied Roofing: Ceramic granules shall be No. 11 screen size dry and free from dust.

2.5 UL Listing: Single ply roofing systems and component materials that have been tested for application and slopes and are listed by Underwriters' Laboratories, Inc. (UL) for Class A or Class B external fire exposure shall be provided. Single ply roof covering materials shall bear the Classification marking (UL) on bundle, package, or container indicating that materials have been produced under UL's Classification and Follow-Up Service.

2.6 FM Listing: Single ply roofing systems and component materials that have been evaluated by Factory Mutual System for fire spread, wind uplift, and hail damage are listed in the "Factory Mutual Approval Guide" for Class 1 construction. Single ply roofing systems and component materials bearing FM approval marking on bundle, package, or container indicating that the material has been subjected to FM's examination and follow-up inspection service shall be provided.

3.0 EXECUTION:

3.1 Preparation:

3.1.1 Roll Roofing: Clean wood deck completely. Ensure that all nails are driven flush with or below deck surface. Surface must be dry before placing any roofing material.

3.1.2 Elastic Sheet Roofing: Clean of dust, debris, or other substances detrimental to work. Remove sharp projections. Prime substrate as required.

3.1.3 Fluid Applied Roofing: Clean all debris from roof surface, new or existing. On existing roof, repair any roof damage to provide a clean smooth surface.

3.2 Installation:

3.2.1 Roll Roofing: Install in accordance with the National Roofing Contractors Association Steep Roofing Manual application instructions.

3.2.2 Elastic Sheet Roofing and Fluid Applied Roofing: Install in accordance with manufacturer's instructions.

SECTION 07550
INVERTED ROOF SYSTEMS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of inverted roof systems. Materials shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Asphalt Primer: ASTM D 41.

2.2 Fiberglass Base Sheet: Glass fiber mat coated with weathering grade asphalt to provide a nonporus ply.

2.3 Fiberglass Felt: ASTM D 2178, Type IV.

2.4 Sheathing Paper: Single-ply 5 lb/100 sq ft, rosin-sized sheathing paper.

2.5 Base for Built-Up Membrane Applied Over Steel Deck shall be one of the following with mechanical attachment:

2.5.1 Mineral Fiberboard: ASTM C 726, 3/4 inch thick.

2.5.2 Wood Fiberboard: Organic fiberboard roof insulation in accordance with ASTM C 208, 1 inch thick.

2.5.3 Gypsum Wallboard: 1/2 inch thick, ASTM C 36.

2.6 Steep Asphalt: ASTM D 312, Type III.

2.7 Extruded Rigid Polystyrene Insulation: ASTM C 578, Type IV, 24-inch by 48-inch standard size, with drainage channel on bottom of each board.

2.8 Galvanized Roofing Nails: 11 gauge, barbed, galvanized with 7/16-inch to 5/8-inch diameter heads or other approved type.

2.9 Fabric for Application Above Insulation: 3 oz/sq yd black polyester or 3 oz/sq yd black polypropylene approved by inverted roof system manufacturer.

2.10 Ballast: Gravel or crushed stone shall be in accordance with ASTM D 448, Gradation No. 57.

2.11 UL Listing: Inverted roof systems and component materials that have been tested for application and slopes and are listed by Underwriters' Laboratories, Inc. (UL) for Class A or Class B external fire exposure shall be provided. Inverted roof systems and component materials shall bear the Classification marking (UL) on bundle, package, or container indicating that materials have been produced under UL's Classification and Follow-Up Service.

2.12 FM Listing: Inverted roof systems and component materials that have been evaluated by Factory Mutual system for fire spread, wind uplift, and hail damage are listed in the "Factory Mutual Approval Guide" for Class 1 construction. Inverted roof systems and component materials bearing FM approval marking on bundle, package, or container indicating the material has been subjected to FM's examination and follow-up inspection service shall be provided.

3.0 EXECUTION:

3.1 Installation on Various Deck Materials:

3.1.1 On Lightweight Insulating Concrete Decks, prime concrete surface with asphaltic primer.

3.1.2 On Poured Gypsum Decks, lay one ply of approved fiberglass base sheet with edges lapped and nailed with nails approved for use with gypsum deck materials.

3.1.3 On Precast Concrete Plank Deck or Precast Concrete Tee Deck, prime concrete surfaces with asphalt primer. Prior to applying built-up roof membrane, apply 18-inch wide slip sheet of 2-ply dry-applied fiberglass felt to cover end joints where concrete planks or tees meet.

3.1.4 On Wood Decks, cover the deck with sheathing paper lapping and mechanically fastening each sheet to the deck. Over sheathing paper, apply one ply of approved fiberglass base sheet, lapping joints and nailing, using galvanized roofing nails driven through flat metal disks not less than 1 inch in diameter.

3.2 Builtup Roof Membrane Installation:

3.2.1 Starting at Low Point of Roof, uniformly mop the surface of the nailed fiberglass base sheet or primed deck surface with steep asphalt at the rate

recommended for substrate (25 +/- 5 to 30 +/- 5 lbs per square). While hot, embed 3 plies of approved fiberglass felts in shingle fashion, lapping each sheet 24-2/3 inches.

3.2.2 Interply Moppings shall be continuous and applied at the rate listed above for substrate. Complete embedment of felts is required and is accomplished by dragging a broom or squeegee over the felt; no more pressure is required than that exerted by the weight of the "brooming" utensil. During cold weather, effective brooming is essential to eliminate voids and to ensure adhesion. As the work progresses, full mop the top surface of the membrane using a minimum coverage of 25 +/- 5 lbs per square. A second flood coat shall be applied at the rate of 45 lbs per square.

3.2.3 At No Time Shall Felts Be Left Exposed overnight or in inclement weather. All mopping bitumen shall be steep asphalt (Type III, 185-205 F softening point).

3.2.4 Bitumen Temperature at the Kettle shall be controlled so as not to exceed the bitumen manufacturer's recommendations. The roof membrane shall not be staged. Temporary membranes are not acceptable as a part of a completed membrane. Install completed membrane in final form on a day-to-day basis.

3.3 <u>All Flashing</u> shall Be Completed in each area prior to installing roof insulation. Details and installation shall conform to standard inverted roof system specifications.

3.4 <u>Unadhered Insulation Installation</u>:

3.4.1 General: Rigid polystyrene insulation shall be placed on the membrane as the membrane is completed to provide immediate protection. Flood coats of steep asphalt shall be allowed to cool completely prior to rigid insulation installation to ensure unadhered foam.

3.4.2 Rigid Polystyrene Insulation shall be placed directly on membrane with channel side down. End joints shall be staggered and all boards shall be tightly abutted. The maximum acceptable opening between boards shall be 3/8 inch. Install insulation to within 3/4 inch of all projections and cant strips. For multilayer installations, install subsequent layers unattached over the unadhered first layer. Stagger all joints in relation to underlying layer. The bottom layer shall be as thick or thicker than the top layer and must be a minimum of 2 inches thick.

3.4.3 Fabric Installation: Place fabric over rigid insulation, unadhered and unattached. Fabric shall be wetted to hold it in place until ballast is installed. Edges shall be overlapped a minimum of 1 foot. Install so that there are no parallel joints within 6 feet of the perimeter. Extend fabric 2 to 3 inches above the stone at perimeter and penetrations.

3.4.4 Thickness of Insulation: Installed thickness shall provide a U-value through completed roof structure, air-to-air, not in excess of that required by job location, as determined for winter conditions in accordance with recognized methods in agreement with ASHRAE Handbook Fundamentals.

3.5 Ballast Installation:

3.5.1 General: Fabric shall be covered with gravel or crushed stone ballast as the fabric is being installed. The stone top covering shall be 3/4 inch with not less than 10 percent nor more than 60 percent of fines smaller than 1/2 inch.

3.5.2 Stone or Gravel Ballast shall be applied at a minimum average rate of 1,000 lbs per square and shall be approximately 1-1/4 inches thick. Around roof perimeter and at penetrations and drains, 20 lbs/sq ft of stone ballast over a 4 foot wide area shall be applied. A continuous row of pavers constituting 22 lbs/lin ft can be substituted for the extra ballast around perimeter, penetrations and drains. Pavers shall be used in high traffic areas near roof and equipment access areas.

**SECTION 07551**
**MODIFIED BITUMEN ROOFING**

**1.0 DESCRIPTON OF WORK: This specification covers the furnishing and installation of a Class "A" Fire rated 12 Year modified bitumen roofing system conforming to a manufacturer's standard, prefabricated, reinforced polymer-modified bitumen membranes (base sheet, 1 or 2 ply heavy weight plies and cap sheet), SEBS asphalt, with insulation, flashing, and accessories as specified and indicated. The manufacturer shall have a minimum of 10 years experience in manufacturing of the proposed modified bitumen sheet roofing for similar applications. Roofing Contractor shall warrant workmanship for a period of two (2) years from date work is accepted in additional to all manufacturer's or supplier warranties. Demolition and removal of materials shall be as specified and as required to support the work. Work shall conform to NRCA, SMACNA industry standards and material manufacturer's recommendations.**

**2.0 PRODUCTS:**

**2.1 Primer: Asphalt, ASTM D 41.**

**2.2 Bitumen:**

**2.2.1 Asphalt: Modified-Asphalt (SEBS), ASTM D 312, Type III for slopes up to 25 percent (1/4 inch per foot vertical/horizontal) and Type IV for slopes up to 50 percent (1/2 inch per foot vertical/horizontal) or as specified by roof materials manufacturer.**

**2.2.2 Mastic: Cement shall conform to ASTM D 4586 and as recommended by roof materials manufacturer.**

**2.3 Cants: Treated fiberboard, ASTM C 208; wood blocking treated with waterborne preservative, AWPA C9 listed in AWPA P5. Cants shall have maximum 5-1/2 inch face dimensions at a 45 degree incline to roof plane and lengths as long as practical. Field cut ends of wood cants shall be field treated with AWPA M4.**

**2.4 Felts:**

**2.4.1 Fiberglass Felts:**

**2.4.2 Plies: ASTM D 2178, Type IV or VI as recommended by the manufacturer.**

**2.4.3 Modified Bitumen Base Sheet: ASTM D 4897, Type II for vented sheets or ASTM D 4601, Type II for non-vented sheets. Sheets shall be a bitumen modified asphalt with styrene butadiene styrene (SBS); or SBS which has been further modified with styrene ethylene butadiene styrene (SEBS). Sheets shall be reinforced with fiber made from glass, polypropylene, or polyester manufactured by Allied Signal, Johns Manville, GAF Corporation, Siplast or equal.**

**2.5 Flashing:**

**2.5.1 Base Flashing: Flashing shall be White or Metal Clad finish as specified, SEBS modified Bitumen cap ply as recommended by material manufacturer.**

**2.5.2 Metal Flashing: Metal flashing as specified and as required.**

**2.5.3 Flashing Cement: MBR type only (asbestos free), compatible for use with SEBS modified bitumen roof system.**

**2.5.4 Cap Flashing Underlayment Membrane: Protective underlayment, SEBS modified asphalt flashing material with polyester face, paper backed, with adhesive. TAMKO, Moisture Guard Plus or equal.**

**2.6 Nails and mechanical Fasteners:**

**2.6.1 Roof Nails: Galvanized or non-ferrous type, size as required to suite application and as recommended by roof materials manufacturer.**

**2.6.2 Mechanical Fasteners for Flexible Flashing: Masonry, specially heat treated, stress relived, I-1/4 inch; Masonry nails manufactured by Simplex Nails, Inc. or equal. Wood blocking, high carbon, zinc coated steel, annular threaded shank nails; with minimum 1 inch x 30 gauge metal disk; Roofing nails manufactured by Simplex Nails, Inc or equal.**

**2.6.3 Mechanical Fasteners for Insulation to Steel Deck: #14 screw with corrosive resistant coating (able to pass 30K cycles) with compatible plastic disk; sufficient screw shank length to penetrate steel deck in accordance with manufacturer's instruction for base layer of insulation. Plastic disks shall have provision for recessed fastener head.**

**2.6.4 Mechanical Fasteners for Metal Flashing: As recommended by materials manufacturer.**

**2.7 Surfacing Materials: Surfacing shall factory applied granules requiring no further coating.**

**2.8 Adhesive: Adhesive shall be approved type recommended by the roofing membrane manufacturer.**

**2.9 Walkway Surfaces: Walkways shall be mineral asphalt planks, minimum ¾ inch thick, as specified or as recommended by roof membrane manufacturer.**

**2.10 Wood Nailers and Edge Blocking: As specified and as required, Non-stress graded wood members, treated with waterborne preservative in compliance with AWFB LP-2.**



**2.11 Insulation: As specified and as required, insulation shall be compatible with roof membrane as recommended by material manufacturer and installed in accordance with FM I-90, NRCA and manufacturer recommendations.**

**2.12 Metal Flashing, Gravel Guards, Gutters, and Downspouts and accessories: As specified and as required.**

**2.13 Coating: As specified; aluminum coating shall conform to ASTM D 2824 Type I or III, or shall be as recommended by roof membrane manufacturer.**

**2.14 Pitch Pan: As specified and required; Pitch pans shall have rain cap and shall be filled with a 2 part pourable sealant. Sealant shall conform to ASTM D 529, Firestone Rubberguard pourable sealer S-10 or equal.**

**3.0 EXECUTION**

**3.1 Preparation Requirements: The substrate construction of any bay or section of building shall be clean before roofing work is begun thereon. Vents and other items penetrating the roof shall be secured in position and properly prepared for flashing. Nailers, curbs and other items attached to roof surface shall be in place before roofing is begun.**

**3.2 Installation of Cants: Cants shall be installed in the angles formed between the roof and walls or other vertical surfaces. Cants shall be laid in a solid coat of bituminous cement just prior to laying the base sheet or membrane. Cants shall be continuous, and shall be installed in lengths as long as practicable.**

**3.3 Condition of Surfaces: Surfaces shall be inspected and approved immediately prior to application of roofing and flashing. The roofing and flashing shall be applied to a smooth and firm surface free from ice, frost, visible moisture, dirt, projections, and foreign materials. Prior to application of primer on pre-cast concrete decks, joints shall be covered with 4 inch strip of roofing felt, embedded in and coated with bituminous cement.**

**3.4 Application of Roofing System: Application shall be in accordance with NRCA specifications and roofing materials manufacturer recommendations and warranties.**

**3.5 Mechanical Application Devices: Mechanical application devices shall be mounted on pneumatic-tired wheels, and shall be designed and maintained to operate without damaging the insulation, roofing membrane, or structural components.**

**3.6 Priming: Concrete, masonry and metal surfaces to receive bitumen shall be uniformly coated with primer at a rate of not less than 0.4 liters per square meter, 1 gallon per square and allowed to dry.**

**07551**

**3.7 Heating of Bitumen: Asphalt shall not be heated higher than 75 degrees F above EVT or 50 degrees F below the flash point or 525 degrees F (maximum) whichever is lower. EVT and flash point temperatures of asphalt in the kettle shall be conspicuously posted on the kettle. Heating kettle shall be provided with automatic thermostatic control and an accurate thermometer. Kettle operator shall be in attendance at all times during the heating to ensure that the maximum temperature specified is not exceeded. An asphalt tanker shall be treated as a kettle.**

**3.8 Bitumen Application: Asphalt shall be applied within 25 degrees F below or above the EVT, or 400 degrees F, whichever is higher. Application temperatures shall be measured at the mop bucket or mechanical applicator. Bitumen at a temperature below the recommended temperature shall be returned to the kettle.**

**3.9 Application of Base Sheet: Base sheet shall be applied, shingle fashion, in a continuous operation, with side laps in accordance with manufacturer's printed instructions. End laps shall be not less than 6 inches and staggered a minimum of 24 inches. Base sheets shall be applied at right angles to the slope (except on curved or steep deck) and laps shall be face down the slope. Venting base sheet shall be mechanically fastened in conformance with manufactured printed instructions. Non vented base sheet on insulation shall be applied in hot mopping of not less than 20 pounds nor more than 35 pounds of modified asphalt per square and shall be embedded in the hot asphalt with squeegee or broom to eliminate air pockets and ensure complete adhesion. Operator shall avoid heavy application of squeegee to glass-fiber sheets.**

**3.10 Modified Bitumen Membrane Application: Membrane shall be three plies as recommended by the membrane manufacturer. Each sheet in each ply shall be fully adhered to the underlying surface. Sheet edges shall lie flat, with no fishmouths or wrinkles. Installation shall begin at the low point of the roof and progress to the high point with each sheet installed in shingle fashion. Each sheet shall be unrolled to provide 4 inch side laps and 6 inch end laps. End laps shall be staggered not less than 24 inches. Laps shall not coincide with laps of base layer except at lines of permanent termination. Sheets shall be adhesive-bonded as specified in manufacturer's approved written instructions.**

**3.11 Termination at Perimeters: The modified bitumen membrane shall extend up abutting surfaces at least 4 inches or 2 inches above top of the cant.**

**3.12 Mechanical Fastening: Nails and fasteners for securing base or membrane sheet to wood nailers or deck shall be flush driven through disk. Screw fasteners with disk as specified by the membrane manufacturer shall be used on concrete or metal deck. Nailers and fasteners shall be spaced to meet I-90 wind uplift requirements and within tolerance specified by the manufacturer. Penetration of nails and fasteners will not be permitted through the exposed surface of the membrane.**



**3.13 Protection of Applied Roofing: At end of day's work or whenever precipitation is imminent, the terminated edge of the roofing shall be sealed with two full width strips of roofing felt set in and coated with bitumen cement or hot mopped asphalt. One half-width of strip shall be extended up and over the finished roofing and other half-width extended out and onto the bare roof deck or existing membrane. Sealing strips shall be removed before continuing installation of the roofing. To facilitate sealing, termination edges may be straightened with pieces of insulation board and shall be removed when work is resumed.**

**3.14 Flashing: Flashing shall be provided over cants, in the angles formed at walls and other vertical surfaces, and where required to make work watertight. All penetrations shall receive flashing as required. Modified bitumen flashing shall be used, except where metal flashing is required or specified. Metal cap flashing shall have peal and stick rubber membrane (ice dam) flashing applied between cap wall and metal flashing.**

**3.15 Walkways: Walkways shall be mineral-surfaced asphalt planks, back mopped and embedded in the flood coat prior to aggregate surfacing and shall be located as indicated or as required.**

**3.16 Surfacing: Surface material shall be mineral surfaced or metal clad as specified.**

**3.17 Inspection: The Contractor and applicator shall establish and maintain an inspection procedure to assure compliance of the installed roofing system. The materials manufacturer shall certify, inspect and issue written warranties. Any work found not in compliance shall be promptly removed or repaired in an approved manner. Inspection shall include, bit not limited to, the following:**

**3.17.1 Observation of environmental conditions; number and skill level of roofing workers; start and end time of various tasks; condition of substrate.**

**3.17.2 Verification of compliance of materials before, during and after installation.**

**3.17.3 Inspection of condition of equipment and accuracy of thermometers and metering devices.**

**3.17.4 Inspection of flashing, cants, and curbs.**

**3.17.5 Inspection of membrane placement, widths of starter sheets, laps, proper use of squeegee, and mechanical fastening.**

**3.17.6 Inspection of application of bitumen, aggregate, and walkways.**

**3.17.7 Inspection of embedded of aggregate for required weight and coverage.**



**3.17.8 Sampling and analysis as directed.**

**3.17.8 Inspection of all metal work to include flashing, gutters and downspouts.**

**3.17.9 Final inspection that roof system is watertight and complete.**

**End of Section**

SECTION 07572
WOOD TRAFFIC TOPPING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of wood traffic topping. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Lumber: Standard grade or No. 2 grade, nonstress grade lumber. Lumber and material sizes shall conform to requirements of the rules or standards under which produced.

2.1.1 Species of Nontreated Wood: Walkway members shall be fabricated of cypress or redwood.

2.1.2 Preservative Treated Wood: Walkway members shall be fabricated of preservative treated lumber, treated by pressure method in compliance with AWPB LP-2 and so marked in compliance with AWPB standard. Preservative treated members shall be air-dried or kiln-dried and marked "DRY." Treated wood that is cut after treatment shall be brush-coated with preservative used in original treatment.

2.1.3 Bitumen: Type used in roofing system.

2.1.4 Bituminous Cement: Fed. Spec. SS-C-153, bituminous plastic cement.

2.1.5 Type I: For use with asphalt roofing system.

2.1.6 Type II: For use with coal-tar roofing system.

2.1.7 Premolded Filler Strip: ASTM D 1751, minimum 3/8 inch thick.

2.1.8 Cap Sheet: Fed. Spec. SS-R-630, asphalt saturated roofing felt, coated with strip asphalt both sides and surfaced on weathering side with mineral granules. Cap sheet shall weigh not less than 70 pounds per square.

2.1.9 Prepared Roll Roofing: ASTM D 249, No. 90 asphalt saturated organic fiber felt, coated on both sides with asphalt and surfaced on weathering side with mineral granules.

3.0 EXECUTION:

3.1 Preparation:

3.1.1 Membrane Roofing:

3.1.1.1 Bitumen Coating: Before installing walkways, areas to be covered shall be coated with 40-inch wide continuous path of bitumen used for roofing system.

3.1.1.2 Cap Sheet Protection Course: Embed cap sheet strips in solid coat of roofing cement. Set strips at right angles to direction of walkway and 48 inches apart.

3.1.1.3 Premolded Filler Strip: Embed premolded filler strip in solid coat of roofing cement. Set filler at right angles and direction of walkway and 48 inches on center.

3.1.1.4 Sloping Roofs: Cover areas to be covered with wood walkways with one continuous ply of prepared roll roofing material, embedded in steep asphalt applied at rate of 25 pounds per square. Roofing sheet shall be of width to extend minimum of 4 inches beyond both sides of walkway area.

3.2 Installation:

3.2.1 Installation of Walkways on Flat Surfaces:

3.2.1.1 Wood Bases: Nominal 2-inch by 6-inch wood base members, maximum of 32 inches long, shall be set into solid uniform layer of bituminous cement, 12 inches wide and spaced 48 inches apart. Apply cement over protection course or premolded filler when applied.

3.2.1.2 Securing in Place: Fasten runners to wood base members with metal angle braces or nail in place. Fasteners shall not penetrate through base units into roofing material. Runners shall be 12 feet minimum length, and joints shall occur over wood bases.

3.2.1.3 Walkways: Nail 1-inch by 4-inch boards, spaced maximum 1/2 inch apart, to 2-inch by 4-inch wood runner members standing on edge, spaced maximum 26 inches apart. Walkway boards shall extend maximum of 4 inches over runners at each side. Nail walkway boards to runner with minimum two nails per board.

3.2.1.4 Roof Surfacing: Apply roof surfacing material to roof surface after wood bases are installed and before walkways are fastened in place. Do not apply surfacing material over wood bases, only between and around.

3.2.2 Installation of Walkways on Sloped Surfaces:

3.2.2.1 Runners: Run nominal 2-inch by 4-inch runners, spaced 24 inches apart maximum, directly over prepared roofing strip, and fasten to roof deck with angle fasteners or nailed directly into deck.

3.2.2.2 Walkway Boards: Nail nominal 1-inch by 4-inch boards to runners. Space walkway boards 6 inches on center, nail flush with outside edge of runners, and fasten to each runner with two nails.

SECTION 07573
COMPOSITION TRAFFIC TOPPING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of composition traffic topping. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Composition Panels: ASTM D 517.

2.2 Adhesive: ASTM D 2822, asphaltic roofing cement.

2.3 Bitumen: Type used in roofing system.

3.0 EXECUTION:

3.1 Preparation: Cut panels at the project site only when necessary to obtain sizes of panels different from those furnished.

3.2 Installation:

3.2.1 Spaced Panels: Space panels maximum of 6 inches apart.

3.2.2 Butted Panels: Butt panels together to form continuous walkway areas.

SECTION 07574
PRECAST CONCRETE OR TILE TRAFFIC TOPPING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of precast concrete or tile traffic topping. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Precast Concrete Tiles:

2.1.1 Compressive Strength: Precast concrete tiles shall have a strength of 3,000 pounds per square inch at 28 days.

2.1.2 Quality Assurance: Absorption shall not exceed 8 percent by weight when tested in compliance with cold water absorption tests specified in ASTM C 1195.

2.2 Quarry Tile: ANSI A137.1.

2.3 Drainage Bed: ASTM D 1863, crushed stone, maximum size 1/2 inch.
2.4 Mortar Materials:

2.4.1 Portland Cement: ASTM C 150, Type I, low alkali content.

2.4.2 Sand: ASTM C 144.

2.4.3 Hydrated Lime: ASTM C 207, Type S.

2.4.4 Setting Bed Mortar Mix: One part Portland cement, three parts damp sand.

2.4.5 Pointing Mortar: One part Portland cement, two parts fine graded sand, 1/5 part lime.

2.5 Sealant: Fed. Spec. TT-S-00227, Type I, two-component elastomeric type compound.

3.0 EXECUTION:

3.1 Preparation: Prior to installing any roof traffic tiles, coat areas to receive tiles with a solid application of bitumen used in roofing system.

3.2 Installation:

3.2.1 Drainage Bed: In areas to receive traffic roof tiles, install 1-1/2 inch thick drainage bed.

3.2.2 Tiles: Lay tiles in 1-inch thick mortar bed. Provide 3/16-inch to 1/4-inch wide joints between tiles.

SECTION 07605
SHEET METAL

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of sheet metal. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS: Materials and fabrication shall comply with applicable recommendations and details of SMACNA Architectural Sheet Metal Manual.

2.1 Shop- and Job-Fabricated Sheet Metal Items may include the following:

a. Downspouts with clips, anchors, straps, and leaders.

b. Edge strip.

c. Flashings, including base, cap, eave, stepped, valley, apron, collar, through-wall and coping flashings.

d. Gravel stops and fasciae, extruded or formed.

e. Gutters, with continuous cleats, hangers, and cover plates.

f. Louvers.

g. Pitch pans.

h. Reglets.

i. Scuppers.

j. Splash pans.

k. Roofing, including batten seam, flat seam, standing seam, and bermuda seam types.

2.2 Aluminum:

2.2.1 Mill Finished Sheets: ASTM B 209, Alloy 3003, temper H14.

2.2.2 Colored Sheets: ASTM B 209, alloy Alclad 3003, temper H14.

2.3 Brass: ASTM B 36, copper alloy No. 260, rolled half-hard temper.

2.4 Copper: ASTM B 370, light cold-rolled temper, mill finish.

2.5 Lead Coated Copper: Cold-rolled sheet copper complying with ASTM B 370, coated with not less than 0.06 pounds per square foot of lead per side. Lead coating shall comply with ASTM B 101, Type I.

2.6 Stainless Steel: ASTM A 167, corrosion-resistant steel, annealed, AISI Type 301, No. 1 finish.

2.7 Copper Clad Stainless Steel: ASTM B 506, stainless steel sheet metal, coated with metallurgically-bonded cladding of copper on each face amounting to 10 percent of thickness (80 percent stainless steel, 20 percent copper). Core shall comply with ASTM A 176, AISI Type 430. Copper cladding shall have mill finish.

2.8 Lead-Coated Copper Clad Stainless Steel: ASTM B 506, copper clad stainless steel sheet metal, coated on one side with 0.06 pounds per square foot of lead complying with ASTM B 101, Type I.

2.9 Terne-Coated Stainless Steel: Stainless steel core complying with ASTM A 167, AISI Type 304, with terne coating of 20 percent tin and 80 percent lead on both faces.

2.10 Terne-Coated Steel: Fed. Spec QQ-T-201, Type 1 commercial quality steel sheet core with 1.45 ounces coating of 20 percent tin and 80 percent lead on both faces.

2.11 Galvanized Steel: ASTM A 526, commercial quality carbon steel sheets with minimum 0.20 percent copper content, hot-dipped galvanized to comply with ASTM A 525, G 90 coating designation. Galvanized steel designated to be finished shall be mill phosphatized and coated with manufacturer's standard baked-on finish.

2.12 Zinc-Alloy: ASTM B 69, containing not less than 0.6 percent copper and 0.14 percent titanium, standard temper.

2.13 Lead Sheet: Fed. Spec. QQ-L-201, Grade B, formed from common desilverized pig lead, complying with ASTM B 29.

2.14 Fasteners:

2.14.1 General Use Fasteners: Same material as sheet metal to which attached, or as recommended by sheet metal manufacturer.

2.14.2 Fasteners for Copper Items: Bronze, brass, or copper types.

2.14.3 Fasteners for Aluminum:

2.14.3.1 Rivets: ASTM B 316, alloy 1100, temper H14, minimum shank diameter of 0.187 inch, length as required to form a head.

2.14.3.2 Screws and Bolts: ASTM B 211, alloy 6061, temper as appropriate for particular use.

2.14.3.3 Washers: Alloy 1100, temper H18 or same aluminum alloy as aluminum sheet or fasteners being used.

2.14.3.4 Noncorrosive Fasteners: Stainless steel, AISI Type 304.

2.14.3.5 Cleats: Formed of same material and thickness as sheet metal being installed, minimum 2 inches wide and long enough to be fully incorporated into work.

2.15 Solder: ASTM B 32, of type best suited for intended purpose.

2.16 Welding Electrodes:

2.16.1 Aluminum: Welding electrodes and filler alloy of type best suited for alloy of aluminum being welded. Paste flux shall be used in welding aluminum.

2.16.2 Stainless Steel: Type recommended by stainless steel producer for type of metal sheet furnished.

2.17 Burning Rods for Lead shall be same composition as lead sheet.

2.18 Miscellaneous Materials:

2.18.1 Felt: ASTM D 226, No. 15 asphalt-saturated organic felt, unperforated.

2.18.2 Sheathing Paper: Rosin-sized paper weighing not less than 6 pounds per square.

2.18.3 Bituminous Plastic Cement: Fed. Spec. SS-C-153, Type I for use with asphaltic roofing materials and Type II for use with coal-tar roofing materials.

2.18.4 Bituminous Coating: Fed. Spec. TT-C-494, Type II, cold-applied solvent type bituminous mastic coating for application in minimum dry film thickness of 12 mils per coat.

2.18.5 Primer Paint: Fed. Spec. TT-P-645, alkyd type zinc chromate.

2.18.6 Zinc Dust Paint: Mil. Spec. MIL-P-21035 galvanized sheet metal touchup paint.

2.18.7 Sealants: Non-drying mastic type as recommended for particular joint being sealed and anticipated movement within joint. One-part sealant shall be Fed. Spec. TT-S-00230, Type II, Class A. Two-component sealant shall be Fed. Spec. TT-S-00227, Type II, Class A.

2.18.8 Wood Nailers and Edge Blocking: Non-stress graded wood members, moisture-resistant, treated with waterborne preservative in compliance with AWPB LP-2 standard. Nominal dimensions of nailers shall be 1 inch by 3 inches, unless otherwise required.

2.18.9 Nonmetallic Through-Wall Flashing: Nonreinforced, homogeneous, waterproof, impermeable elastomeric sheeting having not less than 1,000 psi tensile strength nor more than 7 percent tension set at 50 percent elongation when tested in accordance with ASTM D 412. Sheeting shall resist exposure without visible deterioration when tested not less than 400 hours in accordance with ASTM D 822. Sheeting shall not crack or flake when exposed to low temperatures.

2.18.10 Miscellaneous Sheet Metal Roofing Materials:

2.18.10.1 Wood Batten Strips shall be non-stress graded wood members of nominal 2 inches by 2 inches, pressure-treated with waterborne preservatives in compliance with AWPB LP-2, or other material that is compatible with sheet metal.

2.18.10.2 Polyethylene Underlayment shall be a minimum of 6 mil chlorinated polyethylene film.

3.0 EXECUTION: Installation of sheet metal materials shall comply with applicable recommendations and details of SMACNA Architectural Sheet Metal Manual.

3.1 Nailing Strips and Edge Blocking: When deck surface is non-nailable, nailing strips and edge blocking shall be installed over surface of deck for anchorage of sheet metal materials.

3.2 Substrate Conditions: Surfaces to receive sheet metal materials shall be even, smooth, sound, thoroughly clean and dry, and free from defects that might affect application.

3.3 Fasteners shall be concealed wherever possible in exposed work.

3.4 Dissimilar Surfaces:

3.4.1 Separate Dissimilar Metals by painting each metal surface in areas of contact with bituminous coating, or provide a layer of waterproof sheathing paper or asphalt-coated felt between contact surface.

3.4.2 Separate Metal Items from treated wood and cementitious materials with bituminous coating, applied either to substrate or metal.

3.4.3 Aluminum shall not be used when it will be in contact with copper or where it will contact water that flows over copper surfaces. Protect aluminum surface in contact with wet or pressure treated wood, cementitious materials, or ferrous metals from galvanic or corrosive action by applying one coat of zinc chromate primer and one coat of aluminum paint, or by placing layer of nonabsorptive tape or gasket between adjoining surfaces.

3.4.4 Where Asphalt-Saturated Felt has been applied under sheet metal that will be soldered or welded, cover felt with one layer of sheathing paper before installing sheet metal.

3.5 Sheet Metal Roofing:

3.5.1 Removing Existing Sheet Metal Roofing: Remove sheet metal roofing in full sections or cut damaged sections where possible to make watertight joints between existing roofing and new materials to be installed.

3.5.2 Preparing Existing Surfaces: Bent or raised portions of existing roofing shall be nailed down and repaired to extent necessary to provide smooth surface for sheet metal roofing.

3.5.3 Application of Underlayment:

3.5.3.1 Felt Underlayment: Apply one layer of asphalt-saturated roofing felt over deck surface and cover with one layer of sheathing paper. Underlayment plies shall be installed with mechanical fasteners spaced 6 inches in center at laps or adhesives as appropriate for substrate conditions.

3.4.3.2 Polyethylene Film Underlayment: Install one layer of polyethylene film underlayment over deck surface with adhesive. Cover polyethylene film with one layer of sheathing paper applied with adhesive. Mechanical fasteners shall be installed only where deck surface presents nailable conditions.

3.5.4 Coating Backside of Metal Sheets:

3.5.4.1 Bituminous Coating: Coat back side of metal roofing with bituminous coating wherever metal will be in contact with wood, ferrous metal, or cementitious construction.

3.5.4.2 Painting: Paint back side of metal roofing with zinc chromate type primer, minimum 2-mil dry film thickness.

3.5.5 Expansion Seams: Provide loose lock or slip seams, as designated. Seams shall allow 1/2-inch for expansion and shall be sealed with sealant.

3.5.6 Penetrations Through Roofing shall be flashed with sheet metal material to match roofing material.

SECTION 07705
ROOF ACCESSORIES

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of heat and smoke vents, roof hatches, gravity ventilators, prefabricated curbs and equipment supports, and curb-set expansion joints. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS: Comply with SMACNA Architectural Sheet Metal Manual details for fabrication of units, including flanges and capflashing to coordinate with type of roofing indicated.

2.1 Zinc-Coated Steel: Commercial quality with 0.20 percent copper, ASTM A 525, G90 hot-dip galvanized, mill phosphatized.

2.2 Stainless Steel: AISI Type 302/304, ASTM A 167, 2D annealed finish except as otherwise indicated, tempered as required for forming and performance.

2.3 Aluminum Sheet: ASTM B 209, Alloy 3003, tempered as required for forming and performance; AA-C22A41 clear anodized finish, except mill finish prepared for painting where designated for field painting.

2.4 Extruded Aluminum: Alloy 6063-T52; 0.078 inch minimum thicknesses for primary framing and curb member legs, 0.062 inch for secondary legs; AA-C22A41 clear anodized finish on exposed members, except as otherwise designated.

2.5 Insulation: Rigid or semi-rigid board of glass fiber.

2.6 Wood Nailers: Softwood lumber, pressure-treated with water-borne preservatives for above ground use, complying with AWPB LP-2; not less than 1-1/2 inches thick.

2.7 Fasteners: Same metal as metals being fastened, or nonmagnetic stainless steel or other noncorrosive metal. Match finish of exposed fasteners with finish of material being fastened. Where removal of exterior exposed fasteners affords access to building, provide non-removable fastener heads.

2.8 Gaskets: Tubular or fingered design of neoprene or polyvinyl chloride, or block design of sponge neoprene.

2.9 Bituminous Coating: Fed. Spec. TT-C-494 or SSPC-Paint 12, solvent type bituminous mastic, nominally free of sulfur, compounded for 15-mil dry film thickness per coating.

2.10 Mastic Sealant: Polyisobutylene; nonhardening, nonskinning, nondrying, nonmigrating sealant.

2.11 Elastomeric Sealant: Type that is compatible with joint surfaces; Fed. Spec. TT-S-00227, TT-S-00230, or TT-S-001543.

2.12 Roofing Cement: ASTM D 2822, asphaltic.

2.13 Prefabricated Heat/Smoke Vents: Provide units that have been tested, listed, and labeled by UL (Class A) or FM, as designated. Except as otherwise designated, fabricate for 40 lbs/sq ft external loading and 20 lbs/sq ft internal loading pressure. Fabricate framing of the following materials as designated, with manufacturer's standard welded or sealed mechanical corner joints, including cap flashing:

a. Formed or extruded aluminum.

b. Zinc-coated steel.

c. Formed or extruded aluminum or zinc-coated steel.

2.13.1 Hatch-Lid Type Units: Fabricate with single or double aluminum covers with 1 inch integral insulation and gaskets. Equip units with automatic self-lifting mechanisms and fusible links or other heat-sensitive or smoke-sensitive release devices as indicated, and with complete hardware including hold-open devices and independent manual release devices for inside and outside operation of covers.

2.13.2 Fusible-Dome Type Units: Provide manufacturer's standard shrinkback/drop-out polyvinyl chloride sheet dome unit for 210 F activation; with light transmittance of 40 percent, proven 10-year weather resistance, exterior acrylic protective coating, and maximum flame spread rating of 25 (UL 723). Equip each unit with external safety grid capable of supporting 200 pound loading. Provide glazing system for easy replacement of activated domes and for drainage of condensation to exterior.

2.14 Prefabricated Roof Hatches: Fabricate units as single-leaf type unless otherwise directed, for 40 lbs/sq ft external loading and 20 lbs/sq ft internal loading pressure. Frame with 9-inch high integral-curb double-wall construction with 1-1/2 inch insulation, cant strips, and cap flashing, with welded or sealed mechanical corner joints. Provide double-wall cover construction with 1 inch insulation core. Equip units with complete hardware set including hold-open devices, interior padlock hasps, and both interior and exterior latch handles. Provide gasketing. Fabricate units of following materials as designated:

a. Aluminum sheets and extrusions.

b. Zinc-coated steel sheets.

c. Zinc-coated steel sheet curbs and aluminum covers.

d. Aluminum or zinc-coated steel, or in combination.

2.15 Louvered Penthouse Gravity Ventilators: Provide units fabricated with weatherproof aluminum extrusion louvered walls with mitered or boxed corner construction; with aluminum sheet cover and 1 inch insulation adhesively applied on underside; and with extruded aluminum base and cap flashing for mounting on curbs which are not integral with units. Equip units with manual dampers designed for operation from floor directly below ventilator unit. Equip unit with bird or insect screens as directed, located internally to discourage nesting.

2.16 Prefabricated Vertical-Type Gravity Ventilators: Provide units fabricated from the following materials and including the following features, as designated:

a. Zinc-coated steel sheet, prime painted.

b. Aluminum sheet, prime painted.

c. Aluminum sheet, mill finish.

d. Equip with bird screens.

e. Equip units with dampers, with manual operation device extended to 6 ft 6 in above floor.

2.17 Prefabricated Curbs/Equipment Supports: Comply with loading and strength requirements designated where units support other work. Coordinate dimensions with rough-in sheets or shop drawings of equipment to be supported. Fabricate of structural quality sheet steel (ASTM A 570) that has been prepared for painting, factory-primed, and painted with 2-mil thickness of baked-on

synthetic enamel, after fabrication. Fabricate with welded or sealed mechanical corner joints and with cant strips and base profile coordinated with roof insulation thickness. Except as otherwise designated or required for strength, fabricate units of minimum 14-gauge metal andto minimum height of 12 inches.

2.18 Curb-Set Expansion Joints: Provide extruded aluminum expansion joint units designed for installation on raised curbs. Equip with curb cap, cap flashing, and waterproof bellows of 30- or 60-mil elastic flashing sheet of neoprene, EPDM, butyl rubber, or chlorinated polyethylene. Provide mineral-fiber insulation, concealed under curb cap between curbs, to form a waterproof, airtight, insulated, expansion joint system. Provide units in styles required for roof-to-roof, roof-to-wall, and wall-to-wall applications as required; complete with prefabricated corner and intersection units as required; equipped with special field-splice provisions to ensure permanent continuous waterproof installation of expansion joint system.

3.0 EXECUTION: Anchor units securely to supporting structural substrates, adequate to withstand lateral and thermal stresses as well as inward and outward loading pressures. Except as otherwise designated, install roof accessory items in accordance with construction details of NRCA Roofing and Waterproofing Manual.

3.1 Isolation: Where metal surfaces of units are to be installed in contact with noncompatible metal or corrosive substrates, including wood, apply bituminous coating on concealed metal surfaces or provide other permanent separation.

3.2 Flange Seals: Except as otherwise directed, set flanges of accessory units in a thick bed of roofing cement to form a seal.

3.3 Cap Flashing: Where cap flashing is required as component of accessory, install to provide adequate waterproof overlap with roofing or roof flashing. Seal with thick bead of mastic sealant, except where overlap is required to be left open for ventilation.

SECTION 07811
PLASTIC SKYLIGHTS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for repair and maintenance of plastic skylights. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Single Thickness Plastic Skylights shall be formed to a standard dome profile.

2.2 Double Thickness Plastic Skylights shall have an average 1-inch minimum air space between sheets formed to a standard dome profile, with a standard hermetic edge seal.

2.3 Color: Exterior sheets shall be colorless transparent sheet or bronze tinted transparent sheet, 25-30 percent light transmittance in accordance with ASTM D 1003. Interior sheets shall be colorless transparent sheet.

2.4 Glazing Frame, Dome Retainers, and Trim shall be extruded aluminum.

2.5 Curb Frame shall be extruded aluminum including cap flashing to receive roofing counterflashing.

2.5.1 Curb-Mounted Units shall be designed for installation on nominal 1-1/2 inch thick wood curbs.

2.5.2 Insulated Curb Units shall be self-flashing units with integral, self-supporting double wall formed or extruded or combination aluminum curb, 0.040-inch minimum sheet thickness enclosing minimum 1-inch glass fiberboard or equivalent insulation and with minimum 3-inch roof flanges; welded or sealed mechanical joints at corners.

2.5.3 Curb Height shall be 9 inches minimum above line of roofing or custom height as required. For decks that slope 1/4 inch per ft., tapered curb heights shall match slope to provide a level installation of domes.

2.6 Glazing Systems of neoprene, closed cell sponge neoprene, PVC gasketing, partially vulcanized butyl tape, or liquid-applied elastomeric sealant shall be provided.

2.7 Condensation Control on inside of domes shall be provided using fabricated units with integral internal gutters and nonclogging weeps.

2.8 Plastic for Skylights shall be cast acrylic with abrasion-resistant coating on exterior surface, for 2 percent maximum haze increase of 100 revolutions on 500 g Taber abraser in accordance with ASTM D 1044; 14,500 psi flexural strength; 180 F continuous service temperature or cast polycarbonate with 13,500 psi flexural strength; 240 F continuous service temperature; 16 ft-lb IZ0D impact strength. Skylights shall meet AAMA 1601.1 recommendations for thickness of plastic domes to maintain 40 psf loading (for support of ice and snow only).

2.9 Bituminous Coating shall be in accordance with Fed. Spec. TT-C-494 solvent type bituminous mastic, nominally free of sulphur, compounded for 15-mil dry film thickness per coating.

2.10 Roofing Cement shall be asphaltic complying with ASTM D 2822.

2.11 Mastic Sealant shall be polyisobutylene; non-hardening, non-skinning, non-drying, non-migrating sealant.

3.0 EXECUTION:

3.1 Installation of Skylights shall be coordinated with installation of roof deck or other substrates and with vapor barriers, roof insulation, roofing, and flashing as required to ensure that combined elements are waterproof and weathertight. Units shall be anchored securely to supporting structural substrates to withstand lateral and thermal stresses including inward and outward loading pressures.

3.2 Isolation: Where metal surfaces of units are required to be installed in contact with noncompatible metal or corrosive substrates, including wood, apply bituminous coating on concealed metal surfaces, or provide other permanent separation.

3.3 Flange Seals: Where required, set flanges of accessory units in a thick bed of roofing cement to form a seal.

3.4 Cap Flashing: Where cap flashing is required, install to provide adequate waterproofing overlap with roofing or roof flashing (as counter flashing). Seal

with thick bead of mastic sealant, except where overlap is indicated to be left open for ventilation.

3.5 Cleaning: Clean exposed metal and plastic surfaces.

SECTION 07812
METAL-FRAMED SKYLIGHTS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of metal-framed skylights. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Metal-Framed Skylight Panels shall be 2-1/4 inch thick double-faced panels consisting of glass fiber reinforced polymer, with interior and exterior faces bonded under controlled heat and pressure to a mechanically interlocked aluminum grid core. Exterior face shall have a special erosion protective surfacing.

2.1.1 Panel Performance Characteristics:

2.1.1.1 Color Stability from Weathering: Exterior face shall not change more than 3.5 adams units (Delta E by ASTM D 2244) as determined by an average of three samples after a minimum of outdoor exposure of 60 months in south Florida at 7 degrees facing south.

2.1.1.2 Interior Fire Resistance Characteristics shall be in accordance with ASTM E 84, with flame spread of 45 maximum and a smoke developed rating of 350 maximum. Burn extent shall be 1 inch or less by ASTM D 635.

2.1.1.3 Exterior Face Impact Resistance shall be 60 ft-lb minimum.

2.1.1.4 Coefficient of Linear Expansion shall be 1.24 x 10-5 in./in./F.

2.1.2 Laminate Adhesive shall be heat and pressure resin type. Minimum strength shall be 750 psi tensile strength by ASTM C 297 after two exposures to six cycles each of aging conditions prescribed by ASTM D 1037 and 500 psi shear strength average by ASTM D 1002 after five prescribed exposures.

2.1.3 Grid Core shall be 6063-T6 aluminum I-beams with 7/16-inch flange width, mechanically interlocked to ensure even muntin to muntin intersection.

2.1.4 Aluminum Frame shall be 6063-T5 aluminum with mill finish or corrosion-resistant finish as required with mitered and heli-arc welded corners. Clamp fasteners shall be stainless steel.

2.1.5 Panel U-Values determined by ASTM C 236 shall be as designated.

2.2 Pre-Engineered Self-Supporting Roof Systems shall be one of the following standard types as required:

2.2.1 Continuous Vaulted type shall be semi-circular.

2.2.2 Pyramid type shall be self-supporting.

2.2.3 Grid type shall be 4-foot minimum width by 16-foot maximum length as required.

2.2.4 Preformed Acrylic

2.2.5 Structural Roof Design Loads shall be based on location of installation. Joint and structural systems shall be manufacturer's standard types or special designed systems as required. Roof systems shall be fastened to supports as recommended by the roof system manufacturer.

2.2.6 Flashings shall be aluminum, 0.040 inch thick minimum.

2.3 Optional Face Sheet Material for metal-framed skylight panels shall be 1/8-inch thick clear acrylic panels assembled in accordance with manufacturer's recommendations. Panel assemblies shall be limited to 4-foot by 4-foot modules composed of 12 inches by 24 inches or 8 inches by 20 inches nominal grid size as required.

2.4 Panels may be 1-9/16 inch thickness where required.

3.0 EXECUTION: (Section not used.)

SECTION 07920
SEALANTS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of sealants. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Oil-Based Calking Compound shall conform to Fed. Spec. TT-C-00598, Type I.

2.2 Two-Component Polyurethane Sealant shall be an elastomeric type compound conforming to Fed. Spec. TT-S-00227, Type II, Class A or B as required. The compound shall be supplied in pre-measured kit form for on-the-job mixing.

2.3 Butyl Rubber Sealant shall conform to Fed. Spec. TT-S-001657, Type I or II as required.

2.4 Single-Component Polysulfide Sealant shall be an elastomeric type compound comforming to Fed. Spec. TT-S-00230, Type II, Class A or B as required.

2.5 Polyisobutylene-Based or Isoprene-Isobutylene-Based Pressure-Sensitive Tape or Bead: When applied between two clean, dry surfaces of specified thicknesses and under conditions of continuous pressure that will be encountered in use, the sealant shall seal the joint from water and shall be weather-resistant. The material shall be nonbleeding at 160 F and below, shall withstand temperature ranges from minus 30 F to 200 F without loss of adhesion and without slipping, and shall have properties allowing the compound to move with the expansion and contraction of structure. The tape or bead shall be plain or contain a cloth or fiber insert. The tape or bead shall be supplied in rolls with a removable paper for cloth backing.

2.6 Silicone Rubber Base Sealant shall be an elastomeric type compound conforming to TT-S-001543, Class A or B as required.

2.7 Preformed Strip Sealants:

2.7.1 Preformed Butylene Strip Sealant shall be foamed-urethane strip saturated with a butylene waterproofing material.

2.7.2 Preformed Asphalt Impregnated Strip shall be asphalt-impregnated foamed-polyurethane strip.

2.8 Acoustical Sealant: Synthetic rubber or polymeric-based material shall conform to the following:

2.8.1 Consistency: ASTM D 217, 190 to 310.

2.8.2 Aging: Slightly tacky at 160 F after 50 days.

2.8.3 Accelerated Aging: No significant change after 260 hours in weathermeter.

2.8.4 Nonstaining.

2.8.5 Solids Content: Approximately 80 to 90 percent.

2.8.6 No Oil Migration.

2.9 Silicone RTV Foam Firestop Sealant shall be a medium-density two-part product supplied as liquid components. When components are thoroughly mixed in a one-to-one ratio by either weight or volume the sealant shall expand and cure to a foamed elastomer at room temperature in 1 to 3 minutes. Sealants for fire-rated penetration seal designs shall bear UL classification for 1, 2, or 3-hour fire-rating, as required to match rating of the penetrated construction.

2.10 Sealer: Sealer for use with oil-based calking compound shall be aluminum paint.

2.11 Primer: Primer for two-component polyurethane sealant, butyl rubber sealant, and single-component polysulfide sealant shall be as recommended by the sealant manufacturer. Primer shall have been tested for durability with the sealant to be used and on samples of the surfaces to be sealed.

2.12 Backstop Material: Backstop material shall be resilient urethane or polyvinyl-chloride foam, closed-cell polyethylene foam, closed-cell sponge of vinyl or rubber, polychloroprene tubes or beads, polyisobutylene extrusions, preformed neoprene, neoprene rod, oilless dry jute, or rope yard. Backstop material shall be nonabsorbent, nonstaining, and compatible with the sealant used. Tube or rod stock shall be rolled into the joint cavity. Preformed support

strips for ceramic and quarry tile control joint and expansion joint work shall be polyisobutylene or polychloroprene rubber.

2.13 Bond-Preventive Materials shall be pressure-sensitive adhesive polyethylene tape, aluminum foil, or wax paper. Backstop material with bond-breaking characteristics may be installed in lieu of bond-preventive materials specified.

3.0 EXECUTION:

3.1 General Surface Preparation: The surfaces of joints to be sealed shall be dry. Oil, grease, dirt, chalk, particles of mortar, dust, loose rust, loose mill scale, and other foreign substances shall be removed from all joint surfaces to be sealed. Oil and grease shall be removed with solvent and surfaces shall be wiped with clean cloths.

3.2 Concrete and Masonry Surfaces: Where surfaces have been treated with curing compounds, oil, or other such materials, the materials shall be removed by sandblasting or wire brushing. Laitance, efflorescence, and loose mortar shall be removed from the joint cavity.

3.3 Steel Surfaces: Steel surfaces to be in contact with sealant shall be sandblasted or, if sandblasting would not be practical or would damage adjacent finish work, the metal shall be scraped and wire brushed to remove loose mill scale. Protective coatings on steel surfaces shall be removed by sandblasting or by a solvent that leaves no residue.

3.4 Aluminum Surfaces: Aluminum surfaces of windows and door frames in contact with sealants shall be cleaned of temporary protective coatings. When masking tape is used for a protective cover, the tape and any residual adhesive shall be removed just prior to applying the sealant. Solvents used to remove protective coatings shall be as recommended by the manufacturer of the aluminum work and shall be nonstaining.

SECTION 08110
HOLLOW METAL DOORS AND FRAMES

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of hollow metal doors and frames. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 General: All hollow metal doors and frames shall comply with Recommended Specifications: Standard Steel Doors and Frames (SDI-100), Steel Door Institute.

2.2 Hollow Metal Doors: Doors shall be SDI-100 standard types, styles, and sizes as designated. Doors shall be reinforced to receive builder's hardware in compliance with the requirements of ANSI A115. Provide glazing beads and stops for glass panels and sightproof louvers as required. Doors shall be galvanized. Doors to be field-finished shall receive a shop prime coat. A baked-on finish coat shall be provided for factory-finished doors.

2.3 Hollow Metal Frames: Hollow metal frames for doors, transoms, side lights, borrowed lights, and other openings shall be SDI-100 standard types, styles, and sizes as designated. Frames shall be provided with mitered corners and welded construction for exterior applications and knocked down for field assembly for interior applications. Frames shall be reinforced to receive builder's hardware in compliance with the requirements of ANSI A115. Provide plaster guards or mortar boxes where required. Finish shall be as specified for doors.

2.4 Fire-Rated Assemblies: Fire doors and frames shall be identified with recognized testing laboratory labels indicating the applicable fire rating. The constructed and installed assemblies shall comply with the requirements of NFPA 80.

2.5 Soundproofing Metal Doors: Soundproofing metal doors shall be identified with recognized testing laboratory labels indicating the applicable STC soundproofing rating. Soundproofing rating shall be STC 45 or as required.

2.6 Hollow Metal Combination Storm and Screen Doors: Doors shall be flush foam insulated panels capable of receiving removable screen or glass inserts. Doors shall be not less than 20-gauge steel, minimum 1-3/8 inch thick, and minimum 3-1/2 inch stiles and rails. Screen insert shall be aluminum wire-cloth screening. Glazing shall be 1/4 inch thickness. Doors shall be reinforced to receive, and shall be provided with a spring-loaded chain door stop, a latch with a night lock, a hydraulic closer, 1-1/2 pair butts, door pull, and an adjustable sweep with a vinyl seal. Doors shall be finished as specified for hollow metal doors.

3.0 EXECUTION:

3.1 Frame Installation: Installation of frames shall comply with the provisions of SDI-105, Recommended Erection Instructions for Steel Frames. Provide three wall anchors per jamb at hinge and strike levels. Fire-rated frames shall be installed in compliance with NFPA 80.

3.2 Door Installation: Hollow metal doors shall be fit accurately in frames within clearances specified in SDI-100. Fire-rated doors shall be installed within clearances specified in NFPA 80.

3.3 Soundproofing Metal Door and Frame:

3.3.1 Frames shall be set plumb and true and fully insulated. The floor under the sill, if poured, shall be level and smooth.

SECTION 08120
ALUMINUM DOORS AND FRAMES

1.0 DESCRIPTION OF WORK: This specificiation covers the furnishing and installation of hinged aluminum doors and frames. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Glazed Aluminum Stile-And-Rail Doors and Frames shall be manufacturer's standard type. Adjacent glass enclosures, transoms, and/or sidelights shall be of the same style and design as the doors and frames.

2.1.1 Screws, Nuts, Washers, Rivets, and other miscellaneous fastening devices shall be of hardened aluminum, stainless steel, or other corrosion-resistant material.

2.1.2 Nominal Wall Thickness for Doors shall be not less than 0.125 inch except that the molding shall be not less than 0.05 inch.

2.1.3 Frames shall be extruded tube or open channel shapes not less than 0.125 inch thick for frames 1-3/4 inches by 4 inches and not less than 0.093 inch thick for frames 1-3/4 inches by 4-1/2 inches. Doors shall have extruded aluminum snap-in glass stops with vinyl insert.

2.2 Flush Aluminum Doors:

2.2.1 Doors shall be constructed of tubular frame members, fabricated with reinforced mechanical or welded joints. Limit frame exposure to 3/4 inch maximum width on door faces.

2.2.2 Core shall be resin-impregnated kraft paper with honeycomb, rigid closed-cell polyurethane insulation, or rigid noncombustible mineral insulation board.

2.2.3 Faces shall be of aluminum sheet of 0.064-inch minimum thickness, mechanically interlocked with frame members or laminated to core and framing with waterproof glue to form door thickness of 1-3/4 inches.

2.2.4 Lights (glazed openings in doors) shall have aluminum moldings and stops, with inside removable stops.

2.2.5 Frames shall be of tubular and channel frame assemblies, with either welded or mechanical joints, reinforced as necessary to support required loads and door hardware.

2.3 Aluminum Combination Storm and Screen Doors: Doors shall consist of a master frame with two intermediate horizontal rails, one fixed metal panel, and two glass and two screen removable insert panels. Master frame shall be a minimum 1 inch thick and stiles shall be a minimum 2-3/4 inches wide. Doors shall have a mill finish and shall be provided with a springloaded chain door stop, a latch with a night lock, a hydraulic closer, and an adjustable door sweep with a vinyl seal. Screen inserts shall have aluminum wirecloth screening secured with a vinyl spline.

2.4 Weatherstripping: Weatherstripping shall be door manufacturer's standard applied to stiles, heads, and bottoms of exterior doors and shall be easily replaced without special tools.

2.5 Finishes: Aluminum surfaces shall be provided with one of the following finishes. The coating shall have a minimum film thickness of 0.0004 inch with a minimum weight of 17 milligrams per square inch when tested in accordance with ASTM B 137. Coating shall be sealed with hot water.

2.5.1 Anodic Coating (0.4 mil to 0.7 mil): AA-M12-C22-A31, Architectural Class II, Clear-Anodized or AA-M12-C22-A32, AA-M12-C22-A34, Architectural Class II, Color-Anodized.

2.5.2 Organic Coating (minimum 0.8 mil): AAMA 603.8, Baked-Enamel finish.

2.6 Special Finishes:

2.6.1 Anodic Coating (minimum 0.7 mil): AA-M12-C22-A41, AA-M12-C22-A42, or AA-M12-C22-A44, Architectural Class I, Color-Anodized.

2.6.2 Organic Coating (minimum 1.2 mil): AAMA 605.2, High-Performance finish.

3.0 EXECUTION: Aluminum surfaces in contact with dissimilar materials shall be backpainted with alkali-resistant paint before erection.

SECTION 08210
WOOD DOORS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of wood doors. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 General: Top and bottom edges of doors shall be sealed prior to shipment. Each door shall bear a stamp, brand, or other identifying mark indicating quality and construction of the door.

2.2 Flush Doors: Solid core and hollow core flush doors shall conform to NWWDA I.S.1. For stain or natural finish, doors shall be of Good Grade veneer in accordance with NWWDA I.S.1. For paint finish, doors shall be Standard Grade in accordance with NWWDA I.S.5 or Sound Grade or hardboard-faced in accordance with NWWDA I.S.1. Unless otherwise required for fire safety, solid core doors shall have wood block core or mat-formed particleboard core conforming to NWWDA I.S.1. Hollow core and mat-formed particleboard solid core doors shall have lock blocks. Openings in exterior doors shall be weatherproof.

2.3 Paneled Doors shall conform to NWWDA I.S.5 or FHDA/7. For stain or natural finish, doors shall be Premium Grade in accordance with NWWDA I.S.5 or Selected Grade in accordance with FHDA/7. For paint finish, doors shall be Standard Grade in accordance with NWWDA I.S.5. When laminated panels are furnished, they shall not be less than three ply. Flat panels shall have a minimum finished panel thickness of 5/8 inch. Raised panels shall have a minimum finished panel thickness of 3/4 inch.

2.4 Fire Doors: Fire doors shall be constructed of materials and in a manner that will conform to the requirements of Underwriters' Laboratories. Doors shall bear the identifying label of Underwriters' Laboratories for the desired resistance rating.

2.5 Storm Doors shall be manufacturer's standard solid core door not less than 1-3/4 inches thick with 5-inch minimum stiles and top rail. Upper panel shall be arranged to receive removable glass and screen inserts. Screen insert shall be aluminum wire-cloth screening. Glazing shall be 1/4 inch thickness.

Door shall be provided with 1-1/2 pair butts, a latchset with a night lock, a spring-loaded chain door stop, a hydraulic closer, and an adjustable door sweep with a vinyl seal.

2.6 Screen Doors shall be manufacturer's standard solid wood door not less than 1-3/8 inch thick with 3-1/2 inch minimum stiles, mid-rail and top rail, and 7-1/2 inch bottom rail. Screen shall be aluminum wire-cloth screening secured with wood stops and vinyl splines. Doors shall be provided with 1 pair butts, 1 pull, 1 hook and eye, and 1 spring closer.

2.7 Preservative Treatment: Exterior softwood doors shall be water-repellent preservative treated and so marked at the plant in accordance with NWWDA I.S.4.

2.8 Adhesives: Adhesives shall be in accordance with NWWDA I.S.1, using requirements for Type I doors for exterior doors and requirements for Type II doors for interior doors. Adhesive for doors to receive a natural finish shall be nonstaining.

2.9 Accessories: All doors shall have cutouts, stops, beads, or other accessories as required to receive builder's hardware, glazing, louvers, or other design specialties and penetrations.

3.0 EXECUTION: Installation and operation characteristics of fire doors shall conform to NFPA 80, 80A, and 101.

SECTION 08311
ALUMINUM AND WOOD SLIDING GLASS DOORS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of sliding glass doors. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Aluminum Sliding Glass Doors shall be complete units with safety glass, weatherstripping, hardware, and integral tracks and rollers for smooth operation and installation. Sliding glass door panels shall conform to AAMA 101. Classification of sliding glass doors shall be AAMA type SGD-A3 (monumental grade) provided for high performance (HP) designation.

2.2 Wood Sliding Glass Doors shall consist of wood frame sliding and fixed safety glass panels and casings of selected West Coast hardwood treated with water repellent and factory-primed for exposed wood exterior frame parts and door panels. Sill facing shall be extruded anodized aluminum with PVC thermal barrier. Operating door track shall have stainless steel cap. Each unit shall include door panels, head and sill, track rollers (ball-bearing sheaves), weatherstripping, glazing channels, hardware, and accessories.

2.3 Hardware shall include door pulls and keyless locking with interior locking lever on operating door panel.

2.4 Glazing in door panels shall be safety glass in compliance with ANSI Z97.1.

2.5 Screen Doors shall be manufacturer's standard furnished with sliding doors. Insect screen shall be 18 x 16 mesh aluminum wire conforming to Fed. Spec. RR-W-365 or glass fiber screen conforming to Fed. Spec. L-S-125.

3.0 EXECUTION: Installation of door units shall be complete with all necessary anchors, inserts, and hardware.

SECTION 08312
SLIDING FIRE DOORS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of sliding fire doors. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Composite Sliding Fire Doors shall be standard steel face sheets bonded to and supported by rigid, dimensionally stable inorganic core, with steel reinforced edges. Finish shall be factory-primed.

2.2 Hollow Metal (Sheet Metal) Sliding Fire Doors shall be standard flush design with not less than 20-gauge steel faces over steel stiffeners or honeycomb core materials. Finish shall be factory-primed.

2.3 Tin-Clad Sliding Fire Doors shall be standard design wooden core construction with 14-inch by 20-inch maximum size, 30-gauge galvanized steel sheets not over 48 inches wide with venting as required by NFPA 80. Finish shall be galvanized.

2.4 Horizontal Sliding Steel Doors shall be standard design consisting of two thicknesses of 24-gauge galvanized corrugated sheet steel with an asbestos core and framed with galvanized structural steel shapes. Sheets shall be applied with exposed face corrugations vertical and wall side corrugations horizontal. Finish shall be galvanized.

2.5 Vertical Lift Sliding Steel Doors shall be standard design consisting of two thickness of 24-gauge galvanized corrugated sheet steel with an asbestos core and framed with galvanized structural steel shapes. Sheets shall be applied with exposed face corrugations vertical and wall side corrugations horizontal. Door shall be uprising on vertical tracks. Finish shall be galvanized.

2.6 Metal-Clad (Kalamein) Doors shall be standard horizontal sliding metal covered wood core or stiles and rails and insulated flush panels covered with steel. Finish shall be factory-primed.

2.7 Fire Door Assemblies shall be provided as complete units produced by one manufacturer.

2.7.1 Fire Doors, Frames, and Fire Door Hardware shall be types that have been fire-tested and rated in accordance with ASTM E 152. Doors shall bear labels of the Underwriters' Laboratories, Incorporated or Factory Mutual Laboratories as evidence of rating.

2.7.2 Components for rated door assembly shall be listed in UL Building Materials Directory or Factory Mutual Approval Guide.

2.8 Finish: Galvanized finish shall be hot-dip galvanized minimum 0.6 ounce per square foot and shall not be factory-primed.

2.9 Fire Door Hardware: Hardware shall be labeled, automatic closing type sliding fire door assemblies complete with adjustable roller guides, binders, floor stops, cables, sheaves, counterweight, and fusible links. Fusible links shall be UL listed, 165 F for ordinary temperature classification.

2.10 Accessories: The following items shall conform to the requirements of NFPA 80: Astragal, chafing strips, bumper shoes, rear binder, stay rolls, wedge, and automatic closer.

3.0 EXECUTION:

3.1 Installation: Fire doors shall be installed in accordance with NFPA 80.

3.2 Temporary Fire Protection: During the execution of this work, temporary fire barriers, alarms, or watchmen shall be provided to the degree of opening protection required by the local authority until the permanent work is completed and operational.

SECTION 08330
COILING (ROLLING) DOORS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of coiling doors, coiling grilles, and coiling counter shutters. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS: Doors shall be the manufacturer's standard type. Doors shall be spring counterbalanced, overhead coiling type; coiling grilles shall be overhead or side coiling type. Door shall be complete with all guides, tracks, hardware, fastenings, operating mechanisms, and accessories. Guides at jambs shall be set back a sufficient distance to provide a clear opening when doors are in the open position.

2.1 Roller Shaft: The roller shaft shall be constructed of steel pipe or commercial welded steel tubing of proper diameter and thickness for the size of the curtain. Deflection shall not exceed 0.03 inch per foot of span. Ends of roller shall be closed with cast-iron plugs, machined to fit the pipe. An oil-tempered, helical, counter-balancing steel spring, capable of producing sufficient torque to ensure easy operation of the door curtain from any position, shall be installed within the roller. Spring shall be easily adjustable.

2.2 Brackets: Brackets shall be fabricated of heavy cast iron or steel, designed to close the ends of roller-shaft housing and to form a supporting ring for hood. The bracket hubs or shaft plugs shall be equipped with prelubricated ball bearings, shielded or sealed.

2.3 Hoods: Each hood shall be constructed of steel not lighter than No. 24-gauge, formed to fit the contour of end bracket gear assembly and reinforced with steel rods or rolled beads at top and bottom edges. A weather baffle shall be provided at the lintel.

2.4 Gears: Gears shall be of the best grade gray iron, cast iron teeth machine-molded from machine-cut patterns, enclosed and protected by the hood and brackets.

2.5 Guides: The guides shall consist of steel shapes not less than 2-1/2 inches deep and not less than 3/16-inch thick and shall form a channel pocket of

sufficient depth to retain the curtain in place under the wind pressure specified. Provisions for removal of the door shall be included in the design.

2.6 Head Track: Head track for side coiling grilles shall be of extruded aluminum and shall be provided with adjustable hangers spaced not more than 2 feet-6 inches on center.

2.7 Floor Track: Floor track for side coiling grilles shall be of extruded aluminum with replaceable bronze strips, flush with finish floor and shall provide a floor slot with a maximum width of 1/4 inch.

2.8 Bottom Rail: The curtain shall have a rolled-steel bottom bar consisting of two angles of equal weight, one on each side, fastened to the bottom of the curtain.

2.9 Endlocks and Windlocks: The ends of each slat shall have malleable iron endlocks of the manufacturer's standard design. The door shall have windlocks at the ends of each slat. Windlocks shall prevent curtain from leaving the guide as a result of deflection from wind pressure or other forces.

2.10 Weatherstripping: Doors exposed to weather shall have manufacturer's standard weatherstripping on jambs, top, and sill for weathertight installation.

2.11 Curtains:

2.11.1 Curtains for Coiling Service Doors shall be formed of insulated interlocking galvanized steel slats of No. 20- gauge minimum thickness or of flat steel interlocking slats. The curtains shall be designed to resist designated wind pressure without damage. The curtains shall roll up on a drum supported at the head of the opening on brackets and be balanced by helical springs.

2.11.2 Curtains for Coiling Grilles shall consist of 5/16-inch diameter mill finish aluminum, galvanized steel, or stainless steel rods spaced 2 inches on center to form brick pattern grille, with interlocking links to form a network of vertical and horizontal lines. Links shall be 9 inches apart.

2.12 Counter Doors (Roll-Up Shutters): Integral counter shutter/frame shall be manufacturer's standard. Curtains shall be aluminum, minimum 22-gauge galvanized steel, or stainless steel, minimum 22-gauge Type 302 No. 4 finish as designated. Frame shall be fully welded into a single assembly, complete with anchors; the jambs and head shall be minimum 16-gauge stainless steel or plain steel, and the sill shall be formed of 14-gauge stainless steel No. 4 finish.

2.13 Fire Doors: Doors, frames, hardware, and other accessories shall be in accordance with NFPA 80.

2.14 Operation:

2.14.1 Push-Up Operation: Doors shall have one lifting handle on each side of the door and shall be counter balanced to provide ease of operation while raising or lowering the curtain by hand. The maximum exertion or pull required shall not exceed 25 pounds. Doors over 7 feet high shall be provided with pull down straps or pole hooks.

2.14.2 Chain-Gear Operation: Chain shall be galvanized, endless type, operating over a sprocket and shall extend to within 3 feet of floor. Gears shall be high grade gray iron, cast from machine-cut patterns. Gear reduction shall be calculated to reduce chain pull required to not exceed 35 pounds.

2.14.3 Crank-Gear Operation: Crank shall be removable and located approximately 34 inches above the floor. Gears shall be of high grade gray iron, cast from machine-cut patterns. Gear reduction shall be calculated to reduce pressure exerted on crank to not over 35 pounds.

2.14.4 Motorized Operation: Electric power-operated doors shall be complete with electric motors, operators, controls, switches, and safety devices. Control equipment shall comply with NEMA ICS 2.

2.15 Finish:

2.15.1 Galvanizing: Curtain and bottom rail shall be hot-dipped galvanized with a zinc coating not less than 1.25 ounces total per square foot of flat metal, coating class 1.25 in accordance with ASTM A 525. Hood shall have either class 1.25 galvanizing as described above or be fabricated from electrolytic zinc-coated sheets conforming to ASTM A 591. Hardware items shall be galvanized according to ASTM A 153. Items galvanized after assembly shall comply with ASTM A 123.

2.15.2 Pretreatment: All zinc-coated surfaces shall be given a phosphate coating prior to application of prime paint.

2.15.3 Shop-Applied Prime Paint: All ferrous surfaces, including galvanized curtain, hood, and slats, but excluding wearing surfaces, shall be given one shop-applied prime coat of the manufacturer's standard primer in accordance with Fed. Spec. TT-P-86. Primer shall be compatible with the specified finish

paint and shall not contain lead. Non-galvanized surfaces shall be wire brushed to bare metal prior to primer application.

3.0 EXECUTION: Guides shall be securely attached to adjoining construction. Doors shall be installed with all anchors and inserts for brackets, tracks, hardware, and other accessories located accurately. Upon completion, door shall be weathertight and shall be lubricated and adjusted to operate freely.

SECTION 08350
FOLDING DOORS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of folding doors. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Door shall be full pantograph or "x-accordion" type with flexible fabric panels. Materials shall have a flame spread rating of 25 or less, fuel contributed rating of 10 or less, and a smoke developed rating of 5 or less, in compliance with ASTM E 84. Each new door unit shall be a complete unit produced by one manufacturer including hardware, accessories, mounting, and installation components.

2.2 Framework for Door including posts, pantographs, hinges and hinge plates, and support rods shall be ferrous metal. All enclosed metal shall be galvanized ASTM B 633, or cadmium-plated ASTM B 766. Posts and exposed metal items shall have phosphate treatment complying with Fed. Spec. TT-C-490.

2.3 Folding Mechanism:

2.3.1 Flexible Panels shall be fabricated with not less than 16-gauge metal. Provide one row at top for doors up to 12 feet high, two rows at top for doors over 12 feet high, single row at bottom, and intermediate rows not over 4 feet center to center. Provide vertical rods of a minimum 3/16-inch diameter for connecting hinges in non-rigid type panels.

2.3.2 Rigid Panels shall be fabricated with not less than 14-gauge metal, pantograph top and bottom.

2.4 Lead Posts and Jamb Posts shall be fabricated of not less than 16-gauge steel ASTM A 525 for doors up to 10 feet high and not less than 14-gauge for doors over 10 feet high.

2.5 Carriers: Carriers shall be nylon, ball-bearing, wheeled type.

2.6 Door Covering: Covering shall be attached to frame in a manner that will permit onsite removal and repair. Covering shall be treated to be flame-resistant and shall not peel, craze, crack, or fade. Fabric covering shall be vinyl-coated fabric complying with Fed. Spec. CCC-W-408, 30 ounces per linear yard, 54 inches wide.

2.7 Acoustical-Rated Door shall be manufacturer's standard construction complying with ASTM E 90 to provide a STC rating of 40. Door assembly shall include perimeter seal sweep strips for each side, top, and bottom, and sound liner of door manufacturer's standard for door panels. Door shall have light and sound seal at door lead posts and jamb posts.

2.8 Track: Track shall be steel with factory-applied corrosion-resistant finish. Track shall be recess mounted with necessary sub-channel or trim units to form pocket for ceiling mounting. Sections shall be provided in the maximum lengths practicable.

2.9 Accessories shall be provided as follows: Center stop for bi-parting doors, track switches for door operation, and ceiling contact guard for sound-rated door units.

2.10 Hardware:

2.10.1 Components shall be heavy-duty metal pulls and latches of brass or steel with dull chromium-plated finish.

2.10.2 Latch shall be operable from both sides of closed door.

2.10.3 Deadlock shall be provided to receive cylinder, operable from both sides.

2.10.4 Miscellaneous Items shall be provided as follows: pendant pull in lead post, upper draw latch with grip handle, center molding or strike for bi-parting door, and foot bolts on lead post.

3.0 EXECUTION: (Section not used.)

SECTION 08353
ACCORDION FOLDING DOORS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of accordion folding doors. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Vinyl Covering: Fed. Spec. CCC-W-408, Type II or III, wood grain or textured.

2.2 Plastic Laminate: NEMA LD 3, 1/16-inch minimum thickness, wood grain, patterned, or solid color finish.

2.3 Wood Veneer: Good grade, premium grade, or book matched hardwood, as designated.

2.4 Framework including posts, pantographs, hinges, hinge plates, and support rods shall be either extruded aluminum or ferrous metal. Ferrous metal shall be either cadmium-plated or zinc-coated, except posts at the option of the door manufacturer shall have phosphate treatment and manufacturer's shop finish paint.

2.5 Pantographs: The frames on doors requiring pantographs shall be arranged for horizontal pantograph action with pantographs located at top and bottom of the frame. Intermediate pantographs spaced not over 4 feet center-to-center shall be provided for doors more than 8 feet in height. An intermediate pantograph shall be provided at the center of doors less than 8 feet high unless the door has vertical metal reinforcing. The pantographs shall operate smoothly with positive folding action and shall have a control device to prevent flattening of the folds when the panel is fully extended.

2.6 Hardware: Units shall be complete with grip handles, a positive latching system, and an upper latch with extended pulls if unit is over 11 feet high. Hardware shall be anodized aluminum with a natural finish or chrome plated brass.

2.7 Sweep Strips shall be vinyl or other material which will not crack or craze with severe usage.

2.8 Track shall be recessed or surface-mounted and of extruded aluminum or enamel finish steel, not less than 16-gauge steel or 14-gauge aluminum. Track sections shall be provided in the maximum lengths practicable, not less than 6 feet long except for narrow doors and at ends of runs where short length is required. Suitable joint devices such as interlocking keys shall be provided at each joint to provide permanent alignment of track.

2.9 Metal Soffit shall be provided when track is recessed. Soffit shall be of metal of adequate thickness to protect the ceiling from damage by door operation and shall be provided with the door manufacturer's standard neutral-color applied finish. Soffits may be integral elements of ceiling track.

2.10 Fire Hazard Classification: Vinyl coverings, plastic laminates, and wood veneers shall have a fire hazard classification as determined by ASTM E 84. Provide materials with the following fire hazard classifications:

Flame spread not more than 25.
Smoke developed not more than 50.

3.0 EXECUTION: (Section not used.)

SECTION 08355
FLEXIBLE DOORS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of flexible doors. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 General: Each new door unit shall be a complete unit produced by one manufacturer including hardware, accessories, mounting, and installation components.

2.2 Door Panels: Door panels shall be constructed of the following materials.

2.2.1 Heavy-Duty, Abrasive-Resistant Rubber, 60 durometer, roto-cured process, 2,200 psi tensile strength. Panel thickness shall be 1/2 inch.

2.2.2 Flexible Polycarbonate transparent panels 1/2 inch thick.

2.2.3 Flexible Polyvinylchloride (PVC) transparent panels 0.196 inch (5mm) thick.

2.2.4 Flexible Polyvinylchloride (PVC) opaque panels 0.196 inch (5mm) thick.

2.3 Door Panels shall be single- or double-acting, as required.

2.4 Panel Frame: Framing materials to which door panels shall be secured shall be galvanized steel, ASTM A 525, 11 gauge. Door panels shall be suspended between L-shaped rolled formed rails and stiles by removable bolt and nut connectors.

2.5 Hardware shall conform to the requirements of ASTM B 633, ASTM B 766, or ASTM A 123, as required.

2.5.1 Hinges shall be adjustable spring-type gravity self-lubricating hinges.

2.5.2 Magnetic Catch shall be provided at door overlap at pair of door panels to give positive closure.

2.5.3 Header and Jamb Seals shall be door mounted PVC seals at head and jamb.

2.5.4 Bumpers shall be center or bottom bumpers.

2.5.5 Jamb Guards shall be formed steel guards to enclose and protect lower hinge hardware and closures.

2.6 Door Jamb shall be constructed of steel tube, ASTM A 500, with integral wall anchors, galvanized in compliance with ASTM A 386 or stainless steel bent plate, Type 304, with integral wall anchors, as required.

2.7 Finish: All ferrous metal parts shall be finish-coated with polyurethane paint.

2.8 Fire Hazard Classification: All door panel materials shall have a fire hazard classification as determined by ASTM E 84. Provide materials with the following fire hazard classifications:

Flame spread not more than 25.
Smoke developed not more than 50.

3.0 EXECUTION: (Section not used.)

SECTION 08360
OVERHEAD DOORS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of overhead doors. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Doors shall conform to the requirements of NAGDM 102 and shall be metal or wood overhead or vertical lift sectional type flush panel doors as indicated or required and shall be the products of a recognized manufacturer of the doors and accessories specified.

2.2 Door Assemblies shall be furnished with operating mechanisms, tracks, hardware, and all other necessary accessories required for complete installation and perfect operation.

2.3 Exterior Doors shall be metal sandwich construction filled with foamed-in-place insulation of sufficient density to attain the designated U-value or R-value. Doors shall have flexible neoprene weatherstripping at jambs, top, and sill.

2.4 Door Locks where required shall be five-pin cylinder locks and locking devices and shall be keyed as directed. Chain operators shall have standard devices for securing chain.

2.5 Fire Rated Doors: Where designated, doors, frames, hardware, and accessories shall bear the identifying label of the Underwriters' Laboratories, Inc., or a nationally recognized testing agency qualified to perform certificate programs indicating that units conform to the requirements of the Underwriters' Laboratories, Inc. Certificates of inspection shall be submitted in accordance with the requirements of NFPA 80 and 80A for fire doors exceeding the sizes for which label service is offered by Underwriters' Laboratories, Inc.

2.6 Manual Operation:

2.6.1 Push-Up Operation: Doors shall have one lifting handle on each side of the door and shall be counterbalanced to provide ease of operation while raising or lowering the curtain by hand. The maximum exertion or pull required shall not

exceed 25 pounds. Doors over 7 feet high shall be provided with pull down straps or pole hooks.

2.6.2 Chain-Gear Operation: Chain shall be galvanized, endless type, operating over a sprocket and shall extend to within 3 feet of floor. Gears shall be high-grade gray iron, cast from machine-cut patterns. Gear reduction shall be calculated to reduce chain pull required to not exceed 35 pounds.

2.6.3 Crank-Gear Operation: Crank shall be removable and located approximately 34 inches above the floor. Gears shall be of high-grade gray iron, cast from machine-cut patterns. Gear reduction shall be calculated to reduce pressure exerted on the crank to not over 35 pounds.

2.7 Motorized Operation:

2.7.1 Electric Operators: Operators shall be furnished complete with electric motor, reduction gears, magnetic brake, friction clutch, emergency release for manual operation, heavy-duty roller chain, controls, limit switches, and other accessories.

2.7.2 Motor: Motor shall be totally enclosed, constant duty type, instantly reversible, capable of moving door at not less than 3/4 foot per second and designed for high frequency operation.

2.7.3 Controls: Each door motor shall have an enclosed reversing across-the-line type magnetic starter having thermal overload protection, solenoid-operated brake, limit switches, and one or more remote-control switches as required. The starter shall conform to NEMA ICS 2. Remote-control switches shall be of the three-button type with the buttons marked "OPEN", "CLOSE", and "STOP." CLOSE buttons shall be momentary-contact type requiring constant pressure to maintain motion of the door.

2.7.4 Safety Device: The bottom edge of electrically operated doors shall have a safety device that will immediately reverse the door movement upon contact with an obstruction. The safety device shall be installed across the entire width of the door and shall not substitute for a limit switch.

2.8 Hot-Dipped Galvanized Sheet Steel Surfaces shall be finished according to the requirements of ASTM A 525, G-90. Hardware items shall be galvanized according to ASTM A 153. Items galvanized after assembly shall comply with ASTM A 123.

2.9 Shop Prime Coat of Rust-Inhibiting Paint shall comply with Fed. Spec. TT-P-86.

2.10 Tracks for Overhead Doors shall be designed to accommodate 2-inch or 3-inch diameter galvanized steel rollers. Tracks shall be fabricated of 13-gauge galvanized steel. Track shall have springs at the end of track to cushion the door at the end of the opening motion.

2.11 Track Supports shall be angle iron, galvanized, and installed with cross-bracing to form a rigid construction.

2.12 Counterbalance shall be torsion-spring type for standard counter-balancing with tempered spring wire and continuous steel shaft. Provide cast aluminum and smooth cable drums with galvanized steel lift cables. Entire counterbalance assembly shall be mounted on ball bearings.

3.0 EXECUTION: Panels and frames that are field repaired shall be cleaned sufficiently for good paint adherence then primed to prevent further deterioration. Galvanized coatings that are damaged shall be repaired by the application of a high zinc dust content paint formulated for regalvanizing welds in galvanized steels.

SECTION 08380
SOUND RETARDANT DOORS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of material for sound retardant doors. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 General:

2.1.1 Each Door Location shall be complete with frame and integral acoustical type hardware accessories, mounting, and installation components.

2.1.2 Door Unit shall conform to ASTM E 90 to achieve the required Sound Transmission Classification (STC).

2.2 Steel Sound Retardant Doors: Door assembly shall conform to SDI-100 and ANSI A115.

2.3 Wood Sound Retardant Doors: Door assembly shall conform to NWWDA I.S.1, ASTM E 90, AWI.

3.0 EXECUTION: Door units shall be installed complete with all necessary anchors and inserts, hardware, and other accessories. Upon completion of installation, doors shall be free from warp, twist, or distortion.

SECTION 08386
ALUMINUM SAFETY GLASS DOORS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of aluminum safety glass doors. Products shall match existing materials and/or as shall be directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Aluminum Safety Glass Doors shall be manufacturer's standard and shall comply with the requirements of ANSI Z97.1, Fed. Spec. DD-G-1403, and the Safety Glazing Certification Council (SGCC) standards for heat strengthened and fully tempered safety glass.

2.2 Safety Glass Doors shall have clear tempered safety glass and shall be manufacturer's stock design in standard sizes. Glazing for door tolerance shall be dimension plus 1/16 inch, minus 1/8 inch. All door glazing shall be set in aluminum frames of sufficient strength to withstand heavy duty use.

2.3 Finish for Aluminum Frames shall be anodized AA-C22A 41RIX or AA-M21C22A 42RIX, as required, minimum 0.7 mil thickness with clear methacrylate lacquer coating, minimum 0.5 mil thick.

2.4 Hardware shall be manufacturer's standard finish to match aluminum frame door stiles and rails. Push-pull set shall be manufacturer's stock design flat plate units, approximately 6 inches by 10 inches, engraved with "push" and "pull." Custom designed push-pull (handles) set and required fittings shall be provided where required.

2.4.1 Lockset with Deadbolt in lower rail engaging cut-out in threshold shall be keyed from both sides. Where required, provide a lockset with deadbolt in lock side of glass door, keyed from both sides.

2.4.2 For Pairs of Doors, provide a deadbolt in lower rail of each door that will engage a cut-out in the threshold and key from both sides.

2.4.3 Where Floor Recessed Checking Floor Hinges are required, provide top pivot hardware. Where overhead closers are required, provide bottom pivot

hardware. Provide checking floor hinges with sealed floor box, finished cover plate, separate adjustment screws for checking speed, and hold open device.

2.5 Threshold shall be manufacturer's standard, finished to match door rails and sized to suit door opening.

2.6 Anchorages and Fastenings shall be manufacturer's standard concealed. Finish heads of exposed fasteners shall match finish of adjacent metal surfaces.

2.7 Locate and Provide Holes and Cutouts to receive hardware before tempering safety glass. Do not permit any cutting, drilling, or other glass alterations after tempering operation.

3.0 EXECUTION: (Section not used.)

SECTION 08387
WOOD SAFETY GLASS DOORS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of wood safety glass doors. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Safety Glass shall be clear, heat-strengthened, and fully tempered plate or float glass in compliance with the requirements of ANSI Z97.1 and the Safety Glazing Certification Council. Provide tinted or reflective tempered safety glass as required.

2.2 Wood for Door Frame, Stiles, and Rails shall be Douglas fir, redwood, cedar or select hardwood. Exposed wood surfaces shall be sanded, cleaned, and factory-primed ready for final finish coat. PVC clad wood safety glass doors shall be provided as required.

2.3 Provide Factory-Primed and Finish-Painted Wood Surfaces when no other field painting is required.

2.4 Hardware shall be manufacturer's standard style and designed for the door swing, door size, glass thickness, door weight, and area for access and egress. Hardware fittings of door shall match the hardware finish of the adjacent area.

2.4.1 Provide Heavy-Duty Hardware in heavy pedestrian or high traffic areas.

2.4.2 Door Push-Pull Sets or Handles and Hardware Accessories shall be manufacturer's standard design. Provide floor closer with selective hold-open feature. Locks and deadbolts shall be keyed from both sides of bottom door rail or strike side of door stile.

2.4.3 Where Aluminum Hardware Finish is required, aluminum finish shall be anodized.

2.4.4 Panic Exit Devices or Electric Strikes shall be furnished where required.

3.0 EXECUTION: (Section not used.)

SECTION 08390
SCREEN AND STORM DOORS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of screen and storm doors. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 The Manufacturer shall be a recognized producer of screen and storm doors. See Section 08110 - Hollow Metal Doors and Frames, Section 08120 - Aluminum Doors and Frames, and Section 08210 - Wood Doors.

2.2 All Work Performed shall meet the requirements of local codes and regulations.

3.0 EXECUTION: (Section not used.)

SECTION 08412
ENTRANCES

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of entrance assemblies. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Entrance shall be a complete unit produced by one manufacturer recognized as producer of glass entrance panels with glass doors, weatherstripping, and hardware on operating door panel.

2.1.1 Finishes
Class I finish AA-M10C2231 or AA-M10C2241 for clear (natural) anodized, Class II finish AA-M10C2244 for color anodized, coating finish shall be fluoropolymer coatings contain at least 70% by weight Kaynar 500 resin (polyvinylidene floride)

2.2 Extrusions for Door Construction shall be AA 6063-T5 alloy with clear anodized 204-R1-A1 finish and 22,000 psi ultimate tensile strength. Main member extrusions shall be not less than 0.125 inch in wall thickness.

2.3 Aluminum Sheet Material for Door Construction shall be plain flat sheet for exposed faces of flush and panel doors of not less than 0.062-inch thickness.

2.4 Fasteners shall be aluminum, stainless steel, or other non-corrosive metal fasteners compatible with the framing material. Exposed fasteners shall be Phillips flat-head screws matching fastened material.

2.5 Steel Reinforcement and Brackets shall be manufacturer's special formed units with 2.0 ounce hot-dip zinc coating complying with ASTM A 153, applied after fabrication.

2.6 Frames shall be extruded tube sections manufactured from AA 6063-T5 alloy with clear anodized 204-R1-A1 finish, not less than 0.125 inch in thickness. Frames to receive fixed glass shall have removable glass stops and beads.

2.7 Door shall be fabricated from extruded aluminum seamless tubular shapes. Top and bottom rails shall be welded to stiles with corner reinforcement. Joints shall be milled to hairline watertight fit. Welding shall be done on concealed surfaces and shall not blemish exposed surfaces. Door shall have extruded aluminum snap-in type glass stop with integral vinyl glazing insert.

2.8 Weatherstripping shall be manufacturer's standard compression type neoprene gasket. Weatherstripping shall be easily replaced without special tools. Weatherstripping at meeting rails of pairs of doors 08412-shall be adjustable. Weatherstripping shall be applied to stiles, heads, and bottoms of doors.

3.0 EXECUTION: Entrance assemblies shall be installed or repaired by the manufacturer or an authorized representative.

SECTION 08470
REVOLVING DOORS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of revolving doors. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS: Door units shall be fabricated from extruded aluminum tube sections of AA 6063-T5 alloy, clear 204-RI-A1 anodized finish. Door framing members shall be 0.375-inch minimum wall thickness. Enclosure framing members shall be 0.125-inch minimum wall thickness. Snap-in type glass stops shall be minimum 0.050-inch thickness.

2.1 Fabricate Assembly with welded and mechanical construction; concealed, reinforced joints; and corners with flush hairline joints.

2.2 Provide Weatherstripping at stiles, head, and bottom of door wings.

2.3 Door Wings shall be arranged to collapse and fold to the emergency exit position when a pressure of not less than 100 pounds nor more than 140 pounds is applied to the outer door stile at the push bar height of 3 feet, 10 inches. No visible external braces or collapsing plates will be permitted.

2.4 Door Unit shall be provided with a mechanical floor-mounted speed control sealed unit to control the revolving door up to a maximum of 12 revolutions per minute.

2.5 All Work Performed shall meet the requirements of local codes and regulations.

3.0 EXECUTION: Doors shall be installed or repaired by the manufacturer or an authorized representative.

SECTION 08510
METAL WINDOWS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of steel, stainless steel, and bronze windows. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Fixed Windows, Hopper Vent: Window units shall comply with SWI-01, The Specifier's Guide to Steel Windows, for standard intermediate windows with bottom hinged, swing-in type ventilator hopper sash. Bottom rails of ventilators shall have an outside drip. Hardware shall be manufacturer's standard type for each window. Ventilator shall have one pair of hinges or pivots, two stay arms, and a cam-type lever handle latch. Sash and hardware shall be designed to permit easy removal of sash from inside the building.

2.2 Fixed Windows: Fixed windows shall comply with the requirements of SWI-01, for standard antermediate windows.

2.3 Projected Windows: Projected windows shall comply with the requirements of SWI-01, for commercial projected windows, with project-out type ventilators, top-hinged.

2.4 Continuous Top-Hinged Windows: Continuous windows shall comply with SWI-01 continuous type with manual operation.

2.5 Casement Windows: Casement windows shall comply with SWI-01, for standard intermediate windows. Hardware for operative sash shall provide for cleaning of both sides of the sash from the inside. Operating devices shall include underscreen type rotary operators of the worm-gear type with adjustable operating arms. A continuous drip molding shall be provided above operable sash. Abutting units or combination units shall have manufacturer's stock standard mullion.

2.6 Awning Windows: Awning windows shall comply with the SWI-01, for architectural awning intermediate type frame and ventilator members. Ventilators in same frame shall operate in unison. Hardware for operative sash shall provide for cleaning of both sides of the sash from the inside. Operating

devices shall include underscreen type rotary operators of the worm-gear type, with adjustable operating arms. The operator shall securely close the ventilators without using additional locking devices. Ventilators shall be designed to close and be weathertight to adjoining ventilators or frame. Window frame shall be designed with rebate to receive screens.

2.7 Reversible Windows: Reversible horizontal pivoted windows shall comply with SWI-01, for commercial type.

2.8 Hinged Emergency Windows: Hinged emergency type windows shall comply with SWI Recommended Specifications for Steel Windows, for commercial type, with manual operation side- or hinged for swing-out emergency exit, pivots or hinges for 90 degrees swing-out. Window shall be equipped with push-release type lever operator on window latch, complying with the requirements of local regulations for "panic hardware".

2.9 Double/Single Hung Windows: Double and single hung windows shall comply with SWI Recommended Specifications for steel windows for commercial type. Two spiral type removable sash balances shall be provided for each sash. Balances shall be adjustable without removing sash from frame and without use of special tools. Each window 40 inches wide or less shall be provided with one sweep sash lock. Each window over 40 inches wide shall be provided with two sweep sash locks. Lower sash shall have one continuous integral lift at the bottom of the sash. The upper sash shall have a continuous integral pull down member on the meeting rail.

2.10 Operating Hardware: Hardware shall be provided for all operable, ventilating sash units of manufacturer's standard for the function of each individual window type specified. All operable sash shall have a latch or locking device. Hardware shall be securely attached to the window with noncorrosive bolts or machine screws.

2.11 Miscellaneous Hardware shall comply with ANSI A156.16. All metal hardware for stainless steel windows shall be non-corrodible. All hardware items for bronze windows shall match window finish.

2.12 Screens: Insect screens shall be full size of the operable unit. Screens shall comply with SWI-01 and shall have removable splines of steel or vinyl. Screening shall be 18 x 14 mesh, complying with Fed. Spec. RR-W-365 for wire fabric or Fed. Spec. L-S-125, Type II.

2.13 Weatherstripping shall be the standard type for use with the window unit supplied and shall be easily replaceable.

2.14 Materials for Steel Windows shall comply with the requirements of the following:

a. Sheet steel: Fed. Spec. QQ-S-700.
b. Zinc-coated steel: ASTM A 90 or A 123.
c. Zinc-coating on hardware: ASTM A 153.
d. Corrosion-resistant steel: Fed. Spec. QQ-S-766.

2.15 Materials for Stainless Steel Windows shall comply with the requirements of ASTM A 167.

2.16 Materials for Bronze Frames shall comply with the requirements of ASTM B 96, ASTM B 100, ASTM B 150 or ASTM B 169.

3.0 EXECUTION: Window units shall be installed complete with all necessary anchors, hardware, and other accessories and shall be plumb, square, and level in alignment, and braced and stayed properly to prevent distortion and misalignment.

SECTION 08520
ALUMINUM WINDOWS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of aluminum windows. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Windows shall be furnished as a complete assembly including frame, sash, hardware, mullions, and anchorage devices. Windows indicated to have screen or storm units shall be designed to accomodate the items to be furnished. Aluminum extrusions shall be not less than 22,000 psi ultimate tensile strength and not less than 0.062 inch thickness at any location for main frame and sash members. Window sash and frames shall be designed for outside glazing of vision glass. Weatherstripping shall be easily replaceable. All operable sashes shall have a latch or locking device. Hardware shall be securely attached to the window with noncorrosive bolts or machine screws. Hardware finishes shall match window finishings. Where operating hardware is located 6 feet-6 inches or more above the floor, poles and pole-operated handles shall be provided to operate the windows.

2.2 Aluminum Prime Windows shall be fabricated and assembled in compliance with AAMA 101.

2.3 Double Glazed Windows shall have a minimum condensation factor in accordance with AAMA 1503.1-98.

2.4 Awning Windows shall conform to AAMA 101, Commercial Grade. Hardware for top ventilators shall be designed to drop sash down in such a manner to permit cleaning of the outside glass from inside the building. All operating hardware except ventilator arms and rotary operators shall be concealed within frame and sill. Ventilator arms shall be concealed when unit is closed.

2.5 Basement Windows shall conform to AAMA 101, Commercial Grade, single project-in at top vent.

2.6 Casement Windows shall conform to AAMA 101, Commercial Grade. Each side hinge ventilator shall have non-friction type extension hinges, underscreen

type rotary operator, and locking handles. Rotary operators shall be heavy-duty worm-gear type with machine cut case hardened steel gears.

2.7 Double-Hung and Single-Hung Windows shall conform to AAMA 101, Commercial Grade.

2.8 Fixed Windows and Semi-Circular Head Windows shall conform to specification P-A2, without ventilator sections.

2.9 Horizontal-Sliding Windows shall conform to AAMA 101, Commercial Grade.

2.10 Projected Windows shall conform to AAMA 101, Commercial Grade. Where screens are specified, underscreen operators shall be provided for ventilators that open out.

2.11 Top-Hinged Windows shall conform to AAMA 101, Commercial Grade.

2.12 Vertically-Pivoted Windows shall conform to AAMA 101 Commercial Grade.

2.13 Storm Windows shall be triple-track, self-storing, combination storm-and-screen type, conforming to AAMA 1002.10. Storm units shall be designed for the type of windows with which they will be used and shall provide a rigid unit in place, to permit all sashes to be removed from the inside and to lock into the open and closed positions. An interlocking scribe piece of the same material as the frame shall be provided at bottom edge. Units shall be complete with all mounting and operating accessories required to provide a weathertight installation.

2.14 Insect Screens shall be provided for sash or ventilators of designated windows. Screens shall conform to AAMA 101. Insect screens shall be designed for the type of window with which they will be used and shall be interchangeable with other units of the same size and type. Screens for hopper ventilators shall be stationary type attached directly to the outside of the window unit.

2.15 Forced-Entry Resistant Windows shall be in accordance with the recommendations specified in AAMA 1032.5.

2.16 High Performance Windows shall be in accordance with the requirements of AAMA 101.

2.17 Window Cleaning Anchors shall be of stainless steel and shall conform to ASME A39.1. Windows shall be reinforced for the reception of window cleaning anchors, if necessary to provide the required strength. Window frames shall be reinforced as may be required to receive the window cleaning anchors, and the window frames shall be anchored securely to the wall construction at point of application of the window cleaning bolts.

2.18 Finish: All exposed members shall be free of scratches and other serious surface blemishes. Prime windows shall have anodized finish or paint finish. Anodized finish shall be AA-M12C22A31 clear in accordance with AA Designation System for Aluminum Finishes. Paint finish shall conform to AAMA 603.8. Storm windows shall be mill finish or paint finish, white. Window unit finishes, cleaning, and chemical treatments shall comply with the requirements of NAAMM Metal Finishes Manual and AAMA 603.8.

3.0 EXECUTION: Final adjustment for proper operation of ventilating unit shall be made after glazing. Where aluminum surfaces are in contact with or fastened to dissimilar materials, except stainless steel or zinc, the aluminum surface shall be protected from dissimilar materials as specified in the Appendix of AAMA 101. Surfaces in contact with sealants after installation shall not be coated with any type of protective material.

SECTION 08610
WOOD WINDOWS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of wood windows, general. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Awning Replacement Window Units shall comply with NWWDA I.S.2.

2.2 Single Hung Replacement Window Units shall contain one fixed sash and one balanced vertically-sliding sash and shall comply with NWWDA I.S.2.

2.3 Double Hung Replacement Window Units shall contain two balanced vertically-sliding sashes and shall comply with NWWDA I.S.2.

2.4 Horizontal-Sliding Replacement Window Units shall comply with NWWDA I.S.2.

2.5 Fixed Replacement Window Units shall consist of sashes complying with NWWDA I.S.2 and frames complying with NWWDA I.S.1, or NWWDA I.S.2.

2.6 Window, Screen, and Storm Sash Units shall be manufactured from kiln-dried ponderosa pine, Idaho white pine, Northern white pine, or sugar pine.

2.7 Preservative Treatment: All wood parts shall be water repellent preservative-treated in compliance with NWWDA I.S.4.

2.8 Weatherstripping shall be manufacturer's standard nonferrous spring metal or vinyl gasket.

2.9 Insect Screens: Frames shall be manufacturer's standard formed aluminum or extruded aluminum frames. Insect screening shall be either nonferrous metal or plastic-coated fibrous glass insect screen cloth complying with Fed. Spec. L-S-125, Type II.

2.10 Window Operations shall meet or exceed the minimum operating requirements as specified in NWWDA I.S.2. Each window unit shall be supplied

with all operating devices required for easy operation and with suitable locks or latches.

2.11 Window Classification (Grade): Window units shall comply with Class A requirements as specified in NWWDA I.S.2.

2.12 Fabrication:

2.12.1 Sizes and profiles shall match existing work and shall be coordinated with actual measurements of window openings.

2.12.2 The Scope of Each Replacement Window Unit, except as otherwise indicated, shall include the sash or sashes, frame, sill (including undersill or nosing, if any), exterior and interior trim, integral mullion and muntins (if any), hardware, and accessories.

2.12.3 Removable Insect Screens shall be provided for each operating sash.

2.12.4 Glazing Stops (beads) shall be provided, nailed or snap-on, and coordinated with glass selection and glazing system as indicated.

2.13 Finishes:

2.13.1 Painting: Shop prime coat shall comply with Fed. Spec. TT-P-25, color white.

2.13.2 Vinyl Cladding shall be manufacturer's standard bonded vinyl cladding with permanent paintable finish.

2.13.3 Aluminum Cladding shall be manufacturer's standard formed sheet or aluminum cladding with baked-on acrylic coating.

2.14 Woven Glass Cloth shall weigh not less than 2.0 oz./sq. yd. and shall withstand 120 lbs. of pull per square inch. Resin and hardener catalyst shall be as recommended by the manufacturer of the resin.

3.0 EXECUTION: (Section not used.)

SECTION 08710
FINISH HARDWARE

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of finish hardware. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Labeled fire doors shall have fire rated hardware, including smoke seals where required by code, in accordance with NFPA 80. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS: Hardware finishes shall conform to those identified under ANSI/BHMA A156.18. Finish of fasteners shall match finish of hardware items on which they are applied.

2.1 Locks and Latches: To the maximum extent possible, locksets, latchsets, and deadlocks shall be the products of a single manufacturer. Mortise type locks and latches for doors 1-3/4 inches thick and over shall have adjustable bevel fronts or otherwise conform to the shape of the door. Lock fronts for double-acting doors shall be rounded. Mortise locks shall have armored fronts. Strikes for wood frames and pairs of wood doors shall be furnished with wrought boxes. Trim for mortise locks and latches shall be escutcheon, minimum 7 inches by 1-3/4 inches or sectional, as required, with wrought knob and cast shank and shall conform to the requirements for wrought trim in accordance with ANSI A156.2. Manufacturers' standard plain design shall be used. Keying system shall match remainder of building system (if applicable) or shall be as specified.

2.1.1 Cylinder Locks: Cylinder shall have either six or seven pins with paracentric keyway, as required. Cylinders and the locks in which they are used shall be the product of the same manufacturer. Cylinders shall be provided with removable type single-key cores, where required.

2.1.2 Deadlocks: ANSI A156.5, mortise type, cylinder-operated, E16000 series.

2.1.3 Interconnected Locks and Latches: ANSI A156.12, Grade 1 or 2.

2.1.4 Locksets and Latchsets shall conform to the following types, as required: ANSI A156.2, series 1000, Grade 2; 2000, Grade 1; 4000, Grade 1; A156.13, Operational Grade 1 or 2; and Security Grade 1, 2, 3, or 4.

2.1.5 Locksets for Lead-Shielded Doors shall be provided with factory-installed lead linings. Lead linings shall not be less than the thickness of the lead in the door in which the lockset is required.

2.1.6 Cipher Locks: Cipher locks shall be mechanically operated push button units, with or without master key bypass capability, and changable by authorized access key.

2.1.7 Padlocks: ASTM F 883.

2.2 Door Trim: ANSI A156.6.

2.2.1 Armor Plates shall be category J100, plastic, aluminum, brass, or stainless steel, as required, 40 inches in height, 2 inches less in width than the width of the door for single doors, and 1 inch less for pairs of doors. Edges of metal plates shall be beveled where required. Where the door has a louver panel, the armor plate shall be omitted if top of louver frame is more than 20 inches above the bottom of the door.

2.2.2 Arm Pulls shall be Category J400, double base, aluminum, brass, or stainless steel.

2.2.3 Combination Push-Pull Plates shall be Category J300, 1/8 inch minimum, aluminum, brass, or stainless steel beveled four edges.

2.2.4 Drop Ring Pulls shall be Category J400, aluminum, brass, or stainless steel.

2.2.5 Kick Plates shall be Category J100, plastic, aluminum, brass, or stainless steel. Width of plates shall be 2 inches less than door width for single doors and 1 inch less for pairs of doors. Height shall be 10 inches, except where the bottom rail is less than 10 inches, the plate shall extend to within 1/2 inch of the panel mold or glass bead. Edges of metal plates shall be beveled, where required.

2.2.6 Armor Plates and Mop Plates shall be Category J100, plastic, aluminum, brass, or stainless steel. Width of plates shall be 2 inches less than door width for single doors and 1 inch less for pairs of doors. The height of mop plates shall be 4 inches. Edges of metal plates shall be beveled, where required.

2.2.7 Push and Pull Bars shall be Category J500, aluminum, brass or stainless steel, where required. Edges of mounting plates shall be beveled.

2.2.8 Push Plates shall be Category J300, aluminum, brass, stainless steel, or plastic, in color as required, size as required. Edges of metal plates shall be beveled, where required.

2.2.9 Sectional Door Pulls for metal or kalamein doors shall be Category J400 brass, thru-bolted type of plain modern design. Door pulls on plates for wood doors shall be Category J400 aluminum, brass, or stainless steel with beveled edges, as required.

2.3 Exit Devices and Exit Device Accessories: ANSI A156.3.

2.3.1 Door Coordinator shall be Type 21 and shall be provided for each pair of doors with closers and equipped with an overlapping astragal.

2.3.2 Removable Mullions shall be Type 22 of the box type and shall be used only with those exit devices for which the mullions were manufactured. Mullions shall be furnished with mullion stabilizers of the same manufacturer.

2.4 Door Controls: Overhead holders conforming to ANSI A156.8.

2.5 Auxiliary Hardware, including door surface bolts, door holders, door stops, and roller latches, of the types required, shall conform to ANSI A156.16.

2.5.1 Lever Extension Flush Bolts: Type L14081, installed at the top and bottom of the inactive leaf of pairs of doors, and mortised in the lock edge of the door.

2.5.2 Dust-Proof Strikes: Type L04011.

2.5.3 Garment Hooks: Type L03111.

2.5.4 Hand Rail Brackets: Type L03061, L03081, L03091, or L03101.

2.5.5 Garment Rods: Type L03131 or L03141.

2.5.6 Coat Hook: Type L03111.

2.5.7 Door Stop, Adjustable Hinge Type: Type L02223.

2.5.8 Door Stop, Wall Type Flexible, 3 inch: Type L02051, L02052, L02053.

2.5.9 Door Stop, Wall Type Flexible, 4 inch: Type L02061, L02062, L02063.

2.5.10 Door Stop, Floor Mounted, Type L02143.

2.6 Hinges: ANSI A156.1. Hinges used on metal doors and frames shall also conform to ANSI A156.7.

2.6.1 Hinges for Reverse Bevel Doors with locks shall have pins that are made nonremovable by means such as a set screw in the barrel, or safety stud, when the door is in the closed position.

2.6.2 Hinges with Anti-Friction Bearings may be furnished in lieu of ball bearing hinges, where required. Fire door hinges shall be in accordance with NFPA 80.

2.7 Door Closing Devices: ANSI A156.4.

2.7.1 Surface Type Closers shall be Series C01000, C02000 Standard Cover, C02000 Full Cover with option PT-4C, or C03000 with options PT-4A and PT-4D, where required. Mounting details for the type closers to be used shall be in accordance with manufacturer's standards. Closers for screen and storm doors shall be Type C09353. Closers for outswinging exterior doors shall have parallel arms or shall be top jamb-mounted. Closers for interior doors close to a wall shall be of narrow projection so as not to strike the wall at the 90 degree open position or shall have parallel arms.

2.7.2 Floor Closers and Pivots shall have cement boxes. Floor closers and pivots used on the same door shall be the product of one manufacturer only. Floor plates are not required where thresholds cover the closer cement box. Setting tools shall be furnished for use in installing floor closers.

2.8 Smoke Detectors and Magnetic Holders: ANSI A156.15. Door closers with integral holders connected to a separate detection device or closers with integral holders and detector units, sensing particles of combustion that when activated will release the holder mechanism causing the closer to close the door may be used in lieu of separate closers, detectors, and magnetic holders. Closers shall be listed or labeled by a nationally recognized independent testing laboratory.

2.9 Key Control Storage System: ANSI A156.5, type and capacity as required, properly labeled for key identification.

2.10 Metal Thresholds: Thresholds for exterior metal doors with weatherstripping shall be extruded aluminum or bronze, flat type with fluted top and shall provide proper clearance and an effective seal with specified weatherstripping. Thresholds for use with floor closers shall conform to ANSI

A156.4. Latching thresholds shall conform to ANSI A156.3, Type 26, and of such height that the bottom of the door shall be 1/8 inch over the tread of the threshold and 1/8 inch below the top of the stop.

2.11 Door Silencers: Molded rubber, ANSI A156.16, Type L03011 for metal doors and Type L03021 for wood doors.

2.12 Exit Control or Exit Locks: ANSI A156.5, activated by arm and push plate or paddle. Outside key control shall be provided where required. Units shall be battery-powered. Alarm horns or mechanical bell, when set by inside key, shall sound when door is opened. Units shall have dead bolts or protected latches with either surface or mortised strike. Where required, furnish with silent alarm for indication at a remote panel or a low voltage system. Exit control locks or exit locks shall be as follows.

2.12.1 Single Door: Type E 0421.

2.12.2 Double Door: Type E 0421 (One leaf to have top and bottom bolt activated by cross bar. Other leaf to have Type E 0431 exit lock.)

2.13 Electric Strikes: ANSI A156.6. Rim-mounted strikes shall be Type E09312 for use with rim latches or rim or surface vertical rod exit devices. Mortised strikes shall be Type E 09322 for use with locks not having dead bolts and with mortise exit devices, all with or without auxiliary dead latch.

2.14 Bored Auxiliary Deadlocks: ANSI A156.5. Dead locking latch bolts operated by key from either side shall be Type E2141.

2.15 Mortised Deadlocks: ANSI A156.5. Dead bolts operated by key from either side shall be Type E16061.

2.16 Weatherstripping: Provide only those units where resilient or flexible seal strip is easily replaceable and readily available from stocks maintained by manufacturer. Provide fasteners that are exposed when door is either open or closed to match finish of stripping and seals.

2.16.1 Weatherstripping at Jambs and Heads of Doors:

2.16.1.1 Bumper-Type Resilient Inserts and Metal Retainer Strips: Surfaced-applied unless required to be mortised or semi-mortised; anodized retainer strips; resilient bumper material to be neoprene or vinyl. Adjustable insert of extruded metal and captive adjustment screws designed to act as combination door stop and seal.

2.16.1.2 Spring-Metal Type Stripping: Bronze, 0.009 inch minimum thickness for sliding compression, 0.006 inch minimum thickness for direct compression; aluminum, 0.008 inch minimum thickness; stainless steel, 0.005 inch minimum thickness.

2.16.1.3 Self Adhesive Strips: Ribbed sponge neoprene. Adhesive shall be reinforced with glass fibers. Strip size shall be 3/16 inch by 3/8 inch minimum.

2.16.2 Astragal Stripping On One Active Leaf:

2.16.2.1 Metal Astragal Bar: Not less than 1/8 inch x 1-3/4 inches, for exposed flat-head screw mounting one leaf of extruded aluminum, anodized finish.

2.16.2.2 Closed-Cell Neoprene Astragal Bar: Approximately 3/8 inch x 1-1/4 inches with metal retainer strip for mounting on one leaf of extruded aluminum, 0.094 inch, anodized finish.

2.16.3 Meeting Seals, Both Leaves Active:

2.16.3.1 Metal Housing Strips (Door Centers): With adjustable insert plunger strips retained in housing with captive screws; mortised, semi-mortised, or surface-mounted, as required; double units applied to both leaves and single units applied to only one leaf; extruded aluminum, 0.062 inch thick, anodized finish. Seal materials shall be metal faces on both adjustable inserts or metal face on one adjustable insert, pile insert on the other. Provide pile insert of wool, polypropylene, or nylon pile with aluminum strip backing complying with AAMA 701.2.

2.16.3.2 Metal Strips: To retain hollow extrusions or sheets forming flexible plastic seals; extruded aluminum, 0.062 inch thick, anodized finish. Seal materials shall be one of the following:

a. Heavy neoprene sheet, light grey.

b. Light neoprene sheet, light grey, filled with soft cellular plastic or neoprene backing.

c. Heavy neoprene sheet, black, complying with Mil. Spec. MIL-R-6855, Class II, Grade 40.

d. Heavy flexible vinyl plastic sheet, light grey.

e. Heavy, fabric-reinforced rubber, black.

2.16.3.3 Surface-Mounted Metal Strips: To retain flexible seal strips acting as sweeps or wipers; extruded aluminum, 0.062 inch thick, anodized finish; seal material to be extruded neoprene wiper or sweep, flexible vinyl wiper or sweep, flexible vinyl bulb, or wool or polypropylene pile wiper or sweep.

2.16.3.4 Pile-Type Stripping: Wool, polypropylene, or nylon woven pile with aluminum stripbacking, complying with AAMA 701.2, mounted in manufacturer's standard aluminum housing (non-adjustable type) in edge rail. Mount units in meeting edges of both leaves of pairs of doors or in meeting edge of only one leaf of pairs of doors.

2.16.3.5 Spring-Metal Type Stripping: Mounted in meeting edges of only one leaf of pairs of doors; formed of spring bronze, 0.009 inch thick or spring stainless steel, 0.008 inch thick, as required.

2.16.4 Automatic Door Bottoms:

2.16.4.1 Door Sill Protection shall be weatherproof automatic door bottoms. Plunger shall automatically seal with delayed action when door closes and shall retract when door opens. Automatic door bottoms shall be surface-mounted, fully mortised, or semi-mortised types.

2.16.4.2 Metal: Extruded aluminum, 0.070 inch thick, anodized finish.

2.16.4.3 Seal: Sponge neoprene, Mil. Spec. MIL-R-6130, Type II, Grade A, B, or C, as required.

2.16.5 Door Bottom Sweeps: Retainer of extruded aluminum, 0.070 inch thick, anodized finish; seal of solid neoprene, Mil. Spec. MIL-R-6855, Class II, Grade 40, soft, oil-resistant, which shall remain flexible down to -60 F.

2.17 Automatic Entrance Door Operators: ANSI A156.10 and UL 325. Size shall be as recommended by manufacturer's published data for door size, weight, movement, and condition of exposure for operation under normal traffic load for the type of occupancy as required. Exposed housing for operators shall be extruded or formed aluminum, 0.062 inch minimum thickness, with provisions for maintenance access, and with fasteners concealed in door when door is in closed position. Operators shall be fully adjustable for opening, closing, and checking speeds, as well as length of time door remains open without removal of doors. Operators in hazardous areas shall have explosion-proof motors, operators, and control devices. Door operators shall be provided that will open

and close doors and maintain them in fully closed position when subjected to a wind velocity or equivalant inward pressure differential of 20 mph.

2.17.1 Swing Door Operators: Hydraulic, pressurized unit, with separate cylinders for power and checking. Provide spring action for closing under normal operation and provide emergency release for manual swing-out action on swing-in doors, which are indicated to function as exits. Operator actions such as swing-in, swing-out, double swing, or pairs shall be as required. Provide overhead concealed, surface-mounted, or floor-recessed operators, self-contained with connections for power and control wiring, where required.

2.17.2 Sliding Door Operators:

2.17.2.1 Hydraulic Door Operators for sliding doors shall be a pressurized unit with hydraulic cylinder power opening and either power or spring closing with safety release clutch for obstructed closing and with hydraulic checking for both opening and closing cycles. Provide for manual sliding when power is off. Operator actions such as single slide, bi-parting, and emergency break-away swing feature shall be as required. Provide overhead concealed operators where required. Provide self-contained units, where required, with connections for power and control wiring. Provide remote unit, where required, with interconnecting tubes and connections at power unit for power and control wiring.

2.17.2.2 Pneumatic Door Operators for sliding doors shall be air-opened and either air- or spring-closed with safety release clutch for obstructed closing and with pneumatic checking in both cycles. Provision shall be made for manual sliding when power or air pressure is off. Operator actions such as single slide, bi-parting and emergency breakaway features shall be as required. Provide overhead concealed operators where required. Power unit shall be remote compressor unit.

2.17.3 Door Operator Controls and Accessories:

2.17.3.1 Floor Mat Control Panels: Provide units complete with extruded aluminum mat, frames, recessed to fit flush with floor; concealed anchorage, manufacturer's standard synthetic rubber; or flexible plastic, safety ribbed surface pattern, standard color; containing pressure switches for low-voltage control wiring and intendedfor either sliding or single-acting swing door control, with "Opening" section and "Safety" section switches. Mats shall be 1/2 inch thick. Where required to be installed over existing floor finish, provide surface-mounted frame with tapered safety edge.

2.17.3.2 Photo-Cell Control System: Horizontal beam system.

2.17.3.3 Electrical Interlocks: Interlocks that prevent operation of unit when door is locked latched, door bolted are required unless units are equipped with self-protected devices or circuits.

2.17.3.4 Sliding Door Opening Width Control Switch: Two-position switch that, in normal position, allows sliding doors to travel to full opening width and, in alternate position, reduces opening to a selected partial opening width.

2.18 Finishes: Exposed surfaces of hardware shall have one of the following finishes:

2.18.1 Bright Brass, Clear Coated: ANSI/BHMA A156.18.

2.18.2 Satin Brass, Clear Coated: ANSI/BHMA A156.18.

2.18.3 Satin Bronze, Clear Coated: ANSI/BHMA A156.18.

2.18.4 Bright Chrominum Plated: ANSI/BHMA A156.18.

2.18.5 Satin Chrominum Plated: ANSI/BHMA A156.18.

2.18.6 Bright Stainless Steel: ANSI/BHMA A156.18.

2.18.7 Satin Stainless Steel: ANSI/BHMA A156.18.

2.18.8 Primed Paint Finish.

3.0 EXECUTION:

3.1 Application: Hardware shall be located on doors in accordance with DHI publication, Recommended Locations for Builders' Hardware for Standard Steel Doors and Frames. When approved, slight variations in locations or dimensions will be permitted. Application shall be in accordance with DHI publication, The Installation of Commercial Steel Doors and Steel Framing, Insulated Steel Doors in Wood Frames, and Builders' Hardware. Door control devices for exterior doors such as closers and holders, shall normally attach to doors with thru-bolts such as sex bolts and nuts.

3.1.1 Hardware for Labeled Fire Doors shall be installed in accordance with the requirements of NFPA 80 and 101.

3.1.2 Door-Closing Devices shall be installed and adjusted in accordance with the templates and printed instructions supplied by the manufacturer of the devices. Insofar as practicable, doors opening to or from halls and corridors shall have the closer mounted on the room side of the door.

3.1.3 Floor Closers: Setting tools shall be used in the installation of floor closers.

3.1.4 Kick Plates shall be installed on the push side of single-acting doors and on both sides of double-acting doors.

3.1.5 Door Operators shall be installed in accordance with manufacturer's instructions, including piping, controls, control wiring,and remote power units. Air supply for pneumatic operators shall provide regulated air pressure for each door as required forequipment purchased. In areas subject to extreme cold, dehydrating equipment shall be furnished.

SECTION 08810
GLASS AND GLAZING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of glass and glazing materials. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Glazing Compounds and Preformed Glazing Sealants: A suitable type of glazing compound or preformed glazing sealant in compliance with section Glazing Materials of the FGMA Glazing Manual shall be provided.

2.1.1 Gunnable Polymer Glazing Sealants shall be as follows:

2.1.1.1 Acrylic (one-part): Fed. Spec. TT-S-00230.

2.1.1.2 Butyl (one-part): Fed. Spec. TT-S-001657.

2.1.1.3 Polysulfide (one- or two-part): Fed. Spec. TT-S-00230 and TT-S-00227.

2.1.1.4 Polyurethane (one- or two-part): Fed. Spec. TT-S-00230 and TT-S-00227.

2.1.1.5 Silicone (one-part): Fed. Spec. TT-S-001543 and TT-S-00230.

2.1.2 Glazing Preformed Tapes shall be butyl or polyisobutylene/butyl and shall be manufacturer's standards.

2.1.3 Knife Grade Glazing Sealants shall be as follows:

2.1.3.1 Wood Sash Putty: Fed. Spec. TT-P-00791.

2.1.3.2 Face Glazing Compound: ASTM C 669.

2.1.3.3 Steel Sash Putty: Manufacturer's standard.

2.1.3.4 Channel Glazing Compound: Manufacturer's standard.

2.1.4 Gaskets for Glazing shall be as follows:

2.1.4.1 Dense Neoprene: ASTM C 542 (lock-strip gaskets).

2.1.4.2 Foam Neoprene: ASTM C 509.

2.1.4.3 PVC: ASTM D 2287.

2.1.4.4 Mullion Sections shall be manufacturer's standard for glass size provided.

2.2 Glazing Accessories: Glazing points, chips, shims, angles, beads, setting blocks, spacer strips, and other glazing accessories shall be provided where required to provide a complete installation.

2.3 Float, Plate or Glass:

2.3.1 Clear Glass: ASTM C 1036, Type I, Class 1, Quality q3.

2.3.2 Heat-Absorbing Glass: ASTM C 1036, Type I, Class 2, Quality q3, Style A.

2.3.3 Light-Reducing Glass: ASTM C 1036, Type I, Class 3, Quality q3.

2.3.4 Greenhouse Glass: ASTM C 1036, Type I, Class 1, Quality q6.

2.4 Tempered Glass: ASTM C 1048, Kind FT, Condition A; Type I, Quality q3 or Type II, Quality q8. All tempered glass shall be purchased to meet field dimensions and shall not be altered in the field.

2.5 Wired Glass: ASTM C 1036, Type II, Class 1, Form 1, Mesh M1, 1/4 inch thick and in compliance with ANSI Z97.1. Wired glass for fire doors and windows shall comply with NFPA 80.

2.6 Figured Glass: ASTM C 1036, Type II, Class 1, Form 3, Quality q8, 1/8 inch thick.

2.7 Rough Glass: Rolled, translucent, flat, glazing quality, one side rough and the other polished, 7/32 inch thick.

2.8 Laminated Glass: Laminated Glass shall be fabricated from two pieces of clear, heat-absorbing, light-reducing, or wired glass, as designated and

previously specified, laminated together with a clear vinyl inter-layer. Laminated glass shall comply with ANSI Z97.1.

2.9 Insulating Glass:

2.9.1 Hermetically Sealed Glazing Units shall be fabricated of two lites of glass, separated by a dehydrated air space that is 1/2 inch unless otherwise designated and sealed permanently at the edges. Clear, light-reducing, heat-absorbing, figured, wired, and tempered glass shall be as previously specified.

2.9.2 Manufacturer's Standard Fused-Glass Edge Construction shall use double-strength clear sheet glass and shall only be provided in small applications under 30 sq ft.

2.10 Mirror Glass: Plate or float glass complying with ASTM C 1036, Type I, Class 1, Quality q2, and 1/4 inch thick except as otherwise indicated with a silver coating and protective electrolytic copper coating not less than .0002 inch thick, complying with Fed. Spec. DD-M-411. The protection of the mirror back shall conform to Fed. Spec. DD-M-411.

2.11 Glazing Plastics:

2.11.1 Cast Acrylic Glazing Plastic Sheets of 1/4 inch thickness, of clear transparent acrylic plastic with a light transmittance of 92 percent for a 1/4-inch sheet, impact resistance to withstand a 16-foot drop of a 1/2-pound steel ball on a 12-inch x 12-inch x 1/4-inch edge-supported sheet, modules of elasticity of approximately 450,000 psi, flexural strength of 16,000 psi, and 180 F allowable continuous service temperature.

2.11.2 Cast Polycarbonate Glazing Plastic Sheets of 1/4-inch thickness of clear transparent polycarbonate plastic, with a minimum light transmittance of 82 percent for a 1/4-inch sheet and free of significant dimensional change for exterior exposure. Drop ball impact resistance of 200 foot-pounds, for a 12-inch x 12-inch x 1/8-inch edge-supported sheet, modulus of elasticity of 340,000 psi, flexural strength of 13,500 psi, and 250 F allowable continuous service temperature.

2.11.3 Reinforced Polyester Glazing Plastic Sheets of 1/8-inch thickness of clear translucent acrylic-modified polyester plastic sheet with invisible glass fiber reinforcement compounded specifically for exterior exposure with U.V. absorbers with a light transmittance of 92 percent for an 1/8-inch sheet, manufacturer's standard figured or textured surfaces, a modulus of elasticity of 721,000 psi,

flexural strength of 17,800 psi, and 180 F allowable continuous service temperature.

2.11.4 Reinforced Polyvinyl Chloride Sheets of 0.12 inch thickness of clear transparent rigid polyvinyl chloride with .011-inch galvanized steel mesh woven to 10 mesh screening and located in the center of the sheet thickness. The sheet shall have a light transmission of 85 percent for a 1/4-inch sheet, tensile strength of 8,500 psi, flexural modulus of 550,000 psi, and flexural strength of 15,000 psi.

2.12 Bullet-Resisting Glass: Glass shall be fabricated from Type I, Class 1, Quality q3 glass with polyvinyl butyral plastic interlayers between the layers of glass. The thickness of each layers of glass shall be in accordance with the manufacturer's standard practice. The total nominal thickness of the laminated glass shall be 1-3/16 inches. Glass shall meet the test requirements of the Underwriters' Laboratory for bullet-resisting materials. Listing in Underwriters' Laboratory Guide COGT will be accepted as evidence of compliance with this requirement in lieu of a certificate.

2.13 One-Way Vision Glass: Glass shall be fabricated from Type I, Class 1, Quality q2, 1/4-inch thick glass. One face shall be coated with a hard adherent film of chromium or other approved coating of proven equivalent durability. The glass shall transmit not less than 5 percent or more than 11 percent of total incident light in the visible region and shall reflect from the front surface of the coating not less than 45 percent of the total incident light in the visible region.

2.14 Spandrel Glass: ASTM C 1048, Kind HS, Condition B, Type I, Quality q5.

2.15 Reflective Glass: ASTM C 1048, Kind HS or FT, Condition C, Type I, Quality q3, with minimum 10 percent visible light transmission and maximum 25 percent solar energy transmittance.

3.0 EXECUTION:

3.1 Preparation: Preparation of glazing and surrounding area shall comply with the details and general conditions governing glazing in the FGMA Glazing Manual unless otherwise specified.

3.1.1 Glazing: Remove broken glazing and putty from frames.

3.1.2 Frames: Clean existing frames. Replace missing or inoperative gaskets and glazing beads.

3.2 Installation:

3.2.1 General: The Contractor shall determine glazing dimensions by measuring the actual opening to receive the glass. Install sheet glass with the visible lines or waves running with the horizontal dimensions. Leave labels in place until the installation is approved.

3.2.2 Glass Setting: Items shall be glazed using glass of the quality and thickness specified or indicated. Doors and windows may be glazed in compliance with one of the glazing methods described in the standards under which they are produced, except the face puttying method will not be permitted.

3.2.3 Wired Glass: Install wire glass for fire doors and fire windows in compliance with the requirements of NFPA 80.

3.2.4 Cleaning: Glass surfaces shall be thoroughly cleaned, with labels, paint spots, putty, and other defacements removed and shall be clean at the time the work is accepted.

SECTION 08920
ALUMINUM WINDOW WALLS/CURTAIN WALLS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of aluminum window walls. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 System Performance:

2.1.1 Load-Bearing Strength (wind resistance) shall be in accordance with ASTM E 330, ANSI A58.1, and AAMA CW 1-9.

2.1.2 Deflections and Thermal Movements shall be as recommended by the wall manufacturer for the project site.

2.1.3 Leakage Resistance: Air leakage shall be in accordance with ASTM E 283. Water penetration shall be in accordance with ASTM E 331.

2.1.4 Condensation shall be in compliance with AAMA 1502.7 for the project site.

2.1.5 Sound Transmission Classification (STC) shall be as designated by the Contracting Officer and in accordance with ASTM E 90.

2.1.6 The wall system shall comply in general with applicable provisions of the AAMA Metal Curtain Wall, Window, Store Front, and Entrance Guide Specifications Manual (GSM-1).

2.2 System Components:

2.2.1 Aluminum Members (extrusions, formed members, sheet, and plate) shall be in compliance with requirements of ASTM B 221 for extrusions and ASTM B 209 for sheet/plate.

2.2.2 Insulated Panels shall be laminated aluminum-faced panels finished to match window wall framing. Face sheets shall be not less than 0.0249 inch thick. Concealed back sheets shall be of aluminum or galvanized steel. Edge condition of panels shall be prepared for installation into framing, and either

sealed or vented to exterior only. Panels shall be flat, with no deviations exceeding 5 thousands of an inch in 12 inches. Insulated core shall meet the designated k-value.

2.2.3 Brackets and Reinforcements shall be high-strength aluminum units where feasible. Otherwise, nonmagnetic stainless steel shall be used, except at fabricator's option. Brackets not exposed to weather or abrasion may be hot-dipped galvanized steel complying with ASTM A 386. Provide nonstaining, nonferrous shims for installation and alignment of window wall work.

2.2.4 Window Cleaner's Bolts, if required, shall be nonmagnetic stainless steel complying with ASME A39.1.

2.2.5 Concealed Flashing shall be dead-soft stainless steel, 26 gauge.

2.2.6 Fasteners and Accessories shall have exposed portions matching finish of window wall system. At joints where movement must be accommodated, provide slip-joint linings of sheets, pads, shims, or washers of fluorocarbon resin or similar material recommended by manufacturer.

2.2.7 Inserts for Concrete Masonry shall be cast iron, malleable iron, or hot-dipped galvanized steel complying with ASTM A 386.

2.2.8 Firestopping Materials shall be mineral fiber insulation or other noncombustible material suitable for permanent placement and complying with applicable regulations.

2.2.9 Finishes shall comply with NAAMM AA-M32C21A31 (0.4 mil) for natural aluminum color and NAAMM AA-M32C21A32 (0.4 mil) for integral color anodized finish.

3.0 EXECUTION: (Section not used.)

SECTION 09210
PLASTER REPAIRS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of plaster for repairs. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 General: Materials shall comply with ASTM C 841 and C 842 unless otherwise specified.

2.2 Finish Plaster shall be gypsum plaster or Keene's cement.

2.3 Lath and Furring shall be wood, gypsum, or metal to match existing. Paper backing shall be used on metal lath except when applied over masonry or concrete. Lath for Portland cement plaster shall comply with ASTM C 1063.

2.4 Portland Cement: ASTM C 150, Type I or Type II. Only one type and brand shall be used in the work.

2.5 Portland Cement Plaster: CSI 09220.

2.6 Metal Trim: New metal trim required for replacement of damaged or deteriorated trim shall be compatible with the existing metal trim.

2.7 Gypsum Wallboard for repair of solid but severely cracked plaster shall be 1/4 inch thick, 4-foot by 8-foot sheets.

2.8 Color: FED. STD. 595.

3.0 EXECUTION:

3.1 Preparation: Appropriate measures shall be taken to contain dust and protect adjacent surfaces during removal and replacement. Damaged or deteriorated plaster and accessories shall be removed and disposed of as required. Surfaces to which old plaster was applied shall be cleaned of all loose or foreign materials which might inhibit bonding or proper fitting of new plaster, lathing, and accessories. Concrete or masonry surfaces to be replastered shall be coated with a continuous film of bonding agent.

3.2 Environmental Conditions: A temperature of not less than 55 F shall be maintained in the building for 24 hours before, during, and after plaster application.

3.3 Plaster Installation: Plaster shall be installed in compliance with ASTM C 842. Portland cement plaster shall be installed for all exterior surfaces and all interior surfaces subject to high humidity. Gypsum plaster shall be installed for all remaining interior surfaces. Color, texture, finish, and thickness of plaster shall match adjacent, undamaged plaster or designated areas.

3.3.1 Plaster over Existing Work: Where replacement of the top or finish coat only is required, only the damaged or deteriorated finish coat shall be removed. New finish coat shall be applied, allowed to dry, and sanded to bring smooth with existing adjacent surfaces.

3.3.2 Ornamental Plaster: New plaster shall be run full, straight, and true with molding plaster using clean cut metal conforming to the existing profiles. Rough spots shall be sanded and left ready for painting.

3.3.3 Restoration: The Contractor shall replace or reinstall to the original condition all materials removed to get to the repair work. Materials damaged during removal or reinstallation shall be replaced with similar new materials.

SECTION 09260
GYPSUM DRYWALL AND METAL STUDS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of gypsum drywall. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Application procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS

2.1 Gypsum Panel - Sheetrock fire code gypsum panels (single layer).

2.2 Fasteners - Self-tapping steel screws with rust inhibited coating.

2.3 Insulation - 11/2- inch termafiber sound attenuating blankets or as circumstance dictates.

2.4 Metal Accessories - Corner Beads, trim, etc. shall be galvanized steel.

2.5 Joint Treatment - As recommended by manufacturer.

2.6 Perimeter Caulking - Acoustical as recommended by manufacturer.

2.7 Control Joints - Zinc.

2.8 Joint compound shall be asbestos free type.

2.9 Acoustical Sealant -As recommended by Manufacturer.

2.10 Metal Studs

2.10.1 Steel studs shall be hollow type spaced 16-inches on centers of sizes indicated, built up with diagonal wire web of No. 7 gauge cold drawn wire, diagonally spaced and welded at 8-inch intervals between outer chords on 1/2-inch x 1/2-inch angles, No. 16-gauge cold rolled steel.

2.10.2 Place steel studs approx. 2-inches from abutting partitions and 2-inches from each side of interior angle of all corners.

2.10.3 Steel studs shall be secured to top tracks with 22-ga. galvanized steel adjustable stud shoes.

2.11 STUD TRACKS

2.11.1 Floor and ceiling stud tracks shall be 22-ga. cold rolled steel with 1/2-inch legs and securely fastened to beams, slabs or partitions with 1/2-inch stud bolts or other method approved by manufacturer spaced not more than 24 inches on centers.

2.11.2 In locations where drawings indicate partitions on an existing floor (wood, asphalt tile, etc.), remove existing floor to allow partition to be secured to a sound concrete sub-surface.

2.12 STUD SHOES

2.12.1 Stud shoes shall be wire tied to studs with two double strands of 18-ga. galvanized tie wire.

2.13 HORIZONTAL BRACING

2.13.1 Shall consist of 3/4-inch steel furring channels fastened to inside of stud with webs in a horizontal position. Spacing of channels shall not exceed 6 feet.

3.0 EXECUTION:

3.1 Gypsum ceiling panels screw attached to metal furring channels clipped or wire tied to suspended main runner channels or wire tied to main support members.

3.2 Provide control joints where ceiling abuts dissimilar wall or ceiling or a structural element.

3.3 Gypsum wall panels shall be screwed to metal studs or furring channels and to and bottom metal track.

3.4 All joints of ceiling or wall panels shall be taped with at least two coats of joint compound. See manufacturers instructions for applicable installation.

3.5 Align stud track accurately to the partition layout @ Both floor and Ceiling.

3.6 Adjust all members for straight and proper alignment.

SECTION 09315
TILE FLOORING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of ceramic tile flooring, ceramic mosaic tile flooring, conductive ceramic tile flooring, quarry tile flooring, slate flooring, and quarry tile by the acid-resistant installation. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Glazed Ceramic Tile: ANSI A137.1.

2.2 Ceramic Mosaic Tile: ANSI A137.1.

2.2.1 Natural Clay Tile.

2.2.2 Porcelain Body Tile.

2.2.3 Slip-Resistant Tile: ANSI A137.1.

2.2.4 Pregrouted Sheets of ceramic tile, factory-assembled and grouted with manufacturer's standard polyurethane material.

2.3 Conductive Ceramic Tile: Complying with Type I, Class F.

2.4 Quarry Tile: ANSI A137.1. Wax-coated top surface for acid-resistant installation.

2.4.1 Slip-Resistant Quarry Tile shall comply with TCA ANSI A137.1, Section 5.2.1.2.9.

2.5 Slate: Grade A, unfading slate flooring.

2.6 Base Units: Cove type, round top.

2.7 Trim Pieces: For base shall be cove or bullnose.

2.8 Mortar and Grout Materials:

2.8.1 Portland Cement: ASTM C 150, Type 1.

2.8.2 Aggregate: Sand, ASTM C 144.

2.8.3 Dry-Set Mortar and Grout: ANSI A118.1, TCA Formula 759 or 763 (as applicable).

2.8.4 Conductive Dry-Set Mortar: Conforming to ANSI A118.2.

2.8.5 Conductive Latex Mortar: Conforming to ANSI A118.2.

2.8.6 Liquid Latex: ANSI A118.4 except latex shall be non-remulsifiable in water.

2.8.7 Epoxy Mortar and Grout: TCA Formula AAR-II, two-component epoxy resin, hardener, and mineral filler complying with ANSI A118.3.

2.8.8 Furan Mortar.

2.8.9 Furan Grout.

2.8.10 Water shall be clean, fresh, potable water approved by Public Health authorities for domestic consumption.

2.8.11 Commercial Cement Grout: Proprietary compound of Portland cement and additives, factory-blended to decrease shrinkage.

2.9 Adhesives:

2.9.1 Epoxy Adhesive: TCA Formula C150, two component epoxy resin and hardener.

2.9.2 Organic Adhesive: ANSI A136.1 with TCA certification of conformance.

2.10 Sealants:

2.10.1 Polysulphide: Fed. Spec. TT-S-00230, Type I, single component, synthetic-rubber base.

2.10.2 Polyurethane: Fed. Spec. TT-S-00230, Type I, single component.

2.10.3 Silicone: Fed. Spec. TT-S-001543 Class A and TT-S-00230, single component.

2.11 Ahesive and Joint Sealant: Fed. Spec. TT-S-00230, Type 2, Class B.

2.12 Cleavage Membrane: One of the following:

2.12.1 Saturated Felt: ASTM D 250, 15-pound type.

2.12.2 Polyethylene Film: ASTM D 2103, Type O, 0.004 inch thick.

2.13 Marble Thresholds: Group A per Marble Institute of America MIA-01, with rounded edges and sand rubbed finish.

2.14 Reinforcing Mesh: ASTM A 185.

2.15 Plywood: DOC PS 1, "C-C EXT-APA" or "UNDERLAYMENT C-C Plugged EXT-APA," 3/4 inch thick unless otherwise noted.

2.16 Nails: Fed. Spec. FF-N-105 annular, screw or ring type, zinc-coated.

2.17 Backer Rod: Closed cell polymeric foam, with a density of 2.5 pcf and tensile strength of 35 psi per ASTM D 1623 and water absorption less than 0.02 gms/cc per ASTM C 1083.

2.18 Elastomeric Sheet: 40 mil complying with ASTM D 2103.

3.0 EXECUTION:

3.1 General: Comply with ANSI A108.1 through A108.7 except as otherwise indicated and with TCA Handbook for Ceramic Tile Installation.

3.2 Portland Cement Mortar Bed: Install in accordance with ANSI A108.1, as modified herein.

3.2.1 Mix Mortar in proportion on one part Portland cement to five parts dry sand or six parts damp sand.

3.2.2 On Wood and Framed Concrete Slab Floors provide a cleavage membrane before placing setting bed, with edges of sheets lapped.

3.2.3 On Cleavage Membrane lay welded wire mesh reinforcing, lapping three inches at all edges.

3.2.4 Install Mortar and tamp heavily to compact bed to depth of 3/4 inch to 1-1/4 inches.

3.3 Dry-Set Portland Cement Mortar Bed: Install in accordance with ANSI A108.5 except as modified below.

3.3.1 Carefully Work Sufficient Water into dry-set mortar to obtain desired consistency.

3.3.2 Mix Mortar Ingredients thoroughly before adding latex. Carefully work in sufficient latex to obtain desired consistency.

3.3.3 Rework Mixes from time to time to maintain proper consistency, but do not add additional ingredients.

3.3.4 Apply Layer of Mortar to form a thickness of at least 1/8 inch.

3.4 Organic Adhesive Application: Install in accordance with ANSI A108.4.

3.5 Install Conductive Ceramic Tile in accordance with ANSI A108.7.

3.5.1 Testing: Conductive ceramic tile floors shall be tested in accordance with NFPA 99.

3.5.2 Replacement: Floors that have not met requirements of NFPA 56 within six months after they are installed shall be removed and replaced with properly conductive floor by this Contractor at no additional cost to the Government.

3.6 Install Quarry Tile and Slate in accordance with ANSI A108.3.

SECTION 09320
CERAMIC WALL TILE

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of ceramic wall tile. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Tile:

2.1.1 Ceramic Tile: Tile shall be standard grade conforming to ANSI A137.1. Containers shall be grade-sealed. Seals shall be marked to correspond with the marks on the signed master grade certificate.

2.1.2 Ceramic Mosaic Tile and Trim shall be unglazed natural clay or porcelain with cushion edges. Tile size shall be 1 inch by 1 inch, 1 inch by 2 inches, 2 inches by 2 inches, or a mixture of standard sizes in a stock pattern, as selected.

2.1.3 Glazed Wall Tile and Trim shall be cushion-edged with bright or matte glaze. Tile shall be 4-1/4 inches by 4-1/4 inches, 4-1/4 inches by 6 inches, or 6 inches by 6 inches and, as selected.

2.1.4 Accessories: Accessories shall be the built-in type of the same materials and finish as the wall tile.

2.2 Setting Bed: Metal lath shall be flat expanded type conforming to ANSI A42.3 or A42.4, and weighing not less than 2.5 pounds per square yard.

2.3 Water shall be potable.

2.4 Mortar, Grout, and Adhesive shall conform to the following:

2.4.1 Dry-Set Portland Cement Mortar: ANSI A118.1.

2.4.2 Organic Adhesive: ANSI A136.1, Type I.

2.4.3 Epoxy Resin Grout: ANSI A118.3.

2.4.4 Furan Resin Grout: ASTM C 395.

3.0 EXECUTION:

3.1 Preparation: Surface to receive tile shall conform to the requirements ANSI A108.1 for surface conditions for the type setting bed required and for workmanship.

3.2 Installation:

3.2.1 General: Special shapes shall be provided as required for sills, jambs, recesses, offsets, external corners, and other conditions to provide a complete and neatly finished installation.

3.2.2 Installation of Wall Tile:

3.2.2.1 Plastic or Cured Mortar Bed: Tile shall be installed over a plastic mortar bed or a cured mortar bed. A 4-mil polyethylene membrane, metal lath, and scratch coat shall also be installed. Plastic mortar bed, materials, and installation of tile shall conform to ANSI A108.1. Cured mortar bed and materials shall conform to ANSI A108.1. Dry-set mortar method of installing tile over a cured mortar bed shall conform to ANSI A108.5.

3.2.2.2 Dry-Set Mortar: Dry-set mortar shall be used to install tile directly over clean, sound, dimensionally stable masonry in accordance with ANSI A108.5.

3.2.2.3 Organic Adhesive: Organic adhesive installation of ceramic tile shall conform to ANSI A108.4.

3.3 Cleaning: Upon completion, tile surfaces shall be thoroughly cleaned in accordance with ANSI A108.1. Acid shall not be used for cleaning glazed tile.

SECTION 09405
TERRAZZO

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for terrazzo floors and stairs. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Terrazzo Materials and Installation shall comply with specifications and recommendations of The National Terrazzo and Mosaic Association, Inc. (NTMA)

2.2 Underbed Reinforcement shall be 2-inch by 2-inch by 16-gauge welded wire mesh, ASTM A 185, galvanized.

2.3 Isolation Membrane shall be polyethylene film, complying with ASTM D 2103, not less than 4.0 mils thick.

2.4 Cast-In-Place Terrazzo Materials:

2.4.1 Portland Cement shall conform to ASTM C 150, Type I, except as modified to comply with NTMA requirements for compressive strength. Provide non-staining white cement for terrazzo matrix. Provide standard gray cement for underbed.

2.4.2 Sand shall conform to ASTM C 33.

2.4.3 Aggregate shall be natural, sound, crushed marble chips without excessive flats or flakes, complying with NTMA requirements.

2.4.4 Monolithic Terrazzo shall be 1/2-inch total thickness over concrete slab.

2.4.5 Bonded Terrazzo shall be 1/2-inch terrazzo over a 1-1/4 inch minimum underbed.

2.5 Thinset Epoxy and Polyester Materials:

2.5.1 Polyacrylate-Modified Cementitious Terrazzo Matrix: Polyacrylate and color pigment complying with NTMA "Guide Specification for Polyacrylate Modified Terrazzo."

2.5.2 Polyester Resin Terrazzo Matrix: Two-component polyester resin and hardener, mineral filler, and color pigment, complying with NTMA "Guide Specification for Polyester Terrazzo."

2.5.4 Epoxy Resin Terrazzo Matrix: Thermosetting, amine-cured epoxy resin and hardener, mineral filler, and color pigment, complying with NTMA "Guide Specification for Epoxy Terrazzo."

2.5.5 Conductive Terrazzo with Resinous Matrix: Electricity conductance shall conform to resistance levels established by the UL 779.

2.6 Precast Terrazzo: Precast terrazzo base and stair units shall comply with NTMA.

2.7 Sealer: Colorless, slip-and stain-resistant, non-yellowing penetrating sealer that will not disturb color or physical properties of terrazzo surface; pH factor between 7 and 10.

2.8 Plywood: DOC PS 1, "C-C EXT-APA" or "Underlayment C-C Plugged EXT-APA", 3/4 inch thick unless otherwise noted.

2.9 Nails: Fed. Spec. FF-N-105 annular, screw or ring type.

2.10 Elastomeric Sheet: 40 mil thick extruded, homogeneous, waterproof, impervious, nonplasticized chlorinated polyethylene sheet, complying with ASTM D 2103.

2.11 Curing Materials:

2.11.1 Polyethylene Film: Non-staining type.

2.11.2 Paper: Non-staining, heavy building paper.

2.11.3 Curing Compound: Liquid membrane-forming compound, complying with ASTM C 309, Type I.

2.12 Cleaner: Neutral liquid chemical cleaner, biodegradable, free from crystalline salts, phosphate or water soluble alkaline salts, formulated for terrazzo, pH factor between 7 and 10.

3.0 EXECUTION:

3.1 Preparation: Clean and prepare substrate to comply with NTMA specifications for type of terrazzo application indicated. Clean area to receive terrazzo of loose chips and all foreign matter. Grind concrete substrate as required to provide surfaces within tolerances required by NTMA.

3.2 Installation:

3.2.1 Comply with NTMA and manufacturer's recommendations for proportioning mixes, for installation of strips, and for placing, curing, grinding, grouting, and finishing.

3.2.2 Provide terrazzo bases, thresholds, stair treads, and landings as required.

3.2.3 Install Divider and Accessory Strips in an adhesive setting bed, without voids below strips. Provide mechanical anchorage for adequate attachment of strips to substrate.

3.2.4 Provide Control Joints by installing angle type divider strips back-to-back with neoprene rubber filler cemented between strips, flush with finish floor.

3.2.5 Provide for Expansion Joints by installing angle type divider strips back-to-back, with removable filler of the width shown (but not less than 1/4 inch wide) between strips.

3.2.6 Install Abrasive Inserts where required.

SECTION 09510
ACOUSTICAL CEILINGS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of acoustical units in suspended ceilings. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Acoustical Units shall conform to ASTM E 1264, Class A, and the following requirements:

2.1.1 Acoustical Panel Units for Exposed Grid System shall be the type and pattern required, NRC grade of 55 minimum when tested on mounting No. 7, trimmed and butt, with a LR coefficient of .75 and a STC range of 40-44. Nominal size shall be 24 inches by 48 inches or 24 inches by 24 inches. Finish shall be factory-applied white finish.

2.1.2 Acoustical Panel Units for Semi-Exposed Grid System shall be the type and pattern required, NRC grade of 55 minimum when tested on mounting No. 7, trimmed and butt, with a coefficient of .75 and a STC range of 40-44. Nominal size shall be 12 inches by 24 inches or 12 inches by 12 inches. Finish shall be factory-applied white finish.

2.1.3 Acoustical Tile Units for Concealed Grid System shall be the type and pattern as required, NRC grade of 55 minimum when tested on mounting No. 7. LR grade shall be 1, and STC range shall be 40-44. Edge detail shall be beveled or square, and joint detail shall be kerfed and rabbeted or as required. Nominal size shall be 12 inches by 12 inches, and finish shall be factory-applied white finish.

2.1.4 Metal Ceiling System: Pans shall be type required, and acoustical insulation pads shall be NRC grade 55 minimum when tested on mounting No. 7. The pattern shall be "c," with a nominal size of 12 inches by 24 inches. Edge detail shall be manufacturer's standard, and joint detail shall be beveled or cross-scored to simulate 12-inch by 12-inch units. Finish shall be factory-applied white baked enamel, two coats on exposed surfaces, one coat on edges and backs. Pads shall be completed enclosed, of material and thickness required for acoustical and fire test ratings, with a LR grade of 2.

2.1.5 Fire Resistive Ceilings: Acoustical fire resistive ceiling systems shall be rated for fire endurance when tested in accordance with ASTM E 119. Suspended ceiling shall have been tested with a specimen roof and/or floor assembly representative of the construction, including 09510-mechanical and electrical work within ceiling space openings for light fixtures, air outlets, and access panels.

2.1.6 Ceiling Sound Transmission Class and Test: STC range of acoustical units, when required, shall be determined in accordance with Ceiling Sound Transmission Test by Two-Room Method and reported in accordance with the appendix to ASTM E 90 for 11 frequency data or ASTM E 413 for 16 frequency data.

2.2 Suspension System shall be of the type required and shall conform to ASTM C 635 for intermediate- or heavy-duty systems. Surfaces exposed to view shall be aluminum or steel with a factory-applied white baked enamel finish, aluminum with a clear anodized finish as required or aluminum with colored factory-applied vinyl paint finish. Wall molding shall have a flange of not less than 15/16 inch and shall be provided with inside and outside corner caps.

2.3 Hangers shall be galvanized steel wire. Hangers and attachment shall support a 300-pound vertical load without failure of supporting material or attachment.

2.4 Access Panels shall match adjacent acoustical tiles and shall be designed and equipped with suitable framing and fastenings for removal and replacement without damage. Panel shall be not less than 12 inches by 12 inches or more than 12 inches by 24 inches. An identification plate of 0.032-inch thick aluminum, 3/4 inch in diameter, stamped with the letters "AP" and finished the same as the unit shall be attached near on corner on the face of each access panel.

2.5 Fire Hazard Classification: All acoustical unit materials shall bear the UL label and marking, indicating fire hazard classification of acoustical unit materials as determined by ASTM E 84. Provide materials with the following fire hazard classifications:

Flame spread not more than 25.
Smoke developed not more than 50.

3.0 EXECUTION:

3.1 Acoustical Work shall be provided complete with all necessary fastenings, clips, and other accessories required for a complete installation.

3.2 Suspension System shall be installed in accordance with ASTM C 636 and as specified herein.

3.3 Wall Molding shall be provided where ceilings abut vertical surfaces.

3.4 Ceiling Tiles: Panels in exposed-grid system shall be held in place with manufacturer's standard hold-down clips.

SECTION 09530
ACOUSTICAL INSULATION AND BARRIERS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of acoustical insulation and barriers. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Leaded Vinyl shall be a loaded vinyl sound barrier product composed of lead, vinyl, and fiberglass reinforcing intended for use as a sound attenuation material. The material shall weigh either 72 or 120 ounces per square yard as required. Material thickness shall be 0.025 inch and 0.050 inch for 72 ounce and 120 ounce material, respectively.

2.2 Foil-Reinforced, Kraft-Faced, Mineral-Fiber Insulation shall be a faced insulation product designed to be used for thermal and acoustical insulation. Mineral fiber insulation shall be in accordance with Fed. Spec. HH-I-558, Form A, Class 1 or 2. Noise reduction coefficient (NRC) shall be not less than 0.55 for 1-inch thickness. Vapor transmission rate shall be not more than 0.02 perms. Surface burning characteristics shall be not more than a flame spread classification of 25, a fuel contribution of 50, and a smoke developed rating of 50, when tested in accordance with UL 723.

2.3 Vapor Barrier Facing Material shall be in accordance with ASTM C 1136, Type I or II as required. Facing material shall be a laminate of aluminum foil and kraft-reinforced mineral fiber scrim.

2.4 Sheet Lead shall be in acoustical attenuating product weighing 1 pound per square foot, with a thickness of not less than 1/64 inch. Lead sheet shall conform to Fed. Spec. QQ-L-201, Grade B.

2.5 Fire Hazard Classification: All acoustical insulation and barrier materials shall bear markings indicating the fire hazard classification as determined by ASTM E 84. Provide materials with the following fire hazard classifications:

Flame spread not more than 25.
Smoke developed not more than 50.

3.0 EXECUTION: (Section not used.)

SECTION 09535
SOUND ABSORBING PANELS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of sound absorbing panels. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Perforated Steel Panels shall be modular units, fabricated of 22 gauge zinc-coated steel, and perforated with holes comprising not less than 10 percent of the panel area. Panels shall be suitably stiffened in both directions in accordance with panel size. Panels shall be filled with 2 inch thick, 1.5 lbs/cu ft acoustical insulation meeting Fed. Spec. HH-I-558, Form B, Type 1, Class 7. Installed panel units with acoustical insulation shall have a minimum Noise Reduction Coefficient (NRC) of .70 when tested in accordance with ASTM C 423. Panel units shall be furnished with two coats of white baked-on polyester paint on exposed surfaces and one coat on non-exposed surfaces.

2.2 Fiberglass Wall Panels shall be modular units, fabricated of 1-1/8 inch glass fiber board laminated to a nonwoven needle-punched fabric. The panels shall have a minimum NRC of .80 according to ASTM C 423. Panels shall be furnished with suitable wall fastening system.

2.3 Sound Attenuation Blankets shall be composed of mineral fiber of 4 lbs/cu ft density for 1 inch thickness, and 3 lbs/cu ft density for greater than 1 inch thickness conforming to ASTM C 665. Blanket R-value shall be 4 per inch.

2.4 Fire Hazard Classification: A sound absorbing panel unit and sound attenuation blankets shall have a fire hazard classification as determined by ASTM E 84. Provide materials with the following fire hazard classifications:

Flame spread not more than 25.
Smoke developed not more than 50.

3.0 EXECUTION:

3.1 Perforated Steel Panels shall be installed on ceiling suspension systems and wall furring systems that are compatible with perforated steel panels and that are already in place.

3.2 Fiberglass Wall Panels shall be installed on substrate wall surfaces that are clean, dry, and continuous, with no surface irregularities.

SECTION 09560
WOOD STRIP FLOORING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of wood strip flooring. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Wood Strip Flooring shall be manufactured from kiln-dried, plain-sawed, red oak lumber. Flooring shall be select grade, tongue and groove, end-matched, with manufacturer's standard channeling of back face of each strip. Size shall be 3/4 inch thick, 2-1/4 inches wide.

2.2 Maximum Moisture Content shall be 9 percent for wood strip flooring and 14 percent for other wood members.

2.3 Finishing Materials for Job Finished Flooring:

2.3.1 Stain: Penetrating type non-fading wood stain.

2.3.2 Wood Filler: Fed. Spec. TT-F-336.

2.3.3 Sealer: Penetrating type, pliable, wood-hardening finish/sealer.

2.3.4 Varnish: Alkyd resin varnish.

2.3.5 Urethane Finish: Fed. Spec. TT-C-542.

2.3.6 Floor Wax: Liquid, solvent-type, slip- resistant, conforming to Fed. Spec. P-W-158.

2.4 Composition Cork Expansion Strip: Fed. Spec. HH-C-576, Type I-B, Class 2.

2.5 Nails shall be Fed. Spec. FF-N-105 screw or ring type, zinc coated.

2.6 Asphalt Primer shall comply with ASTM D 41.

2.7 Asphalt Saturated Felt shall be organic, 15-pound, unperforated, complying with ASTM D 226.

2.8 Membrane shall be 6 mil, carbonized polyethylene sheeting, complying with Fed. Spec. L-P-512.

2.9 Wood Sleepers shall be No. 1 common, fir, hemlock, spruce, or yellow pine complying with requirements of the rules or standards under which produced with preservative treatment complying with AWPB LP-2.

2.10 Plywood Subflooring shall be DOC PS 1, "C-D INT- APA," with exterior glue, or "C-C EXT-APA."

2.11 Hardboard shall comply with ANSI/AHA A135.4, specially made for underlayment, 1/4 inch thick.

3.0 EXECUTION:

3.1 Preparation:

3.1.1 Wood Subfloors shall be renailed where loose. Where unsatisfactory wood subflooring is removed, replace with new exterior or underlayment grade plywood. Apply hardboard underlayment just before finish floor is to be installed. Nail plywood subfloors with screw-type nails. Cover ground in crawl space with lapped and sealed 4 mil polyethylene or 55-pound rolled roofing, and cover subfloor with a lapped layer of 15-pound asphalt saturated felt.

3.1.2 Concrete Subfloors: Fill large cracks and holes in concrete structural floor slabs with a one part nonshrinking cement to three part sand grout with a latex or epoxy additive. Test for dryness with a 3 percent solution of phenolphethalein in grain alcohol (97 percent). Sand or trowel smooth irregularities to within allowable tolerances of NOFMA-01. Apply primer to concrete subfloors avoiding separating the emulsion. Apply two applications of hot asphalt mastic and asphalt saturated felt, then apply an additional layer of asphalt mastic. Provide flat 2 x 4 sleepers, 18 to 30 inches long impregnated with an approved wood preservative and laid in additional asphalt mastic; or apply a polyethylene sheet moisture protection system consisting of two courses of 1 x 2 nailing strips with a layer of polyethylene between, the first course being treated with preservative and adhered to the slab in rivers of mastic supplemented by a 1-1/2 inch concrete nail every 24 inches.

3.1.3 Treated Wood Cuts shall be treated with the original preservative.

3.2. Installation of Wood Strip Flooring:

3.2.1 General: Comply with NOFMA-01.

3.2.2 Expansion Space: For straight running pattern flooring and depending upon the width of pattern to be laid (usually the width of the room), provide approximately 1/2 inch of expansion space under base and base shoe along length of stripping, with approximately half as much space at ends of pattern.

3.2.3 Machine Sand installed unfinished flooring to remove offsets and non-level conditions.

3.2.4 Field Finish floors by applying a coat of wood paste filler and stain, if needed.

3.2.4.1 Natural Finish: Apply two coats of sealer and two coats of floor wax.

3.2.4.2 Varnish Finish: Apply three coats of floor varnish.

3.2.4.3 Urethane Finish: Apply multiple coats of urethane finish to build a dry film thickness of 1.0 mil.

SECTION 09566
WOOD BLOCK INDUSTRIAL FLOORING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of wood block industrial flooring. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Wood Block Creosoted Flooring shall be yellow pine, Douglas fir, or upland oak, preservative-treated, and in accordance with ASTM D 1031. Blocks shall be end-grain lumber with beveled corners and shall be 2, 2 1/2, or 3 inches thick, 3 inches wide, and 6 inches long.

2.2 Wood Block Natural Finish Flooring shall be yellow pine or upland oak, preservative-treated. Wood blocks shall be of the species, quality, and size described in ASTM D 1031. Blocks shall be end-grain lumber with beveled corners and shall be 2 inches thick, 3 inches wide, and 6 inches long.

2.3 Primer, Adhesive, and Filler shall be provided for wood block creosoted flooring.

2.4 Flexible Filler and Clear Industrial Sealer and Finish Coating shall be provided for wood block natural finish flooring.

3.0 EXECUTION:

3.1 Preparation: Before any work under this section is begun, all defects such as rough or scaling concrete, low spots, high spots, and uneven surfaces shall have been corrected and all damaged portions of concrete slabs shall have been repaired. If concrete curing compounds or surface sealers have been applied to the concrete slabs, they shall have been entirely removed from the slabs.

3.2 Installation:

3.2.1 For Wood Block Creosoted Flooring, a coat of priming oil shall be applied to the concrete slab. After the priming oil has dried, a squeegee coat of hot adhesive shall be applied. When the adhesive has hardened, the blocks

shall be laid tightly together with the grain vertical. After the floor has been laid, two coats of filler shall be applied by squeegee. Expansion joints shall be provided.

3.2.2 For Wood Block Natural Finish Flooring, the joints shall receive filler and multiple coats of clear sealer and finish coating. Number of coats and method of application shall be adjusted to seasonal conditions.

3.3 Marking Lines: Floor surface in areas to receive lines shall be cleaned by scarification or by wire brushing. At least two coats of a marking material compatible with flooring materials shall be applied with suitable brush or spraying machine. The minimum total thickness of the marking lines shall be 4 mils.

SECTION 09570
WOOD PARQUET FLOORING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of wood parquet flooring. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Wood Parquet Flooring shall be kiln-dried, plain-sawed, red oak.

2.2 Laminated (Plywood) Wood Block Flooring shall be prime grade, 12-inch x 12-inch x 1/2-inch nominal size, with manufacturer's standard urethane floor finish. Flooring shall be tongue and grooved as required for laying in checkerboard pattern.

2.3 Slat Block Flooring shall be clear grade, factory-prefinished with manufacturer's standard penetrating floor sealer treatment. Flooring shall be 9 inches x 9 inches x 5/16 inch, square pattern, tongue and groove, square edge matching. Pattern units of flooring shall be factory- assemble and adhered to removable paper facing for shipment to the project, or with slats fastened together with metal splines on backs.

2.4 Solid Block Flooring: Wood parquet flooring shall be prefinished in factory. Flooring shall be prime grade, tongue and groove, square edge, matching.

2.5 Plastic Impregnated Parquet Flooring shall be manufacturer's standard fabrication of solid hardwood slat-block parquet flooring, which has been impregnated with acrylic plastic and treated by gamma radiation and factory-finished. Flooring shall be composed of 5/16-inch thick x 6-inch squares fabricated into 12-inch square blocks, square edged, tongued and grooved, with tongue and groove matching.

2.6 Adhesive/Mastic shall be polyvinyl acetate (PVA) or special mastic of type recommended by the flooring manufacturer and complying with flammability and environmental control regulations.

2.7 Finish Materials for Unfinished Flooring:

2.7.1 Stain: Penetrating type non-fading wood stain.

2.7.2 Wood Paste Filler: Fed. Spec. TT-F-336, pigmented if required.

2.7.3 Sealer: TT-S-176, Class I, for white oak and red oak, Class II for beech, birch, and hard maple.

2.7.4 Varnish: Alkyd resin varnish conforming to Fed. Spec. TT-V-109.

2.7.5 Polyurethane Finish: Moisture curing type, polyurethane finish conforming to Fed. Spec. TT-C-542.

2.7.6 Floor Wax: Slip-resistant, conforming to Fed. Spec. P-W-158, Type I, Class 2.

2.8 Composition Cork Expansion Strip: Fed. Spec. HH-C-576, Type I-B, Class 2.

2.9 Nails and Screws shall be recommended by NOFMA-01.

2.10 Concrete Primer: ASTM D 41.

2.11 Asphalt-Saturated Felt: ASTM D 226.

2.12 Hardboard Underlayment: ANSI/AHA A135.4.

3.0 EXECUTION:

3.1 Preparation:

3.1.1 For Adhesive Application on Concrete Slab: Test for dryness with a 3 percent solution of phenolphethalein in grain alcohol (97 percent), examine concrete surfaces and grind irregularities to within allowable tolerances of NOFMA-01, and apply primer to concrete subfloors.

3.1.2 For Adhesive Application on Wood Subflooring or Underlayment: Preparation of subflooring or underlayment shall be in compliance with the printed instructions of the flooring manufacturer.

3.1.3 For Nailed Application on Wood Subflooring or Underlayment: Cover subflooring with a layer of 15-pound asphalt-saturated felt, lap all edges at least 2 inches, and turn felt up at least 2 inches behind baseboards.

3.1.4 For Plastic Impregnated Parquet Flooring: Patch and level concrete subfloors with porous latex cement patching compound. If parquet is to be

installed over existing synthetic floor or tongue and grooved subfloor wider than three and one quarter inches, a 1/4-inch plywood or untempered hardboard underlayment.

3.2 Installation:

3.2.1 General: Comply with recommendations and instructions by NOFMA in "Hardwood Flooring Installation Material" and by recommendation of American Parquet Flooring Association, Inc. Where flammable adhesives are used, provide safety sparkproof fans when natural ventilation is inadequate; prohibit smoking, lighting matches, metal heel caps, or any other flame or spark producing device.

3.2.2 Installation of Wood-Block Flooring on Concrete Slabs shall be by adhesive method.

3.2.3 Installation on Wood Subflooring or Underlayment: Apply one layer of saturated felt over wood or underlayment in troweled adhesive, and apply wood blocks with at least two 7-penny spiral or screw type flooring nails per block.

3.2.4 Installation of Plastic Impregnated Parquet Flooring: Install with special adhesive.

3.2.5 Sanding: Machine sand installed unfinished flooring to remove offsets and non-level conditions.

3.2.6 Field Finishing:

3.2.6.1 Base Finish: On same day that final sanding, buffing, and sweeping have been completed, apply a coat of wood paste filler. Apply stain if needed, then apply two coats of sealer.

3.2.6.2 Natural Finish: When floors are dry apply two coats of wax.

3.2.6.3 Varnish Finish: Apply 3 coats of floor varnish.

3.2.6.4 Urethane Finish: Apply urethane finish to build a dry film thickness of 1.0 mil.

SECTION 09596
GYMNASIUM FLOORING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of gymnasium flooring. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Flooring shall comply with MFMA grading rules. Wood strips shall be second grade or better, edge cut, hard maple (acer saccharum), pressure treated, and kiln dried.

2.2 Asphalt Primer: ASTM D 41.

2.3 Asphalt Saturated Felt: Organic, 15 pounds unperforated, complying with ASTM D 226.

2.4 Membrane: 6 mil, carbonized polyethylene sheeting, complying with Fed. Spec. L-P-512.

2.5 Wood Sleepers: No. 1 common, fir, hemlock, spruce, or yellow pine complying with the rules or standards under which produced, with preservative treatment complying with AWPB LP-2.

2.6 Wood Trim: Provide wood baseboard molding, base shoe molding, and stair risers of same species as the wood flooring. Provide wood stripping, nosings, saddles, and thresholds, of same species and cut as the wood flooring.

2.7 Fibrated Kraft Building Paper: Minimum water-vapor permeability of 35 grams per sq. meter per 24 hours (perms).

2.8 Plywood Subflooring: DOC PS 1, "C-D INT-APA," with exterior glue; or "C-C EXT-APA."

2.9 Hardboard: ANSI/AHA A135.4, specially made for underlayment, 1/4 inch thick.

2.10 Nails: Fed. Spec. FF-N-105 annular, screw or ring type, zinc-coated.

3.0 EXECUTION:

3.1 Installation: Comply with MFMA standards and WSFI standards.

3.2 Expansion Spaces: Provide space at walls and other obstructions, interruptions, and terminations of flooring. Cover spaces with base trim, saddles, and thresholds.

3.3 Resiliently-Mounted Subflooring System: Install two layers of 1/2-inch plywood subflooring over moisture barrier and primed substrate. Nail gymnasium flooring to subflooring.

3.4 Steel Channel Sleeper System: Install moisture barrier over primed substrate. Nail channel sleepers to substrate over resilient channel backer, spaced 12 inches o.c. Lay resilient insulation boards in a continuous course between channel sleepers. Fasten gymnasium flooring with flooring clips.

3.5 Resiliently-Mounted Wood Sleeper System: Install 2 foot or 3 foot wood sleeper units at 12 inches o.c. without anchorage over moisture barrier and primed substrate. Nail gymnasium flooring to wood sleepers.

3.6 Wood Subflooring and Sleeper System: Anchor sleeper clips to primed substrate, 24 inches o.c., for running sleepers at 16-inch spacing. Flood-coat substrate with 1/8-inch thick pour of hot asphalt. Shim 2 foot or 3 foot wood sleepers level and grout with 1:3 Portland cement-sand grout. Nail clips to sleepers at each juncture. Nail subflooring on sleepers. Cover subflooring with 30-pound, asphalt-saturated felt, with lapped seams. Install wood strip gymnasium flooring to subfloor.

3.7 Steel Spline Flooring on Vapor Barrier System: Prime concrete slab with asphalt primer before applying two layers of 15-pound, asphalt-saturated felt in asphalt mastic. Cover top layer of felt with a smooth continuous layer of asphalt mastic at least 1/8 inch thick. Lay 12-inch wide continuous strips of finish flooring firmly in asphalt mastic interlocking with saw-toothed steel splines into the slotted ends.

3.8 Steel Spline Flooring on Cork Underlayment System: Vaporproof slabs on grade as described in Section 3.7. Install 1/2-inch thick corkboard or 1/2-inch thick corkroll underlayment in 1/8 inch of asphalt mastic. Over corkboard, trowel on an additional coat of mastic, 1/8 inch thick. Lay 12-inch wide continuous strips of finish flooring firmly in asphalt mastic interlocking with saw-toothed steel splines into the slotted ends.

3.9 Sanding: Machine sand with coarse, medium, and fine grades of sandpaper, followed by disc sanding with 000 sandpaper. Clean with power vacuum. Proceed immediately with finish.

3.10 Finishing: Apply floor sealer (2 coats). Apply as many coats of gym floor finish as needed to build a minimum dry film thickness of 3 mils. Machine buff with steel wool.

SECTION 09598
SOFTWOOD FLOORING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of softwood flooring. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Douglas Fir Wood Strip Flooring, kiln-dried, vertical grain, complying with the requirements of WCLB for Grade C and better flooring.

2.2 Southern Pine Wood Strip Flooring, kiln-dried, edge grain, complying with the requirements of SPIB for Grade C and better.

2.3 Matching: Tongued and grooved, and end matched.

2.4 Pressure Treatment: Where flooring is exposed to the exterior, provide AWPB LP-2 pressure treatment after manufacture of flooring, followed by drying to required moisture content.

3.0 EXECUTION:

3.1 Plank Flooring: For strip flooring of face width over 3-1/4 inches (plank flooring), install two counter-set nails at each end of each piece and spaced not more than 32 inches along length of each piece. Fill holes with matching wood filler.

3.2 Treated Wood: Whenever treated wood flooring must be cut for installation, treat the cut with the preservative used in the original treatment immediately after cutting.

SECTION 09651
RESILIENT FLOORING - CEMENTITIOUS UNDERLAYMENT

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of cementitious underlayment for resilient flooring. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS: Cementitious underlayment shall be one of the following factory-mixed types.

2.1 Magnesium Type: Mixture of sand, magnesium, cement, and/or gypsum. Add water before using.

2.2 Latex Type: Mixture of sand, cement, and latex in dry form to which water is added on the job, or two component type in which latex is added as a liquid on job.

2.3 Polyvinyl Acetate Type: Polyvinyl acetate resins, cement, gypsum, and sand mixtures.

2.4 Epoxy Type: Two-component epoxy type that merely requires mixing of the two parts in compliance with manufacturer's instructions.

2.5 Oxychloride Type: Mixture with cement and with or without magnesium.

3.0 EXECUTION:

3.1 Preparation:

3.1.1 On Wood Subfloors lay 15-pound saturated felt in opposite direction to floor boards. Lap edges three inches.

3.1.2 Place Metal Lath nailed at 6-inch centers over felt.

3.2 Installation:

3.2.1 Install Cementitious Underlayment in strict compliance with instructions for the type of system used.

3.2.2 Where Feather Edges less than 1/4 inch thick are required, use a latex type underlayment for such thin parts of the underlayment.

3.2.3 On Concrete Surfaces apply latex or polyvinyl acetate liquid as a bonding agent before installing underlayment.

SECTION 09655
RESILIENT FLOORING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of resilient flooring. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Critical Radiant Flux: Resilient flooring material shall have an average critical radiant flux of 0.45 watts per square centimeter when tested in accordance with NFPA 253.

2.2 Resilient Tile Flooring:

2.2.1 Asphalt Tile: Fed. Spec. SS-T-312, Type I, 9 inches by 9 inches by 1/8 inch thick.

2.2.2 Homogeneous Vinyl Tile: Fed. Spec. SS-T-312, Type III, 12 inches by 12 inches by 1/8 inch thick.

2.2.3 Rubber Tile: Fed. Spec. SS-T-312, Type II, 12 inches by 12 inches by 1/8 inch thick.

2.3 Resilient Sheet Flooring:

2.3.1 Sheet Vinyl Flooring: Fed. Spec. L-F-475, Type II, Grade A, thickness 0.085 inch, with organic backing, not less than 72 inches wide.

2.3.2 Sheet Rubber Flooring: Solid, integrally colored, 36-inch wide; thickness 1/8 inch.

2.4 Base: Provide base complying with Fed. Spec. SS-W-40, either Type I rubber or Type II vinyl with matching end stops and preformed or molded corner units, with a 4 inch height, 1/8-inch gauge thickness, and standard top-set cove style.

2.5 Resilient Stair Treads: Provide rubber or vinyl stair tread units, full tread width, not less than 1/8 inch at tapered end and 1/4 inch at nosing, with two abrasive strip inserts full width of treads, and curved nosings 1-1/2 inches high.

2.5.1 Resilient Stair Base: Provide rubber or vinyl base, 7-inch cove type, for stair risers to match treads.

2.5.2 Resilient Stringer Skirt: Cut to match riser and tread profile to meet wall base height.

2.6 Resilient Edge Strips shall be 1/8 inch thick, homogeneous vinyl or rubber composition, tapered or bullnose edge, not less than 1 inch wide.

2.7 Metal Edge Strips shall be of width shown and of required thickness to protect exposed edge of resilient flooring. Provide units of maximum available length to minimize number of joints.

2.8 Adhesives:

2.8.1 Asphalt Emulsion: Clay type, Fed. Spec. MMM-A-115, Class 1.

2.8.2 Asphalt Emulsion: Chemical type, Fed. Spec. MMM-A-115, Class II.

2.8.3 Asphalt: Cutback type, Fed. Spec. MMM-A-110.

2.8.4 Adhesives (Cements): As recommended by flooring manufacturer to suit material and substrate conditions.

2.8.5 Cove Base Adhesive: Resin base waterproof adhesive with high initial tack.

2.8.6 Lining Felt Adhesive: Fed. Spec. MMM-A-137.

2.9 Concrete Slab Primer: Non-staining type.

2.10 Asphaltic Slab Primer: Fed. Spec. SS-A-701.

2.11 Wax: Fed. Spec. P-W-155.

2.12 Latex Underlayment: One-component or two-component factory mixed product containing powdered or liquid latex, cement, and other powders.

2.13 Smooth-Lining Felt:

2.13.1 Semi-Saturated Felt: Designed for application with vinyl floor covering materials, minimum weight of 0.75 lbs./sq. yd.

2.13.2 Asphalt Saturated Organic Felt: ASTM D 226, 15-pound plain.

2.14 Crack Filler: Type and brand recommended by floor covering manufacturer.

2.15 Hardboard: AHA A135.4, untempered type specially made for use as underlayment, 3/16 inch or 1/4 inch thick.

2.16 Plywood: DOC PS 1, "C-C EXT-APA" or "UNDERLAYMENT C-C Plugged EXT-APA," 3/4 inch thick unless otherwise noted for subfloors and 1/4 inch thick for underlayment.

2.17 Nails: Fed. Spec. FF-N-105, annular, screw, or ring type.

3.0 EXECUTION:

3.1 Preparation:

3.1.1 Concrete Floor Surfaces: Fill large cracks and holes in concrete structural floor slabs with one part nonshrinking cement to three part sand grout with a latex or epoxy additive. Level floors and fill small cracks and holes in concrete or underlayment with a commercial latex or epoxy floor patching compound.

3.1.2 Wood Floor Surfaces: Fill knot holes, cracks wider than 1/8 inch, and holes larger than 1/4 inch in diameter with a crack filler as specified for this application. All ridges or other uneven surfaces shall be planed, scraped, or sanded smooth. Nail heads shall be set. Renail wood underlayment and sub-floors where loose using annular or ring type coated nails. Remove and replace rotted, broken, or otherwise unsatisfactory wood subflooring and all other defective materials with new exterior grade plywood of equivalent thickness.

3.2 Installation:

3.2.1 Environmental Conditions: Spaces in which flooring work is to be performed shall be maintained between 70 F and 90 F at the floor level for at least 48 hours prior to starting the work, during the time work is performed, and for at least 48 hours after the work is completed. A minimum temperature of 55 F shall be maintained thereafter. Adequate ventilation shall be provided to remove moisture and fumes from the area.

3.2.2 Lay Tile From Center Marks established with principal walls, discounting minor offsets, so that tiles at opposite edges of the room are of equal width. Adjust as necessary to avoid use of cut widths less than 1/2 tile at room perimeters. Lay tile square to room axis, unless otherwise indicated.

SECTION 09670
FLUID-APPLIED RESILIENT FLOORING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of fluid-applied resilient flooring. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Polyurethane Elastomer Flooring:

2.1.1 Polyurethane Elastomer Flooring shall be a poured-in-place urethane recreational type flooring surface system composed of a two-part urethane component system. Components shall be blended and poured as a liquid onto a prepared base. Primer material to provide adhesion of the polyurethane to the base shall be as recommended by the flooring manufacturer. Line paints shall be polyurethane. Flooring color, thickness, durometer hardness, and painted lines shall be as required.

2.1.2 Physical Properties: Material weight shall be approximately 0.83 pound per square foot per 1/8-inch thickness. Tensile strength shall be 200-600 psi in accordance with ASTM D 412. Hardness range shall be 55-65 Shore A-2 in accordance with ASTM D 2240. Elongation shall be limited to 150-350 percent in accordance with ASTM D 412. Compression set shall be 90 percent immediate recovery after 72 hours at 50 percent compression at 72 F in accordance with ASTM D 395. The material shall provide complete resistance to fungus.

3.0 EXECUTION: Base surface preparation shall be in strict accordance with polyurethane flooring manufacturer's recommendations. Cracks and construction joints shall be filled flush with materials recommended by the manufacturer.

SECTION 09675
CONDUCTIVE VINYL TILE FLOORING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of conductive vinyl tile flooring. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Certificate of Conductance: Submit one copy of certificate signed by the Contractor, stating: "Conductive floors were tested by method prescribed in ANSI/UL 779 and were found to have a resistance of less than 1,000,000 ohms and greater than 25,000 ohms."

2.2 Conductive Vinyl Tile: Floor covering shall be of solid, unlaminated construction, manufactured from highest grade materials, with surface smooth, and free from foreign matter. Tile shall be resistant to the action of acids and other materials normally encountered in operating rooms. Tile shall comply with Fed. Spec. SS-T-312, Type III and shall be listed by Underwriters' Laboratories, Inc. Elements of tile shall be so proportioned that the electrically conductive components will not be more than 1/4 inch apart on the top surface. The tile flooring shall have an average critical radiant flux of 0.45 watts per square centimeter when tested in accordance with NFPA 253.

2.2.1 Tile Size: 1/8 inch by 12 inch by 12 inch tiles, micro- squared to ensure tight joints.

2.2.2 Slab Size: 1/8 inch by 36 inch by 36 inch slabs.

2.3 Conductive Adhesive: A two-part chemically setting, water- resisting, epoxy adhesive specially formulated for installing conductive vinyl tile. Adhesive shall form a conductive field under tile without use of copper foil strips.

2.4 Epoxy Calking Cement used to seal the perimeter joint shall be a material recommended by the manufacturer of the flooring.

3.0 EXECUTION:

3.1 Conductive Tile shall be installed by experienced mechanics under the supervision of factory-approved personnel. Install with conductive adhesive. Complete electrical grounding in compliance with the manufacturer's instructions.

3.2 Lay Tile from center marks established with principal walls, discounting minor offsets, so that tile at opposite edges of the room are of equal width. Adjust as necessary to avoid use of cut widths less than 1/2 tile at room perimeters. Lay tile square to room axis, unless otherwise directed.

3.3 Cleaning: Three days after installation, conductive vinyl tile flooring shall be cleaned thoroughly. Do not apply wax to conductive flooring.

3.4 Testing: After completion of installation, conductive vinyl tile floors shall be tested by qualified technicians employed by the Contractor. Test shall be done in presence of the Contracting Officer. Testing procedure shall comply with ANSI/UL 779.

SECTION 09685
CARPETING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of carpeting. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Carpet Cushions:

2.1.1 Rubberized Fiber-Hair Cushion: Burlap fabric reinforcing between top and bottom feltings of blended India jute fiber and new animal hair, less than 90 percent fiber and more than 10 percent hair, 5 oz/sq yd or more of rubberized coating on top surface and on bottom surface complying with Fed. Spec. DDD-C-001023, Type II. Weight shall be 39 oz/sq yd.

2.1.2 Ripple-Type Rubber: Sponge or foam rubber, molded with a rippled or waffled bottom surface, with an adhered top reinforcement of burlap or other fabric complying with Fed. Spec. ZZ-C-00811, Type I, Class 1 (firm), 1/4 inch thick.

2.1.3 High-Density Foam: Open-cell, homogenized latex-rubber, compounded for maximum moisture and aging resistance with ash and filler content not exceeding 50 percent, skinned-over on bottom surface, reinforced on top surface with an adhered fabric. Waffle pattern shall comply with Fed. Spec. ZZ-C-00811, Type I, Class 1, 1/4 inch thick.

2.1.4 Rebonded Polyurethane: Manufacturer's standard formulation of polyurethane foam and binders, to produce a flat carpet cushion complying with Fed. Spec. L-C-001676, Class I, 3/8 inch thick.

2.2 Carpet:

2.2.1 Carpet Fiber (Filament) and Yarn: Fed. Spec. DDD-C-95.

2.2.1.1 Wool: Natural, long staple, virgin wool carpet fiber, not less than 97 percent pure; permanently treated for resistance to insects and mildew.

2.2.1.2 Continuous Hollow Nylon: Continuous multiple hollow-core filament, of manufacturer's standard denier, texturized or crimped for "bulk", delustered with maximum of 15 percent delustrant.

2.2.1.3 Continuous Multilobal Nylon: Continuous nylon filament, of approximately 18 denier, in tri-lobal or similar cross section (not round or ovular), texturized for "bulk."

2.2.1.4 Continuous Round Nylon: Continuous round nylon filament, of not less than 15 denier, texturized or crimped for "bulk," delustered with maximum of 15 percent delustrant.

2.2.1.5 Continuous Nylon: Continuous nylon filament of type recommended by carpet manufacturer, approximately 15 denier, texturized or crimped for "bulk," delustered.

2.2.1.6 Staple Nylon: Long staple (approximately 7 inches) nylon fiber, of varying denier and crimp to resemble natural wool, delustered.

2.2.1.7 Acrylic: Long staple (approximately 7 inches) acrylic fiber, of not less than 15 denier average, crimped to increase "bulk."

2.2.1.8 Modacrylic: Long staple (approximately 7 inches) modified acrylic fiber, modified to increase melting temperature, of not less than 15 denier average, crimped to increase "bulk."

2.2.1.9 Bi-Component Acrylic: Long staple (approximately 7 inches) 2-component acrylic fiber with differential shrinkage characteristic, which imparts spiral crimp for very high "bulk."

2.2.1.10 Polypropylene: Continuous polypropylene (olefin) filament, of 15 denier minimum, textured for "bulk."

2.2.1.11 High-Denier Polypropylene: Continuous filament or long staple polypropylene (olefin) fiber, of 75 denier minimum, textured for bulk, produced specifically for felted or needlepunched construction of carpet.

2.2.1.12 Polyester: Long staple (approximately 7 inches) fiber, of 15 denier minimum, textured for "bulk," specifically compounded for high stain resistance.

2.2.1.13 Nylon-Reinforced Vinyl: Continuous filament nylon thread, coated with vinyl to form a carpet yarn, produced specifically for woven (non-pile) carpet construction.

2.2.1.14 Stain-Resistant Polyester: Long staple (approximately 7 inches) fiber, of 15 denier minimum, unless otherwise indicated, textured for "bulk," specifically compounded for high stain resistance.

2.2.1.15 Destatic Fiber: Metallic carpet fiber, of stainless steel, aluminum, or other metal, either coated or plain, proven by test of round nylon filament pile carpet to be effective in controlling the static buildup in persons to below 3,000 volts when used in one of the following blends of fiber with ambient condition of 20 percent relative humidity and 70 F temperature, with oak-tanned, leather-soled shoes:

a. 0.33 percent of stainless steel filament.
b. 3.0 percent blend of plastic coated aluminum filament.

2.2.1.16 Pile Yarn, General: Provide yarn spun in manner recommended by yarn manufacturer and carpet manufacturer.

2.2.2 Carpet Construction:

2.2.2.1 General: Fabricate carpet by the construction method used in manufacturer's standard process.

2.2.2.2 Pile Density; Pitch and Rows: Fabricate carpet with the spacing of tufts both ways, uniformly spaced by manufacturer's standard method.

2.2.2.3 Variation of Yarn and Density: Wherever the texture or pattern of the completed carpet is not affected and also wherever the effect produced is acceptable to the Contracting Officer, the carpet manufacturer may (at his option) vary both the denier of the yarn and the density of the tufts, provided the product of the two remains constant and equal to the product of yarn denier and tuft density indicated (equal density factor maintained.)

2.2.2.4 Pile Height: Provide pile height as designated.

2.2.2.5 Primary Backing for Tufting: Provide manufacturer's standard backing material, but not less than one of the following:

2.2.2.5.1 Polypropylene: Woven polypropylene fabric weighing not less than 3.2 oz/sq yd.

2.2.2.5.2 Plastic Fabric: A non-woven fabric of 75 percent polypropylene fibers and 25 percent other plastic fibers, weighing not less than 4.0 oz/sq yd.

2.2.2.5.3 Jute: Woven jute fabric, weighing not less than 9.0 oz/sq yd.

2.2.2.6 Adhesive Binding for Tufting: Provide manufacturer's standard liquid latex or other resinous coating as required to produce the tuft bind strength indicated, but not less than 20 oz coating/sq yd.

2.2.2.7 Backing for Woven Carpet: Provide manufacturer's standard shot (weft), chain (warp), filler, and stuffer yarsn, of jute, kraftcord, cotton, or synthetic fibers. Provide the number of yarns perrow or pitch of pile as indicated or, if not indicated, provide manufacturer's standard arrangement as needed for strength and to make up the required carpet weight, but provide not less than 2 shot yarns (3 Axminster) and double chain yarn. Provide woven-through-the-back construction.

2.2.2.8 Back Coating for Woven Carpet: Provide manufacturer's standard liquid latex or other resinous coating, but not less than 10 oz/sq yd.

2.2.2.9 Backing for Knitted Carpet: Provide manufacturer's standard chain (warp) yarns of cotton or synthetic fibers and filler yarns ofjute or kraftcord. Provide the number of yarns per row or pitch as indicated or, if not indicated, provide manufacturer's standard arrangement as needed for strength and to make up the required carpet weight, but not less than double chain yarns and double overlapping filler yarns.

2.2.2.10 Back Coating for Knitted Carpet: Liquid latex or other resinous coating, shall be more than 14 oz/sq yd.

2.2.2.11 Backing for Fusion-Bonded Carpet: Provide manufacturer's standard jute or synthetic fabric backing with latex or vinyl plastic coating for fusion-bonding of face pile.

2.2.2.12 Backing for Needle-punched Carpet: Type and weight designated or, if not designated, manufacturer's standard backing fabric produced specifically for needle-punching and felting of staple fibers to produce carpet, complying with Fed. Spec. DDD-C-001173 for construction of needle-punched carpet.

2.2.2.13 Secondary Fabric Backing: Provide, as a minimum, 8-ounce burlap or jute fabric, laminated to carpet with liquid latex adhesive, to achieve a stripping bond of not less than 2.0 lbs in. (Fed. Std. 191).

2.2.3 Dyeing Method: Carpet shall meet the requirements of both the wet-method color fastness rating of "Good" or better, per Fed. Spec. DDD-C-95, evaluated by Method 5610 of Fed. Std. 191 and the fade resistance established

by the Association of Textile Chemists and Colorists for carpet when tested on the Atlas Fadeometer for the number of hours indicated. If method of dyeing and fade resistance are not indicated, use manufacturer's standard method, as needed to achieve a fade resistance of 40 hours.

2.2.4 Flame Spread: Carpet shall comply to UL 992 flame propagation index of less than 4.0 and Fed. Std 372, minimum average critical radiant flux of 0.50 watts per square centimeter. Carpet shall pass the methamine tablet test per DOC-FF-1-70 (pill test).

2.3 Bonded Cushion Carpet:

2.3.1 High Density Foam Backing: Open-cell homogenized latex-rubber compound for maximum moisture and aging resistance, with ash or filler content not exceeding 50 percent, skinned-over on exposed surface, complying with Fed. Spec. DDD-C-95, Class I, 38 oz/sq yd, 1/8 inch thick. Compression resistance shall be 5 pounds minimum. Compressionset shall be 15 percent maximum. Provide special formulation, tested with carpet for flame spread rating of less than 75 when by the tunnel test of ASTM E 84, or flame propagation index of less than 4.0 when tested by the UL chamber test, UL 992. Carpeting and cushion shall be tested together.

2.3.2 Primary Backing: Polypropylene weighing 3.5 oz/sq yd minimum.

2.3.3 Bonded Cushion Backing: Provide cushion bonded to carpet to achieve a stripping bond of not less than 2.0 lbs/in (Fed. Std. 191A), either cured-in-place or laminated sheet stock. At manufacturer's option, back coating used as tuft binding may be decreased or eliminated with the use of cured-in-place backing, provided required tuft bind strength is achieved.

2.4 Adhesive for Carpet: Waterproof, release type adhesive as recommended by the carpet manufacturer or cushion manufacturer. Provide adhesive that complies with flame spread rating required for the carpet installation, if any.

2.5 Adhesive for Seams: Waterproof, nonstaining adhesive furnished or recommended by the carpet manufacturer that complies with flame spread rating required for the carpet.

2.6 Carpet Edge Guard: Bend-down type of formed or extruded aluminum carpet edge guard stripping. Form units with concealed teeth to grip the carpet from below.

2.7 Tackless Carpet Stripping: Water-resistant plywood stripping, with angular pins protruding from the top. Provide stripping with 2 rows of pins wherever the carpet width is less than 20 feet and with 3 rows of pins wherever carpet width is 20 feet or more. Provide prenailed stripping, ready for anchorage to concrete or similar substrate.

2.8 Tape:

2.8.1 Cushion Tape: Singel Face cloth, 2 inches wide.

2.8.2 Carpet Tape: Double-face cloth, 2 inches wide.

2.8.3 Seam Tape: Paperback, for latex sewing, 4 inches wide.

2.8.4 Seam Tape: Heat bonding, 4 inches wide.

2.9 Seam Thread: No. 18 waxed linen.

2.10 Masonry Nails: No. 9 (0.148 inch x 1 inch) hardened masonry nails, Fed. Spec. FF-N-105.

2.11 Latex Underlayment: One- or two-component, factory-mixed product containing powdered or liquid latex, cement, and other powders.

2.12 Crack Filler: Type and brand recommended by carpeting manufacturer.

2.13 Hardboard: AHA A135.4, untempered type specially made for use as underlayment, 3/16 inch or 1/4 inch thick.

2.14 Plywood: DOC PS 1, "C-C EXT-APA" or "UNDERLAYMENT C-C Plugged EXT-APA", 3/4 inch thick unless otherwise noted for subfloors and 1/4 inch thick for underlayment.

2.15 Nails: Fed. Spec. FF-N-105 annular, screw or ring type.

3.0 EXECUTION:

3.1 Preparation:

3.1.1 Fill Large Cracks and Holes in concrete structural floor slabs with a one-part, nonshrinking cement to three-part sand grout with a latex or epoxy additive. All ridges or other uneven surfaces shall be ground smooth; chalky or dusty surfaces shall be primed.

3.1.2 Level Floors and fill small cracks and holes in concrete or underlayment with a commercial latex or epoxy floor patching compound.

3.1.3 Wood Floor Surfaces: Knot holes, cracks wider than 1/8 inch, and holes larger than 1/4 inch in diameter shall be filled with a crack filler as specified for this application. All ridges or other uneven surfaces shall be planed, scraped, or sanded smooth.

3.1.4 Wood Underlayment and Subfloors shall be renailed where loose.

3.1.5 Rotted, Broken or Otherwise Unsatisfactory Wood Subflooring and all other defective materials shall be removed and replaced with new.

3.1.6 Undercut Wood Door Bottoms as required to allow clear door swing over newly carpeted areas.

3.2 Installation:

3.2.1 Install Carpet Edge Guard at every location where edge of carpet is exposed to traffic, except where another device, such as an expansion joint cover system or threshold, is indicated with an integral carpet binder bar.

3.2.2 Installation On Stairs: Install carpet by nailing or other secure method recognized to be durable and safe for traffic on stairs. Conceal edges. Avoid seams at points of high wear (nosings and treads). Cushion on stairs shall be twice the thickness of cushions on floor.

SECTION 09710
MAGNESIUM OXYCHLORIDE FLOORING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of magnesium oxychloride flooring and base. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Magnesium Oxychloride Composition: Manufacturer's standard product shall comply with Mil. Spec. MIL-D-16680. Color to be used will be selected by the Contracting Officer from manufacturer's standard colors.

2.1.1 Mixing Solution: Magnesium chloride flake in a 22 degree Baume solution.

2.1.2 Physical Properties when tested in compliance with Mil. Spec. MIL-D-16680:

Fire Resistance: Incombustible
Water Absorption: Less than 7 percent
Abrasion Resistance: 0.072 inch
Impact Resistance: 0.031 inch; no chipping, crackling or detachment.

2.2 Saturated Felt: ASTM D 250, 15-pound type.

2.3 Expanded Metal Lath: Fed. Spec. QQ-L-101, diamond mesh pattern, expanded copper alloy steel, weighing 3.4 pounds per square yard.

2.4 Bonding Agent: Trowel-applied bonding medium made by manufacturer of magnesium chloride.

3.0 EXECUTION:

3.1 Environmental Conditions: Installation shall not be started unless ambient temperature of area in which the work occurs is at least 50 F and rising and is maintained above 50 F without interruption while the work is being done and for at least three days after the completion of the work.

3.2 Preparation:

3.2.1 Concrete Floors shall be clean and free from all grease, dirt, paint, and all other foreign matter and shall be completely dry prior to flooring installation.

3.2.2 Wood Floors shall be structurally sound, firmly nailed, free of vibration, and broom clean. Lay felt over wood in opposite direction to joints in wood and overlap edges 3 inches.

3.3 Installation: Apply flooring and base to a uniform 1/2-inch thickness and steel-trowel to a uniform smooth density. Where cover base is installed over wood, trowel material on metal lath. Light traffic may be permitted 24 hours after installation and heavy traffic after 3 to 5 days.

SECTION 09720
EPOXY FLOORING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of epoxy flooring. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 General: Component materials for any one flooring type shall be from a single manufacturer. Cove bases of flooring material shall be provided if required.

2.2 Epoxy Quartz Chip Flooring shall be decorative floor surfacing system consisting of primer; topping including epoxy resin, hardener, and ceramic-coated quartz aggregate; and finish coat or coats. Topping, including aggregate, when tested in accordance with referenced standards, shall have a compressive strength of 9,800 psi (ASTM C 579), a flexural strength of 6,000 psi (ASTM C 580), a bond strength of 400 psi (ACI 503, Appendix A), and a water absorption rate of 0.06 percent (ASTM C 413). Tests of chemical resistance of cured resin, when immersed for 7 days in reagents, shall show no effect from ammonium hydroxide, carbon tetrachloride, citric acid, dimethyl formamide, formaldehyde (3 percent), heavy-duty detergent, heptane, hydrogen peroxide (28 percent), lactic acid, oleic acid, phenol solution, sodium carbonate (20 percent), sodium chloride (10 percent), sodium hydroxide (60 percent), sodium hypochlorite, sulfuric acid (30 percent), and urine.

2.3 Epoxy Flooring shall be industrial floor surfacing system consisting of primer; topping including epoxy resin, hardener, coloring agent, and selected fine aggregates; and finish coat or coats. Physical properties of topping, including aggregate, when tested in accordance with referenced standards, shall have a compressive strength of 7,500 psi (ASTM C 579), a tensile strength of 1,750 psi (ASTM C 307), a flexural strength of 3,000 psi (ASTM D 790), and a maximum thermal coefficient of linear expansion of 20 by 10!-6! in/in/degrees F (ASTM D 696). The extent of burning shall be 0.25 inches maximum (ASTM D 635). Minimum bond strength shall be 200 psi, with 100 percent concrete failure (ACI 503, Appendix A). Abrasive resistance shall be 0.20 grams maximum (ASTM D 1044, 1,000 Grams, 1,000 Cycles). Impact strength, except topping bonded to concrete, shall be 0.05, with no chipping, cracking, or detachment of surfacing from concrete (MIL-D-3134, Para. 4.7.3). Tests of chemical resistance

of cured resin when immersed 7 days in reagents, shall show no effect from acetic acid (5 percent), ammonium hydroxide (10 percent), citric acid (50 percent), cola syrup, fatty acid, motor oil (20W), hydrochloric acid (10 percent), salt water, sodium hydroxide (10 percent), sulfuric acid (10 percent), trisodium phosphate (5 percent), and water (distilled). There shall be only slight softening from ethyl alcohol (95 percent), jet fuel JP-4C, and mineral spirits. There shall be no effect but slight stain from nitric acid (10 percent).

2.4 Chemical-Resistant Epoxy Flooring shall be chemical-resistant floor surfacing system consisting of primer; topping including epoxy resin, hardener, coloring agent, and selected fine aggregates; and finish coat or coats. Topping, including aggregate, when tested in accordance with referenced standards, shall have a compressive strength of 9,500 psi (ASTM C 579), a flexural strength of 2,080 psi (ASTM C 580), an impact strength of 120 in. lbs (ASTM D 2794), a bond strength of 400 psi (ACI 503, Appendix A), and a water absorption rate of 0.04 percent (ASTM C 413). Tests of chemical resistance of cured floor surfacing system, when immersed for 7 days in reagents listed, shall show no effect from acetic acid (100 percent), chromic acid (10 percent), citric acid (20 percent), formaldehyde (37 percent), heavy-duty detergent, hydrochloric acid (37 percent), hydrogen peroxide (28 percent), lactic acid (85 percent), mineral spirits, nitric acid (40 percent), oleic acid, oxalic acid (10 percent), phosphoric acid (85 percent), potassium hydroxide (50 percent), sulfuric acid (75 percent), tannic acid (20 percent), tartaric acid (10 percent), and urine.

2.5 Epoxy Terrazzo Flooring shall be decorative floor surfacing consisting of primer, thermosetting epoxy resin matrix, decorative mineral aggregate, epoxy grout, and sealer. Heavy brass, 1/4-inch divider strips, and expansion joints shall also be provided as required. Materials shall conform to applicable National Terrazzo and Mosaic Association (NTMA) publications. Flooring, when tested in accordance with the standards, shall show no toxicity. Epoxy terrazzo flooring shall be self-extinguishing when tested in compliance with ASTM D 635.

3.0 EXECUTION:

3.1 Preparation:

3.1.1 Concrete Surfaces shall comply with ASTM C 811 unless otherwise indicated or required by manufacturers' instructions.

3.1.2 Wood Floors shall have contaminants removed by sanding, solvent cleaning, detergent cleaning, or other methods as required.

3.1.3 Primer Shall Be Applied over prepared substrate.

3.2 Installation:

3.2.1 Epoxy Quartz Chip Flooring, Epoxy Flooring and Chemical-Resistant Epoxy Flooring shall have a topping mix of aggregates and/or fillers trowel-applied to the following thicknesses:

a. Epoxy quartz chip flooring: 1/4 inch.
b. Epoxy flooring: 3/16 inch.
c. Chemical-resistant epoxy flooring: 1/4 inch.

Finish or sealing coat or coats shall be applied after topping mix has cured. Floor system shall be applied to wall surfaces at locations indicated to form base with cove of radius and height designated. All interior and external corners of base shall be rounded.

3.2.2 Epoxy Terrazzo Flooring shall be applied according to NTMA recommendations and as follows. A 1/4-inch thick aggregate/filler topping mix and recommended curing compound shall be applied and the surface shall then be ground, rinsed, grouted, and reground. Finish or sealing coat or coats shall be applied after topping mix has cured. Floor system shall be applied to wall surfaces at locations designated to form base with cove of radius and height indicated. All interior and external corners of base shall be rounded.

SECTION 09731
CONDUCTIVE ELASTOMERIC LIQUID FLOORING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of conductive elastomeric liquid flooring. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Carbon Black shall comply with ASTM D 561.

2.2 Acrylic/Urethane shall be water dispersed acrylic resin mixed with dry components and aggregates. Material shall comply with Mil. Spec. MIL-D-3134. Factory pre-mixed with carbon black.

2.3 Acrylic shall be modified high strength acrylic resin mixed with dry component powders with tensile strength of 4,890 psi, bond strength of 290 psi, and flexural strength of 1,650 psi, minimums, complying with Mil. Spec. MIL-D-3134.

2.4 Neoprene Rubber shall be water-phase neoprene rubber composition complying with NTMA Specifications, with tensile strength of 245 psi, bond strength to concrete of 255 psi, and compressive strength of 2,600 psi, minimums.

2.5 Latex shall be specially formulated, emulsion resin mixed with dehyrated powders. Comply with Paragraphs 3.4 through 3.22 of Mil. Spec. MIL-D-3134, except Paragraph 3.7 shall not apply.

2.6 Epoxy Emulsion shall be 100 percent non-volatile, thermosetting, two-part epoxy resin matrix with tensile strength of 4,000 psi, bond strength of 200 psi, and compressive strength of 14,000 psi.

2.6.1 Water-Emulsified Epoxy Resin shall have the following characteristics:

Viscosity: 180 centipoises at 25 C.
Specific weight: 9.2 pounds per gallon.
Color: opaque white.
Solids (minimum): 59 percent.

Stable after five freeze-thaw cycles.

2.6.2 Water Emulsified Hardener shall have the following characteristics:

Viscosity: 160-190 centipoises at 50 C.
Specific weight: 8.6 pounds per gallon.
Solids (minimum): 75.0 percent.
Stable after five freeze-thaw cycles.

2.7 Polyacrylate: A polyacrylate hydraulic cement copolymer and dry coreactant composite shall comply with requirements of Mil. Spec. MIL-D-3134.

2.8 Polyester: Thermosetting polyester topping resin, catalyst, and premixed fillers shall have tensile strength of 5,000 psi, compressive strength of 14,000 psi, and bond strength of 200 psi, minimums.

2.9 Fillers: Inert mineral or cellulosic material best suited for the resin binders shall be used. Filler in quantity necessary to impart required physical characteristics shall be furnished with particle size not greater than 3/16 inch in any dimension and shall contain sufficient fines to provide an even-textured, nonslip type of surface on the finished topping.

2.10 Primer shall be material that will penetrate into pores of substrate. Primer shall bond with topping to form a permanent monolithic bond between the substrate and the topping.

3.0 EXECUTION:

3.1 Environmental Conditions: Elastomeric liquid flooring installation shall not be started unless ambient temperature of area in which the work occurs is at least 50 F. and rising, and is maintained above 50 F. without interruption while the work is being done and for at least three days after the completion of the work.

3.2 Installation Over Wood Floors: Renail wood subfloors where loose, using annular or ring type zinc-coated nails. Remove and replace rotted, broken, or otherwise unsatisfactory wood subflooring and all other defective materials.

3.3 Installation Over Concrete Floors: Roughen surfaces that are glossy, painted, or have loose surface material. Fill large cracks and holes.

3.4 Cleaning: Thoroughly clean all surfaces to receive flooring to remove all grease, oil, wax, dirt, dust, and other foreign matter.

3.5 Topping: Install topping 1/8 inch thick for epoxy type and 1/8 to 3/8 inch thick for other types.

3.6 Bases shall be cover type cast-in-place with 1-inch radius cove and shall be 6 inches high.

3.7 Finish or Sealer Coat shall be applied.

3.8 Testing: After completion of installation, test conductive floors. Test must prove that conductive floors comply with all requirements of ANSI/UL 779.

# SECTION 09740
# HEAVY-DUTY CONCRETE FLOOR TOPPING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of heavy-duty concrete floor topping. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Portland Cement: Comply with ASTM C 150, Type I or Type III.

2.2 Aggregate: Selected, clean, hard, and tough material, either crushed or natural, as approved by the Contracting Officer. Trap rock, granite, quartz, corundum, or manufactured products such as silicon carbide or heat-treated aluminum oxides are acceptable. They shall comply, in all respects except gradation, with ASTM C 33.

2.3 Water shall be clean, fresh, potable water approved by public health authorities for domestic consumption.

3.0 EXECUTION:

3.1 Preparation: Roughen surfaces of present concrete that are glossy, painted, or have loose surface material. Clean and sweep thoroughly to remove all grease, oil, wax, dirt, sand, dust, and all other foreign matter.

3.2 Installation: Nominal mixture shall be one part of Portland cement, one part of fine aggregate, and two parts of coarse aggregate by volume. Not more than four gallons of mixing water shall be used for each bag of Portland cement in the mixture. Mixing of concrete shall continue for at least one minute after all ingredients are in mixer.

# SECTION 09741
# ARMORED FLOORING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of armored flooring. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Premixed Topping: Specially factory formulated topping mix of Portland cement, ASTM C 150 Type I or III, iron aggregate and plasticizer designed to produce 28 day compressive strength of over 8,000 psi.

2.2 Water: Water shall be clean, fresh, potable water approved by public health authorities for domestic consumption.

3.0 EXECUTION:

3.1 Preparation: Roughen surfaces of present concrete floor that are glossy, painted, or have loose surface material. Clean and sweep thoroughly to remove all grease, oil, wax, dirt, sand, dust, and all other foreign matter.

3.2 Installation: Mix premixed topping and water in a paddle type mixer for three minutes. Place topping over prepared concrete slab to a thickness of 3/4 to one inch. Float and machine trowel as recommended by manufacturer. A shake of premixed topping shall be added. Hand trowel to a smooth hard finish. Cure by applying curing membrane complying with ASTM C 309.

SECTION 09750
BRICK FLOORING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of brick flooring. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Brick Materials:

2.1.1 Light Traffic Paving Brick: ASTM C 902, Class SX, MX, or NX, Type I, II, or III, Application PS, PX, or PA.

2.1.2 Chemical-Resistant Brick: Solid brick, ASTM C 279, Type H or L.

2.1.3 Industrial Floor Brick: Solid brick, ASTM C 410, Type T, H, M, or L.

2.1.4 Base: Matching base shall be provided at walls and vertical elements, including stretcher units, internal and external corners, stops, and other locations as required. Type shall be square-top cove, round-top cove, or turn-up base.

2.1.5 Lining Units shall be brick units matching floor brick for lining pits and trenches and for curbs and pads occurring in floor brick field. Provide special trim shapes for continuous coverage of sub-strates.

2.1.6 Temporary Coating: Wax shall be compatible with cleaning method required to remove wax without damage to grout or brick.

2.2 Setting Materials:

2.2.1 Mortarless Applications:

2.2.1.1 Roofing Felt: ASTM D 226, 15-pound asphalt-saturated felt.

2.2.1.2 Fine Aggregate for Setting Bed: ASTM C 144 or stone screenings.

2.2.1.3 Sand for Joints: ASTM C 144, free of clay particles.

2.2.2 Portland Cement Applications:

2.2.2.1 Portland Cement: ASTM C 150, Type I, natural color or white, to produce the required color of mortar or grout.

2.2.2.2 Aggregate: ASTM C 144 or C 404, or both.

2.2.2.3 Liquid Admixture for Setting Bed and Grout: Liquid latex mortar additive with a compressive strength of 3,000 psi, bond strength of 500 psi, no loss in strength when exposed to ozone for 200 hours at an ozone concentration of 200 pphm and water absorption of 4 percent maximum.

2.2.2.4 Bond Coat Admixture: High strength liquid latex mortar additive with a compressive strength of 5,000 psi, bond strength of 500 psi, tensile strength of 500 psi, no loss in strength when exposed to ozone for 200 hours at 200 pphm, and water absorption of 4 percent maximum.

2.2.2.5 Pigments: Commercial iron oxide, manganese dioxide, ultra-marine blue, chromium oxide, or carbon black, suitably compounded for use in mortar mixes.

2.2.2.6 Water: Clean and free of deleterious materials which would impair strength or bond.

2.2.3 Chemical-Resistant Mortar and Grout:

2.2.3.1 Sulfur Mortar: ASTM C 287, with silica or carbon filler.

2.2.3.2 Resin Mortar: Liquid resin and filler material shall comply with ASTM C 395. Resin shall be phenolic, furan, polyester, epoxy, or vinylester. Filler shall be silica or carbon.

2.2.3.3 Resin Grout: ASTM C 658, epoxy or furan.

2.2.3.4 Chemical-Resistant Membrane: Multiple-component asphaltic system consisting of asphalt primer and bituminous-coated glass fiber cloth embedded in hot-melt asphalt compound.

2.2.3.5 Expansion Joint Filler: Elastomeric sealant of type recommended and produced by mortar/grout manufacturer for type of application indicated. Include primer and backer rod where required.

2.2.4 Miscellaneous Materials:

2.2.4.1 Cleavage Membrane: 15-pound asphaltic felt, ASTM D 226, Type I, or 4-mil polyethylene sheeting, ASTM C 171.

2.2.4.2 Setting Bed Reinforcement: 2 inches by 2 inches, 16/16, welded wire fabric.

2.2.4.3 Sealer: Phenolic type or acrylic base non-slip material.

3.0 EXECUTION:

3.1 Expansion and Control Joints: Provide sealant-filled joints at locations and widths required. Install expansion joint filler where sealant type joints are required in chemical-resistant flooring.

3.2 Ungrouted Mortarless Brick Flooring:

3.2.1 Cushioning Material: Install roofing felt, two layers with edges butted to achieve uniform thickness, and fine aggregate setting bed screeded to depth required.

3.2.2 Lay Bricks and fill joints with sand. After all bricks are in place and all joints are filled, remove excess sand.

3.3 Latex-Modified Portland Cement Applications:

3.3.1 Apply Cement Slush Coat not to exceed 1/16 inch thickness.

3.3.2 Mix Portland Cement, Sand, and Liquid Admixture.

3.3.3 Spread and Screed Setting Bed to uniform thickness at subgrade elevations required.

3.3.4 Place Brick before initial set of cement occurs. Tamp and beat bricks to obtain full contact with setting bed.

3.3.5 Grout Joints as soon as possible after initial set of setting bedand cure grout.

3.4 Chemical-Resistant Sulfur Mortar Applications shall comply with ASTM C 287 unless otherwise directed.

3.5 Chemical-Resistant Resin Mortar Applications:

3.5.1 Bricklaying: Except as otherwise directed, bricklaying shall comply with ASTM C 399.

3.5.2 Tile Setting: Except as otherwise directed, tile setting shall comply with ANSI/ASTM C 723.

3.5.3 Chemical-Resistant Membrane: Provide chemical-resistant asphaltic membrane system over concrete substrates under chemical-resistant mortar applications where directed.

3.5.4 Set Bricks on Vertical Surfaces in compliance with ASTM C 399, using either resin mortar or sulfur as bed joint material, as required.

3.6 Chemical-Resistant Cement Mortar and Resin Grout Applications:

3.6.1 Application of brick in hydraulic cement mortar setting bed shall comply with ASTM C 398. Grouting joints with resin grout shall comply with ASTM C 723, unless otherwise directed.

3.6.2 Install Cleavage Membrane as required.

3.6.3 Reinforce Setting Bed with welded wire fabric as required.

SECTION 09751
LIGHT-DUTY BRICK FLOORING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of light-duty brick flooring. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Floor Brick (Brick Pavers): ASTM C 62, Grade SW, solid uncored brick, 1-1/4 inches thick by 3-1/4 inches by 8 inches.

2.2 Paving Brick: ASTM C 902, solid uncored brick of size selected by the Contracting Officer.

2.3 Masonry Mortar: ASTM C 270, Type M.

2.4 Portland Cement: ASTM C 150, Type I.

2.5 Aggregate for Masonry Mortar: ASTM C 144.

2.6 Hydrated Lime: ASTM C 207, Type S.

2.7 Aggregate for Cement Setting Beds: Sand as recommended in ASTM C 404.

2.8 Aggregate for Grout: Sand as recommended in ASTM C 404.

2.9 Pigments: Inert mineral oxides or carbon black.

2.10 Sand Setting Bed: ASTM C 33.

2.11 Commercial Cement Grout: Proprietary compound of Portland cement and additives.

2.12 Cleavage Membrane: 15-pound asphalt felt or 4-mil polyethylene sheeting.

2.13 Setting Bed Reinforcement: 2-inch by 2-inch, 16/16, welded wire fabric, ASTM A 185.

3.0 EXECUTION:

3.1 General Requirements: Do not use brick with chips, cracks, voids, discolorations, and other defects. Cut brick shall have clean, sharp, unchipped edges. Use full units without cutting wherever possible. Set brick with uniform joints.

3.2 Ungrouted Applications: Place sand setting bed and compact by tamping. Set brick closely together, and sweep fine sand over surface to fill joint irregularities.

3.3 Portland Cement Applications:

3.3.1 Preparation of Subbase: Clean subbase to remove dirt, dust, debris, and loose particles.

3.3.2 Install Cleavage Membrane and provide folded membrane material at overlapping edges to form lock joints.

3.3.3 Apply Slush Coat of cement grout over surface of concrete subbase about 15 minutes prior to placing setting bed.

3.3.4 Setting Bed: Mix one bag of Portland cement to 3 cu. ft. of sand. Use only enough water to produce a moist surface when setting bed is ready for setting of brick. Install reinforcing mesh if over a wood substrate.

3.3.5 Wet Brick several hours before laying. Do not lay bricks with free water on the surface.

3.3.6 Set Brick before initial set of cement bed occurs. Do not set brick on dry bed. Set and level each brick immediately.

3.3.7 Grout Joints as soon as possible after initial set of setting bed. Force grout into joints, strike flush, and tool slightly concave.

3.3.8 Use Portland Cement Grout mixed in the proportion of one bag of Portland cement to 2 cu. ft. of sand mixed with water to the consistency of heavy cream.

3.4 Masonry Mortar Applications:

3.4.1 Mix Mortar to comply with ASTM C 270 proportion specifications for Type "M" mortar.

3.4.2 Install Brick in bed joints of mortar with vertical joints filled with mortar. Remove excess mortar promptly as the work progresses.

3.4.3 Strike Joints flush with top surface of brick and tool slightly concave.

3.5 Pointing: During the tooling of joints, enlarge voids or holes and completely fill with mortar or grout.

3.6 Cleaning: Remove excess mortar/grout from exposed brick surfaces, wash, and scrub clean. Rinse with clean water.

3.7 Sealing and Waxing: After cleaning, apply a neutral sealer to brick flooring, and when dry, apply a suitable floor wax recommended for brick floors.

SECTION 09791
STANDARD FLOOR TREATMENT

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for standard floor treatments for terrazzo, ceramic tile, oxychloride, concrete, and resilient flooring. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Cleaning Compound: A liquid chemical cleaner containing non-ionic and anionic type detergents, non-reactive to flooring. Compound shall have no free metal alkalies, no artificial coloring, and no fatty acids. Compound shall be UL listed as "slip-resistant."

2.2 Stripper: An ammoniated stripper that will penetrate and loosen wax films without damaging flooring. Stripper shall be non-flammable and phosphate-free with a flash point of none to boiling.

2.3 Wax: Water-emulsion type, self polishing, made from 100 percent No. 1 prime Carnauba wax, UL listed as "slip-resistant."

2.4 Polish: Metal cross-linked copolymer, slip-resistant polish. Polish shall dry to clear gloss without buffing.

2.5 Sealer: Penetrating type seal that will fill pores and leave a clear, hard, non-flaking, non-tracking finish. Sealer shall be UL listed as to slip resistance.

3.0 EXECUTION:

3.1 Preparation and Installation:

3.1.1 Terrazzo and Oxychloride Floors:

3.1.1.1 Clean floors with a neutral liquid cleaner with pH factor as near seven as possible.

3.1.1.2 Apply two coats of sealer, and buff with electric polishing machine.

3.1.2 Ceramic Tile Floors: Scrub thoroughly using a neutral liquid cleaner, and apply one coat of penetrating sealer.

3.1.3 Concrete Flooring:

3.1.3.1 Scrub thoroughly using a neutral liquid cleaner. Apply stripper to remove stubborn grease, waxes, and polishes.

3.1.3.2 When floor is clean and dry, apply two coats of penetrating sealer.

3.1.4 Resilient Flooring:

3.1.4.1 Scrub with a light solution of neutral chemical cleaner. Use a stripper to remove build-up of old wax and polishes. Rinse clean, and allow to dry.

3.1.4.2 Apply two coats of wax and machine polish.

SECTION 09792
FLOOR TREATMENT NON-SLIP COATINGS
ON CONCRETE FLOORS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for non-slip coatings on concrete floors. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS: A combination of pigmented two-part high solids urethane resin and a select gradation of sand shall be used. Color shall be selected from manufacturer's standard colors.

2.1 Tensile Strength and Elongation: Tensile strength shall be 580 psi, and elongation shall be 57 percent, all complying with ASTM D 412.

2.2 Water Absorption: Coatings shall not absorb water, in accordance with ASTM D 570.

2.3 Coefficient of Friction shall comply with ASTM D 1894.

2.4 Abrasion Resistance shall be ASTM D 1044 Taber Abraser, H-18 wheel, 1 kg load. Weight loss shall be 0.20 grams after 1,000 cycles.

2.5 Impact shall be by a 2-pound falling ball at 150 inch-pounds pressure, 0.05 inch maximum indentation with no cracking.

2.6 Chemical Resistance shall be non-staining to most common chemicals, such as 10 percent acetic acid, 10 percent citric acid, 10 percent sodium hydroxide, and ethyl alchol.

3.0 EXECUTION: Concrete Floors shall be either acid etched or sand blasted. Surface to be coated shall be clean, dry, and free from surface contaminants.

SECTION 09793
FLOOR TREATMENT - REFINISHING WOOD FLOORS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for refinishing wood floors. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Cleaning Compound: A liquid chemical cleaner containing non-ionic and anionic type detergents, non-reactive to wood flooring. Compound shall have no free metal alkalies, no artificial coloring and no fatty acids. Compound shall be UL listed as "slip-resistant."

2.2 Varnish Remover: Non-flammable paint and varnish remover.

2.3 Stain: Penetrating type non-fading wood stain.

2.4 Wood Filler: Paste type wood filler, pigmented if necessary to match sample, complying with Fed. Spec. TT-F-336.

2.5 Floor Sealer: Penetrating type, pliable, wood-hardening finish/sealer.

2.6 Floor Varnish: Alkyd resin varnish, specially compounded for floor finish, Fed. Spec. TT-V-109.

2.7 Urethane Finish: Specially compounded for wood floor finish, moisture curing type, for multiple-coat application.

2.8 Floor Wax: Liquid, solvent-type, slip-resistant, Fed. Spec. P-W-158, Type I, Class 2.

3.0 EXECUTION:

3.1 Preparation:

3.1.1 Cleaning: Scrub thoroughly with cleaning compound and warm water. Rinse with clean water, mop dry, and buff with polishing machine.

3.1.2 Varnish Removal: Apply paint and varnish remover as required.

3.1.3 Sanding: Traverse floors two times with an electric-powered sanding machine. A rotary disc sander may be used for the final cut, but first cut shall be made with a drum-type machine. The first cut may be made crosswise of the grain or at a 45-degree angle. Make second cut in direction of grain. Use No. 1/2 sandpaper for first traverse and No. 0 for second traverse. Use an electric edger or hand sander for sanding areas near walls, in corners, and small closets.

3.2 Installation:

3.2.1 Apply Wood Paste Filler, followed by wiping cross-grain to work into pores and cracks.

3.2.2 Apply Stain if needed to match selected finish.

3.2.3 Apply Sealer (2 coats) complying with Fed. Spec. TT-S-176. Use Class I for white oak and red oak floors and Class II for beech, birch, and hard maple floors.

3.2.4 Apply Floor Varnish, (3 coats) buffing after each coat. First coat may be thinned as a sealer.

3.2.5 Apply Urethane Finish. Apply as many coats as needed to build a dry film thickness of 1.0 mil.

3.2.6 When Floors are Dry, apply two coats of wax complying with Fed. Spec. P-W-155; concentration 12 percent. Spread the wax at the rate of 1,500 square feet per gallon and polish the floors with a weighted floor brush or an electric polisher.

3.2.7 Protection: Upon completion of work, cover all traffic areas immediately with nonstaining kraft paper or polyethylene, taped along edges, and maintain floor protection until acceptance.

SECTION 09910
EXTERIOR PAINTING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and application of paint to exterior surfaces. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Application procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS: Painting materials for the exterior surfaces indicated shall conform to the following Federal and Military Specifications:

2.1 Concrete:

TT-P-19 Paint, Acrylic Emulsion, Exterior

2.2 Concrete Masonry Units:

TT-F-1098 Filler, Block, Solvent-Thinned, for Porous Surfaces (Concrete Block, Cinder Block, Stucco, Etc.).

TT-P-19 Paint, Acrylic Emulsion, Exterior.

TT-P-96 Paint, Latex Base, Exterior.

TT-P-97 Paint, Styrene-Butadiene Solvent Type, White (for Exterior Masonry).

2.3 Stucco:

TT-F-1098 Filler, Block, Solvent- Thinned, for Porous Surfaces (Concrete Block, Cinder Block, Stucco, Etc.).

TT-P-19 Paint, Acrylic Emulsion, Exterior.

TT-P-96 Paint, Latex Base, Exterior.

TT-P-97 Paint, Styrene-Butadiene Solvent Type, White (for Exterior Masonry).

2.4 Asbestos Cement:

TT-P-19 Paint, Acrylic Emulsion, Exterior

2.5 Wood, Unpainted:

TT-P-001984 Primer Coating, Latex Base, Exterior (Undercoat for Wood), White and Tints.

MIL-P-28582 Primer Coating, Exterior, Lead Pigment-Free (Undercoat for Wood, Ready-Mixed, White and Tints).

2.6 Wood, Primed:

TT-P-19 Paint, Acrylic Emulsion, Exterior.

TT-P-31 Paint, Oil: Iron-Oxide, Ready-Mixed, Red and Brown.

TT-P-37 Paint, Alkyd Resin, Exterior Trim, Deep Colors.

TT-P-102 Paint, Oil, Alkyd Modified, Exterior, White and Tints.

TT-P-1510 Paint, Latex, Exterior, for Wood Surfaces, White and Tints

2.7 Wood, Decks and Porches, Primed and Unpainted:

TT-E-487 Enamel: Floor and Deck.

2.8 Wood, to Receive Stain:

TT-S-708 Stain, Oil; Semi-Transparent, Wood, Exterior.

TT-S-001992 Stain, Latex, Exterior for Wood Surface.

2.9 Concrete Walls and Floors of Swimming Pools:

TT-P-95 Paint, Rubber: For Swimming Pools and Other Concrete and Masonry Surfaces.

2.10 Ferrous Metals, Ungalvanized and Unpainted.

TT-P-86 Paint, Red-Lead-Base, Ready-Mixed.

TT-P-645 Primer, Paint, Zinc-Chromate, Alkyd Type.

2.11 Ferrous Metals, Galvanized but Unpainted:

TT-P-641 Primer Coating: Zinc Dust-Zinc Oxide (for Galvanized Surfaces).

MIL-P-26915 Primer Coating, Zinc Dust Pigmented, for Steel Surfaces.

2.12 Ferrous Metals, Primed:

TT-E-489 Enamel, Alkyd, Gloss (for Exterior and Interior Surfaces).

TT-E-1593 Enamel, Silicone Alkyd Copolymer, Gloss (for Exterior and Interior Use).

TT-P-31 Paint, Oil: Iron-Oxide, Ready-Mixed, Red and Brown.

TT-P-37 Paint, Alkyd Resin, Exterior Trim, Deep Colors.

TT-P-38 Paint, Aluminum, Ready-Mixed.

TT-P-102 Paint, Oil, Alkyd Modified, Exterior, White and Tints.

2.13 Aluminum or Aluminum Alloy, Unpainted:

TT-P-645 Primer, Paint, Zinc-Chromate, Alkyd Type.

2.14 Aluminum or Aluminum Alloy, Primed:

TT-E-489 Enamel, Alkyd, Gloss (for Exterior and Interior Surfaces).

TT-E-1593 Enamel, Silicone Alkyd Copolymer, Gloss (for Exterior and Interior Use).

3.0 EXECUTION:

3.1 Preparation:

3.1.1 Concrete, Concrete Masonry Units and Stucco: Remove all glaze, efflorescence, laitance, dirt, grease, oil, asphalt, surface deposits of iron, and other foreign matter. Apply a filler to areas of irregular surface profile.

3.1.2 Asbestos Cement: Remove stains with solvent. Do not wire brush.

3.1.3 Wood: Clean off foreign matter. On seasoned knots, scrape, clean, and apply thin coat of knot sealer. Scrape off or remove pitch with mineral spirits or turpentine. Set nails and prime and fill nail holes and other surface inperfections with putty, exterior spackling compound, or plastic wood filler. Allow to dry and sand smooth.

3.1.4 Ferrous Metals, Ungalvanized: If not shop-coated, solvent clean. Remove loose rust, mill scale, and other foreign matter by power wire brushing or sandblasting to the degree specified on the drawings.

3.1.5 Ferrous Metals, Galvanized, and Aluminum and Aluminum Alloy: Solvent clean and treat with vinyl type wash coat conforming to Mil. Spec. DOD-P-15328.

3.1.6 Removal of Paints Containing Lead or Other Contaminants: All work associated with the removal of paints containing lead or other contaminants shall be in accordance with 29 CFR 1910 and 29 CFR 1926 (including all sub parts). The Contractor shall submit for approval a detailed lead protection program, accident prevention plan, respiratory protection plan, airborne sampling plan, and containment plan for all work involving lead paint removal. These submittals shall define all measures that are to be taken to ensure that workers and the environment will be protected during the progress of the work.

3.2 Application: Provide complete hiding and uniform thickness of coats. All paints shall be applied and allowed to cure in accordance with the manufacturer's recommendations. All surfaces not scheduled to receive paint shall be protected from overspray. Clean-up of oversprayed areas shall be at the contractor's expense.

3.2.1 Concrete Masonry Units: Apply filler coat to bare concrete masonry units and allow to dry. Follow with finish coats.

3.2.2 Wood to Receive Paint: Prime bare wood prior to application of finish coats.

3.2.3 Ferrous Metals: Prime bare metal prior to application of finish coats. Vinyl paints shall be spray applied at a total coating thickness of 7 mils (3 coats minimum).

3.2.4 Aluminum and Aluminum Alloy: Prime bare metal prior to application of finish coats.

SECTION 09920
INTERIOR PAINTING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and application of paint to interior surfaces. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Application procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS: Painting materials for the interior surfaces indicated shall conform to the following Federal and Military Specifications.

2.1 Concrete:

2.1.1 Walls and Nontextured Ceilings:

TT-E-508 Enamel, Interior, Semigloss, Tints and White.

TT-E-509 Enamel, Odorless, Alkyd, Interior, Semigloss, White and Tints.

TT-E-545 Primer (Enamel-Undercoat, Alkyd, Odorless, Interior, Flat, Tints and White).

TT-P-29 Paint, Latex Base, Interior, Flat, White and Tints.

TT-P-30 Paint, Alkyd, Odorless, Interior, Flat, White and Tints.

TT-P-95 Paint, Rubber: For Swimming Pools and Other Concrete and Masonry Surfaces.

TT-P-1511 Paint, Latex (Gloss and Semigloss, Tints and White) (for Interior Use).

2.1.2 Textured Ceilings:

TT-C-555 Coating, Textured (for Interior and Exterior Masonry Surfaces).

2.1.3 Floors:

TT-P-91 Paint, Rubber-Base, for Interior Use (Concrete and Masonry Floors).

2.2 Concrete Masonry Units:

TT-C-535 Coating, Epoxy, Two Component, for Interior Use on Metal, Wood, Wallboard, Painted Surfaces, Concrete, and Masonry.

TT-C-542 Coating, Polyurethane, Oil-Free, Moisture Curing.

TT-C-550 Coating System Glaze, High Performance, (Solvent Base) for Interior Surfaces.

TT-E-505 Enamel, Odorless, Alkyd, Interior, High Gloss, White and Light Tints.

TT-E-506 Enamel, Alkyd, Gloss, Tints and White (for Interior Use).

TT-E-508 Enamel, Interior, Semigloss, Tints and White.

TT-E-509 Enamel, Odorless, Alkyd, Interior, Semigloss, White and Tints.

TT-E-545 Primer (Enamel-Undercoat, Alkyd, Odorless, Interior, Flat, Tints and White).

TT-F-1098 Filler, Block, Solvent-Thinned, for Porous Surfaces (Concrete Block, Cinder Block, Stucco, Etc.).

TT-P-29 Paint, Latex Base, Interior, Flat, White and Tints.

TT-P-30 Paint, Alkyd, Odorless, Interior, Flat, White and Tints.

TT-P-95 Paint, Rubber: For Swimming Pools and Other Concrete and Masonry Surfaces.

TT-P-1511 Paint, Latex (Gloss and Semigloss, Tints and White) (for Interior Use).

2.3 Asbestos Cement:

TT-E-508 Enamel, Interior, Semigloss, Tints and White.

TT-E-509 Enamel, Odorless, Alkyd, Interior, Semigloss, White and Tints.

TT-E-545 Primer (Enamel-Undercoat, Alkyd, Odorless, Interior, Flat, Tints and White).

TT-P-29 Paint, Latex Base, Interior, Flat, White and Tints.

TT-P-30 Paint, Alkyd, Odorless, Interior, Flat, White and Tints.

TT-P-1511 Paint, Latex (Gloss and Semigloss, Tints and White) (for Interior Use).

2.4 Gypsum Wallboard and Plaster:

TT-C-535 Coating, Epoxy, Two Component, for Interior Use on Metal, Wood, Wallboard, Painted Surfaces, Concrete, and Masonry.

TT-C-542 Coating, Polyurethane, Oil-Free, Moisture Curing.

TT-C-550 Coating System Glaze, High Performance, (Solvent Base) for Interior Surfaces.

TT-E-505 Enamel, Odorless, Alkyd, Interior, High Gloss, White and Light Tints.

TT-E-506 Enamel, Alkyd, Gloss, Tints and White (for Interior Use).

TT-E-508 Enamel, Interior, Semigloss, Tints and White.

TT-E-509 Enamel, Odorless, Alkyd, Interior, Semigloss, White and Tints.

TT-E-545 Primer (Enamel-Undercoat, Alkyd, Odorless, Interior, Flat, Tints and White).

TT-P-29 Paint, Latex Base, Interior, Flat, White and Tints.

TT-P-30 Paint, Alkyd, Odorless, Interior, Flat, White and Tints.

TT-P-650 Primer Coating, Latex Base, Interior, White (for Gypsum Wallboard).

TT-P-1511 Paint, Latex (Gloss and Semigloss, Tints and White) (for Interior Use).

TT-S-179 Sealer Surface: Pigmented Oil for Plaster and Wallboard.

2.5 Wood Other Than Floors:

2.5.1 Painted Surfaces:

TT-E-505 Enamel, Odorless, Alkyd, Interior, High Gloss, White and Light Tints.

TT-E-506 Enamel, Alkyd, Gloss, Tints and White (for Interior Use).

TT-E-508 Enamel, Interior, Semigloss, Tints and White.

TT-E-509 Enamel, Odorless, Alkyd, Interior, Semigloss, White and Tints.

TT-E-545 Primer (Enamel-Undercoat, Alkyd, Odorless, Interior, Flat, Tints and White).

TT-P-29 Paint, Latex Base, Interior, Flat, White and Tints.

TT-P-1511 Paint, Latex (Gloss and Semigloss, Tints and White) (for Interior Use).

2.5.2 Stained, Varnished, or Natural Finishes Surfaces:

TT-S-176 Sealer, Surface, Varnish Type, Floor, Wood and Cork.

TT-S-711 Stain; Oil Type, Wood, Interior.

TT-V-85 Varnish, Oil, Low Sheen, Brush or Spray Application.

TT-V-109 Varnish, Spar, Alkyd-Resin.

TT-V-119 Varnish, Spar, Phenolic-Resin.

TT-V-121 Varnish, Spar, Water-Resisting.

2.5.3 Furniture:

TT-S-711 Stain; Oil Type, Wood, Interior.

TT-V-86 Varnish, Oil, Rubbing (for Metal and Wood Furniture).

2.6 Wood Floors:

2.6.1 Painted Surfaces:

TT-E-487 Enamel: Floor and Deck.

2.6.2 Stained or Natural Finished Surfaces:

P-W-155 Wax, Floor, Water-Emulsion.

P-W-158 Wax, General Purpose, Solvent Type.

TT-C-542 Coating, Polyurethane, Oil-Free, Moisture Curing.

TT-S-176 Sealer, Surface, Varnish Type, Floor, Wood and Cork.

2.7 Ferrous Metals:

2.7.1 Ungalvanized and Unpainted:

TT-P-86 Paint, Red-Lead-Base, Ready-Mixed.

TT-P-615 Primer Coating: Basic Lead Silico Chromate, Ready Mixed.

TT-P-645 Primer, Paint, Zinc-Chromate, Alkyd Type.

TT-V-51 Varnish: Asphalt.

2.7.2 Galvanized but Unpainted:

DOD-P-15328 Primer (Wash), Pretreatment, (Formula No. 117 for Metals) (Metric).

2.7.3 Primed:

TT-E-489 Enamel, Alkyd, Gloss (for Exterior and Interior Surfaces).

TT-E-505 Enamel, Odorless, Alkyd, Interior, High Gloss, White and Light Tints.

TT-E-506 Enamel, Alkyd, Gloss, Tints and White (for Interior Use).

TT-E-508 Enamel, Interior, Semigloss, Tints and White.

TT-E-509 Enamel, Odorless, Alkyd, Interior, Semigloss, White and Tints.

TT-E-545 Primer (Enamel-Undercoat, Alkyd, Odorless, Interior, Flat, Tints and White).

TT-P-30 Paint, Alkyd, Odorless, Interior, Flat, White and Tints.
TT-P-38 Paint, Aluminum, Ready-Mixed.

2.8 Fire Retardant Paint:

2.8.1 Non-Metallic Surfaces:

TT-P-26 Paint, Interior, White, Tints and Black, Fire Retardant.

2.8.2 Metallic Surfaces:

TT-P-001932 Paint, Latex Base, Interior, White, Tints and Black, Fire Retardant.

3.0 EXECUTION:

3.1 Preparation:

3.1.1 Concrete and Concrete Masonry Units: Remove all glaze, efflorescence, laitance, dirt, grease, oil, asphalt, and surface deposits of iron and other foreign matter.

3.1.2 Asbestos Cement: Remove stains with solvent. Do not wire-brush.

3.1.3 Gypsum Wallboard: Remove dirt and dust prior to application of first coat.

3.1.4 Plaster: Age at least 30 days. Clean, remove loose matter, and repair surface irregularities. Instrument-measured moisture content shall not exceed 8 percent.

3.1.5 Wood: Remove foreign matter. On seasoned knots, scrape, clean, and apply thin coat of knot sealer. Scrape off or remove pitch with mineral spirits or turpentine. Set nails, and prime and fill nail holes and other surface imperfections with putty or plastic wood filler. Allow to dry and sand smooth.

3.1.6 Ferrous Metals, Ungalvanized: If not shop-coated, clean with solvent. Remove loose rust, mill scale, and other foreign matter by proper wire brushing or sand blasting.

3.1.7 Ferrous Metals, Galvanized: Clean with solvent.

3.2 Application: Provide complete hiding and uniform thickness of coats.

3.2.1 Concrete Masonry Units: Apply filler coat to bare concrete masonry unit surfaces where required and allow to dry. Follow with finish coats.

3.2.2 Gypsum Wallboard and Plaster: Touch up suction spots or overall application of base coat or sealer to produce a uniform color or gloss prior to application of finish coats.

3.2.3 Wood to Receive Stain: Sand lightly after application of stain. On open-grain wood surfaces, apply wood filler after staining as required. Sand smooth. Sand lightly between coats of varnish.

3.2.4 Ferrous Metals: Prime bare metal prior to application of finish coats.

SECTION 09941
PAINTING OF WATER STORAGE TANK
INTERIOR SURFACES

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for painting water storage tank interior surfaces. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS: The following materials form a part of this section of the specification: Mil. Spec. DOD-P-15328, SSPC Paint 8, and Mil. Spec. MIL-P-15930.

3.0 EXECUTION:

3.1 Preparation:

3.1.1 Respirators: Respirators shall be worn by all persons engaged or assisting in spray painting. Air-fed respirators will be worn by all persons engaged in spray painting in confined areas (water thinned coatings excluded).

3.1.2 Forced Ventilation: Whenever surface preparation or painting operations include the use of volatile organic solvents, the enclosed space shall be made safe at all times from fire and explosion as determined by a calibrated explosimeter or organic vapor analyzer. During the painting operation, sufficient exhaust ventilation shall be provided to exchange the air in the enclosed spaces with fresh air at the rate of 5,000 cfm for each spray gun in operation. All parts of the enclosed spaces shall be swept by moving air. Exhaust ducts shall discharge clear of working areas and away from sources of possible ignition. If the ventilation fails, operations shall be stopped and the compartment evacuated until sufficient exhaust ventilation is provided.

3.1.3 Blast Cleaning: Ferrous surfaces shall be dry blast cleaned to near white metal grade, which shall be in compliance with SSPC-SP 5, except that paragraphs 3.1, 3.2, 3.3, and 3.10 shall not be applicable and except that a limited relaxation from the uniform white metal grade of surface cleanliness will be permitted, as follows. The metal shall be cleaned to such a degree that were a large surface to be divided into 6-inch squares, at least 75 percent of the subdivisions would meet the white metal grade of cleanliness and the remaining subdivisions would be randomly distributed. Within these small, randomly

distributed areas a minor relaxation from white metal cleanliness would be permitted, consisting only of very slight shadows, stains, and discolorations stemming from very thin, adherent, sparsely scattered residues of mill scale and corrosion products. No relaxation from the white metal grade will be permitted on surface irregularities such as edges, interior angles, welds, rivet lines, and junctions of joining members. The overall blasting effort expended shall be not less than two-thirds (2/3) of that which would be required to accomplish the white metal grade of cleanliness on the specific surfaces involved, but this limitation shall not be construed as a waiver of any of the requirements above. Remove weld spatter not dislodged by blasting with impact or grinding tools. Surfaces shall be dry at the time of blasting.

3.1.4 Surface Protection: Within 8 hours after cleaning but in any event prior to the deposition or formation of any detectable moisture, contaminants, or corrosion, all ferrous surfaces that have been blast cleaned to the near-white metal grade shall be cleaned of dust and abrasive particles by brushing, vacuum cleaning, and/or blowdown with clean, dry compressed air, and shall be given the pretreatment and first coat of paint.

3.1.5 Pretreatment: All sandblasted surfaces shall receive a washcoat pretreatment complying with Mil. Spec. DOD-P-15328. Application shall be by spray, and all requirements of the specification concerning mixing, thinning,application, and spreading rate shall be followed. All materials not applied within a maximum of eight hours after mixing shall be discarded and must not be used.

3.2 Installation:

3.2.1 Primer Paint: All pretreated surfaces shall receive two coats of vinyl paint complying with Mil. Spec. MIL-P-15930. Application shall be by brush or spray. All corners, angles, welds, rivets, and other surface irregularities shall receive one additional preliminary spray coat. The succeeding primer coat (or initial finish coat) shall not be applied until the primer is dry to touch. The color of alternate coats shall provide contrast to assist in obtaining complete coverage.

3.2.2 Finish Paint: All primed surfaces shall receive a minimum of two coats of Aluminum Vinyl Finish Paint complying with SSPC Paint 8. The paint shall be formulated as specified except that high boiling solvents such as cyclohexanone shall not be used in the formulation. High boiling solvents may be substituted for the ketones specified in the thinner only if ambient temperatures at the time of application exceed 75 F (24 C). Application shall be by spray. All corners, angles, welds, rivets, and other surface irregularities shall receive one additional

preliminary spray coat. The succeeding coat shall not be applied until the first coat is dry to touch.

3.2.3 Thickness Requirements: Apply the washcoat pretreatment to a dry film thickness of at least 0.3 mils but not exceeding 0.5 mils. Apply the primer paint to produce a dry film of approximately 2.5 mils. Apply the finish paint such that the resulting total system has a minimum dry film thickness of at least 5 mils at its thinnest point. If this thickness is not obtained in the specified number of coats, apply additional coats of the finish paint to meet the minimum thickness requirement at no additional cost to the Government. Final thickness measurements shall be made by the Contractor in the presence of the Contracting Officer using a magnetic thickness gauge as specified in SSPC-PA 2.

3.2.4 Final Drying Time: After the final coat of paint has been applied, the tank shall remain open and forced ventilation shall be continued for a minimum of three days prior to being flooded with water.

3.2.5 Washing: After the final work has been completed in the tank, but prior to any disinfecting operations, wash the tank with clean water to remove all dust and overspray. Washing may take place during the final dry time provided the coating is sufficiently cured to withstand the abuse.

3.2.6 Disinfection of Tank: After painting and all other interior work has been completed, disinfect the tank before it is replaced in service. If the local medical facility or health department requires a specific procedure for disinfection, follow that procedure. Otherwise the following procedure shall be followed: Place water containing 50 ppm chlorine in the tank to such a depth that when the tank is filled the resultant chlorine concentration shall be no less than 2 ppm. Hold the water containing 50 ppm chlorine in the tank for 24 hours before the tank is filled. Allow the full tank, in turn, to stand for 24 hours, after which the tank may be put into service without draining the water used to disinfect it.

SECTION 09942
PAINTING OF WATER STORAGE TANK
EXTERIOR SURFACES

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for painting water storage tank exterior surfaces. Product shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS: The following materials form a part of this section of the specification: Fed. Spec. TT-P-86, TT-P-320, TT-V-81, and SSPC Paint 101.

3.0 EXECUTION:

3.1 Preparation:

3.1.1 All Exterior Surfaces to be Painted shall be cleaned using power tools in compliance with SSPC-SP 3 or, at the option of the Contractor, surfaces may be blast cleaned in compliance with SSPC-SP 7. In addition, the following operations shall be implemented.

3.1.2 Mildew shall be removed from all surfaces to be painted by scrubbing the surface with a solution consisting of 1/2 pound of trisodium phosphate and 1 pound of hypochlorite bleach per gallon of warm water. Additional bleach may be beneficial in heavily mildewed areas. Rinse surfaces to remove cleaning materials and allow to dry completely before repainting.

3.1.3 Surface Glaze remaining on existing coatings shall be removed either by lightly abrading the surface or through the use of a chemical deglosser.

3.1.4 Removal of Vines and Trimming of Plantings: Remove all ivy vines and tentacles interfering with the contract work from the exteriors of the structure and haul from the site of the work. Remove ivy in such a fashion that the remaining growth shall all be live and connected to the root system. Other types of plantings that interfere with the contract surfaces shall be trimmed or tied back.

3.2 Installation:

3.2.1 All Paints shall be mixed, thinned, and applied in compliance with the procedures and requirements set forth in SSPC-PA 1. The following paint system shall be used.

3.2.2 Primer: The primer shall consist of one coat of a material complying with Fed. Spec. TT-P-86, Type II.

3.2.3 Finish Coats: The finish coats shall consist of a minimum of two coats of one of the following paints: Paint 1 - job-mixed alkyd aluminum paint in compliance with SSPC Paint 101 Type I or Paint 2 - aluminum paint consisting of aluminum paste and a mixing varnish in compliance with Fed. Spec. TT-V-81, Type II and mixed in the proportions of two pounds of aluminum paste complying with Fed. Spec. TT-P-320 per gallon of mixing varnish.

3.2.4 Thickness Requirements: Apply the primer paint to a dry film thickness of approximately 1.5 mils. Apply the finish paint such that the resulting total system has a minimum dry film thickness of at least 3.5 mils at its thinnest point. If this thickness is not obtained in the specified number of coats, apply additional coats of the finish paint to meet the minimum thickness requirement. Final thickness measurements shall be made by the Contractor in the presence of the Contracting Officer, using a magnetic thickness gauge as specified in SSPC-PA 2.

3.2.5 Respirators: Respirators shall be worn by all persons engaged or assisting in spray painting. Air-fed respirators will be worn by all persons engaged in spray painting in confined areas (water thinned coatings excluded).

3.2.6 Lettering and Sign Painting: Building number signs, gauges, and other signs that are painted shall have lettering and numbering repainted. Design and color shall match existing.

SECTION 09952
WALL COVERINGS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of vinyl, cork, fabric, and flexible wood wall coverings. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Vinyl Wall Covering: Wall covering shall conform to Fed. Spec. CCC-W-408, Type I, II, or III as required. A polyvinyl fluoride film, 1/2 mil thick, shall be factory-applied to the wall covering as required. The film shall conform to Fed. Spec. L-P-1040, Type I, Grade B, Class 2.

2.2 Cork Wall Covering shall be either sheet cork in standard 24-inch by 36-inch sheet size, or sheeting composed of a cork sheeting material factory-bonded to a fabric backing. Wall covering material shall be either 20 ounces per lineal yard or 24 ounces per lineal yard and 36 inches wide, as required.

2.3 Fabric Wall Covering shall be natural woven fabric bonded to a paper backing. Fabric materials shall be treated for stain and mildew resistance and shall be a minimum of 27 inches wide. All fabric wall coverings shall be Class A flame-rated and tested in accordance with ASTM E 84.

2.4 Flexible Wood Sheets shall be composed of genuine wood veneer bonded to a clay-filled cotton backing fabric to form a flexible wall covering in sheets not less than 12 inches wide, factory matched and numbered in sequence for spaces as required.

2.5 Primer and Adhesive shall be mildew-resistant and non-staining, as recommended by the wall covering manufacturer.

2.6 Wainscot Caps shall be aluminum extrusions.

2.7 Fire Hazard Classification: Provide wall covering materials bearing UL label and marking, indicating fire hazard classification of wall covering, as determined by ASTM E 84. Provide materials with the following fire hazard classifications:

Flame spread not more than 25.
Smoke developed not more than 50.

3.0 EXECUTION:

3.1 Wall Covering Materials shall be acclimatized by removing from packaging in area of installation not less than 24 hours before application.

3.2 Prime and Seal Substrates in accordance with wall covering manufacturer's recommendations for type of substrate. Surface sealer shall be applied to gypsum wallboard to permit future removal of wall covering without damage to paper facing.

SECTION 10155
COMPARTMENTS AND CUBICLES
FOR SHOWER AND TOILET ROOMS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of laminated plastic and metal toilet partitions, urinal screens, and shower and dressing compartments. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Laminated Plastic Toilet Partitions and Urinal Screens:

2.1.1 Plastic Laminate shall be NEMA LD-3, minimum 0.062 inch thick.

2.1.2 Core Material for Plastic Laminate shall be manufacturer's standard particleboard or plywood, in thickness to provide a nominal dimension of 1 inch for doors, panels, and screens and 1-1/4 inches for pilasters.

2.1.3 Pilaster Shoes shall be ASTM A 167, Type 302 or 304, stainless steel not less than 3 inches high, 20 gauge, finished to match hardware.

2.1.4 Stirrup Brackets shall be manufacturer's standard design for attaching panels to walls and pilasters, either chromium-plated nonferrous cast alloy or anodized aluminum.

2.1.5 Hardware and Accessories shall be manufacturer's standard design heavy duty operating hardware and accessories of chromium-plated nonferrous cast alloy or chromium plated brass, as required.

2.1.6 Overhead Bracing shall be continuous extruded aluminum tubing in antigrip profile, with clear anodized finish.

2.1.7 Anchorages and Fasteners shall be manufacturer's standard exposed fasteners of stainless steel, chromium-plated steel, or brass finished to match hardware, with theft-resistant type heads and nuts. For concealed anchors, use hot-dip galvanized, cadmium-plated, or other rust-resistant protective-coated steel.

2.1.8 Fabrication:

2.1.8.1 General: Furnish standard doors, panels, screens, and pilasters fabricated for partition system. Furnish units with cutouts, 10155-drilled holes, and internal reinforcement to receive partition-mounted hardware, accessories, and grab bars.

2.1.8.2 One-Piece Face Sheets shall be pressure-laminated to core material with no splices or joints, and with edges straight and sealed. Seal exposed core material at cutouts to protect against moisture.

2.1.8.3 Overhead-Braced Partitions: Furnish galvanized steel supports and leveling bolts at pilasters, as recommended by manufacturer to suit floor conditions. Make provisions for setting and securing continuous aluminum overhead-bracing tube at top of each pilaster. Furnish shoe at each pilaster to conceal supports and leveling mechanism.

2.1.8.4 Floor-Supported Partitions: Furnish galvanized steel anchorage devices, complete with threaded rods, lock washers, and leveling adjustment nuts at pilasters, to permit structural connection at floor. Furnish shoe at each pilaster to conceal anchorage.

2.1.8.5 Ceiling-Hung Partitions: Furnish galvanized steel anchorage devices, complete with threaded rods, lock washers, and leveling adjustment nuts at pilasters, to permit connection to structural support above finished ceiling. Furnish devices which are designed to support pilasters from structure without transmitting load to ceiling finish. Furnish 3 inch high stainless steel trim piece, finished to match hardware, at each pilaster.

2.1.8.6 Wall-Hung Screens: Furnish panel units of same construction and finish as partition system panels.

2.1.8.7 Floor-Supported Screens: Furnish pilasters not less than 1 inch in thickness, panels and pilasters of same construction and finish as toilet partitions. Furnish galvanized steel anchorage devices, complete with threaded rods, lock washers, and leveling adjusting nuts at pilasters, to permit structural connection to floor. Furnish shoe at pilaster to conceal anchorage.

2.1.8.8 Furnish Hardware for each compartment in partition system, as follows:

a. Cutout inset type hinges, adjustable to hold door open at any angle up to 90 degrees; gravity type, spring-action cam type, or concealed torsion rod type.

b. Recessed or surface-mounted latch unit, designed for emergency access, with combination rubber-faced door strike and keeper.

c. Coat hook with combination hood and rubber-tipped bumper.

d. Door pull.

2.2 Metal Toilet Partitions and Urinal Screens:

2.2.1 Toilet Enclosures shall conform to Fed. Spec. RR-P-1352, Type I, Style A, B, or C as required. Finish surface of panels shall be baked enamel, in color as required. Panels to receive toilet paper holders or grab bars shall be reinforced for the reception of the items required.

2.2.2 Room Entrance Screens shall conform to Fed. Spec. RR-P-1352, Type II, Style A . Finish surface of screens shall be baked enamel.

2.2.3 Urinal Screens shall conform to Fed. Spec. RR-P-1352, Type III, Style A or D, as required. Finish surface of screens shall be baked enamel. Width of Style A screens shall be 24 inches or 36 inches, as required.

2.3 Shower and Dressing Compartments:

2.3.1 General: Materials shall be provided which have been selected for surface flatness and smoothness. Exposed surfaces which exhibit pitting, seam marks, roller marks, stains, discolorations, telegraphing of core material, or other imperfections on finished units are not acceptable. Shower compartments shall include a shower receptor for each compartment.

2.3.2 Steel Sheets for Baked Enamel Finish shall be ASTM A 591, Class C, galvanized-bonderized, of the following minimum thicknesses:

a. Pilasters (overhead-braced): 20-gauge.

b. Panels and Screens: 20-gauge.
c. Doors: 22-gauge.

2.3.3 Concealed Anchorage Reinforcement shall be minimum 12-gauge galvanized steel sheet.

2.3.4 Concealed Tapping Reinforcement shall be minimum 14-gauge galvanized steel sheet.

2.3.5 Core Material for Metal Partitions shall be manufacturer's standard sound-deadening honeycomb of impregnated kraft paper, in thickness to provide finished dimension of 1 inch minimum for doors, panels, and screens and 1-1/4 inches minimum for pilasters.

2.3.6 Pilaster Shoes shall be ASTM A 167, Type 302/304 stainless steel, not less than 3 inches high, 20-gauge, finished to match hardware.

2.3.7 Stirrup Brackets shall be manufacturer's standard design for attaching panels to walls and pilasters, either chromium-plated nonferrous cast alloy or anodized aluminum.

2.3.8 Hardware and Accessories shall be manufacturer's standard design, heavy-duty operating hardware and accessories of chromium-plated nonferrous cast alloy or chromium-plated brass, as required.

2.3.9 Overhead Bracing shall be continuous extruded aluminum tubing in antigrip profile, with clean anodized finish.

2.3.10 Anchorages and Fasteners shall be manufacturer's standard exposed fasteners of stainless steel, chromium-plated steel, or brass finished to match hardware, with theft-resistant type heads and nuts. For concealed anchors, use hot-dip galvanized, cadmium-plated, or other rust-resistant protective-coated steel.

2.4 Solid Plastic( polymere resin) Toilet / Shower Enclosures and Urinal Screens:

2.4.1 Toilet and shower enclosures shall conform to FS RR-P-1352, Type I, style A.
Doors, panels, pilasters, and screens shall be solid Polymer resin. All doors,panels, pilasters and screens shall be protected with a plastic masking.

2.4.2 Doors, Panels, pilasters, and Screens shall be one (1) inch thick with all edges uniformly machined to a o.250 inch radius. Panels shall be anchored to walls and pilasters with continuous wall brackets made of extruded aluminum. Each panel shall contain a continuous aluminum strip on the bottom. Doors, Panels, pilasters and urinal screens shall shall be provided with the standard hardware. Doors shall be furnished with one (1) coat hook / bumper of manufacturer's standard.

2.5 Fabrication:

2.5.1 Furnish Standard Doors, Panels, Screens, and Pilasters fabricated for partition system, unless otherwise indicated. Furnish units with cutouts, drilled holes, and internal reinforcement to receive partition-mounted hardware, accessories, and grab bars, as required.

2.5.2 Door Dimensions: Unless otherwise indicated, furnish 24-inch wide in-swinging doors.

2.5.3 Pressure Laminate Seamless Face Sheets to core material and seal edges with continuous interlocking strip or with lapped and formed edges. Weld edges and corners, with exposed welds ground smooth.

2.5.4 Overhead-Braced Partitions: Furnish galvanized steel supports and leveling bolts at pilasters, as recommended by manufacturer to suit floor conditions. Make provisions for setting and securing continuous aluminum overhead-bracing tube at top of each pilaster. Furnish shoe at each pilaster to conceal supports and leveling mechanism.

2.5.5 Floor-Supported Partitions: Furnish galvanized steel anchorage devices, complete with threaded rods, lock washers, and leveling adjustment nuts at pilasters, to permit structural connection at floor. Furnish shoe at each pilaster to conceal anchorage.

2.5.6 Furnish Hardware for each dressing compartment as follows:

a. Cutout inset type hinges, adjustable to hold door open at any angle up to 90 degrees; gravity type, spring-action cam type, or concealed torsion rod type.
b. Recessed or surface-mounted latch unit, designed for emergency access, with combination rubber-faced door strike and keeper.
c. Coat hook, with combination hook and rubber-topped bumper.

d. Door pull.

2.5.7 Accessories: Each dressing compartment shall be provided with the following accessories: shower curtain rod, curtain, hooks, soap dish, and wood seat.

2.5.8 Finish for Compartments and Showers shall be baked enamel. Clean galvanized steel surfaces after fabrication and before application of enamel coating system to remove processing compounds, oils, and other contaminants. Prime metal with baked-on rust-inhibitive primer. Apply two coats of thermosetting enamel finish, applied by electrostatic process, and baked in accordance with paint manufacturer's instructions.

2.5.9 Shower Receptor shall be pre-cast terrazzo, made of marble chips cast in white Portland cement. Provide wrought brass drain bodies cast integrally in receptor. Drain bodies shall provide for caulked lead connection not less than one inch deep to a two-inch pipe, with a removable type stainless steel strainer. Shower receptor curb shall be rabbeted 1 inch deep to receive steel shower walls. Receptors shall have an integral steel flange, 6-inch minimum height, on all sides except at threshold location.

3.0 EXECUTION:

3.1 Installation: Partitions associated with compartments and cubicles shall be installed straight and plumb with all horizontal lines level and rigidly anchored to the supporting construction. Anchorage to walls shall be by through-bolting or toggle-bolting as required. Drilling and cutting for installation of anchors shall be at locations that will be concealed in the finished work.

SECTION 10275
ACCESS AND PEDESTAL FLOORS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of access and pedestal floors. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS: Provide access flooring that, when installed, complies with NFPA 75, (components shall have a flame spread rating of 25 or less and a smoke developed rating of 50 or less when tested in accordance with NFPA 255 and ASTM E 84) unless otherwise directed.

2.1 Panels shall be 24 inches by 24 inches square (+/- 0.015 inch) and shall be capable of withstanding a concentrated load of 1,200 pounds with a deflection of not greater than 0.080 inches and a uniform load of 500 pounds per square foot with a deflection not to exceed 0.080 inches.

2.2 Pedestals shall be assemblies that are electrically conductive and corrosion-resistant. Each shall be capable of adjustments of 1/64-inch increments, have positive locking, and be capable of supporting a 5,000-pound axial load.

2.3 Stringers (on floors 18 inches in height or greater) shall be capable of individual removal and shall support 200 pounds.

2.4 Accessory Ramps, Handrails, and Fascia Plates shall be compatible with panels and pedestals.

3.0 EXECUTION:

3.1 Preparation: No installation of access flooring shall take place until structural floor surfaces are clean and dry.

3.2 Installation:

3.2.1 Completed System shall be rigid and free from vibration, with no rocking panels.

3.2.2 Floor shall be level within +/- 0.062 inch in any 10-foot area and +/- 0.125 inch over the entire area.

SECTION 10290
PEST CONTROL

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for pest control. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS: One of the following materials shall be used for pest control:

2.1 Benzene Hexachloride, 0.8 percent gamma isomer concentration in a water emulsion.

2.2 Chlordane, 1.0 percent concentration in a water emulsion.

2.3 Heptachlor, 0.5 percent concentration in a water emulsion.

3.0 EXECUTION:

3.1 Immediately prior to placing concrete floor slabs on grade and basement slabs for structures and immediately prior to backfilling around foundation for structures with basements or crawl spaces, soil treatment shall be applied as hereinafter specified. Soil treatment agents shall be delivered to the jobsite in sealed and labeled containers. Labels shall bear the manufacturer's warnings to be observed in the handling and use of soil treatment materials.

3.2 Soil Treatment shall be applied in accordance with the precautions on the label and in the following minimum quantities:

3.2.1 Under Slabs on Grade, 1-1/2 gallons per 10 square feet as overall treatment. In critical areas such as around utility openings for pipes, ducts, and conduits, 0.5 gallon per square foot shall be applied. Along the exterior perimeter of the slab and under expansion joints, 2 gallons per 5 linear feet in a strip 1 foot wide shall be applied.

3.2.2 Foundation Walls of Structures with Basements, 2 gallons per 5 linear feet per foot of depth from finished grade to top of footings in a strip 1 foot wide on exterior side at each elevation as follows: near level of top of footings before any backfill is placed, as each 1-foot lift of backfill is completed, and just below finished grade. Two gallons per 5 linear feet in a strip 1 foot wide shall be applied under the basement slab next to perimeter footings.

3.2.3 Foundation Walls of Structures with Crawl Spaces, 2 gallons per 5 linear feet per foot of depth from finished grade to top of footings in a strip 1 foot wide on exterior, with one-half of the application near level of top of footings before any backfill is placed, and the remainder just below finished grade. Two gallons per 5 linear feet in a strip 1 foot wide shall be applied adjacent to the interior side of the foundation of buildings.

# SECTION 10351
# FLAGPOLES

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of flagpoles. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Steel Flagpoles shall be constructed from standard weight steel pipe complying with ASTM A 53, Type S, Grade B, or better.

2.2 Aluminum Flagpoles shall be fabricated from seamless extruded tubing complying with ASTM B 241, alloy 6063-T6, having a minimum wall thickness of 3/16 inch.

2.3 Stainless Steel Flagpoles shall be seamless construction, fabricated of AISI 302/304 alloy.

2.4 Bronze Flagpoles shall be fabricated from Copper Development Assoc. No. 230 bronze alloy seamless pipe.

2.5 Flagpole Style shall be cone-tapered, sectionally swaged, or entasis-tapered and shall be of designated height and diameter.

2.6 Two Continuous Halyards shall be provided for each pole and furnished complete with all standard fittings.

2.7 Provide Anchors and Base necessary for the particular installation requirements.

3.0 EXECUTION

3.1 Flagpoles shall have a positive lightning ground for each installation.

3.2 Portions of Ground-Set Flagpoles shall be painted below ground with a heavy coat of bituminous paint.

SECTION 10410
DIRECTORY AND BULLETIN BOARDS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of directories and bulletin boards. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Directory Boards shall be grooved and covered with felt, vinyl, or rubber. Boards shall be fabricated of one piece of material. Space grooves at 1/4 inch O.C. to receive changeable letters or changeable name bases, as required.

2.2 Chalkboard Surfaces shall comply with Porcelain Enamel Institute specifications.

2.3 Tack Board Surfaces shall be natural cork, plastic-impregnated cork, or vinyl fabric laminated under pressure to 1/4 inch thick exterior plywood or hardwood backing.

2.4 Visual Aid Boards shall have a white porcelain enamel writing surface.

2.5 Frames shall be constructed of hardwood, chrome-plated steel, aluminum, bronze, or stainless steel of designated design. All units located on the exterior shall be of weatherproof construction.

2.6 Glass for Encased Boards shall be laminated glass, tempered glass, acrylic sheeting, or polycarbonate sheeting.

2.7 Locks and Keys for Glass-Encased Boards shall be of the disk tumbler type with two keys.

3.0 EXECUTION:

3.1 Preparation Installation Mounting Surface
preparation and product installation shall be in accordance with the product manufacturer's written recommendations.

3.2 Protection and Cleaning
The work shall be protected against damaged during construction. During construction hardware shall be adjusted for proper operation. Products that are damaged or improperly installed shall be removed and reinstall or replaced with new products as directed. Glass, frames and other discolored surfaces shall be cleaned in accordance with manufacturer's instructions.

SECTION 10440
SIGNS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of signs. Materials shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Cast-Aluminum Letters shall have a satin, polished, clear anodized, colored anodic, or enameled finish.

2.2 Cast-Bronze Letters shall have a satin, polished, or oxidized finish.

2.3 Special Medallion Construction shall be of cast bronze or aluminum, free from pits, scale, second holes, or other defects.

2.4 Adhesive Door Signs shall be fabricated from individually die cut-to-shape letters that are pre-spaced and pre-masked on a high-quality plastic film coated with a pressure-sensitive adhesive backing.

2.5 Hard Plastic Door Signs shall be made from high-pressure plastic laminate engraving stock with face and core plies in contrasting colors.

2.6 Frames For Plastic Door Signs shall be made of solid extruded aluminum with an anodized gold or silver finish and concealed mounting holes. Frames shall be designed to allow signs to slide in from the side.

3.0 EXECUTION

3.1 Signs shall be installed in accordance with approved manufacturer's instructions. Signs shall be installed plumb and true at mounting heights. Locations and mounting heights shall be as directed by the Contracting Officer. Signs mounted on other surfaces shall not be installed until the finishes on such surfaces have been completed.

3.1 Anckorage
Anckorage shall be in accordance with approved manufacturer's instructions. Anchorage not otherwise specified or indicated shall include slotted inserts, expansion shields, and power- driven fasteners when approved for concrete;toggle bolts and through bolts for masonry; machine carriage bolts for steel; lag bolts and screws for wood.

3.2 Protection and cleaning
The work shall be protected against damage during construction. Hardware shall be adjusted for proper operation. Glass, frames and other sign surfaces shall be cleaned in accordance with manufacturer's instructions

SECTION 10505
METAL LOCKERS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of metal lockers. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Materials and Finishes:

2.1.1 Stainless Steel: ASTM A 167, Type 302, 304, or 316 alloy. Exposed surfaces shall have a satin finish or a minimum of no. 4 polished finish.

2.1.2 Carbon Steel: ASTM A 366, baked enamel finish.

2.2 Wardrobe Lockers:

2.2.1 Backs and Sides of lockers shall be fabricated of minimum 24-gauge steel with double flanged connections extending full height. Top and bottom shall be of not less than 24 gauge steel with flanged edges. Exposed ends of non-recessed lockers shall be of a minimum 16-gauge steel. Provide one 24-gauge steel hat shelf in single-tier units.

2.2.2 Doors shall be one-piece construction of minimum 16-gauge sheet steel, flanged at all edges. Provide extra bracing or reinforcing on inside of doors over 15 inches wide.

2.2.3 Ventilation: Provide stamped, louvered vents in door face. Single-tier lockers shall have not less than 6 louver openings top and bottom. Double-tier lockers shall have not less than 3 louver openings top and bottom. Multi-tier lockers shall have not less than 2 louver openings top and bottom, or 3 louver openings top or bottom.

2.2.4 Hinges shall be heavy-duty, not less than 0.050 inch thick steel, full-loop, 5-knuckle, tight pin, 2 inches high. Weld to inside of frame and secure to door with not less than 2 factory-installed fasteners, which are completely concealed and tamperproof when door is closed. Provide at least 3 hinges for each door 42 inches high and over, at least 2 hinges for each door less than 42 inches high.

2.2.5 Standard Hardware Items, including coathooks, sequential number plates, and arrangements for locking devices, shall be provided.

2.3 Box Lockers:

2.3.1 Tops and Bottoms of lockers shall be fabricated from minimum 16-gauge steel sheet and backs from not less than 18-gauge steel. Sides and intermediate partitions shall be constructed of expanded metal welded to steel hemming. Provide 16-gauge steel shelf in single-tier lockers.

2.3.2 Doors shall be manufacturer's standard of either expanded metal in a steel frame or perforated steel sheet with flanged edges, minimum 16 gauge. Provide extra bracing or reinforcing on inside of doors over 15 inches wide.

2.3.3 Hinges shall be heavy-duty, not less than 0.050 inch thick steel, full-loop, 5-knuckle, tight pin, 2 inches high. Weld to inside of frame and secure to door with not less than 2 factory-installed fasteners which are completely concealed and tamperproof when door is closed. Provide at least 3 hinges for each door 42 inches and over, at least 2 hinges for each door less than 42 inches high, or continuous piano hinge at top for multi-tier units. Manufacturer shall provide allnecessary hardware including sequential number plates and arrangements for locking devices.

2.4 Basket Locker: Rack shall have legs for fastening to the floor and sway braces. Racks shall be designed to allow bolting together to form double-faced racks.

2.4.1 Uprights on Rack shall be a minimum of 13 gauge, shelves a minimum of 18 gauge, and dividers a minimum of 20 gauge, ribbed for stiffness.

2.4.2 Baskets shall be all wire or wire and minimum 24 gauge steel front with perforations. All baskets shall be zinc plated with a bright finish. Pilfer guards shall be available for all styles of baskets.

2.4.3 Hardware shall be provided as required for installation and functioning including sequential number plates and arrangements for locking.

3.0 EXECUTION: Lockers shall be installed in accordance with the designated arrangement, securely anchored in position, and accurately aligned vertically and horizontally.

SECTION 10520
FIRE EXTINGUISHERS, CABINETS, AND ACCESSORIES

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of fire extinguishers, cabinets, and accessories. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendaions. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Fire Extinguishers shall be Underwriters' Laboratories (UL) listed and/or Factory Mutual System (FM) approved for their intended use in compliance with NFPA 10 and its appendices. Fire extinguishers shall be clearly marked to indicate extinguisher suitability according to class of fire.

2.2 Fire Extinguisher Cabinets and Accessories shall be in compliance with NFPA 10 and its appendices and shall be of sufficient size to house fire extinguishers of the type and capacity required.

3.0 EXECUTION:

3.1 Fire Extinguishers shall be distributed and maintained in compliance with NFPA 10 and its appendices.

3.2 Fire Extinguisher Cabinets and Accessories shall have the locations of fire extinguishers readily recognizable by the use of markings that are not part of the extinguisher itself.

SECTION 10550
POSTAL SPECIALTIES

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of mail chutes and mail boxes. Materials shall match existing materials and/or as shall be directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 General: All products shall comply with U.S. Postal Service requirements for construction and installation of units serviced by USPS carriers.

2.2 Mail Chutes shall have sides and back that are of a continuous one-piece construction extending from floor to ceiling on each floor and extending 4 feet 6 inches above finish flooring on top floor. Back and sides shall be fabricated of aluminum with a 0.105-inch minimum thickness and alloy 6063-T5 extrusions with satin anodized finish complying with NAAMM-M31C21A31. Removable front panels shall be made of 3/16-inch tempered glass, 1/4-inch float glass, or transparent polycarbonate resin plate, set into continuous one-piece frames and covers. Frames and covers shall be fabricated from aluminum with a 0.125 inch minimum thickness, and alloy 6063-T5 extrusions with satin anodized finish complying with NAAMM-M31C21A31, or color anodized, bronze, or standard bronze statuary finish.

2.2.1 Furnish Manufacturer's Standard Cast-Metal Floor and Ceiling Fascia and Lock Band finished to match front frames and covers. Furnish lock band with acceptable locking device and keyed lock which prevents key removal if locking device is not secured.

2.2.2 Mail Slot shall be metal pocket with cigarette ejector and brass finish. Inscribe "U.S. MAIL" on face of mail slot.

2.2.3 Bundled Mail or Package Chute shall be constructed similarly to standard mail chutes. Furnish complete with removable frames, hinged lock band, bottom deflector or baffle slow-down, and mail openings on each floor. Fabricate chute size 14 inches wide and 7 inches deep, unless otherwise indicated. Bundled mail chutes will not require USPS approval.

2.2.4 Locked Receiving Mail Box shall be constructed of aluminum alloy 6063-T5 with satin anodized finish complying with NAAMM-M31C21A31 or bronze with statuary finish. Boxes shall be 36 inches by 20 inches by 12 inches.

2.3 Mail Boxes:

2.3.1 Letter Slot shall be metal, designed for flush mounting. The legend "U.S. MAIL" must be plainly inscribed on every mail opening.

2.3.2 Rural Letter Box shall be post-mounted type and shall have a heavy-duty piano hinge and red flag. Doors shall have legend "U.S. MAIL" plainly inscribed. Boxes shall have a polyurethane baked-on finish that resists rust.

2.3.3 Apartment House Keyed Mail Boxes: Mail compartments and wall receptacles shall be of heavy galvanized steel or corrosion-resistant metal construction. Each compartment shall be designed to receive name card and shall bear identification numbers as directed.

2.3.4 Letter Box with Combination Lock: Each compartment shall be equipped with a single-dial, 3-digit combination lock and shall be provided with identification numbers.

2.3.5 Letter Box with Keyed Lock: Each compartment shall be equipped with a 5-pin tumbler cylinder lock capable of at least 1,000 key changes, with 2 keys for each box door. Each box shall be keyed differently and a master key shall be provided. Provide identification numbers for each compartment.

3.0 EXECUTION: Install postal specialties so that they comply with U.S. Postal Service requirements.

SECTION 10605
WIRE MESH PARTITIONS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of wire mesh partitions. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Mesh shall be 10-gauge crimped steel wire woven into 1- 1/2 inch mesh, or heavy-duty type constructed of 6-gauge or 8-gauge steel woven wire woven into 2-inch mesh, securely clinched to frame members.

2.2 Frames: Provide cutouts for pipes, ducts, beams, and other items necessary for partition installation.

2.2.1 Vertical Members shall be 1-1/4 inch x 5/8-inch cold-rolled steel C-Section channels with 1/4-inch bolt holes approximately 15 inches on center.

2.2.2 Horizontal Members shall be 1-inch x 1/2-inch x 1/8-inch cold-rolled steel channels, mortised and tenoned to vertical members.

2.2.3 Horizontal Reinforcing Members shall be 1-inch x 1/2-inch x 1/8-inch cold-rolled steel channel with wire woven through or two 1-inch x 3/8-inch channels bolted or riveted to each side of mesh and secured to vertical members. Provide number of horizontal reinforcing members to suit panel height.

2.3 Stiffening Bar: For free-standing partitions over 8 feet -0 inches in height, provide flat bar stiffener posts between abutting panel frames.

2.4 Top Capping Bars shall be 2-1/4 inch x 1-inch cold-rolled steel channels, secured to top framing channel with 1/4-inch U-bolts spaced not more than 28 inches on center.

2.5 Corner Posts shall be 1-1/4 inch x 1-1/4 inch x 1/8-inch angles with 1/4-inch bolt holes to align with bolt holes in vertical frame members and floor plate.

2.6 Floor Shoes shall be cast iron, sized to suit vertical framing and to provide approximately 3 inches clear space between finished floor and bottom horizontal frame members. Furnish units with set screw for leveling adjustment.

2.7 Sheet Metal Base shall be panels formed to 16-gauge steel sheet, welded or bolted to frames.

2.8 Hinged Door: Door frame shall be of 1-1/4 inch x 1/2-inch x 1/8-inch channels, with 1-1/4 inch x 1/8-inch flat bar cover plate on 3 sides and matching 1/8-inch thick angle strike bar and cover on lock side. Provide 1-1/2 pair butt hinges riveted or welded to door and frame and bronze mortise type cylinder lock operated by key outside with recessed knob inside. Provide cylinders for lock, keyed and master keyed, if required.

2.9 Sliding Door: Door frame shall be of 1-1/2 inch x 3/4-inch x 1/8-inch channels with 1-1/2 inch x 1/8-inch flat bar cover plate on all 4 sides. Provide door with two 4-wheel roller bearing carriers, box track, bottom guide channel, and bronze mortise type cylinder lock operated by key outside and recessed knob inside. Provide cylinders for locks, keyed and master keyed, if required.

2.10 Service Window: Fabricate of same mesh and frames as panel units, arranged to lock in open and closed positions with spring catches.

2.11 Service Window Shelf: Fabricate of 12-gauge steel, flanged front and back, edges finished smooth, with side brackets for support.

2.12 Line Posts: Where partition runs exceed 20 feet without intersection or connection to overhead framing, furnish standard line posts and base plates located at intervals to ensure partition rigidity and stability.

2.13 Finish: Manufacturer's standard shop-applied enamel finish.

2.14 Provide Bolts, Hardware, and Accessories for complete installation.

3.0 EXECUTION:

3.1 Erect Partitions plumb, rigid, properly aligned, and securely anchored in place.

3.2 Provide Additional Field Bracing as necessary for rigid, secure installation.

SECTION 10615
DEMOUNTABLE PARTITIONS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of demountable partitions. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 General Requirements: Movable partitions shall be floor-to-ceiling type, designed for erection on finished floors, and shall include doors, windows, fasteners, and accessories required for the installation. The partition system shall be capable of accommodating electrical wiring, outlets, and switches and shall be readily demountable without damage to panels, framing, electrical work, and other major components.

2.2 Fire-Resistive Rating and Test: Partitions shall have a flame spread rating of 25 or less and a smoke developed rating of 50 of less when tested in accordance with ASTM E 84. Fire-resistance rating shall be determined in accordance with ASTM E 119.

2.3 Sound Transmission Class and Test: Where sound-rated partitions are required, partition assemblies shall have a minimum STC of 40. STC range shall be determined in accordance with Sound Transmission Test by Two-Room Method and reported in accordance with the appendix to ASTM E 90 for 11 frequency data or ASTM E 413 for 16 frequency data.

2.4 Panel Units shall be manufacturer's standard construction except that gypsum wallboard shall be a minimum of 5/8 inch thick and shall conform to ASTM C 36. Gypsum backing board, if used, shall conform to ASTM C 442.

2.5 Framing System: The framing system shall consist of extruded anodized aluminum or roll-formed steel components that include ceiling runners, floor track, starting units, studs or posts, post covers if applicable, bracing, and suitable treated fasteners to prevent corrosion. The framing system when assembled with panel units shall form a rigid, stable partition.

2.6 Doors, Frames, and Hardware: Doors shall be 1-3/4 inch flush hollow metal of a size to provide 3/32-inch clearance at jambs and head. Door frames shall provide a compatible appearance with other trim com-ponents, shall be a

minimum 18-gauge cold-rolled steel or extruded anodized aluminum constructed to incorporate a cushion door stop at the head and both jambs, and shall allow for variations in floor level. Door hardware shall be the manufacturer's standard type hardware, except all doors shall receive 1-1/2 pairs of 4-1/2 inch by 4-1/2 inch butts.

2.7 Finishes: Exposed steel or aluminum surfaces shall be prefinished. Gypsum wallboard shall be painted or finished with a minimum 6-mil vinyl wall covering, as required.

2.8 Base Trim shall be 4-inch PVC without exposed fasteners, 4-inch vinyl cover base with snap-on capabilities, 4-inch vinyl cover base applied with adhesive, or 4-inch metal clip on base cover, as required.

3.0 EXECUTION: Partitions shall be erected plumb and straight after floor covering and finished ceiling are in place. Doors shall be hung to swing freely and hardware shall be carefully fitted and adjusted. Glass for glazed openings shall be installed on shims in a vinyl or polyurethane foam gasket. Glass stops shall be installed without exposed fastenings.

SECTION 10618
SECURITY SCREENS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of security screens for doors and windows. Products shall match existing materials and shall be as directed by the Contracting Officer. Installations shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Mesh shall be 9-gauge crimped steel wire woven into 2-inch mesh securely clinched to frame members.

2.2 Standard Diamond Pattern Expanded Metal shall be 1-1/2 inch, 9-gauge, carbon steel conforming to ASTM F 1267 Type I Class 1.

2.3 Flattened Diamond Pattern Expanded Metal shall be 1-1/2 9-gauge carbon steel conforming to ASTM F 1267 Type II Class 1.

2.4 Frame Bars and Center Stiffeners shall be not less than 1/2-inch in diameter cold finished steel bars conforming to ASTM A 108.

2.5 Frame Channels shall be hot rolled low carbon bar channels not less than 1-inch by 1/2-inch by 1/8-inch conforming to ASTM A 29.

2.6 Center Stiffeners where frame channels are used, shall be not less than two 3/4-inch by 3/8-inch channels, conforming to ASTM A 29, bolted to each side.

2.7 Subframes for Hinged Security Screens shall be not less than 1-1/4 inch by 1-1/4 inch by 1/8-inch medium carbon steel angles conforming to ASTM A 36.

2.8 Finish: Manufacturer's standard shop-applied enamel finish or hot dipped galvanized as directed.

2.9 Provide Bolts, Masonry Anchors, Hardware, and Accessories for complete installation. Hardware shall include all padlock hasps and staples, hinges, and locking devices. Provide cylinders for locks, keyed and mastered keyed, if required.

3.0 EXECUTION:

3.1 Erect Security Screens plumb, rigid, properly aligned, and securely anchored in place for a rigid installation.

SECTION 10630
MOVABLE METAL PARTITIONS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of movable metal partitions. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Freestanding Partition Systems shall consist of individual panels, connector posts, and framing components. Nominal panel height shall be 5 feet-0 inches.

2.2 Panels shall be of manufacturer's standard width and height, constructed of 1/8-inch S2S tempered hardboard facing laminated to a core material. Total thickness shall be 1-9/16 inches.

2.3 Panel Face Coverings shall be vinyl, plastic laminate, fabric, natural hardwood, or baked enamel on steel substrate.

2.4 Panels shall have a flame spread rating of 25 or less and a smoke developed rating of 50 or less when tested in accordance with ASTM E 84 when tested as a composite unit.

2.5 Framing Members shall be extruded aluminum shapes in 6063-T5 Alloy and 22-gauge pre-finished steel.

2.6 Exposed Components shall have anodized or baked acrylic paint finish.

2.7 Panel Frame Design shall provide connection and attachment of connector posts and various framing components with the use of simple hand tools. Each panel unit shall be able to be individually free-standing or connected to other panels.

2.8 Sound-Absorbing Panels shall be constructed of flame-resistant decorator fabric applied over a reinforced wood frame and fiberglass core. Flame-resistant fiberglass insulation shall be held in place by galvanized steel wire netting. Total panel thickness shall be 2-1/2 inches providing a minimum noise reduction coefficient (NRC) of 0.75.

3.0 EXECUTION: Additional framing components shall be provided as required to assemble the freestanding partitions. Components include, but are not limited to, vinyl edge inserts and filler caps, individual panel supports, and wall connectors.

# SECTION 10671
# METAL STORAGE SHELVING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of metal storage shelves. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Metal Storage Shelvings: Fed. Spec. AA-S-1048, Carbon Steel, baked enamel finish or ASTM A 167, stainless steel, a minimum no. 3 polished finish or a satin finish.

2.1.1 Shelves: Form of 0.0478-inch thick steel with front and rear faces double flanged and box channeled.

2.1.2 Brackets: Cantilever design, steel not less than 0.1046 inch thick and of hook-in-lift-off design, adjustable without use of tools.

2.1.3 Anchorage: 1/4-inch size bolts with standard nuts and lock washers.

3.0 EXECUTION: Storage shelvings shall be installed in accordance with the designated arrangement, securely anchored in position, and accurately aligned vertically and horizontally.

SECTION 10805
TOILET ACCESSORIES

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of toilet accessories other than porcelain type tile wall accessories. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Finishes: Finishes on metal shall be provided as follows:

2.1.1 On Stainless Steel: No. 4 general-purpose polished.

2.1.2 On Carbon Steel, Copper Alloy, and Brass: Chromium-plated, bright.

2.2 Miscellaneous Accessory Items:

2.2.1 Mirror, Glass (MG): Glass mirror shall conform to Fed. Spec. DD-M-411.

2.2.2 Mirror, Metal (MM): Metal mirror shall be stainless steel or chromium-plated steel, mirror quality, 0.037-inch minimum thickness, edges turned back 1/4 inch and recess fitted with fiberboard backing, mounted with concealed theftproof fastening. Size shall be as required.

2.2.3 Grab Bar (GB): Grab bar shall conform to Fed. Spec. WW-P-541. Grab bar shall be form and length as required. Flange shall have screw mounting holes concealed on the lip of the flange. Installed bars shall be capable of withstanding a 500-pound vertical load without becoming loose from the fastenings and without obvious permanent deformation.

2.2.4 Shelf, Glass (SG): Glass shelf shall conform to Fed. Spec. WW-P-541 and shall be supported between brackets or on brackets. Shelf shall be plate or float glass, width and length as required. Separate supports shall be stainless steel.

2.2.5 Shelf, Metal, Heavy-Duty (SMHD): Heavy-duty metal shelf shall be stainless steel supported between brackets or on brackets not more than two feet on center. Thickness of shelf and brackets shall be not less than 0.07 inches. Shelf shall have rounded corners with minimum 1/2-inch lipped front

edge, designed to support 60 pounds per linear foot. Width and length shall be as required.

2.2.6 Shelf, Metal, Light-Duty (SMLD): Light-duty metal shelf shall conform to Fed. Spec. WW-P-541. Shelf shall be supported between brackets or on brackets. Width and length shall be as required. Shelf and separate supports shall be stainless steel.

2.2.7 Soap and Grab Bar Combination, Recess-Mounted (SGR): Recess-mounted soap and grab bar combination shall conform to Fed. Spec. WW-P-541, stainless steel, modified to provide a grab bar. Plastic insert dish shall be furnished.

2.2.8 Towel Bar (TB): Towel bar shall conform to Fed. Spec. WW-P-541, stainless steel, length as required. Bar shall be minimum 3/4 inch in diameter.

2.2.9 Towel Pin (TP): Towel pin shall have concealed wall fastenings; pin shall be integral with or permanently fastened to wall flange, approximately 4-inch projection.

2.3 Dispensers and Receptacles:

2.3.1 Paper Towel Dispenser (PTD): Paper towel dispenser shall conform to Fed. Spec. WW-P-541.

2.3.1.1 Mounting S, Surface: Style N or O.

2.3.1.2 Mounting R, Recessed: Style P, Q, or T.

2.3.2 Sanitary Napkin and Tampon Disposer (SND): Sanitary napkin and tampon disposer shall conform to Fed. Spec. WW-P-541, stainless steel. Reusable liner of the type standard with the manufacturer shall be provided.

2.3.3 Sanitary Napkin and Tampon Dispenser (SNTD): Sanitary napkin and tampon dispenser shall conform to Fed. Spec. WW-P-541.

2.3.4 Waste Receptacle (WR) shall conform to Fed. Spec. WW-P-541.

2.3.5 Facial Tissue Dispenser (FTD) shall conform to Fed. Spec. WW-P-541.

2.3.6 Toilet Tissue Dispenser (TTD) shall conform to Fed. Spec. WW-P-541.

2.3.7 Toilet Paper Holder (TPH) shall conform to Fed. Spec. A-A-2524, roller mounted, 2 support brackets.

2.3.8 Toothbrush and Tumbler Holder (TTH) shall conform to Fed. Spec. WW-P-541.

2.3.9 Soap Dispenser (SD) shall be liquid type consisting of a stainless steel tank with hold capacity of 40 fluid ounces.

2.3.10 Soap Holder (SH) shall conform to Fed. Spec. WW-P-541.

2.4 Medicine Cabinets:

2.4.1 Medicine Cabinet (MC) shall conform to Fed. Spec. WW-P-541. Width, height, and depth of cabinet shall be as required.

2.4.2 Sliding Door Cabinet, Class 1, assembly shall be surface-mounted vanity or recessed cabinet with design and lighting arrangement as required.

2.4.3 Swinging Door Cabinet, Class 2, Design and assembly, including the lighting arrangement, shall be as required. Assembly shall be surface or recess-mounted.

2.5 Shower Curtains and Rods:

2.5.1 Shower Curtain (SC) shall conform to Fed. Spec. A-A-2398, size as required to suit conditions.

2.5.2 Shower Curtain Rods (SCR) shall be stainless steel 1 inch OD by 0.049 inch minimum, straight or bent as required to meet installation conditions.

2.6 Hand Dryer shall be electrically operated conforming to Fed. Spec. W-H-50. Unit shall be surface-mounted, semi-recessed or flush-mounted as required. Cover face shall be polished aluminum, cadmium-plated, polished chrome, stainless steel, or porcelain. Fan shall deliver a minimum of 150 cfm at the discharge end of the nozzle.

2.7 Ash Urn shall be wall-mounted, paraboloidal shape, two quart capacity conforming to Fed. Spec. RR-A-1255. Urn shall be 22-gauge type 304 stainless steel with satin finish or satin bronze finish.

2.8 Janitorial Material:

2.8.1 Mop and Broom Holder shall be 18-gauge stainless steel, satin finish, 8 inches deep in standard lengths as required.

2.8.2 Utility Shelf with mop and broom holders shall be 18-gauge stainless steel, satin finish, 8 inches deep in standard lengths as required.

2.8.3 Pail or Ladder Hook shall be 12-gauge stainless steel, bright polished finish projecting 8 inches from wall, 6 inches high, and 1 inch wide.

2.9 Hospital Accessories:

2.9.1 Foot Operated Soap Dispenser: Dispensing mechanism shall be non-corroding containing a stainless steel hood and shatter-proof container. The unit shall contain a molded rubber foot pump with non-slip base.

2.9.2 Bed Pan Storage Rack: Rack shall be stainless steel surface-mounted providing storage for bed pans and urinals.

3.0 EXECUTION: Anchors and fasteners shall be capable of developing a restraining force commensurate with the strength of the accessory to be mounted and shall be well suited for use with the supporting construction. Where exposed fasteners are permitted, they shall have oval heads and finish to match the accessory, except exposed fasteners in designated areas shall be of tamper-proof design.

SECTION 10900
WARDROBES

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of wood or steel wardrobes. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacture's recommendations. Demolition and removal of materials shall be a as required to support the work.

1.1 Design: Wardrobes shall be constructed of either wood or steel at the Contractor's option except when necessary to match existing or where one type is better suited for locality and intended usage. The material selected shall be used throughout the project. Design of wardrobes shall be by the Contractor using specified requirements as a minimum of acceptability. Each wardrobe shall be a complete unit capable of relocation without modifying or adding components, except for anchors and scribes. Common sides or backs between adjacent units are not permissible. The dimensions indicated are for the purpose of establishing general layout. Minor variations necessary to coordinate the details of construction will be permitted. All parts shall be manufactured to standards that will permit replacement without modifying of remaining parts.

2.0 PRODUCTS

2.1 Hardware:

2.1.1 Hinges shall be brass or steel, not less than 0.062 inch thick, 5 knuckle, tamper-proof institutional type, joint length not less than 2-1/2 inches, chromium finish or primed for paint finish. When doors are closed, only a smooth beveled and rounded joint shall be exposed. Doors 42 inches and less on the hinged side shall have two hinges; doors more than 42 inches on the hinged side shall have three hinges.

2.1.2 Latches: The active door of double doors on the clothes hanging compartment shall be provided with a three-point latching and locking mechanism. The handle shall be of the lever type, of cast brass or bronze, and shall be designed to permit locking by padlocking the handle to a steel keeper with a matching hole. A 14-gauge rectangular corrosion resisting steel shield shall be provided to protect the door from damage at the handle and padlock area. The interior components of the mechanism shall include locking bars or rods not less than 1/2-inch thick, two steel upper guides and two steel lower guides, three-finger cam, and applied strikes or reinforced openings for latching.

The handle, keeper, and locking bars or rods shall have a chromium finish, and all other components shall have a chromium, nickel, zinc, or cadmium plated finish. Doors to overhead storage compartment, when separate from clothes hanging compartment doors, shall be provided with a heavy-duty catch and strike which will latch automatically when the overhead storage compartment is closed and which can be released manually when the clothes hanging compartment doors are open.

2.1.3 Clothes hanging rods shall be chromium plated or zinc-coated steel tubing approximately 1 inch in diameter and with a minimum wall thickness of 0.083 inch. Clothes hanging rods with exposed ends shall be provided with plastic caps to prevent marring the finish on the inside of the wardrobe.

2.1.4 Drawer Slides shall be heavy duty 14-gauge steel mating channels equipped with replaceable nylon-tired rollers or self-lubricating double-prong plastic glides located to insure that the drawer will operate freely and smoothly throughout its travel. Slides shall have integral cushioned stops at both ends of the travel, shall permit removal of drawers without tools, and shall be free of excessive play or sag.

2.1.5 Silencers of rubber or similar resilient material shall be provided on door frames at close proximity to each latching point to minimize noise when the door is closed. Silencers shall be replaceable.

2.1.6 Astragals: Active door of double doors shall be provided with an astragal, full height of the door.

2.2 Steel Sheets shall be cold-rolled, commercial quality, stretcher level degree of flatness and of manufacturer's standard gauges specified.

2.3 Steel Wardrobe Construction:

2.3.1 Workmanship: Form bends accurately. Cut edges straight and smooth. Holes shall be accurately punched or drilled and have all burrs removed. Extend butt welds the full width of joining edges; grind smooth and flush with adjacent surfaces when on exterior of wardrobes. Resistance welds shall be 3/16-inch minimum diameter and maximum spacing of 8 inches on center. Welds shall be thoroughly fused and sound and free from cracks, fissures, pits, holes, gas pockets, porosity, and undercuttings. Leave no sharp corners or protrusions of any kind in the final assembled wardrobes. Use of mechanical fasteners exposed to exterior of unit shall be limited to those required for application of hardware and scribes.

2.3.2 Base shall be closed type, formed to provide a bearing surface at the floor, and provided with floor mounting holes. Bases constructed as part of the framing and panel members shall be of the same gauge as those members. Bases constructed as separate components shall be not lighter than 16-gauge steel.

2.3.3 Back and Side Panels shall each be formed of sheet steel not lighter than 22 gauge and shall be reinforced if necessary to impart rigidity to unbroken spans.

2.3.4 Front shall be not lighter than 18-gauge steel and multichannel formed as required to provide strength and rigidity to side panels, top, and bottom without exposing fasteners. Front shall be reinforced as necessary to serve as a stable mount and frame for doors and hardware. Fronts formed as part of side panels shall be equivalent to the specified 18-gauge steel multichannel construction. With the door closed, clearance between door edge and frame shall be uniform and shall not exceed 1/8 inch and door face shall be flush with the face of the front.

2.3.5 Top shall be not lighter than 22-gauge steel, flat exterior surface, and formed as required for securing to back, front and sides.

2.3.6 Bottom shall be not lighter than 18-gauge steel and formed as required for securing to back, front and sides.

2.3.7 Hat Shelf and Upper Storage Shelf shall be not lighter than 18-gauge steel and formed as required for securing to back and sides.

2.3.8 Doors shall be of double-wall type with not lighter than 22-gauge steel inside panel and not lighter than 20-gauge outside panel separated by not less than 3/4 inch of rigid mineral insulation cemented between the panels. Doors shall be reinforced or otherwise prepared for the reception of hardware and to provide strength and rigidity to the doors.

2.3.9 Scribes and Closures shall be not lighter than 20 gauge.

2.3.10 Chest Unit shall have top and side of not lighter than 20-gauge steel firmly attached to the wardrobe. Shelves shall be constructed of not lighter than 18-gauge steel. Drawer bodies shall be of not lighter than 22 gauge, and drawer fronts shall be of not lighter than 20 gauge with the top formed to provide a full length integral pull.

2.3.11 Finish shall be an approved factory-applied baked-enamel, semigloss finish in accordance with manufacturer's standard finishes. Color will be selected from manufacturer's standard colors.

2.4 Wood Wardrobe Construction:

2.4.1 General: Except as otherwise shown or specified, wood wardrobes shall conform to AWI-02 and AWI-01. Plywood for transparent finish shall be hardwood plywood, and one species shall be used throughout. Plywood for paint finish shall be hardwood plywood, or have a medium density impregnated fiber overlay.

2.4.2 Wood Scribes and Closures shall be 3/8-inch minimum thickness and shall match wardrobes. Moldings used in conjunction with scribes and closures and for joints between adjacent wardrobes shall be 5/16- by 1-1/16 inch flat members or 3/4-inch quarter round.

2.4.3 Wood Finishes: Interior surfaces shall be given an approved transparent finish, and exterior surfaces shall be given an approved paint finish of the color as selected from manufacturer's standard colors or an approved transparent finish. Surfaces to receive a transparent finish shall be stained to an approved shade and all wood surfaces to be finished shall be filled, sanded smooth, and given not less than two coats of an approved finish coating. Finishing of interior and exterior surfaces shall be part of a continuous shop operation to and including at least the first finish coat in order to minimize warpage.

3.0 EXECUTION

3.1 Installation: Wardrobes shall be assembled and positioned in accordance with the layout shown, set level, and secured in place. Wardrobes with backs to walls shall be secured to the wall with not less than four fasteners, using one fastener near each corner. Free-standing or island-type installations shall be secured to the floor with not less than four fasteners, using one fastener near each corner. Back-to-back or side-to-side wardrobes shall be secured to each other. Securing of adjacent wardrobes shall be with three fasteners located high, low, and intermediate when a side is involved. Securing of adjacent wardrobes shall be with four fasteners located near the corners when a back-to-back installation is involved. Fasteners to secure metal wardrobes in place shall penetrate two thicknesses of metal at each wardrobe or shall be provided with washers. There shall be no sharp corners or protrusions in the final assembled wardrobes that could be considered harmful to the user or the stored items. Scribes over 14 inches wide shall be secured to the building

construction with concealed fasteners at intervals not to exceed 12 inches on center. Hardware shall be adjusted and left in good working order. Doors and drawers shall not stick or bind, but shall operate smoothly and easily. Wardrobes shall be cleaned and protected from damage until acceptance.

SECTION 11161
PLATFORM AND DOCK LEVELERS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for replacement, repair, and maintenance of platform and dock levelers. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Replacement Components:

2.1.1 General: Replacement components shall be new and of matching quality and construction. Every replacement part shall be made to definite standards, tolerances, and clearances and to fit in the existing equipment.

2.1.2 Structural Components: All replacement parts of the equipment to be repaired shall be of such design, size, material, and strength as required to carry and sustain the maximum allowable load placed upon it.

2.1.3 Hydraulic System Components: The hydraulic system shall consist essentially of a hydraulic pump, hydraulic rams, pressure relief valve, fluid reservoir, hydraulic control valves including necessary continuous-duty solenoid valves and check valves, and connections. The system shall be installed as a separate and complete system in each platform unit.

2.1.4 Electrical System Components: All electrical components shall comply with the National Electrical Code. Conduit, outlet boxes, and fittings shall be galvanized. Wire shall comply with Fed. Spec. J-C-30. All materials and equipment shall be rated for wet locations. Insulation resistance shall be not less than 1 megohm.

2.2 Permanent, Self-Forming, and Free Standing Adjustable Dock Levelers: Levelers shall comply with DOC ASME MH14.1 for Class A loading. Minimum live load capacity for rollover and crossover travel shall be 12,000 pounds. Physical dimensions and maximum capacity shall be as designated.

2.3 Permanent Manually Operated Dockboards: Permanent manually operated dockboards shall comply with DOC ASME 14.1 for Class B loading. Minimum live load capacity for rollover and crossover travel shall be 12,000 pounds. Physical dimensions and maximum capacity shall be as designated.

3.0 EXECUTION:

3.1 Repair: Repair shall consist of removal and replacement of various defective equipment components. Installation of hydraulic system components shall be such that no leaks exist in any part of the system. All electrical work shall comply with the National Electrical Code.

3.2 Installation of Equipment: The equipment shall be installed by, or under the supervision of, the manufacturer or his licensee. After installation is complete and equipment is properly adjusted, perform operational and load tests per manufacturer's instructions to ensure that the equipment functions properly and has the specified capacity.

# SECTION 11162
# PLATFORM AND DOCK LIFTS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for replacement, repair, and maintenance of platform and dock lifts. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Replacement Components:

2.1.1 Structural Components: All replacement parts of The equipment to be repaired shall be of such design, size, material, and strength as required to carry and sustain the maximum allowable load placed upon it.

2.1.2 Hydraulic System Components: Pipe, tubing, fittings, and hydraulic hose shall be designed and constructed with a minimum safety factor of three based on bursting pressure. Cylinders, pumps, and control valves shall be designed to withstand test pressures of 150 percent of the design operating pressure.

2.1.3 Electrical System Components: All electrical components shall comply with the National Electrical Code. Conduit, outlet boxes, and fittings shall be galvanized. Wire shall comply with Fed. Spec. J-C-30. All materials and equipment shall be rated for wet locations. Insulation resistance shall not be less than one megohm.

2.2 Dock Lifts shall comply with ASME 14.1. The replacement lift shall have the same capacity, travel, minimum lowered level, and nominal raising and lowering speed as the existing lift.

2.3 Truck Levelers: The truck leveler shall have a capacity of 40,000 pounds. Leveler shall have a total travel of 36 inches, divided as follows: 18 inches up, 18 inches down.

3.0 EXECUTION:

3.1 Repair: Installation of hydraulic system components shall be such that no leaks exist in any part of the system. All electrical work shall comply with the National Electrical Code.

3.2 Installation of Equipment: The equipment shall be installed by, or under the supervision of the manufacturer or his licensee. After installation is complete and equipment is properly adjusted, perform operational and load tests per manufacturer's instructions to ensure that the equipment functions properly and has the specified capacity.

SECTION 11164
PLATFORM AND DOCK ENCLOSURES

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for replacement, repair, and maintenance of platform and dock enclosures. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Fabric shall be hypalon-coated nylon, 5.1 oz. per sq. yd. with 65 percent coating on front and 35 percent on back face. Total weight with coatings shall be 16 oz. per sq. yd.

2.2 Thread shall be polyester, heavy-duty minimum-size FF (Size 139) bonded, complying with Fed. Spec. V-T-285.

2.3 Wood Framing: Lumber shall be air-dried and well seasoned, to contain not more than 19 percent moisture at time of finishing, identified by official grade marks and shall be Douglas Fir-Larch No. 2 or better, Hemlock-Fir, No. 1 or better, or Southern Pine No. 2 or better. Lumber shall be smooth on all sides.

2.4 Pads shall be polyurethane foam with a minimum density of 1.25 pounds per cubic foot and a 35-pound compression factor, open cell construction of an ether base. Foam shall be resilient from -50 F to +180 F. Pads shall be bonded to framing members.

2.5 Bottom Pads and Bumpers: Three polyurethane foam pads with cover fabric and two laminated or extruded rubber dock bumpers mounted to a continuous 2-inch by 12-inch wood frame.

3.0 EXECUTION: (Section not used.)

SECTION 11165
PLATFORM AND DOCK BUMPERS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of platform and dock bumpers. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Timber Bumpers shall be dense red oak. Ends shall be smooth and edges rounded to a radius of approximately 1/2 inch. All bolt holes shall be countersunk. Bumpers shall be treated in compliance with AWPA P5. Treating process and results shall comply with Fed. Spec. TT-W-571. Retention shall be a minimum of 0.23 pounds of oxide per cubic foot of treated wood.

2.2 Laminated Rubber Bumpers shall be resilient rubber material made from rubberized fabric truck tires cut to uniform size pads and punched to receive 3/4-inch supporting rods. The bumpers shall be closed with 3-inch by 2-1/2 inch by 1/4-inch structural steel angles under approximately 1,500 pounds of pressure. Angles shall be welded to 3/4-inch rods at one end and closed with threaded rod and nuts at the other end. Anchor leg of angle shall extend a minimum of 2-1/2 inches beyond rubber surface at either end and contain 2 or 3 anchor bolt holes.

2.3 Extruded Rubber Bumpers shall be manufactured of extruded ethylene propylene diene monomers (EPDM) hydrocarbon rubber of 70 durometer hardness or higher and with a minimum tensile strength of 2,400 psi. All mounting holes shall be countersunk.

3.0 EXECUTION:

3.1 Removal of Existing Bumpers: Remove existing bumpers in a manner to prevent damage to the surface on which they are mounted. All existing anchor bolts that have deteriorated or are not in proper position to faciliate mounting of new bumpers shall be cut off flush with the base surface. Existing bumpers that have been mounted by welding shall be removed by cutting torch and the resultant mounting surface power ground smooth and flush prior to installation of the new bumper.

3.2 Installation of New Bumper: All mounting hardware shall be new except existing expansion shields that are properly located and in suitable condition for reuse. Final installation shall be properly aligned, tight and flush against mounting surface.

# SECTION 11166
# PLATFORM AND DOCK WARNING DEVICES

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of platform and dock warning devices. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Pavement Marking Paint shall comply with Fed. Spec. TT-P-115.

2.2 Glass Spheres shall have at least 42 percent reflectivity and shall comply with the State Standard Specifications.

2.3 Reflectors shall be acrylic plastic prismatic reflectors complying with the State Standard Specifications.

3.0 EXECUTION:

3.1 Preparation: Thoroughly clean all pavement areas to be painted by use of hand brooms, rotary brooms, air blast, scrapers, or other acceptable means that will not damage the surface.

3.2 Installation:

3.2.1 Pavement Marking: Apply paint and glass spheres with mechanical equipment. Apply the paint and glass spheres uniformly to form markings of the dimensions and shapes required. Lines shall be true with sharp edges and ends. The length of lines shall be within plus or minus 3 inches; width shall be within plus or minus 1/8 inch.

3.2.2 Reflectors: Install reflectors at the locations and by the method required. Align and orient reflectors so that proper reflectivity is obtained.

SECTION 11167
PLATFORM AND DOCK GUARDRAILS AND POSTS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of platform and dock guardrails and posts. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Steel Guardrail: Steel plate beam guardrail, end sections, and splice plates shall comply with AASHTO M180. Steel posts, restraints, braces, and plates shall be galvanized.

2.2 Materials for Timber Guardrail and Cable Guard Construction: Treated timber shall comply with the NFPA requirements for 1850F dense southern pine or 1900F dense Douglas fir. Wire rope cable and fastenings shall comply with AASHTO M30, Class A.

2.2.1 Offset Spring Brackets shall have a deflection of one inch under a compression load of not less than 3,500 pounds and not more than 6,000 pounds applied for one minute perpendicular to the line of the cables with the cables in place. The offset spring brackets shall not collapse under a compression load of 10,000 pounds.

2.2.2 Special Offset Spring Brackets of the blunt, slotted, overlapping nose type shall be fabricated from spring steel, tempered, and drawn. The brackets with steel stay pins shall be slotted for 3 cables. Special offset spring brackets shall have a minimum deflection of one inch under a compression load of 15,000 pounds applied for one minute perpendicular to the line of the cables at the points of attachment of the cables and the bracket with the cables in all slots.

3.0 EXECUTION:

3.1 Guardrail Removal: Sections of guardrail shall be removed as required to provide access to damaged or deteriorated components.

3.2 Guardrail Fabrication and Erection: New guardrail shall be erected in compliance with AASHTO M180 and the construction requirements for the type of guardrail being erected.

3.2.1 Steel Plate Beam Fabrication shall comply with AASHTO M180. Roll or round the edges of the plates so that they present no sharp edges.

3.2.2 Setting Timber and Steel Posts: Set posts in compacted soil to a minimum depth of 3 1/2 feet. Backfill the holes in minimum 6-inch layers with approved materials. Compact each backfill layer in a manner not to displace the posts from correct alignment.

3.2.3 Painting: Steel surfaces that have not been galvanized shall be shop-coated with rust inhibitive primer paint. Give primed surfaces to be painted two coats of white or aluminum paint after erection. Where the surface will be inaccessible after erection, paint before installation.

3.2.4 Cable Guard: The offset brackets shall be attached to each post by means of one or more bolts not less than 3/4 inch in diameter inserted through the bracket and the post with the threaded end of the bolts at the back of the post. All bolts except adjustment bolts shall be drawn tight, and all bolts shall be sufficiently long to extend at least 1/4 inch beyond the nuts. After the posts and offset brackets have been set, the cables shall be erected and stretched taut by an approved mechanical device. The completed assembly shall provide a smooth, continuous platform and dock guard conforming to the required line and grade. After the cable has been stretched in its final position, the takeup on adjustment bolts, intermediate anchors, and end anchors shall be made as necessary.

SECTION 11220
MIXING CHAMBERS AND EQUIPMENT

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for repair and maintenance of water treatment plant mixing chambers and equipment. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Concrete Repair Material shall be epoxy type grout in compliance with Fed. Spec. MMM-A-001993.

2.2 Baffle Repair and Replacement Parts: Material and accessories for baffle repair or replacement parts shall be chemically resistant to the chemicals being mixed in the mixing chamber.

2.3 Air Agitation System Repair and Replacement Parts such as diffuser, pipe, and fittings shall match the existing equipment.

2.4 Mixing Chamber Drive Equipment: Multiple V-belt drives shall be furnished in matched sets.

3.0 EXECUTION:

3.1 Preparation: Alternate Mixing Chamber and appurtenances shall be furnished, installed, and removed after completion of work by the Contractor.

3.2 Installation:

3.2.1 Static Mixer shall be cleaned and repaired.

3.2.2 Mixing Chamber Baffles: Drain the mixing chamber and repair or replace the baffles as required.

3.2.3 Mixing Chamber Drive Equipment:

3.2.3.1 Gear Drive: Maintenance and Repair Procedures shall be such that they will result in the equipment being able to operate at its rated capacity.

3.2.3.2 Cleaning: Accumulated dirt, oil, grease, and debris shall be removed from the parts.

3.2.3.3 Testing: Repaired equipment shall be tested ensure that it operates at design conditions and rated capacity. Replace and retest equipment failing to meet test conditions.

# SECTION 11221
# FLOCCULATORS AND SCRAPERS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for repair and maintenance of flocculators and scrapers. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Coal-Tar Epoxy Coating shall comply with SSPC-PAINT 16.

2.2 Concrete Repair Material shall be non-shrink, non-sag type grout suitable for the anticipated service conditions.

3.0 EXECUTION:

3.1 Preparation:

3.1.1 Cleaning: Prior to removing parts or components of flocculators and scrapers, clean dust, dirt, grime, and other foreign matter from the surfaces of the flocculators and scrapers.

3.1.2 Interruption of Treatment: Not more than one flocculator and scraper unit shall be taken out of service at a time.

3.2 Installation:

3.2.1 Clean interior concrete surfaces with high pressure water or steam to remove all dirt and residue, allow to dry, and brush sandblast in compliance with SSPC-SP 7.

3.2.2 Fill holes and voids in the concrete surfaces left from the blast cleaning by means of troweling and squeeze application of an epoxy filler. Allow the surfacing material to cure overnight, and then apply two coats of coal-tar epoxy to a dry film thickness of 10 mils per coat.

SECTION 11225
CLARIFIERS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for the repair and maintenance of sewage treatment plant clarifiers. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Epoxy Filler Compound for Concrete Surfaces shall comply with Fed. Spec. MMM-A-001993.

2.2 Coal-Tar Epoxy shall comply with SSPC-PAINT 16.

2.3 Epoxy Paint shall comply with Mil. Spec. MIL-P-24441.

2.4 Red-Lead Base Paint shall comply with Fed. Spec. TT-P-86, Type 1.

2.5 Finish Coat Paint shall comply with Fed. Spec. TT-P-38.

3.0 EXECUTION:

3.1 Preparation:

3.1.1 Cleaning: Prior to removing parts or components of the clarifier or appurtenant equipment, clean dust, dirt, grime, and other foreign matter from the surfaces.

3.1.2 Interior Concrete Surfaces of the clarifier tank shall be cleaned with high pressure water or steam to remove all dirt and residue, alowed to dry, and brush sandblasted in compliance with SSPC-SP 7.

3.1.3 Interruptions of Treatment: Not more than one clarifier shall be taken out of service at a time.

3.2 Installation:

3.2.1 Holes and Voids in the concrete surfaces left from the blast cleaning shall be filled by means of troweling and squeeze application of an epoxy filler. The surfacing materials shall be allowed to cure overnight, and then two coats of coal-tar epoxy shall be applied.

3.2.2 Submerged Ferrous Metal Surfaces, such as piping, ladders, structural steel, equipment, and metal roof surfaces that are exposed to the sludge shall be sandblasted in compliance with SSPC-SP 10 and coated with two coats of coal-tar epoxy.

3.2.3 Clean Exterior Concrete Surfaces of the clarifier by means of brush sandblast in compliance with SSPC-SP 7, blow down the surfaces with air to remove the blasting residue and dust, and apply two coats of epoxy-polyamide paint.

3.2.4 Ferrous Metal Surfaces that are not submerged shall be cleaned by means of sandblasting in compliance with SSPC-SP 6. Surfaces inaccessible to sandblasting shall be power tool cleaned in compliance with SSPC-SP 3. Surfaces shall be coated with one coat of red-lead base paint. After the base paint has dried sufficiently, two coats of aluminum finish paint shall be applied.

3.2.5 Startup: After completion of maintenance and repairs, the clarifier shall be started up and operating adjustments shall be made by the Contractor as required to achieve the design flow rate and quality of the effluent.

# SECTION 11230
# AERATION EQUIPMENT

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for repair and maintenance of water treatment plant aeration equipment. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Media for tray type aeration equipment shall be coke, stone, or factory-made ceramic balls, 2 to 6 inches in diameter.

2.2 Trays: Tray repair and replacement parts shall be of the same kind of material or shall be compatible with existing trays.

3.0 EXECUTION:

3.1 Preparation: Pipe, valves, and fittings to install a bypass around the aerator shall be provided.

3.2 Installation:

3.2.1 Enclosure Repairs: Repair or replace screens, screen frames, and structural parts of the aeration equipment as required.

3.2.2 Defective Media shall be removed and new media added, or the defective media shall be replaced with new media.

3.2.3 Repair and Replacement of Trays: Repair or replace trays as required. Drain and clean trays. Remove media, if necessary, to accomplish the repairs, and replace media after the repairs are complete.

3.2.4 Flame Cutting: No cutting by torch or flame shall be done without written authorization from the Contracting Officer.

3.2.5 Testing: After repairs are completed, test the equipment to ensure that it will operate at design conditions.

SECTION 11239
CHEMICAL BYPASS FEEDERS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of chemical bypass feeders for water treatment systems. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS: Bypass feeders shall be used to control corrosion, inhibit lime scale formation, and remove dissolved iron in small water systems.

2.1 In-Line Mount Unit shall be equipped with built-in bypass and shutoff valves and hold pressures up to 125 psi.

2.2 Floor Mount Unit shall be equipped with 5-, 10-, or 12-gallon capacity feeder tanks, lockable filler cap, one short and one long slotted strainer, flow indicator, drain cock, and shutoff valves. The flow indicator shall consist of a transparent pyrex glass cylinder. The unit shall hold pressures up to 175 psi.

3.0 EXECUTION:

3.1 In-Line Mount Unit Feeder shall be installed before the pressure tank to prevent rust deposition. To prevent corrosion, the unit shall be installed on the inlet line to the heater.

3.2 Floor Mount Unit Feeder Unit shall be installed in a bypass on the cold water line to the equipment to be protected against corrosion or lime scale problems.

3.2.1 Water Heater Protection: Feeder shall be placed before a water heater but far enough away so that hot water will not flow back into the feeder.

3.2.2 Private Well Systems: The feeder shall be installed before the water storage tank.

3.2.3 Pressure Relief Valve: A pressure relief valve shall be installed on either the inlet or outlet line between the shutoff valve and the feeder when feeding chemicals that generate excess heat and pressure upon contact with water.

# SECTION 11240
# CHEMICAL STORAGE EQUIPMENT

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for repair and maintenance of water treatment plant chemical storage equipment. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Solution Tank Repair Material shall be PVC in compliance with ASTM D 1784, polyethylene in compliance with ASTM D 1248, or fiberglass.

2.2 Manhole Gasket Material shall be chemically resistant to the material stored in the bin.

3.0 EXECUTION:

3.1 Repair and Replacement of Parts: The equipment shall be cleaned and repaired, parts shall be replaced as required, and the equipment lubricated and adjusted to operate properly.

3.2 Stored Material shall be removed from the chemical storage bin, the bin cleaned and repaired, and the stored material replaced in the bin.

3.3 Manhole Cover and Gasket shall be removed, gasket sealing surfaces cleaned, new gasket installed, and the manhole cover reinstalled.

3.4 Welding shall comply with AWS D1.1.

3.5 Testing: After repairs are completed, the equipment shall operate at design conditions.

# SECTION 11241
# WATER TREATMENT PLANT SCALES AND WEIGHING EQUIPMENT

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for repair and maintenance of water treatment plant scales and weighing equipment. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS: (Section Not Used.)

3.0 EXECUTION:

3.1 Testing and Adjustment: Test and adjust controls to have same accuracy as originally guaranteed by the manufacturer.

3.2 Sealing: After testing and adjustment, the scale shall be sealed by the Contractor to prevent unauthorized tampering that might affect its accuracy.

# SECTION 11250
# ION EXCHANGE EQUIPMENT

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for repair and maintenance of water treatment plant ion exchange equipment. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Exchange Column Vessels: Welding rods and shell material that are compatible with the steel of the vessel shall be used for leak repair. Welding rods shall comply with ASME Boiler and Pressure Vessel Code, Section II.

2.2 Vessel Lining or Coating Repair Material shall be compatible with the existing lining or coating.

2.3 Ion Exchange Resins, Cation, or Anion used for replacement shall be as originally specified by the equipment manufacturer or approved equivalent.

3.0 EXECUTION:

3.1 Exchange Column:

3.1.1 Vessel Repair Welding shall comply with the applicable requirements of ASME Boiler and Pressure Vessel Code, Section IX.

3.1.2 Structural Welding shall comply with the applicable requirements of AWS D1.1.

3.2 Controllers and Analyzers: The following equipment shall be cleaned and shall have defective ports repaired or replaced to restore the items to their original operating condition:

Flow Control
Totalizer
Sequence Controller
Time Delay Relay
Drum Controller
Automatic Analyzer
Conducting Meter
Sample Conditioning Equipment

SECTION 11255
SOFTENING EQUIPMENT

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for repair and maintenance of water treatment plant softening equipment. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Concrete Repair Material for chemical storage bins and sedimentation basins shall comply with Fed. Spec. MMM-A-001993.

2.2 Manhole Gasket Material shall be as recommended by the bin fabricator and shall be chemically resistant to the material stored in the bin.

2.3 Bin Vent System repair and replacement parts shall be as recommended by the manufacturer, or equivalent.

2.4 Replacement Parts for the sedimentation tank mechanism, drive system, and appurtenances shall be as recommended by the manufacturer of the equipment, or equivalent.

3.0 EXECUTION:

3.1 Carbon Dioxide Diffusion System: Maintenance and repair shall result in the recarbonation system being restored to its design capacity.

3.2 Manhole Gasket: Manhole cover and gasket shall be removed, seated surfaces shall be cleaned, a replacement gasket shall be put in place, and the manhole cover shall be reinstalled.

3.3 Bin Vent System: Parts shall be cleaned and repaired or replaced.

3.4 Testing: Mixers shall be tested to ensure that they operate at their rated capacity. The diffusion system shall be tested for leaks, carbon dioxide flow rate, and pH change in the water. Bin(s), vent system, and appurtenances shall be tested to ensure operation at design conditions. Tanks and connecting lines shall be examined for leaks after being filled to operating level, and leaks shall be repaired.

3.5 Access: Softening equipment parts or appurtenances that interfere with access to or performance of the work shall be removed and replaced after the work has been completed.

# SECTION 11260
# CHLORINE CONTACT TANKS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for repair and maintenance of water treatment plant chlorine contact tanks. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Bolts, Nuts, and Screws removed due to repair work shall be replaced with new bolts or screws of the same type, size, and finish, complying with ASTM A 193, Grade B8. Replacement nuts of the same type, size, and finish shall comply with ASTM A 194, Class 8F.

2.2 Finishes: Items replacing existing items that are galvanized, plated, painted, or otherwise finished, shall be finished with like finish.

2.3 Concrete Repair Material shall be epoxy type grout in compliance with Fed. Spec. MMM-A-001993.

3.0 EXECUTION:

3.1 Tank shall be cleaned and repaired with the corroded parts replaced as required.

3.2 Testing: After repairs are completed, test the equipment to ensure that it operates at designed conditions.

SECTION 11261
DISINFECTION EQUIPMENT

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for water and sewage treatment plant disinfection equipment. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Chlorinator: The chlorinator shall be wall- or cabinet-mounted, shall be a vacuum-operated solution-feed type, and shall include an integral manifold trap complete with a built-in electric heater. The manifold shall have a removable chlorine filter with a 5-square inch filtering area. A positive tight shutoff valve shall be provided within the chlorinator to isolate gas under pressure from the control system should there be a loss of vacuum. An easily removable basket with filter screen shall be included upstream of the inlet valve. A spring-operated pressure relief valve shall be provided to prevent the buildup of pressure within the gas control system. An excess vacuum shutoff valve, which isolates the regulator and gas supply system from the ejector on loss of gas pressure shall be supplied. Provisions for automatic changeover shall be incorporated within the vacuum regulator without the need for an external valve. An indicator shall provide a visual signal when the chlorine gas supply is exhausted or interrupted.

2.2 Gas Injector: The injector of diffuser shall be polyvinyl chloride (PVC) in compliance with ASTM D 1784. The ejector shall be provided with dual check valves as well as an emergency drain valve to protect against flooding of the vacuum regulator.

2.3 The Unit shall be supplied with the following accessories: metering tube supply indicator, rate valve, 50 feet of 5/8-inch polyethylene tubing for vent and vacuum lines, insect screen, bottle of ammonia solution, spare gaskets, thread lubricant, a flexible connector, and a universal wrench.

3.0 EXECUTION:

3.1 Installation: The chlorine feeding machines and all equipment appurtenances shall be installed in accordance with the Chlorine Institute, Inc. Chlorine Manual and Pamphlet 6 so as to provide a complete and integrated system.

3.2 Testing: After installation of the chlorine feeding machine and evaporators is complete, operating tests shall be carried out to ensure that the chlorine feeding installation operates properly. All piping shall be tested hydrostatically and for leaks. If any deficiencies are revealed during any tests, such deficiencies shall be corrected, and the tests shall be reconducted.

SECTION 11262
GASEOUS CHEMICAL METERING EQUIPMENT

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for the repair and maintenance of gaseous chemical metering equipment. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Gas Injectors shall be PVC plastic in compliance with ASTM D 1784.

2.2 Gas Evaporators:

2.2.1 Electrical Heating Elements shall be flat rod, immersion type.

2.2.2 Wiring, Switch, Thermostat, and Alarm Switch: Load rating of wiring, switch, thermostat, and alarm switch shall be equal to or greater than the load rating of the wiring, switch, thermostat, and alarm switch to be replaced.

3.0 EXECUTION:

3.1 General: The gas injector, gas evaporator, and chemical metering equipment shall be cleaned and repaired.

3.2 Testing: Each piece of equipment shall be tested and adjusted to operate properly over its capacity range.

3.3 Leak Tests: Piping, tubing, vessels, or jackets that are part of the equipment being repaired shall be tested for leaks at one and a half times normal working pressure.

3.4 Calibration: Metering equipment shall be calibrated in compliance with manufacturer's instructions.

3.5 Safety Precautions pertaining to chlorine shall be in compliance with the Chlorine Institute, Inc. Chlorine Manual.

SECTION 11304
SEWAGE EJECTORS, SUBMERSIBLE

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of submersible sewage ejectors. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS: The sewage ejectors shall be of the simplex or duplex pneumatic type and shall be complete with receivers, compressors, electric motors, control equipment, piping, and all necessary accessories.

2.1 Sewage Receivers: Sewage receivers shall be of cast-iron or welded-steel construction conforming to the ASME Code, Section VIII for Pressure Vessels. Sewage inflow and outflow pipe connections shall be flanged; air-supply and vent-piping connections shall be screwed. Pipe threads shall conform to Fed. Std. H28 and pipe flanges shall conform to ASTM A 53. The receiver shall be tested at a pressure 50 percent greater than the working pressure. Each receiver shall be provided with suitable support and a manhole or handhole conveniently located. Steel receivers shall be coated inside and outside with coal-tar primer and enamel conforming to the requirements of AWWA C203 in all respects of materials and application, or shall be coated with a coal-tar epoxy paint system conforming to the requirements of SSPC-PS 11.01.

2.2 Air Compressor: Each compressor shall be equipped with suction silencer, complete automatic lubrication system, an air filter, and adequate means for cooling. The operating speed of the air compressors shall not exceed 1,800 rpm. Installation of the air compressor shall conform to ASME B19.1.

2.3 Air Reservoir: If the equipment furnished requires a compressed air reservoir for proper operation, the tank shall be constructed in conformance with ASME Boiler and Pressure Vessel Code, Section VIII, with flanged or screwed inlet and outlet connections as required. The storage tank shall be tested at a pressure 50 percent greater than the working pressure. The tank shall be fitted with a pressure gauge, inspection openings, blowoff cock, and a safety valve. The connection to the compressor shall be provided with a check valve and a shutoff valve.

2.4 Electric Motor: Each electric motor shall conform to NEMA MG 1. Temperature rise shall be based on 40 C ambient temperature.

2.5 Controls: An automatic control system shall be provided for each ejector.

2.6 Piping: The sewage influent and effluent lines be flanged cast iron. The air piping shall be wrought iron or steel with malleable-iron units and fittings. Pipe hangers and supports shall be spaced at not more than 10 feet on center.

2.7 Check Valves: AWWA C508, except that valves on the discharge side of the receivers shall be provided with replaceable valve seats.

2.8 Gate Valves:

2.8.1 Cast Iron: AWWA C500, Class 125, Grade A, Design NRS, flanged ends.

2.8.2 Bronze: MSS SP-80, Type I, Class 125.

2.9 Motor Controls: NEMA ICS 2.

2.10 Pipe:

2.10.1 Cast Iron: Fed. Spec. WW-P-421, Class 150, as applicable to pipe barrel only. AWWA C110/A21.10, Class 125, for pipe flange.

2.10.2 Steel: ASTM A 53, Grade B, Type E or S, zinc coated.

2.11 Pipe Fittings:

2.11.1 Cast Iron: ANSI B16.1.

2.11.2 Malleable Iron: Fed. Spec. WW-P-521, Type II.

2.11.3 Malleable Iron Unions: Fed. Spec. WW-U-531, Type B.

2.12 Pipe Hangers and Supports: MSS SP-58 and SP-69.

3.0 EXECUTION:

3.1 Valves: Valves installed in the wrought-iron and steel pipeline shall be bronze with screwed ends and valves installed in the cast-iron pipeline shall have bronze-mounted iron bodies with flanged ends. Gate valves shall be opened by turning counterclockwise.

3.2 Concrete Foundations shall be integral with and of the same concrete as the building floor unless otherwise directed. 4,000 psi concrete shall be used in foundations that are entirely separated from the surrounding floor. Foundation

bolts, as required, shall be provided for proper positioning during the placement of the concrete.

3.3 Bolts, Nuts, Anchors, Washers, and All Other Types of Supports Necessary shall be of wrought iron or steel galvanized according to ASTM A 153.

# SECTION 11320
# CENTRIFUGES

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for the repair and maintenance of sewage treatment plant centrifuges. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS: (Section not used.)

3.0 EXECUTION:

3.1 Preparation: Clean centrifuge thoroughly of sludge and residue prior to commencing maintenance and repair.

3.2 Installation:

3.2.1 Repair and Replacement of Parts: The equipment shall be cleaned and repaired, and parts shall be replaced as required.

3.2.2 Lubrication: Friction parts shall be lubricated with proper lubricants. Oil and grease shall be removed from surfaces and parts not intended to be oiled or greased.

SECTION 11325
GRIT CHAMBERS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for repair and maintenance of sewage treatment plant grit chambers. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Epoxy Filler Compound for concrete surfaces shall comply with Fed. Spec. MMM-A-001993.

2.2 Coal-Tar Epoxy shall comply with SSPC-PAINT 16.

2.3 Epoxy Paint shall comply with Mil. Spec. MIL-P-24441.

2.4 Red-Lead Base Paint shall comply with Fed. Spec. TT-P-86, Type 1.

2.5 Finish Coat Paint shall comply with Fed. Spec. TT-P-38.

3.0 EXECUTION:

3.1 Interruption of Sewage Treatment: Not more than one grit chamber shall be taken out of service at a time.

3.2 Installation:

3.2.2 Dust Control: Adequate provisions shall be made to prevent the transfer of dust to other equipment and to areas occupied by Government personnel.

3.2.3 Grit Chamber Cleaning and Coating: Grit chamber shall be cleaned and coated as follows:

3.2.3.1 Interior Concrete Surfaces of the grit chambers shall be cleaned with high pressure water or steam to remove dirt and residue, allowed to dry, and brush sandblasted.

3.2.3.2 Holes and Voids in the concrete surfaces left from the blast cleaning shall be filled by means of troweling and squeeze application of an epoxy filler. Apply two coats of coal-tar epoxy to the surface after the epoxy has cured.

3.2.3.3 Submerged Ferrous Metal Surfaces such as piping, ladders, structural steel, and equipment that are exposed to the sewage shall be sandblasted and coated with two coats of coal-tar epoxy.

3.2.3.4 The Exterior Concrete Surfaces shall be cleaned by means of brush sandblast, the surfaces blown down with air to remove the blasting residue and dust, and two coats of epoxy-polyamide applied.

3.2.3.5 Ferrous Metal Surfaces that are not submerged shall be cleaned by means of sandblasting. Coat surfaces with one coat of red-lead base paint. After the base paint has dried sufficiently, apply two coats of aluminum finish paint.

SECTION 11326
MICRO-SCREENS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for the repair and maintenance of sewage treatment plant micro-screens and filter screens. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Replacement Parts shall have the same characteristics as the parts to be replaced, unless otherwise approved.

3.0 EXECUTION:

3.1 General: Screen, wash pumps, controller, drive equipment, and appurtenances shall be repaired or replaced, lubricated, and placed in service as required.

3.2 Waste Outlet shall be flushed and cleaned with high pressure water or steam or by rodding.

3.3 Stopping Screen Unit: If, for any reason, the unit must be stopped, it shall be carefully drained down and the fabric shall be cleaned. The drum shall never be left standing for any length of time in a tank of dirty water. To the extent feasible, the interior and exterior water levels shall be maintained nearly equal, the drum kept constantly turning, and the backwashing spray left on until the tank has been drained.

3.4 Startup of Screen Unit: After testing for rotation, admit water at a slow rate to the micro-screen tank. Water levels on both sides of the screen shall be equalized during filling. Keep the drum rotating and turn the washwater supply on. Since initial filling of the tank may entrain many impurities, watch the operation of the unit carefully to avoid problems with backwashing and, if required, supplement washwater sprays with hose streams to keep the screen clean during the tank filling operation.

3.5 Cleaning Screen:

3.5.1 Cleaning of Slime from the filter screen shall be accomplished by shock chlorination using sodium hypochlorite solution or other acceptable methods.

After treatment, drain and flush the tank to waste prior to returning the micro-screen to service.

3.5.2 Cleaning of Iron or Manganese Oxide Film from the filter screen shall be accomplished by using an inhibited acid cleanser.

3.5.3 Clean Grease from the surface of filter screen panels by the use of steam.

# SECTION 11330
# COMMINUTORS AND BAR SCREENS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for repair and maintenance of sewage treatment plant comminutors and bar screens. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Motor: Unless otherwise directed, replacement motors shall be rated for continuous operation.

2.2 Electrical Work: Electrical wiring shall comply with the requirements of NFPA 70.

2.3 Cutter Blades shall be cobalt-chromium-tungsten alloy faced.

2.4 Fasteners shall be stainless steel.

3.0 EXECUTION:

3.1 Motor Bearings shall be lubricated or replaced.

3.2 Welding shall be done by qualified welders in compliance with AWS D1.1.

# SECTION 11335
# ROTATING BIOLOGICAL FILTERS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for the repair and maintenance of sewage treatment plant rotating biological filters. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Steel Parts: Steel parts shall be fabricated from new stock conforming to ASTM A 366.

2.2 Hardware:

2.2.1 Bolts and Nuts: ASTM A 307.

2.2.2 Washers, Flat and Lock Type: ANSI B18.22.1.

2.3 Rust Inhibitive Primer: Fed. Spec. TT-P-664.

2.4 Galvanizing: ASTM A 123 and A 153.

3.0 EXECUTION:

3.1 Welding: Welding shall be in conformance with the AWS D1.1. Galvanized or painted surfaces destroyed by welding shall be restored to original surface for corrosion protection.

3.2 Shop Coating: All structural and miscellaneous metal items shall be painted or galvanized as required.

3.3 Lubrication: Lubricate all motors, chains, drive units, and bearings in compliance with the equipment manufacturer's instructions.

# SECTION 11340
# VACUUM FILTERS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for repair and maintenance of sewage treatment plant vacuum filters. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Ferrous Metal Surfaces Not Exposed to Sewage shall be coated with red-lead paint complying with Fed. Spec. TT-P-86, Type 1, with finish coats of aluminum paint complying with Fed. Spec. TT-P-38.

2.2 Ferrous Metal Surfaces Exposed to Sewage shall be coated with a coal-tar epoxy-polyamide paint complying with SSPC Paint 16.

3.0 EXECUTION:

3.1 Preparation:

3.1.1 Cleaning: Prior to removing parts or components of the vacuum filter or appurtenant equipment, clean dust, dirt, grime, and other foreign matter from the surfaces.

3.1.2 Interruption of Treatment: Provide temporary bypass piping required during the performance of the work, and remove when no longer required.

3.2 Installation:

3.2.1 Openings in Exterior Walls or floor left by removal of a piece of equipment shall be closed to the weather. Remove temporary closures upon installation of the equipment.

3.2.2 Ferrous Metal Surfaces Exposed to Sewage shall be sandblasted in compliance with SSPC-SP 10. After the necessary surface preparation has been accomplished, apply two coats of coal-tar epoxy to a dry film thickness of 10 mils per coat.

3.2.3 Ferrous Metal Surfaces Not Exposed to Sewage shall have a surface preparation in compliance with the manufacturer's instructions and be coated with a primer and finish coat.

# SECTION 11350
# SLUDGE DRYING BEDS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for repair and maintenance of sewage treatment plant sludge drying beds. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Liner Repair Material: Plastic liner and bonding cement shall be compatible with the existing liner.

2.2 Sand: Sand shall have an effective grain size of 0.3 to 0.75 mm and a uniformity coefficient of not over 40.

2.3 Gravel shall be coarse, medium, and fine gravel suitable for supporting sand bed. Top three inches shall be 1/8 inch to 3/4 inch in size.

3.0 EXECUTION:

3.1 Walls shall be restored to original condition. Minor repairs may be made with concrete repair material.

3.2 Gate Repair shall be done by qualified welders in compliance with AWS D1.1.

3.3 Liner Repair shall comply with liner fabricator's recommendations.

3.4 Underdrain Repair: Clean, unplug, repair, or replace underdrains as required.

SECTION 11365
TRICKLING FILTER

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for the repair and maintenance of sewage treatment plant trickling filters. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Filter Media shall be crushed traprock, granite, limestone, hard coal, coke, cinders, blast furnance slag, rot-resistant wood, ceramic, or plastic materials.

2.1.1 Media shall be free of most fine material.

2.1.2 Media Size shall comply with ASCE-02, grading size 3-1/2 to 2-1/2 inches.

2.2 Distribution Arms: Pipe, nozzles, and drive parts shall be as recommended by the equipment manufacturer.

2.3 Underdrain System:

2.3.1 Vitrified Clay Underdrain: ASTM C 159.

2.3.2 Concrete Underdrain: ASTM C 654.

2.3.3 Perforated Vitrified Clay Pipe and Fittings: ASTM C 700.

2.3.4 Vitrified Clay Pipe and Fittings: ASTM C 301.

3.0 EXECUTION:

3.1 Filter Media: Place media to avoid damage, displacement, or clogging of the underdrains, in layers not exceeding 18 inches in depth, to ensure uniform vertical and horizontal distribution of size throughout the filter.

3.2 Distribution Arms Seals: Replace mechanical seal parts as recommended by the manufacturer. Replace mercury seals with mechanical seals.

3.3 Underdrain Collection System:

3.3.1 Underdrain Blocks shall be arranged in rows without anchoring and with space maintained by lug. Opening shall be free and unobstructed to the passage of water.

3.3.2 Perforated Pipe shall be firmly supported with sand bedding.

3.3.3 Open-Spaced Pipe shall be installed in compliance with ASTM C 12.

3.3.4 Patented Filter Underdrain Systems shall be installed as detailed in the manufacturer's published data.

SECTION 11375
AERATION TANKS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for repair and maintenance of sewage treatment plant aeration tanks. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recom-mendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Coatings:

2.1.1 Epoxy Filler Compound for concrete surfaces shall comply with Fed. Spec. MMM-A-001993.

2.1.2 Coal-Tar Epoxy shall comply with SSPC-PAINT 16.

2.1.3 Epoxy Paint shall comply with Mil. Spec. MIL-P-24441.

2.1.4 Red-Lead Base Paint shall comply with Fed. Spec. TT-P-86, Type 1.

2.1.5 Finish Coat Paint shall comply with Fed. Spec. TT-P-38.

2.2 Steel Plate shall comply with ASTM A 827.

3.0 EXECUTION:

3.1 Interior Concrete Surfaces of the Tank shall be cleaned with high pressure water or steam to remove all dirt and residue, allowed to dry, and brush sandblasted in compliance with SSPC-SP 7.

3.2 Holes and Voids in the concrete surfaces left from the blast cleaning shall be filled by means of troweling and squeeze application of an epoxy filler. The surfacing material shall be allowed to cure overnight and coated with two coats of coal-tar epoxy.

3.3 Holes and Cracks in steel tank surfaces shall be cut back to solid metal with a torch. Steel plate of thickness equal to, or greater than, the existing steel tank shall be welded to the surface in compliance with AWS D1.1.

3.4 Submerged Ferrous Metal Surfaces that are exposed to liquids shall be sandblasted in compliance with SSPC-SP 10 and coated with two coats of coal-tar.

3.5 The Exterior Concrete Surfaces of the tank shall be cleaned by means of brush sandblast in compliance with SSPC-SP 7. The surfaces shall be blown down with air to remove the blasting residue and dust, and two coats of epoxy-polyamide paint applied.

3.6 Ferrous Metal Surfaces that are not submerged shall be cleaned by means of sandblasting in compliance with SSPC-SP 3. Surfaces inaccessible to sandblasting shall be power tool cleaned in compliance with SSPC-SP 3. Surfaces shall be coated with one coat of red-lead base paint. After the base paint has dried sufficiently, two coats of aluminum finish paint shall be applied.

SECTION 11376
SURFACE AERATORS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for surface aeration equipment. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS: The floating power assembly shall consist of an aerator motor, motor support-deflector, drive shaft and coupling, replaceable shaft sleeve and bearing, weedless or nonfouling propeller, and mounting hardware to attach the power assembly to the float assembly. The power assembly shall be high or low speed, as required.

2.1 Aerator Motor: The aerator motor shall be a vertical, totally enclosed, fan-cooled motor.

2.2 Motor Support Deflector: Support for the aerator motor shall be provided by a conically shaped, all fiberglass or stainless steel structure designed to carry the static and dynamic forces imposed upon the rotating assembly and the propeller.

2.3 Drive Shaft and Coupling: The propeller drive shaft shall be rigidly coupled with a compression type coupling to the standard motor shaft extension. Each drive shaft shall be equipped with a replaceable austenitic stainless steel shaft sleeve at the apex of the conical motor support-deflector.

2.4 Propeller and Supporting Hardware: The propeller shall be manufactured of cast manganese bronze or stainless steel. Blade design shall be two- or three-blade anti-fouling, with sweptback leading edge.

2.5 Float Assembly: The flotation unit shall be constructed of polyester resin reinforced with fiberglass matte and woven glass roving. It shall be internally filled with high-density polyurethane, foamed-in-place and completely sealed from the external environment.

2.6 Mooring Cable: The aerators shall be moored with 1/4-inch stain-less steel mooring cable. The mooring cables shall be attached to eye bolts anchored into blocks of concrete.

2.7 Electric Cable: Each aerator shall be furnished with the type and amount of underwater electric cable required.

3.0 EXECUTION:

3.1 Operating Performance: Each aerator shall be capable of high oxygenation by entraining and disbursing atmospheric oxygen at designated minimum rate under standard conditions and with the motor not loaded over 100 percent of its rated capacity. The rotating assembly and propeller of each unit shall be statically, dynamically, and hydraulically balanced so that under normal operating conditions, the motor and unit will operate smoothly, and the vibration measured at the top of the motor shall not exceed established limits for industrial equipment of the same horsepower and motor speed. Aerators shall remain stable and not whirl, process, or otherwise exhibit erratic behavior that may result in damage or fatigue to itself or its accessories.

3.2 Maintenance: Aerator units shall be so designed as to require a minimum of maintenance consisting only of lubrications of the upper and lower motor bearings twice a year in accordance with the manufacturer's instructions.

SECTION 11380
SLUDGE DIGESTERS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installing of materials for repair and maintenance of sewage treatment plant sludge digesters. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Coatings:

2.1.1 Epoxy Filler Compound for concrete surfaces shall comply with Fed. Spec. MMM-A-001993.

2.1.2 Coal-Tar Epoxy shall comply with SSPC-PAINT 16.

2.1.3 Epoxy Paint shall comply with Mil. Spec. MIL-P-24441.

2.1.4 Red-Lead Base Paint shall comply with Fed. Spec. TT-P-86, Type 1.

2.1.5 Aluminum Finish Paint shall comply with Fed. Spec. TT-P-38.

3.0 EXECUTION:

3.1 Preparation:

3.1.1 Protection required to prevent damage to adjacent materials, equipment, fixtures, and finishes shall be provided. Purge gas from anaerobic sludge digester tanks, covers, piping, equipment, and control buildings to prevent explosion, fire, or oxygen starvation of personnel.

3.1.2 Interruption of Treatment shall be held to a minimum. Not more than one sludge digester shall be taken out of service at a time.

3.2 Installation:

3.2.1 Emptying Digester: Specified sludge digester(s) shall be emptied. Sludge digester emptying procedure shall be as follows:

3.2.1.1 Methane Formation shall be stopped and existing methane purged from under the digester cover, in the cover, in gas lines, equipment, and control

building. After discontinuing the sludge feed, allow 3 days for the partial digestion of the last sludge added. When the rate of gas production indicates that most of the sludge has been digested, sludge heating shall be stopped. The gas space under the cover shall be purged with nitrogen or carbon dioxide. When the methane concentration is well below the lower explosive limit of 5.3 percent by volume, open all cover manholes and withdraw the contents of the digester.

3.2.1.2 When draining an anaerobic sludge digester with a floating or gasholder cover, the Contractor shall continuously observe the cover until the cover is resting on the corbels. If the cover should tilt or bind, withdrawal shall be stopped immediately and the problem corrected prior to resumption of the draining operation. As the cover contacts the corbels, the cover shall be watched for signs of structural failure that could damage piping and equipment in the sludge digester tank.

3.2.2 Digester Cleaning and Coatings:

3.2.2.1 Interior Concrete Surfaces of the sludge digester tank shall be cleaned with high pressure water or steam to remove dirt and residue, allowed to dry, and brush sandblasted in compliance with SSPC-SP 7.

3.2.2.2 Holes and Voids in the concrete surfaces left from the blast cleaning shall be filled by means of troweling and squeeze application of an epoxy filler. Epoxy shall be applied in compliance with the manufacturer's application instructions. Two coats of coal-tar epoxy shall be applied after the surface material has cured.

3.2.2.3 Submerged Ferrous Metal Surfaces such as piping, ladders, structural steel, equipment, and metal roof surfaces that are exposed to the sludge shall be sandblasted in compliance with SSPC-SP 10 and coated with two coats of coal-tar epoxy.

3.2.2.4 Exterior Concrete Surfaces of the digester shall be cleaned by means of brush sandblast in compliance with SSPC-SP 7, the surfaces blown down with air to remove the blasting residue and dust, and two coats of epoxy-polyamide paint applied.

3.2.2.5 Ferrous Metal Surfaces that are not submerged shall be cleaned by means of sandblasting in compliance with SSPC-SP 6. Surfaces inaccessible to sandblasting shall be power tool cleaned in compliance with SSPC-SP 8. Surfaces shall be coated with one coat of red-lead base paint. After the base paint has dried sufficiently, two coats of aluminum finish paint shall be applied.

3.2.3 Hydrostatic Pressure Test: A hydrostatic test shall be made to demonstrate that the sludge digester is gas tight. After a satisfactory test has been made, the digester drained, and maintenance and repair work completed, valves shall be returned to normal operating position, plugs shall be removed, and the sludge digester and appurtenances shall be left ready for use.

3.2.4 Startup of Aerobic or Anaerobic Digester: After maintenance and repair work has been completed and approved, the Contractor shall return the sludge digester to service and operate it to design capacity.

SECTION 11395
TERTIARY SAND FILTERS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for repair and maintenance of sewage treatment plant tertiary sand filters. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Filter Media:

2.1.1 Sand: Silica sand shall be inert to wastewater and bacterial attack and shall have the following characteristics:

2.1.1.1 Sphericity: Not less than 9.0.

2.1.1.2 Porosity: Not more than 0.4.

2.1.1.3 Hardness: Not less than 7.0.

2.1.1.4 Specific Gravity: Not more than 2.65 or less than 2.6.

2.1.1.5 Inertness: Not less than 97 percent of the sand shall remain insoluble after 24 hours in hydrochloric acid.

2.1.2 Support Gravel shall be hard, durable, clean, and uniformly spherical particles, free of mica and other thin and flat particles. Depths and sizes shall be as designated.

2.2 Underdrain System:

2.2.1 Vitrified Clay Underdrain: ASTM C 159.

2.2.2 Concrete Underdrain: ASTM C 654.

2.2.3 Perforated Vitrified Clay Pipe and Fittings: ASTM C 700.

2.2.4 Vitrified Clay Pipe and Fittings: ASTM C 301.

2.3 Filter Housing:

2.3.1 Grout shall be metallic, nonshrink type.

2.3.2 Concrete Repair Material shall be epoxy type complying with Fed. Spec. MMM-A-001993.

2.3.3 Concrete Coatings:

2.3.3.1 Outside and Above Grade shall be epoxy type complying with Mil. Spec. MIL-P-24441.

2.3.3.2 Inside and Below Grade shall be coal-tar epoxy type complying with SSPC-PAINT 16.

2.3.4 Steel Repair Material shall be steel plate, to match existing, epoxy cement, or fiberglass cloth.

2.3.5 Steel Coatings shall be red-lead base coat complying with Fed. Spec. TT-P-86, Type I and finish coats of aluminum paint complying with Fed. Spec. TT-P-38.

2.4 Loss of Head Switch shall be of the same model or type, range, and contact rating as the loss of head switch to be replaced.

3.0 EXECUTION:

3.1 Media Placement for Gravity and Pressure Filters:

3.1.1 The Filter Box or Tank and Underdrain shall be thoroughly cleaned before starting gravel and media placement. Materials becoming dirty shall be removed and replaced.

3.1.2 The Bottom Gravel Layer shall be placed carefully by hand to avoid movement to the underdrain system and to assure free passage for water from the orifices. Each layer shall be completed before the layer above is started. Gravel of differing gradations shall not be mixed. Gravel becoming mixed shall be removed and replaced. Gravel shall be cleaned as necessary by backwashing. For sizes less than 1/2 inch, the gravel shall be leveled to +/- 1/4 inch of the water surface defining its limit. For sizes greater than 1/2 inch, the gravel shall be leveled to +/- 1/2 inch of the water surface.

3.1.3 Media shall be placed in a manner similar to the gravel placement and processed as may be required to achieve the gradation recommended by the manufacturer.

3.2 Underdrain Repair:

3.2.1 Underdrain Blocks shall be arranged in rows without anchoring and with space maintained by lug. Opening shall be free and unobstructed to the passage of water.

3.2.2 Perforated Pipe shall be firmly supported with sand bedding.

3.2.3 Open-Spaced Pipe shall be installed in compliance with ASTM C 12.

3.3 Filter Housing Repair:

3.3.1 Filter Material shall be removed and inside walls cleaned prior to grouting or coating application.

3.3.2 Welding shall be done in compliance with AWS D1.1.

3.4 Cleaning and Coating:

3.4.1 Interior Concrete Surfaces of the tank shall be cleaned with high pressure water, steam, or sandblasted to remove all dirt and residue.

3.4.2 Holes and Voids in the concrete surfaces left from the blast cleaning shall be filled with an epoxy filler. The surfacing material shall be allowed to cure overnight, and then two coats of coal-tar epoxy shall be applied to a dry film thickness of 10 mils per coat.

3.4.3 Submerged Ferrous Metal Surfaces, such as piping, ladders, structural steel, equipment, and metal roof surfaces that are exposed to the sludge, shall be cleaned and coated with two coats of coal-tar epoxy with dry film thickness of 10 mils per coat.

3.4.4 Exterior Concrete Surfaces of the tank shall be cleaned and two coats of epoxy-polyamide paint shall be applied to a dry film thickness of 5 mils per coat.

3.4.5 Ferrous Metal Surfaces that are not submerged shall be cleaned and coated with one coat of red-lead base paint to a dry film thickness of 3 mils. After the base paint has dried sufficiently, two coats of aluminum finish paint shall be applied to a dry film thickness of 2 mils per coat.

3.5 Manual Scouring shall be done during backwash (bed expanding) cycle, using long tined rakes and high pressure hose streams directed at, and into, the expanded bed.

3.6 Chemical Cleaning Solution from the filter bed shall be discharged to the backwash return tanks.

3.7 Detergents and Chemicals shall not be allowed in the maintenance of rapid sand filters. Purging of the underdrain system shall be with caustic detergents (2 to 5 percent caustic soda) or 50 parts per million chlorine solution in slow sand filters.

3.8 Defective Wash Nozzles shall be replaced in each filter.

3.9 Cleaning of Air or Water Wash Nozzles: Jet and cone shall be removed from each nozzle and punched clean with a wire or rod.

3.10 Distribution Laterals shall be flushed for a few minutes by removing the nozzles at the end of laterals.

3.11 General Maintenance of Loss of Head Switch: Connecting tubing shall be purged with clean air or water. Contacts shall be burnished, as required.

SECTION 11402
FOOD SERVICE EQUIPMENT

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of food service equipment. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS: Food service equipment shall comply with applicable NSF Standards. Gas-burning equipment shall be designed for operation with the type of gas designated and shall be approved by AGAL. Electrically operated equipment shall be in accordance with applicable standards of the UL Electrical Appliance and Utilization Equipment Directory and UL 197.

2.1 Equipment:

2.1.1 Vertical Steam Cooker: Mil. Spec. MIL-C-2354.

2.1.2 Commercial-Type Range: Gas, Fed. Spec. A-A-50064; electric, Fed. Spec. A-A-50035.

2.1.3 Ice Cube Machine: Mil. Spec. MIL-I-11867.

2.1.4 Rinser-Sanitizer: Mil. Spec. MIL-R-19038.

2.1.5 Fry Pan: Gas, ASTM F 1047; electric, ASTM F 1047.

2.1.6 Automatic Coffee Urn: Mil. Spec. MIL-U-43263.

2.1.7 Steam Kettles: Electric, Mil. Spec. MIL-K- 43359; gas, Mil. Spec. MIL-K-43943.

2.1.8 Food Service Cabinets, Warmer-Refrigerator, Roll-Through, Roll-In: Mil. Spec. MIL-C-43427.

2.1.9 Convection Ovens: Gas, Fed. Spec. A-A-50042; electric, Fed. Spec. A-A-50039.

2.1.10 Sanitizing Hot Water Heater: Mil. Spec. MIL-H-43895.

2.1.11 High Pressure Cleaning and Sanitizing Machines: Mil. Spec. MIL-C-43949.

2.2 Materials:

2.2.1 Black Iron Pipe: ASTM A 53.

2.2.2 Brass Pipe: Fed. Spec. WW-P-351, Class 1.

2.2.3 Chromium Plating of Brass Pipe, Valves, and Fittings: Fed. Spec. WW-P-541.

2.2.4 Copper Tubing: ASTM B 88, Type K or L, or ASTM B 75, as required.

2.2.5 Stainless Steel, Nonmagnetic: ASTM A 167 or ASTM A 240.

2.2.6 Stainless Steel Pipe and Tubing: Seamless or welded, of true roundness, and of material specified for stainless steel. Seamless tubing shall be thoroughly annealed, pickled, and ground smooth. Welded tubing shall be thoroughly heat-treated, quenched to eliminate carbide precipitation, and then drawn true to size, roundness, and ground. Tubing shall be given a No. 3 or 4 finish when exposed to view.

2.2.7 Fittings for Copper Tubing: Solder-joint type. Flared joint fittings may be used in specific applications when approved. Cast bronze solder joint fittings shall conform to ANSI B16.22. Wrought copper and wrought bronze solder joint fitting shall conform to ANSI B16.22. Cast bronze fittings for flared joints shall conform to ANSI B16.26.

2.2.8 Fittings for Brass Pipe: Fed. Spec. WW-P-460, Class A or B, as required.

2.2.9 Galvanizing Repair Compound: Mil. Spec. MIL-P-21035.

2.2.10 Silver Solder: Fed. Spec. QQ-B-654, class as applicable.

2.2.11 Steel Structural Shapes for Framing: ASTM A 36. Sections shall be galvanized by the hot-dip process, conforming to ASTM A 123, coating designation G-90.

2.2.12 Tin-Lead Solder: Fed. Spec. QQ-S-571, composition Sn50.

2.3 Garbage Disposal Machine: A floor supported type with cast alloy body supported on adjustable tubular legs. The upper housing shall be removable. The disposal shall be provided with a stainless steel cone with a water swirl inlet. Throat shall have a neoprene silver trap.

2.3.1 The Disposal shall be provided with magnetic starter with overload and under voltage protection, 5-minute timer, panel cover interlock, fused disconnect, prewired solenoid, vacuum breaker, water flow controls, positive flushing action and reversing action, or other positive means of preventing jamming. The rotor shall be cast alloy carrying rigid impact bars fixed directly onto motor shaft, or stainless steel swivel impellers and stainless steel undercutter. Disposal machines with a 5 hp or 7-1/2 hp motor shall have a minimum 8-inch diameter rotor.

2.3.2 Control: Control panel box shall be waterproof stainless steel construction.

2.4 Hoods: Design, fabrication, and installation of hoods and duct systems shall conform to NFPA 96 and UL 710 where applicable. Hood duct systems, grease removal devices, and cooking equipment, which may be a source of ignition of grease in the hood or duct, shall be protected with fixed pipe systems and provided with portable fire extinguishing equipment in accordance with NFPA 96, NFPA 17, and as specified. Ducts and hoods shall be secured to building so as to be level and free from vibration under all conditions of operations. Hoods, exposed ducts, and enclosures over dishwashing machines and rinse compartment of pot washing sinks shall be constructed of 18-gauge stainless steel. Hood shall be fabricated so as to form a condensate gutter at the perimeter and shall be provided with a condensate drain terminating at the floor sink location. Exhaust outlet shall be connected to the exhaust system.

2.5 Prefabricated Walk-In Refrigerators: Commercial, walk-in type, intended for use in dining facilities, in accordance with Mil. Spec. MIL-R-43900 except insulation shall provide a maximum "U" factor of 0.0295 Btuh.

2.6 Gas Burning Equipment shall comply with the applicable requirements of AGAL and ANSI. Each gas-burning appliance shall shall be connected to the building piping by means of a quick-disconnect device and flexible connector. A manual shutoff valve shall be installed on the building piping, ahead of the supply side of each quick-disconnect device. The quick-disconnect device shall conform to ANSI Z21.41 and the flexible connector to ANSI Z21.45. The length of the flexible connector shall be as required but shall not exceed 72 inches. Flexible connector shall not be concealed and shall not extend from one room to another. Dust caps and plugs shall be provided for quick-disconnect fittings for use when fittings are uncoupled.

2.7 Backflow Preventers: Each item of food service equipment having water supply and waste connections, with the water inlet connected below the flood level of the equipment, shall be supplied with backflow preventer of size and proportions that will allow an ample flow of water to the equipment, but will prevent the backflow of waste or polluted water into the water supply system.

2.8 Paint shall be of a durable, nontoxic, nondusting, nonflaking, and mildew-resistant type, suitable for use with food service equipment and in conformance with NSF 2.

3.0 EXECUTION:

3.1 Installation: Equipment shall be installed in accordance with NSF Installation Manual for Food Service Equipment. The Contractor shall make provision for the plumbing, heating, and electrical connections and for equipment indicated as being furnished and installed by the Government. Equipment connections shall be complete to wall or floor for all utilities. Unless otherwise specified, exposed piping shall be chromium-plated copper alloy or stainless steel. Gas equipment installation shall conform to ANSI Z21.15 and NFPA 54. Electrical work shall comply with NFPA 70.

3.2 Painting: All exterior, galvanized parts, exposed members of framework, and wrought steel pipe, where specified to be painted, shall be cleaned, degreased, primed with rust inhibiting primer, and finished with two coats of epoxy-based grey hammertone paint.

SECTION 11452
REFRIGERATORS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of residential refrigerators. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Refrigerators and Freezers: AHAM HRF-1.

2.2 Cords and Plugs: UL 62 and UL 817

2.3 General Electrical: NFPA 70.

2.4 Compressors: UL 984.

2.5 Condensers: UL 250.

2.6 Motors: UL 73.

3.0 EXECUTION: (Section not used.)

SECTION 11453
DISHWASHERS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of residential dishwashers. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Dishwashers: UL 749.

2.2 Time Control: UL 917.

2.3 Control Valves: UL 429.

2.4 General Electrical: NFPA 70.

2.5 Cords and Plugs: UL 62.

2.6 Motors: UL 73 and UL 547.

2.7 Safety-Interlock Switch: UL 749.

3.0 EXECUTION: (Section not used.)

SECTION 11454
GARBAGE DISPOSERS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of residential garbage disposers. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Household Garbage Disposal: Fed. Spec. OO-G-1513 and AHAM FWD-1.
2.2 Cords and Plugs: UL 62 and UL 817.

2.3 Motors: UL 73.

2.4 General Electrical: NFPA 70.

3.0 EXECUTION: (Section not used.)

SECTION 11455
RANGES AND OVENS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of residential ranges and ovens. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Conduit: UL 1.

2.2 Conductors: UL 62, UL 83, and UL 817.

2.3 Switches: UL 20 and UL 917.

2.4 Fuses and Fuseholders: UL 198 and UL 512.

2.5 Connectors: UL 486.

2.6 Ranges: UL 858.

2.7 Thermal Cutoffs: UL 1020.

2.8 General Electrical: NFPA 70.

2.9 Pilot Lights: UL 496 and UL 542.

2.10 Range Hoods: Non-vented, two-speed fan, charcoal filter, light, UL listed.

3.0 EXECUTION: (Section not used.)

SECTION 11456
CLOTHES DRYERS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of residential clothes dryers. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Cords and Plugs: UL 62 and UL 817.

2.2 Thermal Cutoffs: UL 1020.

2.3 General Electrical: NFPA 70.

2.4 Motors: UL 73.

2.5 Home Laundry Equipment: UL 560 and Fed. Spec. OO-W-860.

2.6 Switches: UL 917 and UL 20.

2.7 Lamps and Lamp Holders: UL 496 and UL 542.

2.8 Vent Duct: Plastic wrapped, flexible wire duct of diameter to fit duct pipe of machine.

2.9 Weather Hood: Aluminum construction with backdraft damper.

3.0 EXECUTION: (Section not used.)

SECTION 11457
CLOTHES WASHERS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of residential clothes washers. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Cords and Plugs: UL 62 and UL 817.

2.2 Electrically-Operated Valves: UL 429.

2.3 Home Laundry Equipment: UL 560 and Fed. Spec. OO-W-860.

2.4 Lamps and Lamp Holders: UL 496 and UL 542.

2.5 General Electrical: NFPA 70.

3.0 EXECUTION: (Section not used.)

SECTION 11460
UNIT KITCHENS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of unit kitchens. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS: Electrical components shall comply with applicable UL standards and bear appropriate UL labels. Gas-burning equipment shall comply with ANSI Z21.1 and shall bear the AGA seal of approval.

2.1 Materials: Minimum 22-gauge steel sheet for component body parts, minimum 20-gauge steel sheet for door fronts and liners, and heavier-gauge steel for internal gussets and bracing.

2.2 Components: Electrical components shall be wired for the voltage available and shall terminate at factory-installed terminal boxes. Gas-burning components shall be designed to operate on the designated fuel. Unit kitchens shall include the following, as required:

2.2.1 Top and Sink shall be seamless, one-piece with integral back and end splashes fabricated from 18-gauge AISI Type 302/304 stainless steel with No. 4 brushed finish or 16-gauge minimum titanium steel with acid-resistant porcelain finish. Sink accessories shall include chrome-plated swing spout faucet with aerator, chrome-plated faucet handles, stainless steel cup strainer, and drain outlet with tailpiece.

2.2.2 Food Waste Disposer shall be complete with drain outlet and tailpiece.

2.2.3 Refrigerator and Freezer Compartments shall be the designated minimum capacity measured in accordance with AHAM HRF-1.

2.2.4 Range: Each cooktop burner shall be rated at not less than 1,250 watts, if electric, or 8,000 Btu, if gas.

2.2.5 Oven: Electric oven "Bake" operation shall be rated at 2,000 watts minimum and "Broil" operation shall be rated at 2,500 watts minimum; gas oven burners shall be rated at 18,000 Btu minimum.

2.2.6 Cabinets shall be under-counter and upper wall-mounted, with shelves, doors, drawers, and hardware.

3.0 EXECUTION: (Section not used.)

SECTION 11490
GYMNASIUM EQUIPMENT

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of gymnasium equipment. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Basketball Backstops shall be ceiling-suspended forward-folding, backward-folding, side-folding, wall-braced or fixed type; wall-mounted up-folding, side-folding or fixed type; or floor-mounted portable type as required. Backstop shall come complete with backboard, goal, and all accessories. Backboard material shall be glass, fiberglass, steel or wood as required and rectangular or fan shaped. Movable backstops shall be manually or electrically operated. Backstops, goals, and their accessories shall meet the specifications of the National Collegiate Athletic Association.

2.2 Telescoping Bleachers shall be operable bleacher systems of multiple-tired benches on interconnected folding supports, which permit closing, without requiring dismantlement, into a nested relationship for purposes of storing or moving. The bleachers shall be wall-attached, free-standing floor-attached, or free-standing movable type as required. The bleachers shall conform to the applicable requirements of Chapter 5 of NFPA 102. Bleacher seats shall be wood, vinyl-clad steel, or plastic, as required. System shall have row rise and row spacing as desired and shall come complete with end panels, rear fillers, back panels, end railings and back railings as required. Bleachers shall be manually or electrically operated.

2.3 Gym Divider Curtains shall be constructed of vinyl for the first eight feet (8' 0") above the floor. The remainder shall be 1-3/4 inch mesh, white nylon netting. A chain or other ballast shall be sewn into the bottom hem. Curtains that are drawn shall be manually operated and glide along their own track. Roll-up curtains shall be power-operated.

3.0 EXECUTION:

3.1 Basketball Goals shall be securely attached to supporting construction and shall be installed at a height of 10 feet from the rim to the floor.

3.2 Telescoping Bleacher Seating: Verify that areas to receive telescoping bleacher seating are free of impediments interfering with installation and operation. Securely attach to supporting construction.

3.3 Gym Divider Curtains: Verify that areas to receive gym divider curtains are free from interferences and structurally capable of supporting the curtains.

SECTION 11496
TARGET FIRING RANGES (EXTERIOR)

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for the maintenance and repair of target firing ranges. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Aggregate and Gravel: ASTM D 2940.

2.2 Concrete: ASTM C 94.

2.3 Lumber and Timber: ASTM D 245 and ASTM D 1760.

2.4 Reinforcement Steel: ASTM A 615.

2.5 Structural Steel: ASTM A 36.

2.6 Manufactured Materials and Equipment: Parts for equipment and materials no longer available shall be repaired or replaced using approved equipment and materials equivalent to the original.

3.0 EXECUTION: Timber repairs shall be executed using methods complying with the approved practices as referenced in AITC Timber Construction Manual.

SECTION 11498
FIXED WOOD BLEACHERS (EXTERIOR)

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of fixed wood bleachers. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Hardware, Brackets, Fasteners, and Connectors shall be zinc-coated or hot-dipped galvanized steel or aluminum. Nails, brads, staples, and spikes shall comply with Fed. Spec. FF-N-105.

2.2 Lumber and Timber Members used for repair or replacement of bleacher components shall be of the species and grades complying with National Design Specification for Wood Construction and its Fastenings (National Forest Products Association). Sizes shall comply with American Lumber Standards Committee PS20. Lumber materials shall bear a mark of recognized inspection agency identifying the species, grade, and compliance with the applicable standard. Wood preservatives shall be pressure-applied and shall comply with ASTM D 1760. Creosote or arsenate treatments shall not be used.

2.2.1 Seatboard Lumber shall be kiln-dried Dense No. 1 Douglas fir or Dense No. 1 yellow pine boards.

2.2.2 Footboard Lumber shall be kiln-dried Dense No. 1 Douglas fir or Dense No. 1 yellow Southern pine boards.

2.2.3 Support Member and Timber shall be Dense No. 1 Douglas fir or Dense No. 1 yellow pine timbers or boards.

2.3 Ready-Mixed Concrete shall comply with ASTM C 94 with compressive strength of 3,000 pounds per square inch (210.9 kgs per square cm) at 28 days and shall be protected from freezing for seven days after placement.

2.4 Reinforcement for Concrete shall comply with ASTM A 184, A 185, or A 615 as indicated.

3.0 EXECUTION: Repair or replace wooden bleacher components using methods complying with the approved practices as referenced in American Institute of Timber Construction Timber Construction Manual.

SECTION 11499
DEMOUNTABLE BLEACHERS (EXTERIOR)

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of demountable bleachers. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Hardware and Accessories shall be zinc-coated or hot-dipped galvanized steel or aluminum.

2.2 Lumber used for seatboard and footboard repair or replacement shall be species and grades complying with National Forest Products Association National Design Specification for Wood Construction and Its Fastenings. Sizes shall comply with American Lumber Standards Committee PS20. Lumber materials shall bear the mark of a recognized inspection agency identifying the species, grade, and compliance with the applicable standard. Wood preservatives shall be pressure-applied and shall comply with ASTM D 1760. Creosote or arsenate treatments shall not be used.

2.2.1 Seatboard Lumber shall be kiln-dried Dense No. 1 Douglas fir or Dense No. 1 Southern pine boards.

2.2.2 Footboard Lumber shall be kiln-dried Dense No. 1 Douglas fir or Dense No. 1 Southern pine boards.

2.3 Steel Structural Members shall comply with ASTM A 36.

2.4 Aluminum Structural Members shall comply with ASTM B 308.

3.0 EXECUTION: Repair or replace bleacher components using methods complying with the approved practices as referenced in American Institute of Timber Construction Timber Construction Manual.

SECTION 11501
PAINT SPRAY BOOTH

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of paint spray booths. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work. Contact the Fire Protection Engineering Branch for requirements of paint spray booth protection.

2.0 PRODUCTS: All products shall meet applicable OSHA and NFPA standards.

2.1 Enclosure:

2.1.1 Panels: 18 gauge, ASTM A 568.

2.1.2 Stiffeners and Support Shapes: ASTM A 36.

2.1.3 Exhaust Chamber: 18 gauge, formed to hold filters.

2.1.4 Doors:

2.1.4.1 Access Door: 2 feet 6 inches by 7 feet 0 inches, steel-clad.

2.1.4.2 Entrance Doors for Vehicular Booths: Swing type, two-section, steel-framed with intake air filters, a minimum opening of 8 feet 9 inches in height by 9 feet 10 inches in width, leak-proof seals and a heavy-duty latch.

2.1.4.3 Exit Doors for Vehicular Drive-Through Booths: Swing type, two-section, steel frame, metal-clad, solid, with a minimum opening of 7 feet 9 inches in height by 9 feet 10 inches in width, leak-proof seals, and a heavy-duty latch.

2.1.5 Factory Finish: Galvanized or painted.

2.2 Filtering Equipment:

2.2.1 Arrestor: Disposable, expanded fiber or fiberglass, Class 2 listed by UL.

2.2.2 Water Wash: Complete with pumps, spray nozzles, baffles, and controls.

2.3 Exhaust Fans shall be sized to maintain 100 fpm minimum across the cross sectional area of booth and shall have permanently lubricated bearings and enclosed belts. Fan motors shall be located outside of air stream.

2.4 Lighting: Fluorescent.

2.5 Fans, Controls, and Lights inside Paint Booths shall be explosionproof.

3.0 EXECUTION: Installation shall comply with applicable codes and environmental regulations.

# SECTION 11851
# BRIDGE-ATTACHED LAND AND MARINE TRAFFIC CONTROLS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for marine traffic controls attached to bridges. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 General: All navigational aid shall meet the standards of the governing authority.

2.2 Conduit shall be galvanized rigid steel pipe or PVC.

2.3 Boxes and Fittings shall be forged or cast to comply with NEMA.

2.4 All Materials shall be corrosion-resistant, and assemblies shall be weatherproof. Galvanized steel shall only be permitted as specified above.

3.0 EXECUTION:

3.1 General: All electrical repairs or replacements shall comply with standards of the National Electrical Code.

3.2 Sign Panels and Supports: Install signs at the locations indicated by the Contracting Officer.

3.3 Pavement and Waterway Marking: Stenciling is permitted for waterway level, clearance, and other information directly applied to the structure.

3.4 Conduit: All above grade wiring shall be run in conduit. Any existing wiring not in conduit shall be removed, and conduit shall be provided for the existing wiring.

3.5 Boxes and Fittings: Wherever possible replacement boxes shall be installed where the removed box was located. Boxes shall be of proper size and shape for the conduits and conductors entering them. New conduits having runs of more than 100 feet or more than three right angle bends shall have pull boxes at intermediate locations. Pull boxes shall be supported independently of the conduits. Boxes shall have only the holes necessary to accommodate the conduit at points of installation.

3.6 Buried Cables: Trenches for direct burial cables shall be at least 27 inches in depth with 3 inches of sand bedding above and below cable.

3.7 Grounding: All conduit, raceways, switchgear frames and housings, panel housings, fixture housings, equipment frames, etc., shall be properly grounded.

SECTION 13121
PRE-ENGINEERED STRUCTURES

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of pre-engineered metal buildings. Products shall match existing materials and/or shall be as directed by the Contracting Oficer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS: Metal buildings shall be the design and product of a recognized metal building manufacturer who is regularly engaged in the fabrication of pre-engineered structures.

2.1 Design Requirements:

2.1.1 Metal Buildings shall be designed for the dead load, designated live loads, and combinations of these loads as set forth in the MBMA Low Rise Building Systems Manual.

2.1.2 Framing and Structural Members: Structural steel members shall be designed in accordance with AISC publication, Specification for the Design, Fabrication, and Erection of Structural Steel for Buildings. Structural cold-formed steel framing members shall be designed in accordance with the AISI publication, Specification for the Design of Cold-Formed Steel Structural Members. Framed openings shall be designed to structurally replace the covering and framing displaced. Welding of steel shall be in accordance with AWS D1.1.

2.1.3 Exterior Covering: Maximum wind load deflection for wall sheets shall not exceed 1/180 of the span between supports: Maximum live load deflection for roof sheets shall not exceed 1/180 of the span between supports. Maximum deflections shall be based on sheets continuous across two or more supports with sheets unfastened and fully free to deflect.

2.2 Materials:

2.2.1 Hot-Rolled Structural Shapes: ASTM A 36 or A 529.

2.2.2 Tubing or Pipe: ASTM A 500, Grade B; ASTM A 501; or ASTM A 53.

2.2.3 Members Fabricated from Plate or Bar Stock: 42,000 psi minimum yield strength; ASTM A 529, A 570, or A 572.

2.2.4 Members Fabricated by Cold Forming: ASTM A 607, Grade 50.

2.2.5 Galvanized Steel Sheet: ASTM A 446 with G 90 coating.

2.3 Framing:

2.3.1 Rigid Frames shall be hot-rolled structural steel; factory-welded and shop-painted built-up "I" shape or open web rigid frame consisting of tapered or parallel flange beams and tapered columns. Furnish complete with attachment plates, bearing plates, and splice members. Frames shall be factory-drilled for bolted field assembly.

2.3.2 End Wall Columns shall be factory-welded, built-up "I" shape or cold-formed sections, fabricated of minimum 14-gauge material, and shop-painted.

2.3.3 Wind Bracing shall be adjustable, threaded steel rods, 1/2 inch in diameter minimum; ASTM A 36 or A 572, Grade D.

2.3.4 Secondary Framing: Purlins, eave struts, end wall beams, and flange and sag bracing shall be minimum 16-gauge rolled formed sections and shop-painted. Base channel, sill angle, end wall structural members (except columns and beams), and purlin spacers shall be minimum 14-gauge cold-formed steel, galvanized.

2.3.5 Bolts shall be ASTM A 307 or A 325 as necessary for design loads and connection details. Bolts shall be shop-painted, except zinc- or cadmium-plated units shall be provided when in direct contact with panels.

2.4 Roofing and Siding: Provide flashings, closers, fillers, metal expansion joints, ridge covers, fascias, and other sheet metal accessories, factory-formed of same material and finish as roofing and siding.

2.4.1 Roof-Covering Assemblies shall have a wind uplift resistance rating of Class 90 in accordance with UL 580 and shall be listed in the UL Fire Resistance Directory for wind uplift resistance classification.

2.4.2 Steel Covering shall be zinc-coated steel conforming to ASTM A 446, Grade C, with G 90 coating complying with ASTM A 525. Steel sheets and panels shall be not less than 26-gauge.

2.4.3 Aluminized Steel Sheets shall be aluminum-coated, ASTM A 463, Drawing Quality with T1-40 coating. Metal thickness shall be not less than 26-gauge.

2.4.4 Aluminum Sheets shall be fabricated from aluminum alloy 3003 or 3004 Alclad with tempering as required to suit forming operations, ASTM B 209. Aluminum sheet thickness shall be not less than 0.032 inch.

2.4.5 Insulated Wall Panels shall be factory-assembled or field-assembled units, consisting of a central insulating core with metal interior and exterior face sheets securely fastened together with rivets, bolts, studs, "snap-on", or other approved methods of fastening, including interlocking with basic wall units.

2.5 Insulation:

2.5.1 Insulation shall be batts, blankets, and/or rigid material of required thickness and density to provide an overall tested heat transfer U-value as required. Insulation shall have a flame spread classification of 25 or less and a smoke developed rating not in excess of 50 when tested in accordance with ASTM E 84. Exposed insulation shall be faced with a vapor barrier of vinyl film, vinyl reinforced foil, or foil reinforced kraft.

2.5.2 Rigid or Semirigid Board Insulation shall conform to Fed. Spec. HH-I-558, Form A, Class 1 or Class 2. Insulation shall have a white non-dusting and non-shedding painted finish.

2.5.3 Blanket Insulation shall conform to Fed. Spec. HH-I-558, Form B, Type I, Class 6. Insulation shall have a white sheet vinyl facing.

2.6 Accessories:

2.6.1 General: Provide coated steel accessories with coated steel roofing and siding; aluminum accessories with aluminum roofing and siding.

2.6.2 Gutters shall be formed in sections, complete with end pieces, outlet tubes, and special pieces that may be required. Finish to match roof fascia and rake.

2.6.3 Downspouts shall be formed in sections, complete with elbows and offsets, and shall be finished to match wall panels.

2.6.4 Circular Gravity Roof Ventilators shall be low-profile, ridge type ventilators, complete with base, bird screen, hood, flashing, closures, and fittings, finished to match roof panels.

2.6.5 Continuous Ridge Ventilators shall be factory-engineered and fabricated units of continuous heat valve type.

2.6.6 Wall Louvers: Provide units fabricated of not less than 18-gauge steel, finished to match wall panels. Provide bird screens of 1/2-inch x 1/2-inch galvanized steel mesh in rewirable frames on exterior face of louvers. Secure screens with clips to ensure ease of removal for cleaning and rewiring.

2.7 Hollow Metal Doors and Door Frames shall comply with Recommended Specifications for Standard Steel Doors and Frames (SDI-100), Steel Door Instutute.

2.7.1 Materials: Hot-rolled, pickled, and oiled in compliance with ASTM A 569 and A 568; cold-rolled in compliance with ASTM A 366 and A 568.

2.7.2 Hollow Metal Units to receive mortised and concealed finish hardware, including cutouts, reinforcing, drilling, and tapping, shall comply with ANSI A115. Locate finish hardware in compliance with BHMA Recommended Locations for Builder's Hardware.

2.7.3 Hardware: Provide hardware for each door, as follows:

2.7.3.1 Hinges: 1-1/2 pair, steel, template hinges, 4-1/2 inches x 4-1/2 inches.

2.7.3.2 Lockset: Cylindrical, key in knob.

2.7.3.3 Threshold: Extruded aluminum (exterior doors only).

2.7.3.4 Weatherstripping: Sponge neoprene or extruded vinyl, enclosed in an aluminum housing. Bottom weatherstripping shall be an aluminum extrusion with vinyl sweep strip.

2.8 Overhead Doors:

2.8.1 Overhead Doors shall be industrial type of standard manufacture, fabricated of 24-gauge galvanized steel minimum or 0.032-inch thick aluminum. Accessories shall include galvanized steel track, torsion-spring mechanism, ball-bearing roller, cylinder lock, and weatherstripping. Doors shall be manually operated, except that doors over 144 square feet in area shall be chain hoist or electric motor operated.

2.8.2 Overhead Coiling Doors:

2.8.2.1 General: Provide operating door assemblies as a complete unit produced by one manufacturer, including door curtain, guides, counterbalance, hood, hardware, operators, and installation accessories.

2.8.2.2 Door Curtain: Fabricate overhead coiling door curtain of interlocking slats designed to withstand required wind loading. Slats shall be structural quality, cold-rolled galvanized steel sheets complying with ASTM A 446, Grade A, with G90 zinc coating, complying with ASTM A 525, and phosphate treated before fabrication, or aluminum slats, 5052 alloy, standard mill finish, not less than 0.04 inch thick.

2.9 Windows: Windows shall be of steel in accordance with the Steel Window Institute, The Specifier's Guide to Steel Windows, or of aluminum in accordance with the AAMA 101. Windows shall be complete with operating and locking hardware and glazing.

2.10 Fabrication: Shop fabricate to the required size and section, complete with base plates, bearing plates, and other plates as required for erection, welded in place, and with all required holes for anchoring or connections shop drilled or punched to template dimensions. Shop connections shall be power riveted, bolted, or welded. Field connections shall be bolted.

2.11 Shop Painting:

2.11.1 Clean Surfaces to be Primed of loose mill scale, rust, dirt, oil, grease, and other matter precluding paint bond. Follow procedures of SSPC-SP3 for power tool cleaning, SSPC-SP7 for brush-off blast cleaning, and SSPC-SP1 for solvent cleaning.

2.11.2 Prime Structural Steel primary and secondary framing members with rust-inhibitive primer having over 50 percent rust-inhibitive pigment, such as red-lead mixed pigment alkyd varnish (Fed. Spec. TT-P-86, Type II) or zinc chromate iron-oxide alkyd (Fed. Spec. TT-P-664).

2.11.3 Prime Galvanized Members, after phosphoric acid pretreatment, with zinc dust-zinc oxide primer (Fed. Spec. TT-P-641).

3.0 EXECUTION: Erection shall be in accordance with the approved erection instructions. Dissimilar materials that are not compatible when contacting each other shall be insulated from each other by means of gaskets or insulating compounds. Exposed surfaces shall be kept clean and free from sealant, metal cuttings, and other foreign materials.

3.1 Framing: Erect structural framing true to line, level, plumb, rigid, and secure. Provide rake or gable purlins with tight-fitting closure channels and fascias. Provide diagonal rod or angle bracing in both roof and sidewalls as required. At framed openings provide shapes of proper design and size to reinforce opening and to carry loads and vibrations imposed, including

equipment furnished under mechanical or electrical work. Securely attach to building structural frame.

3.2 Roofing and Siding: Arrange and nest sidelap joints so that prevailing winds blow over, not into, lapped joints. Lap ribbed or fluted sheets one full rib corrugation. Apply panels and associated items for neat and weathertight enclosure. Avoid "panel creep" or application not true to line. Protect factory finishes from damage. Provide weather seal under ridge cap; flash and seal roof panels at eave and rake with rubber, neoprene, or other closures to exclude weather.

3.2.1 Roof Sheets: Provide sealant tape at lapped joints of ribbed or fluted roof sheets and between roof sheeting and protruding equipment, vents, and accessories.

3.2.2 Wall Sheets: Apply elastomeric sealant continuous between metal base channel (sill angle) and concrete and elsewhere as necessary for waterproofing. Align bottoms of wall panels and fasten panels with blind rivets, bolts, or self-tapping screws.

3.3 Sheet Metal Accessories: Install gutters, downspouts, ventilators, louvers, and other sheet metal accessories, for positive anchorage to building and weathertight mounting.

3.4 Swing Doors and Frames: Install doors and frames straight, plumb, and level.

3.5 Overhead Doors: Set doors and operating equipment complete with necessary hardware, jamb and head mold stops, anchors, inserts, hangers, and equipment supports. Adjust moving hardware for proper operation.

3.6 Windows: Anchor windows securely in place. Seal entire perimeter of each unit with elastomeric sealant used for panels. Adjust and lubricate operating sash (vents) and hardware for proper operation. Clean surfaces of window units. Mount screens directly to frames with tapped screw clips.

3.7 Glazing: Clean channel surfaces and prime as recommended by sealant manufacturer. Cut glass to required size for measured opening; provide adequate edge clearance and glass bite all around. Install setting blocks at quarter points, set in a bed of sealant if heel-bead is used. Install spacers inside and out, all around, wherever liquid or plastic mastic compounds are used.

3.8 Thermal Insulation: Install blankets straight and true in one-piece lengths and both sets of tabs sealed to provide a complete vapor barrier.

3.9 Field Painting: Apply finish coating to factory-primed items.

SECTION 13152
SWIMMING POOL ACCESSORIES

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of swimming pool equipment. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Diving Stands shall be fabricated of 1-1/2 inch Schedule 40 stainless steel pipe. Their use shall be directed by facility dimensional requirements and shall comply with APHA, USS, NCAA, AAU, and FINA.

2.2 Diving Boards shall be fabricated of all aluminum or of laminated wood and fiberglass. All upper surfaces shall be non-skid, and all edges shall be rounded and sealed.

2.3 Ladders shall be fabricated from low carbon Type 304 stainless steel and have raised non-skid treads. Quantities, locations, and clearances shall comply with National Spa and Pool Institute standards.

2.4 Lifeguard Chairs shall be fabricated from Type 304 stainless steel (framework and handrails) and have raised non-skid treads and non-skid platforms. Units shall comply with Safety Requirements, published by the National Swimming Pool Institute, and OSHA standards.

2.5 Underwater Lights of not less than 0.5 watts per square foot of pool area shall be provided in accordance with Lighting and Wiring, published by the National Spa and Pool Institute, and Article No. 68D of the National Electrical Code.

2.6 Pool Covers shall be polyethylene, having a flame spread rating of "0" as per ASTM E 84. Materials shall be non-toxic, non-absorbent, non-permeable, chemical-resistant and have a upper service limit of 110 F. Storage reels shall be constructed of Type 304 stainless steel.

2.7 Slides shall consist of fiberglass bodies with integral continuous flowing water supply, Type 304 stainless steel frames and raised non-skid ladder treads.

3.0 EXECUTION: (Section not used.)

SECTION 13182
SLUDGE INCINERATORS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for the repair and maintenance of sewage treatment plant incinerators. Products shall match existing materials and/or as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Refractory Materials shall comply with ASTM C 27.

2.2 Sand for Fluidized Bed shall be high silica sand having an effective size of 0.20 mm. and a uniformity coefficient of 1.8.

2.3 Repair and Replacement Parts for Burners shall be compatible with the existing burners.

3.0 EXECUTION:

3.1 Cleaning, Lubrication, and Adjustments: Throughly clean fan, blower, motor, and damper of dirt, dust, and other foreign material. Parts shall be lubricated and adjusted for proper operation.

3.2 Burner Parts shall be cleaned and primary and secondary air openings shall be adjusted as required for good combustion and to meet the design requirements for excess air to the burner. Adjustments shall be made with the incinerator in normal operation.

3.3 Cleaning of Fuel and Atomizing Lines: Gas, oil, air, and steam lines connected to the burner shall be disconnected, cleaned, and reconnected.

3.4 Startup: After completion of maintenance and repairs, the incinerator shall be started up and operating adjustments shall be made by the Contractor as required to achieve the design flow rate and emission quality of the incinerator.

# SECTION 13205
# SETTLING CHAMBER

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for repair and maintenance of water treatment plant settling chambers and weirs. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS: (Section not used.)

3.0 EXECUTION:

3.1 Interruptions of Treatment: Not more than one settling chamber shall be taken out of service at a time.

3.2 Installation:

3.2.1 Painting: Exposed new surfaces and surfaces marred during the work shall be painted to match existing color.

3.2.2 Startup: Final adjustments and startup shall be made in such a way as to ensure that all equipment operates at design conditions and rated capacity.

3.2.3 Weir Adjustment: Adjust existing weirs that have a top edge elevation variation of more than 1/32 inch, and all new weirs, to be level throughout their length at the elevation specified.

3.2.4 Weir Repair: Grind metal weir plates smooth and even, if grinding does not exceed amount of available equipment.

SECTION 13221
WATER TREATMENT PLANT FILTERS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for repair and maintenance of gravity and pressure filters for water treatment plants. Products shall match exiting materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Concrete Repair Materials shall be epoxy type grout in compliance with Fed. Spec. MMM-A-001993.

2.2 Steel Plate, Welding Rods, and Welding Electrodes shall be of a composition that complies with Section II of ASME Boiler and Pressure Vessel Code.

2.3 Sequencing Controls and Solenoid Valves shall comply with NEMA ICS and UL 508.

2.4 Filter Media shall comply with the requirements of AWWA B100 and shall be equivalent to the existing filter materials.

2.5 Replacement Weirs and Troughs may be steel, conforming to ASTM A 36, or glass fiber reinforced plastic, in compliance with ASTM D 3841.

3.0 EXECUTION:

3.1 Tank and Trough Repair: Welding repairs shall comply with Paragraph UF-37 of Section VIII of the ASME Boiler and Pressure Vessel Code or AWS D1.1.

3.2 Weirs: Adjust weirs to the elevation required. Weirs may not have a top edge elevation variation of more than 1/32 inch throughout their length. Eroded top edges of metal weir plates shall be ground smooth and even, if grinding does not exceed amount of available adjustment.

3.3 Filter Media: Filtering materials shall be replaced in accordance with AWWA B100.

3.4 Testing: Test leak repairs by hydrostatic pressure or by pneumatic pressure if the leak is in the tank air space. Test sequence controls, solenoid

valves, and backwash equipment to ensure that they operate at design conditions.

3.5 Cleaning: Clean tank interior of all sediment and foreign matter after completion of repair and testing. Clean sequence controls and associated electrical contacts.

3.6 Painting: Exposed metal surfaces shall be painted.

3.7 Disinfection: Disinfect piping and filters in accordance with AWWA B100.

SECTION 13222
PRESSURE FILTERS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for the repair and maintenance of pressure filters for water treatment plants. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Steel Plate, Welding Rods, and Welding Electrodes shall be of a composition that complies with Section II of ASME Boiler and Pressure Vessel Code.

2.2 Relief Valves shall be set to relieve at 15 psi above the normal operating pressure of the tank.

3.0 EXECUTION:

3.1 General: Welding repairs shall comply with Paragraph UF-37 of Section VIII of the ASME Boiler and Pressure Vessel Code or AWS D1.1.

3.2 Repair of Pin Holes: Weld holes of diameter less than half the plate thickness in compliance with AWS D1.1.

3.3 Repair of Cracks: Patch cracks or holes larger than one half the thickness of the tank shell plate.

3.4 Testing: Test leak repairs by hydrostatic pressure or by pneumatic pressure if the leak is in the air space of the tank.

3.5 Cleaning: Clean tank interior of all sediment and foreign matter after completion of repair and testing.

SECTION 13227
BACKWASH TANKS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for repair and maintenance for water treatment plant backwash tanks. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Bolts and Screws: Existing bolts and screws removed due to repair work shall be replaced with new bolts or screws complying with ASTM A 193, Grade B8 and nuts complying with ASTM A 194, Class 8F of the same type, size, and finish.

2.2 Finishes: Items replacing existing items that are galvanized, plated, painted, or otherwise finished shall be of like finish.

2.3 Steel Tank Repair Parts shall be as specified in ASTM A 36, A 131, A 283, or A 573, depending upon required thickness.

2.4 Steel Tank Coatings shall be as specified in AWWA D102.

2.5 Concrete Tank Repair Material shall be epoxy type grout in compliance with Fed. Spec. MMM-A-001993.

2.6 Concrete Tank Coatings shall be a taste-free and odor-free, coal-tar base coating.

3.0 EXECUTION:

3.1 Preparation: Temporary backwash tank and accessories shall be furnished and installed as required to provide uninterrupted service.

3.2 Installation:

3.2.1 Flame Cutting: No cutting by torch or flame shall be done without written authorization from the Contracting Officer.

3.2.2 Testing: Test tanks by filling with water and inspecting for leaks. Test piping and valves hydrostatically at one and one half times normal working pressure or 50 psig, whichever is greater.

# SECTION 13320
# SEWAGE TREATMENT PLANT
# ELECTRICAL CONTROLS AND INSTRUMENTATION

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of sewage treatment plant instrumentation. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Applicable Data: Flow diagrams, loop diagrams, and installation drawings of the existing instruments and sampling systems for which maintenance and repair is to be provided should be requested from the Contracting Officer.

2.2 Instrumentation: All instrumentation shall be in accordance with the manufacturer's instructions.

3.0 EXECUTION:

3.1 Scheduling and Coordination: Contractor shall determine that arrangements have been made to take the equipment out of service for the duration of the work.

3.2 General: Perform listed maintenance procedures and repairs on meter and sampling system in compliance with the manufacturer's recommendations.

3.3 Calibration: Calibrate meter over the meter's range and adjust to read correctly.

# SECTION 13321
# WATER TREATMENT PLANT
# ELECTRICAL CONTROLS AND INSTRUMENTATION

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of water treatment plant electrical controls and instrumentation. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 General: Items not specified but required for the proper installation or repair of a specified item of work shall be provided. Items shall be of proper type, size, design, and characteristics for the use intended. Parts shall be factory-made.

2.2 Finishes: Items replacing existing items that are galvanized, plated, painted, or otherwise finished shall be finished with like finish in compliance with the manufacturer's standard practice.

2.3 Electrical Controls and Instrumentation Components for replacement purposes shall be designed for same service as the existing.

3.0 EXECUTION:

3.1 Coordination: Contractor shall determine that requirements for removal of the equipment from service, the bypassing of control valves, and installing of temporary replacements have been coordinated with the Contracting Officer. Bypassing of control valves or putting a control instrument in the Remote-Hand-Control mode will be done by the plant operators.

3.2 Power Supplies that may be a hazard during the performance of the work shall be locked out.

3.3 Testing: Check the operation of each instrument after it is returned to service. Adjust each instrument to operate properly over the design range.

SECTION 13322
FLOW MEASUREMENT DEVICES

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of current type, turbine type, compound type, and fire service type meters for the measurement of flow. Products shall match existing materials and/or shall be as directed by contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Current Type Meters in sizes ranging between 5/8 inch and 6 inches shall conform to AWWA C 700.

2.2 Turbine Type Meter For Customer Services in sizes ranging between 1-1/2 inches and 12 inches shall conform to AWWA C 701.

2.3 Compound Type Meters in sizes ranging between 2 inches and 10 inches shall conform to AWWA C 702.

2.4 Fire Service Type Meters in sizes ranging between 3 inches and 10 inches shall conform to AWWA C 703.

2.5 Current Type Meters, Propeller-Driven in sizes ranging between 2 inches and 36 inches shall conform to AWWA C 704.

2.6 Multi-Jet Type Meters in sizes ranging between 5/8 inch and 2 inches shall conform to AWWA C 708.

3.0 EXECUTION: Calibration shall result in the flow measurement device reading correctly over its normal operating range.

SECTION 13600
SOLAR WATER HEATING EQUIPMENT

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of solar water heating equipment. The solar energy system shall be arranged for preheating of service (domestic and/or process) water using flat plate liquid solar collectors. System components shall include a solar collector array, storage tank, pump[s], automatic controls, instrumentation, interconnecting piping and fittings, uninhibited food-grade propylene-glycol and water heat transfer fluid in a closed loop, potable water heat transfer fluid in an open loop, heat exchanger (for closed-loop), expansion tank (for closed-loop), and accessories required for proper operation of the system.

2.0 PRODUCTS:

2.1 General Equipment Requirements:

2.1.1 Standard Products: Materials and equipment shall be the standard products of a manufacturer regularly engaged in the manufacture of such products and shall essentially duplicate items that have been in satisfactory use for at least 2 years prior to bid opening. Equipment shall be supported by a service organization that is, in the opinion of the Contracting Officer, reasonably convenient to the site.

2.
1.2 Special Tools: One set of special tools, calibration devices, and instruments required for operation, calibration, and maintenance of the equipment shall be provided.

2.2 Piping System: Piping system shall be complete with pipe, pipe fittings, valves, strainers, expansion loops, hangers, inserts, supports, anchors, guides, sleeves, and accessories.

2.3 Electrical Work: Electric motor-driven equipment specified shall be provided complete with motor, motor starters, and controls. Electrical characteristics shall be as specified or indicated. Motor starters shall be provided complete with thermal overload protection and other appurtenances necessary for the motor control specified. Each motor shall be of sufficient size to drive the equipment at the specified capacity without exceeding the nameplate rating of the motor. Manual or automatic control and protective or signal devices required for the operation specified, and any control wiring required for controls and devices, but not shown, shall be provided.

2.4 Collector Subsystem: Collectors shall be of the flat plate, liquid, internally manifolded type. Each collector shall be provided with cover glazing, an absorber plate, heat transfer liquid flow tubes, internal headers, weep holes, insulation, and a casing. Collectors shall be of weather-tight construction. Solar collectors shall withstand a stagnation temperature of 350 degrees F and a working pressure of 125 psig without degrading, out-gassing, or warping. Collector net aperture area shall be a minimum of 28 square feet. Collector length, width, and volume shall be as shown.

2.4.1 Collector Warranty: Contractor shall provide a minimum 10-year warranty against the following: failure of manifold or riser tubing, joints or fittings; degradation of absorber plate selective surface; rusting or discoloration of collector hardware; and embrittlement of header manifold seals. The warranty shall include full repair or replacement of defective materials or equipment.

2.4.2 Solar Collector Performance: Thermal performance shall be plotted on the thermal efficiency curve in accordance with ASHRAE 93. The y-intercept shall be equal to or greater than 0.68, and the numerical value of the slope of the curve (FRUL) shall be between 0 and minus 5.7 watts per square meter per degree K (0 and minus 1.0 Btu per hour per square foot per degree F). Manufacturer's recommended volumetric flow rate and the design pressure drop at the recommended flow rate shall be as shown. Manufacturer's recommendations shall allow at least seven collectors to be joined per bank while providing for balanced flow and for thermal expansion considerations.

2.5 Solar Collector Array:

2.5.1 Net Absorber Area and Array Layout: Array shall consist of an assembly of solar collectors as shown. Solar collectors shall be assembled as shown in banks of equal number of collectors. Banks shall consist of no less than 4 and no more than 7 collectors each. Collector array shall be oriented so that all collectors face the same direction and are oriented within 20 degrees of true south and with respect to true south as indicated. Collectors arranged in multiple rows shall be spaced so that no shading from other collectors is evident between 1000 hours and 1400 hours solar time on December 21. Minimum spacing between rows shall be as shown.

2.5.2 Piping: The array piping shall include interconnecting piping between solar collectors, and shall be connected in a reverse-return configuration as indicated with approximately equal pipe length for any possible flow path. Flow rate through the collector array shall be as indicated. Automatic pressure relief valves shall be provided in the array piping system as indicated, and shall be adjusted to open when the pressure within the solar array rises above 125 psig. Each collector bank shall be capable of being isolated by valves, and each bank capable of being separated shall have a pressure relief valve installed and shall be capable of being drained. Manually operated air vents shall be located at system high points, and all array piping shall be pitched a minimum of 0.25 inch per foot as shown so that piping can be drained by gravity. Calibrated balancing valves shall be supplied at the outlet of each collector bank as indicated.

2.5.3 Supports for Solar Collector Array: Support structure for collector array shall be aluminum and shall secure collector array at the tilt angle with respect to horizontal and orientation with respect to true south as shown. Support structure shall withstand static weight of filled collectors and piping, wind, snow, seismic, and other loads as indicated. Support structure shall allow access to all equipment for maintenance, repair, and replacement.

2.6 Storage Tank: Solar system hot water storage tank shall have a storage volume between 1.5 to 2 gallons per square foot of collector area and shall be as shown. Solar system storage tank shall conform to specifications for hot water storage tanks in Section 15401 INTERIOR PLUMBING. Insulation shall have an R value of not less than 30. Tank penetrations shall be designed to allow for connections to copper piping without risk of corrosion due to dissimilar metals, and shall be factory installed as indicated.

2.7 Transport Subsystem:

2.7.1 Heat Exchanger: The heat exchanger construction and testing shall be in accordance with ASME BPV VIII Div 1. Minimum design pressure rating shall be 125 psig. Heat exchanger shall be capable of returning a hot-side exit temperature of 120 degrees F or less given a hot-side approach temperature of 140 degrees F and a cold-side approach temperature of 100 degrees F. Heat exchanger shall be capable of withstanding temperatures of at least 240 degrees F. Heat exchanger shall be capable of operation at the flow rates as shown.

2.7.1.1 Plate Heat Exchanger: Heat exchanger shall be constructed of multiple plates of 316 stainless steel, titanium, copper, copper-nickel, or brass. Plates shall be frame-mounted, mechanically bonded, welded, or brazed at edges. Plate-type heat exchanger shall be able to be cleaned. Gaskets shall be of EPDM rubber or Viton. All plate heat exchanger characteristics shall be as indicated.

2.7.1.2 Tube-in-Shell Heat Exchanger: Heat exchanger shall be [fixed] [removable] bundle, shell-and-tube type. Shell, tube sheets, and end plates shall be constructed of nonferrous, brass, copper-nickel, or 316 stainless steel. Shell insulation shall have a minimum R value of not less than 12. Tubes shall be seamless copper or copper alloy and shall be mechanically bonded, welded, or brazed to the end tube plates. Tubes shall be straight and supported by tube sheets which maintain the tubes in alignment. Straight tube heat exchanger shall be arranged for mechanical cleaning. All tube-in-shell heat exchanger characteristics shall be as indicated.

2.7.2 Pumps: Circulating pumps shall be electrically-driven, single-stage, centrifugal type. The pumps shall be supported on a concrete foundation or by the piping on which installed. The pumps shall have a capacity not less than that indicated and shall be either integrally-mounted with the motor or direct-connected by a flexible-shaft coupling on a cast-iron or steel subbase. The pump shaft shall be

constructed of corrosion resistant alloy steel, sleeve bearings and glands of bronze designed to accommodate a mechanical seal. Pumps shall have stainless steel impellers and casings of bronze. The motors shall have sufficient power for the service required, shall be of a type approved by the manufacturer of the pump, shall be suitable for the available electric service and for the heat transfer fluid used. The motors shall be controlled by suitable switches that can be activated by either the differential temperature controller or by manual override (Hand-Off-Automatic). Each pump suction and discharge connection shall be provided with a pressure gauge as specified.

2.7.3 Pipe Insulation: Array piping insulation shall be capable of withstanding 250 degrees F, except that piping within 1.5 feet of collector connections shall be capable of withstanding 400 degrees F.

2.7.4 Expansion Tank: Expansion tank shall be constructed and tested in accordance with ASME BPV VIII Div 1 and as applicable for a working pressure of 125 psig. Tank shall be provided with an elastomeric EPDM bladder which separates the system fluid from the tank walls and is suitable for a maximum operating temperature of 240 degrees F. Expansion tank acceptance volume shall be as a minimum the amount of fluid equal to the fluid volume of the collectors plus piping at the same height or above the collectors. Total tank size and arrangement shall be as shown. Tank shall be provided with 125 psi pressure relief valve. Tank shall be provided with precharge pressure as shown.

2.7.5 Heat Transfer Fluid: Solar collector loop fluid shall be uninhibited USP/food-grade propylene-glycol and shall be mixed with distilled or demineralized water to form a 30 or 50 percent by volume propylene-glycol solution with climates that commonly attain freezing temperatures (those above 4000 heating degree F days) receiving the 50 percent solution.

2.8 Control and Instrumentation Subsystem:

2.8.1 Differential Temperature Control Equipment: Differential temperature control equipment shall be supplied as a system by a single manufacturer. Controller shall be solid-state electronic type complete with an integral transformer to supply low voltage, shall allow a minimum adjustable temperature differential (on) of 8 to 20 degrees F, a minimum adjustable temperature differential (off) of 3 to 5 degrees F, and shall include a switching relay or solid state output device for pump control. Thermostat shall operate in the on-off mode. Controller accuracy shall be plus or minus 1 degree F. Controller shall be compatible with 10-kOhm thermistor temperature sensors. Differential control shall provide direct digital temperature readings of all temperatures sensed. Control shall indicate visually when pumps are energized. Control ambient operating range shall be a minimum of 32 to 120 degrees F.

2.8.2 Sensor and Control Wiring: 18 AWG minimum twisted and shielded 2, 3, or 4 conductor to match analog function hardware. Control wiring shall have 600 volt insulation. Multiconductor wire shall have an outer jacket of PVC.

2.8.3 Flowmeters: Flowmeters shall consist of a venturi, 6 inch dial differential pressure meter, valved pressure taps, and bar stock needle valves. Venturi flow nozzle shall have threaded bronze ends for pipe sizes up to 2 inches and flanged ends for pipe sizes 2-1/2 inches and above. Venturi length shall not be less than 1.6 times the pipe size. Venturi shall be selected to read differential pressure corresponding to 0.5 to 1.5 times the system flow rate. Venturi shall have an accuracy of plus or minus 1 percent of the range. Meter shall have an accuracy of plus or minus 2 percent of the full scale range.

2.8.4 Sight Flow Indicators: Sight flow indicators shall consist of a clear glass window or cylinder and a nonferrous or 316 stainless steel body and impeller. Indicator shall have threaded ends for pipe sizes up to 2 inches and flanged ends for pipe sizes 2-1/2 inches and above. Maximum operating pressure shall be no less than 125 psi. Maximum operating temperature shall be no less than 250 degrees F.

2.9 Painting and Finishing: Equipment and component items, when fabricated from ferrous metal and located inside the building, shall be factory finished with the manufacturer's standard finish.

3.0 EXECUTION:

3.1 Installation:

3.1.1 Collector Subsystem:

3.1.1.1 Collector Array: Solar collector array shall be installed at the tilt angle, orientation, and elevation above roof as indicated. For installation on flat roofs with rack type collector mounting or for ground mounted collectors, bottom of collector shall be a minimum of 18 inches from roof or ground surface. For mounting on pitched roofs, back of collectors shall be installed a minimum of 2 inches above roof surface. Each solar collector shall be removable for maintenance, repair, or replacement. Solar collector array shall not impose additional loads on the structure beyond the loads scheduled on the structural drawings.

3.1.1.2 Array Piping: Collector array piping shall be installed in a reverse-return configuration so that path lengths of collector supply and return are of approximately equal length.

3.1.1.3 Array Support: Array support shall be installed in accordance with the recommendations of the collector manufacturer. Structural members requiring welding shall be welded in accordance with AWS D1.2 for aluminum and welders should be qualified according to AWS B2.1.

3.1.2 Storage Subsystem: Solar storage tank penetrations shall be installed as shown so that cold water inlet to storage tank and outlet from storage tank to collector array are located near the bottom of the tank, and inlet from collector array and outlet to load are located near the top of the tank.

3.1.3 Transport Subsystem:

3.1.3.1 Flow Rates: Flow rate in the collector loop shall be based on recommended collector flow rate, and shall be as shown. Storage loop flow rate shall be 1.25 times the collector loop flow rate. System flow rate shall be based on recommended collector flow rate, and shall be as indicated. All flow rates shall be below 5 feet per second.

3.1.3.2 Pumps: Pumps shall be installed on foundations, leveled, grouted, and realigned before operation in accordance with manufacturers instructions. Additional pipe supports shall be provided for close-coupled in-line pumps. All base mounted pumps shall have a straight pipe between the suction side of the pump and the first elbow. The length of this pipe shall be a minimum of five times the diameter of the pipe on the suction side of the pump, or a suction diffuser of the proper size shall be attached to the suction side of the pump. All in-line pumps shall have straight pipe between the suction side of the pump and the first elbow. The length of this pipe shall be a minimum of five times the diameter of the pipe size on the suction side of the pump. Drain line sizes from the pumps shall not be less than the drain trap or the pump dirt pocket, but in no case shall the drain line be less than 1/2 inch iron pipe size. Drain lines shall terminate to spill over the nearest floor or open sight drain.

3.1.3.3 Expansion Tank: Expansion tank shall be installed on suction side of pump as shown.

3.1.3.4 Piping, Valves, and Accessories: Piping shall be coded with fluid type and flow direction labels. When a food-grade uninhibited propylene-glycol solution is used to heat potable service water, tamper resistant seals must be attached to all fill ports. All propylene-glycol circuits must be labeled "CONTAINS UNINHIBITED FOOD-GRADE PROPYLENE-GLYCOL: INTRODUCTION OF ANY NONAPPROVED FLUID MAY CONSTITUTE A HEALTH HAZARD." All tamper resistant seals must carry the name of the registered engineer or licensed plumber who certifies that only a 30 or 50 percent food-grade uninhibited propylene-glycol and water solution has been installed in the system. Air vents shall be installed at the high points of the collector array and in the equipment room.

3.1.3.5 Pipe Expansion: Expansion of supply and return pipes shall be provided for by changes in the direction of the run of pipe or by expansion loops as indicated. Expansion loops shall provide adequate expansion of the main straight runs of the system within the stress limits specified in ASME B31.1. Loops shall be cold-sprung and installed where indicated. Pipe guides shall be provided as indicated. Expansion joints shall not be used in system piping.

3.1.3.6 Valves: Valves shall be installed at the locations indicated and where required for the proper functioning of the system. Valves shall be installed with their stems horizontal or above. Gate or ball valves shall be installed at the inlet and outlet of each bank of internally manifolded collectors. Calibrated balancing valves with integral pressure taps shall be installed at the outlet of each bank and at the pump discharge. Final setting for each valve shall be marked on each valve. Ball valves shall be installed with a union immediately adjacent. Gate valves shall be installed at the inlet and outlet of each pump and also at the inlet and outlet of each heat exchanger. A check valve shall be installed at pump discharges. Discharges of relief valves shall be piped to the nearest floor drain or as indicated on system drawings.

3.1.3.7 Foundations: Concrete foundations or pads for storage tanks, heat exchangers, pumps, and other equipment covered by this specification shall be constructed in accordance with manufacturer's recommendations and be a minimum of 6 inches high with chamfered edges.

3.1.4 Control Subsystem:

3.1.4.1 Differential Temperature Controller: Automatic control equipment shall be installed at the location shown in accordance with the manufacturer's instructions. Control wiring and sensor wiring shall be installed in conduit. Unless otherwise indicated, operators, controllers, sensors, indicators, and like devices when installed on equipment casings and pipe lines shall be provided with stand-off mounting brackets, bases, nipples, adapters, or extended tubes to provide clearance, not less than the thickness of the insulation, between the surface and the device. These stand-off mounting items shall be integral with the devices or standard accessories of the controls manufacturer unless otherwise approved. Clamp-on devices or instruments where direct contact with pipe surface is required shall be exempted from the use of the above mounting items. All control wiring shall be color coded and identified with permanent numeric or alphabetic codes.

3.2 Inspection and Testing:

3.2.1 Inspection: Contractor shall make system available for inspection at all times.

3.2.2 Testing Prior to Concealment:

3.2.2.1 Hydrostatic Test: Contractor shall demonstrate to Contracting Officer that all piping has been hydrostatically tested, at a pressure of 125 pounds per square inch for a period of time sufficient for inspection of every joint in the system and in no case less than 2 hours, prior to installation of insulation. Expansion tank and relief valves shall be isolated from test pressure. No loss of pressure shall be allowed. Leaks found during tests shall be repaired by replacing pipe or fittings. Caulking of joints shall not be permitted.

3.2.2.2 Cleaning of Piping: System piping shall be flushed with clean, fresh water prior to concealment of any individual section and prior to final operating tests. Prior to flushing piping, relief valves shall be isolated or removed. Solar collectors shall be covered to prevent heating of cleaning fluid, unless cleaning is performed during hours of darkness. The solution shall be circulated through the section to be cleaned at the design flow rate for a minimum of 2 hours.

3.2.3 Posting Framed Instructions: Framed instructions under glass or in laminated plastic shall be posted where directed. These instructions shall include a system schematic, and wiring and control diagrams showing the complete layout of the entire system. Condensed operating instructions explaining preventative maintenance procedures, balanced flow rates, methods of checking the system for normal safe operation, and procedures for safely starting and stopping the system shall be prepared in typed form, framed as specified above, and posted beside the diagrams. Proposed diagrams, instructions, and other sheets shall be submitted for approval prior to posting. The framed instructions shall be posted before acceptance testing of the system.

3.2.4 Acceptance Testing and Final Inspection: Contractor shall notify the Contracting Officer 7 calendar days before the performance and acceptance tests are to be conducted. Tests shall be performed in the presence of the Contracting Officer. Contractor shall furnish all instruments and

personnel required for the tests. Electricity and water shall be furnished by the Government. A written record of the results of all acceptance tests shall be maintained, to be submitted in booklet form. The tests shall be as follows:

3.2.4.1 As-Built Drawings: The Contractor shall provide as a condition of final acceptance a complete set of as-built system drawings. Drawings shall clearly indicate the actual condition of the installed solar energy system at the time of the final test.

3.2.4.2 Final Hydrostatic Test: Contractor shall demonstrate to Contracting Officer that all plumbing has been hydrostatically tested at a pressure of 125 pounds per square inch for a period of time sufficient for inspection of every joint in the system and in no case less than 2 hours. Expansion tank and relief valves shall be isolated from test pressure. Gauges used in the test shall have been calibrated within the 6-month period preceding the test. Test shall be witnessed by Contracting Officer. No loss of pressure shall be allowed. Leaks found during tests shall be repaired by replacing pipe or fittings and the system retested. Caulking of joints shall not be permitted.

3.2.4.3 System Flushing: For the final inspection, the system shall be thoroughly flushed of all foreign matter until a white linen bag installed in a strainer basket shows no evidence of contamination and in no case for less than 2 hours. Contracting Officer shall inspect the linen bag prior to completion of flushing. System shall be drained prior to final filling.

3.2.4.4 System Filling: System shall be filled through indicated connections with propylene-glycol solution. Solution shall be mixed externally to the solar system and consist of 30 or 50 percent propylene-glycol and 70 or 50 percent water by volume. System pressure at the high point on the roof shall be 10 psig minimum.

3.2.4.5 Operational Test: Operational test shall occur over a period of 48 consecutive hours with sufficient solar insolation to cause activation of the solar energy system during daylight hours. With system fully charged so that pressure at the high point on the roof or the lowest system pressure is a minimum of 10 psig and with fluid and pump[s] energized, sight flow indicator must indicate flow flowmeter must indicate flow as indicated. Calibrated balancing valves with pressure taps shall indicate bank flow rate as shown.

3.2.4.6 Control Logic: By substituting variable resistors for collector and storage tank temperature sensors, Contractor shall demonstrate the differential temperature controller correctly energizes the system pump[s] when the collector sensor indicates a temperature of 15 degrees F greater than the storage tank temperature, as indicated on the controller display panel. The differential temperature controller shall de-energize the system pump[s] when the displayed temperature of the solar collectors is degrees 5 degrees F greater than the displayed temperature of the storage tank.

3.2.4.7 Temperature Sensor Diagnostics: Contractor shall demonstrate that the controller will correctly identify open and short circuits on both the solar collector temperature sensor circuit and the storage tank sensor circuit.

3.2.4.8 Overall System Operations: Contractor shall demonstrate that the solar energy system will operate properly while unattended for a period of at least 72 hours. The system must demonstrate that the controller will start pump[s] after being warmed by the sun, and that it will properly shut down during cloudy weather or in the evening over a minimum of three complete cycles. Contractor is permitted to manipulate the temperature of the storage tank by the introduction of cold water at local groundwater temperature.

3.3 Field Training: A field training course shall be provided for designated operating and maintenance staff members. Training shall be provided for a minimum period of 16 hours of normal working time and shall start after the system is functionally complete but prior to final acceptance tests. The training shall include discussion of the system design and layout and demonstrations of routine operation and maintenance procedures. This training shall include: normal system operation and control; flow balancing; detection of a nonfunctioning system due to sensor, controller, and/or mechanical failure;

filling, draining, and venting of the collector array; replacement of sensors, collectors, and collector components; collector cleaning and inspection for leaks; and heat exchanger cleaning and expansion tank charging if applicable.

SECTION 13955
VEHICLE BARRIERS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of portable, semi-permanent, permanent, power-assisted or manually deployed vehicle barriers. Type, size and capacity shall be as indicated or shall match existing.

2.0 PRODUCTS:

2.1 Retractable Barriers: In the raised position, the total retractable barrier heights shall be no less than 28 inches above the roadway surface and the width indicated. In the lowered position, the retractable barrier shall extend no more than 5/8 inch above the roadway surface. Retractable barriers in the lowered position shall be capable of supporting a 32,000-pound axle load or a 16,000-pound wheel load. Design for this load shall be in accordance with AASHTO-01.

2.1.1 Powered Retractable Barrier shall be capable of 240 complete up/down cycles per hour. Barrier motion shall be instantly reversible and shall be capable of raising the barrier form the lowered position to the raised position within 8 seconds during normal use, and within 2 seconds during an emergency. Barrier shall be capable of being closed
from the raised position to the lowered position in not more than 3 seconds. Portable power-assisted retractable barriers shall be equipped with on and off ramps for smooth transition between surfaces.

2.1.1.1 Failure Modes of Operation: The system shall be designed to prevent lowering of the barrier in the event of hydraulic, electrical, or mechanical failure. A manual pump shall be included for operation of hydraulic and/or mechanical barriers without power.

2.1.1.2 Electric Motors: Unless otherwise indicated, electric motors shall have totally enclosed enclosures.

2.1.1.3 System shall be designed to maintain the barriers in the raised position, without inspection, for periods of time of up to 1 week. Equip hydraulic systems with pressure relief valves to prevent overpressure.

2.1.1.4 Hydraulic Power Unit shall contain hydraulic fluid which maintains its viscosity between 80 to 4000 saybolt universal seconds (SUS) even at constant heaviest use rate, for an ambient temperature range of 20 degrees F to 150 degrees F. Buried hydraulic lines for the connection of the hydraulic power unit to the barrier shall be flexible and/or carbon steel pipe. Flexible and rigid

hydraulic line working pressure shall exceed the maximum system relief pressure. PVC pipe and fittings for burial of hydraulic lines shall be in accordance with ASTM D 3034 Type PS 46 with minimum pipe stiffness of 46.

a. Flexible hydraulic lines shall be in accordance with SAE J517.

b. Seamless carbon steel pipe shall be in accordance with ASTM A 106.

2.1.1.5 Hydraulic Power Unit Enclosure: A NEMA Type 3R enclosure as specified in NEMA 250 shall be provided to enclose the hydraulic power unit. The enclosure shall be designed for easy removal of the hydraulic power unit and other accessories without complete removal of the enclosure.

2.1.2 Manual retractable barriers shall be capable of being raised and lowered by manual means such as levers or hydraulics requiring a maximum 60 pounds of force. The manual mechanism shall contain a locking pin which accepts a padlock for securing the barrier when it is in the "UP" position.

2.2 Retractable Bollards: Total bollard height in the raised position shall be no less than 30 inches above the roadway surface and shall have an outside diameter of no less than 8 inches. Bollard system shall consist of a minimum of three bollards spaced no more than 32 inches from centerline to centerline of bollards across a 10-foot roadway. Bollards in the lowered position shall be capable of supporting a 16,000-pound wheel load each. Design for this load shall be in accordance with AASHTO-01.

2.2.1 Powered retractable bollards shall be capable of 240 complete up/down cycles per hour. Bollards shall be capable of being raised or lowered within a 3 to 15-second range during normal use and within 2.5 seconds for emergency operations.

2.2.1.1 Failure Modes of Operation: The system shall be designed to prevent lowering of the barrier in the event of hydraulic, electrical, or mechanical failure. A manual pump shall be included for operation of hydraulic and/or mechanical barriers without power.

2.2.1.2 Electric motors shall have totally enclosed enclosures unless otherwise indicated.

2.2.1.3 System shall be designed to maintain the barriers in the raised position, without inspection, for period of time of up to 1 week. If a hydraulic system is used, it shall be equipped with pressure relief valves to prevent overpressure.

2.2.1.4 Hydraulic power unit shall contain hydraulic fluid which maintains its viscosity between 80 to 4000 saybolt universal seconds (SUS) even at constant

heaviest use rate, for an ambient temperature range of 20 degrees F to 150 degrees F. For ambient temperatures below 20 degrees F, a hydraulic oil heater shall be provided so that the oil viscosity remains between 80 to 4000 SUS. Buried hydraulic lines for the connection of the hydraulic power unit to the barrier shall be flexible and/or carbon steel pipe. Flexible and rigid hydraulic line working pressure shall exceed the maximum system relief pressure. PVC pipe and fittings for burial of hydraulic lines shall be in accordance with ASTM D 3034 Type PS 46 with minimum pipe stiffness of 46.

a. Flexible hydraulic lines shall be in accordance with SAE J517.

b. Seamless carbon steel pipe shall be in accordance with ASTM A 106.

2.2.1.5 Hydraulic Power Unit Enclosure: A NEMA Type 3R enclosure as specified in NEMA 250 shall be provided to enclose the hydraulic power unit. The enclosure shall be designed for easy removal of the hydraulic power unit and other accessories without complete removal of the enclosure.

2.2.2 Manual retractable bollards shall be capable of being raised and lowered utilizing a recessed handle on the top surface of the bollard, with a maximum force of 60 pounds or a manual hydraulic pump requiring a max 60 pounds of force. A recessed panel at the base of each bollard, adjacent to the bollard in the "DOWN" position, shall contain a spring actuated latching mechanism that automatically secures the bollard in either the full "UP" or full "DOWN" position. The panel shall have an access cover with provisions for a padlock to secure the access cover.

2.3 Crash Gate shall consist of steel buttresses anchored into the ground and an above grade assembly consisting of a heavy steel structural or a combination of heavy steel and structural aluminum capable of being opened and closed. The height of the gate shall be a minimum of 84 inches from the road surface to the top of the gate frame. The length shall close and protect a minimum 120 inch clear opening. The maximum clear opening between the gate frame and end posts, between the bottom of the gate and finished grade, and between any grill work shall be 3 inches.

2.3.1 Powered Crash Gate: The gate movement shall be controlled by an electromechanical gate operator or a hydraulic gate operator consisting of an operator unit with required control circuits and operator station. The control and operating voltage shall be 24 vac (nominal).

2.3.2 Failure Mode of Operation: The system shall be designed to prevent opening of the crash gate in the event of electrical or mechanical failure. A disconnect system for the gate drive shall be provided to allow manual operation of the barrier in the event of a power outage.

2.3.3 Manual crash gate shall be capable of being hinged from either side. Hinge points of both buttresses shall each contain a locking pin with padlock acceptance for securing the crash gate in the closed position. The crash gate shall withstand a 10,000-pound vehicle at impact speed of 50 miles per hour, with maximum gate deflection or vehicle penetration of 10 feet.

2.4 Crash Beam shall be an above-grade assembly that, in the "DOWN" position, shall present a formidable obstacle to approaching vehicles. The height of the barrier shall be a minimum of 30 inches as measured from the roadway surface to the centerline of the crash beam. The crash beam shall be capable of blocking a minimum road width of 120 inches. The crash beam end shall contain a locking pin with padlock acceptance for securing the crash beam when it is in the "DOWN" position. Crash beam shall withstand a 10,000-pound vehicle at impact speed of 15 miles per hour, with a maximum beam deflection of 20 feet.

2.4.1 Powered crash beam shall be operated by means of a hydraulic power system. The crash beam shall be capable of being raised or lowered within an 8- to 15-second time range.

2.4.1.1 Failure Mode of Operation: A disconnect system for the crash beam shall be provided to allow manual operation of the barrier in the event of an electrical or mechanical failure.

2.4.2 Manual crash beam shall be manually raised and lowered with the aid of a counterbalanced end requiring approximately 60 pounds of force.

2.5 Electrical Work: Motors, manual or automatic motor control equipment except where installed in motor control centers, and protective or signal devices required for the operation specified herein, and wiring required for operation shall be provided in accordance with DIVISION 16 ELECTRICAL Section.

2.6 Control Panel and control circuit shall be provided to interface between all barrier control stations and the power unit. The control station is defined as the main control panel and the remote control panel as shown. The control circuit shall contain all relays, timers, and other devices or an industrial programmable controller programmed as necessary for the barrier operation. The control panel shall allow direct interface with auxiliary equipment such as card readers, remote switches, loop detectors, infrared sensors, and gate limit switches. The enclosure shall be as indicated on the drawings. All device interconnect lines shall be run to terminal strips.

2.6.1 Voltage: The control circuit shall operate from a 120 volt 60 Hz supply.

2.6.2 Main control panel shall be supplied to control barrier function. This panel shall have a key-lockable main switch with main power "ON" and panel "ON"

lights. Buttons to raise and lower each barrier shall be provided. Barrier "UP" and "DOWN" indicator lights shall be included for each barrier. An emergency fast operate circuit (EFO) shall be operated from a push button larger than the normal controls. The EFO shall also be furnished with an EFO-active light and reset button. The main control panel shall have a key lockable switch to arm or disable the remote control panel. An indicator light shall show if the remote control panel is enabled.

2.6.3 Remote control panel shall have a panel "ON" light that is lit when enabled by a key lockable switch on the main control panel. Buttons to raise and lower each barrier shall be provided. Barrier "UP" and "DOWN" indicator lights shall be included for each barrier. The EFO shall be operated from a push button larger than the normal controls. The EFO shall be interconnected with an EFO-active light. When the remote control panel EFO is pushed, operation of the barrier will not be possible from this panel until reset at the main control panel.

2.7 Miscellaneous Equipment:

2.7.1 Safety Equipment: Red/yellow 8-inch traffic lights shall be supplied for each entrance and exit to alert motorists of the barrier position. Traffic lights are not required for manual barriers. The yellow light shall indicate that the barrier is fully open. All other positions shall cause the light to show red. Brackets shall be supplied to allow the light to be mounted a minimum 4.5 feet above the roadway pavement on a 3.5-inch outside diameter metal post or mounted directly on the crash gate.

2.7.2 Heater: A waterproof barrier heater with a thermostat control and NEMA 4 junction box connection point shall be provided for de-icing and snow melting. The heater shall provide barrier operation to an ambient temperature of minus 40 degrees F. For retractable bollards, a 250-watt heater shall be provided for each bollard.

2.7.3 Signage shall read "Axle Weight Limit 9 Tons" and shall conform to FHWA-01 sign (R12.2).

2.7.4 Vertical Arm Gates (Traffic Arms) shall have an opening and closing time of less than or equal to 15 seconds. The gates shall be capable of 15 duty cycles per hour as a minimum. Gate shall operate the arm through 90 degrees. Gate operators shall be supplied with single phase 120 volt motors. Each gate shall be capable of being operated from a remote open-close push button station. Gates shall have a hand-crank mechanism which will allow manual operation during power failures. Each gate shall be supplied with a handcrank. Gate arms shall be constructed out of wood, steel, fiberglass, or aluminum, as specified by the manufacturer for the given lengths as shown on the drawings.

Gate arms shall be covered with 16-inch wide reflectorized red and white sheeting. Each gate shall be furnished with a spare gate arm. Gate operator cabinets shall be constructed of galvanized steel and shall be painted manufacturers standard color as approved. Each gate operator shall be provided with an obstruction detector that will automatically reverse the gate motor when an obstruction is detected. The obstruction detector shall be any of the following three types: An electronic loop vehicle detector buried in the road, a photocell electric eye mounted on the gate operator, or a safety strip mounted on the lower edge of the arm. The detector system shall be automatically deactivated when the arm reaches the fully lowered position. Slab size and anchorage for gate operator shall be per manufacturer requirements.

2.8 Finish: Surfaces shall be painted in accordance with requirements of DIVISION 9 Section on painting except for materials supplied with manufacturers standard finish. The roadway plate shall have a nonskid surface. The barrier front shall have 6-inch wide reflective yellow stripes 4 inches apart. Bollards shall be painted reflective yellow with 3-inch wide black diagonal stripes. The barrier crash gate shall be painted white and the crash beam shall be painted reflective yellow with 3-inch wide black diagonal stripes.

2.9 Concrete shall conform to DIVISION 3 Concrete section.

2.10 Welding shall be in accordance with AWS D1.1.

2.11 Pavement: After placement of the vehicle barrier, the pavement sections shall be replaced to match the section and depth of the surrounding pavement. Pavement shall be warped to match the elevations of existing pavement. Positive surface drainage, away from the vehicle barrier, shall be provided by pavement slope.

3.0 EXECUTION

3.1 Installation shall be in accordance with manufacturers instructions.

3.2 Buried Hydraulic Lines shall be placed in polyvinyl chloride (PVC) sleeves. Positive drainage shall be provided from the hydraulic power unit to the barrier for drainage of condensation within the PVC sleeve.

3.3 All controls shall be terminated with compression ring-style terminals. Roundhead screws and lockwashers shall be used to provide vibration-resistant connections. Connections between any printed circuit cards and the chassis shall be made with screw connections or other locking means to prevent shock or vibration separation of the card from its chassis.

SECTION 14245
PASSENGER ELEVATORS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of passenger elevators. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Elevators shall be of size, type, and operation directed by the Contracting Officer. Elevators shall comply with the requirements of ANSI A17.1 and ANSI A117.1. Elevator cab shall be galvanized metal shell with enamel finish. Elevator doors shall be galvanized metal with enamel finish. Walls of elevator shall have raised plastic laminate panels. Structural and non-exposed ferrous metal surfaces shall receive two coats of structural grade primer. Elevator shall be complete with protective car pads and hooks.

2.2 Operating Equipment: Motors, pumps, controllers, hydraulic fluid reservoir, cylinder, casing, plunger, piping, guide rails, buffers, buttons, wiring, indicators, hardware, fittings, and all other equipment required to provide a fully operational elevator shall be provided.

2.3 Finishes:

2.3.1 Galvanizing: ASTM A 526, G90 Coating Designation.

2.3.2 Enamel: Shop-applied baked enamel of color as selected by the Contracting Officer.

2.3.3 Plastic Laminate: Fed. Spec. L-P-508, color, texture, and pattern as selected by the Contracting Officer.

2.4 Wiring: All wiring necessary to connect operating buttons, switches, signals, and all electrical equipment on the car shall be provided. Wiring shall be in accordance with the National Electrical Code and shall, except for traveling cables, be installed in conduit, electrical metallic tubing, or metal wireways, except that flexible conduit may be used for short runs. Traveling cables shall be of the best grade for the service and shall be so installed to provide a proper size loop for the car. Traveling cables shall have a fire-resistant outer braid.

3.0 EXECUTION:

3.1 Preparation: Prior to installation of elevator, ensure that shafts and openings for moving equipment are plumb, level, and in line. Check measurements of space for equipment and means of access for installation and operation.

3.2 Installation: Install machinery, guides, controls, car, equipment, and accessories in accordance with applicable codes and standards. Installation shall provide a quiet, smoothly operating installation, free from sidesway, oscillation, or vibration.

3.3 Inspection: At completion of installation, elevator shall be inspected in accordance with ANSI A17.2. All deficiencies shall be corrected and retested.

SECTION 14250
FREIGHT ELEVATORS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of freight elevators. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Elevators shall comply with the requirements of ANSI A17.1. When provisions for the handicapped are required, elevators shall comply with the requirements of ANSI A117.1. Elevator cab shall be galvanized metal shell with enamel finish. Elevator doors shall be galvanized metal with enamel finish. Structural and non-exposed ferrous metal surfaces shall receive two coats of structural grade primer.

2.2 Operating Equipment: Motors, pumps, controllers, hydraulic fluid reservoir, cylinder, casing, plunger, piping, guide rails, buffers, buttons, wiring, indicators, hardware, fittings, and all other equipment required to provide a fully operational elevator shall be provided.

2.3 Finishes:

2.3.1 Galvanizing: ASTM A 526, G90 Coating Designation.

2.3.2 Enamel: Shop-applied baked enamel.

2.4 Wiring: All wiring necessary to connect operating buttons, switches, signals, and all electrical equipment on the car shall be provided. Wiring shall be in accordance with the National Electrical Code and shall, except for traveling cables, be installed in conduit, electrical metallic tubing, or metal wireways, except that flexible conduit may be used for short runs. Traveling cables shall be of the best grade for the service and shall be so installed to provide a proper size loop for the car. Traveling cables shall have a fire-resistant outer braid.

3.0 EXECUTION:

3.1 Preparation: Prior to installation of elevator, ensure that shafts and openings for moving equipment are plumb, level, and in line. Check measurements of space for equipment and means of access for installation and operation.

3.2 Installation: Install machinery, guides, controls, car, equipment, and

accessories in accordance with applicable codes and standards. Installation shall provide a quiet, smoothly operating installation, free from sidesway, oscillation, or vibration.

3.3 Inspection: At completion of installation, elevator shall be inspected in accordance with ANSI A17.2. All deficiencies shall be corrected and retested.

SECTION 14400
LIFTS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of commercial lifts. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS: Lifts shall comply with ANSI A17.1.

2.1 Lifts shall be electrically operated traction type with counter-weights, winding drum type, or hand-operated chain or screw drive type for low-capacity, infrequent use as required. The lift shall be manufacturer's standard pre-engineered system.

2.2 Capacity Rating shall be 100 pounds, 50 pounds, or as required.

2.3 Speed shall be 50 fpm, with travel distance as required.

2.4 Hoistway Doors shall be 2 feet 6 inches wide by 3 feet 0 inches high, or as required.

2.5 Self-Supporting Structure: Provide units with structural steel self-supporting hoistway framing that requires vertical-load support only at base and lateral support only at landing levels to coordinate car movement with hoistway doors.

2.6 Machine Locations: Locate lift machines inside the shaft at top or bottom of hoistway as required.

2.7 Electric Control System: Provide standard, fully automatic call-and-send operation that responds to momentary push-button signals at each landing.

2.7.1 Pushbuttons Shall Be Inoperative while car is in transit, for a predetermined time period after car arrival at any given landing, or when any doors are open. Delivery calls shall take precedence over calls for service.

2.7.2 Provide Adjustable Limited Period of Time for receiving station to make its access to car, before responding to next station call-for-service. Post notice of limitation at each station.

2.7.3 When Delivery Has Been Completed, doors are cdosed, and no calls-for-service are registered, return car automatically for parking at indicated "home" station.

2.8 Materials and Finishes:

2.8.1 Enameled Steel: Formed steel units with baked synthetic enamel finish.

2.8.2 Primed-for-Paint Steel: Formed steel units with baked metal primertion, free from sidesway, oscillation or vibration.

2.8.3 Stainless Steel: AISI Type 302/304, with directional polish or satin finish.

2.8.4 Plastic Laminate: High-pressure type complying with NEMA LD3, 0.05 inch thickness.

2.9 Car Construction:

2.9.1 General: Provide car construction of either formed, reinforced, and sound-deadened sheet metal with welded joints; or of metal-clad plywood with mechanically riveted or bolted joints, with exposed edges of plywood covered with metal and with internal seams sealed by soldering. Provide shelves, compartments, gates and other features as required.

2.9.2 Car Light: Equip car with recessed incandescent light fixture, located in ceiling near front of car. Provide perforations or glazed port through car gate and hoistway doors near light location, sufficient for observation that car is present at landing.

2.10 Car Gates:

2.10.1 Manual Car Gates shall be of counterbalanced bi-parting vertical sheet steel with black enamel finish and electrical interlocks.

2.10.2 Power-Operated Car Gates shall be vertical bi-parting gates, equipped with power operator and connecting linkages to operate hoistway doors at landing when car is present.

2.11 Hoistway Doors: Provide flush hollow metal doors and frames of counterbalanced vertical bi-parting design.

2.12 Signal Equipment: Provide signal equipment at each landing hall push-button station; include call button, send button for each landing served, and illuminated "car-in-use" pilot light that flashes when car arrives at landing (until

door is opened). Provide recessed station set in face of door jamb with surface-mounted stainless steel face plate.

2.13 Door Buttons: Where power operated doors are required, provide momentary pressure "door open" and constant pressure "door close" buttons.

2.14 Audible Arrival Signal: Provide standard bell or gong system on top of each car, equipped to sound as car approaches landing.

2.15 Audible Call Signal: Provide standard buzzer system on top of car, equipped to sound continuously when any call button is depressed and held, but only if car is located at a landing where hoistway door or car gate is open.

3.0 EXECUTION: (Section not used).

# SECTION 14410
# PERSONNEL LIFTS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of personnel lifts. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Personnel Lifts: Personnel lifts shall be electrically operated, electronically controlled platform type. Capacity shall be as directed. Lift shall have a capacity safety factor of 5. Lift speed shall not exceed 30 feet per minute. Platform shall be welded and bolted steel construction. Drive belts and/or chains shall have safeties that auto-matically lock the carriage to the guide rails in the event of slack or lift belt/chain failure. Lifts shall conform to ANSI A90.1. Lifts shall be complete with necessary screens and guards for moving parts and floor openings.

2.2 Controls: Personnel lifts shall be provided with normal and final limit switches at each stop. Lifts shall have emergency stop switch.

2.3 Motor: Motors shall be sized for capacity of lifts. Motor shall be direct drive, gear type with electric brake. Power requirements shall be as directed.

2.4 Wiring: All wiring necessary to connect operating buttons, switches, signals, and all electrical equipment on lifts shall be provided. Wiring shall be in accordance with the National Electrical Code and shall, except for traveling cables, be installed in conduit, electrical metallic tubing, or metal wireways, except that flexible conduit may be used for short runs. Traveling cables shall be of the best grade for the service and shall be so installed to provide a proper size loop for the car. Traveling cables shall have a fire-resistant outer braid.

3.0 EXECUTION:

3.1 Preparation: Prior to installation of lifts, ensure that shafts and openings for moving equipment are plumb, level, and in line. Check measurements of space for equipment and means of access for installation and operation.

3.2 Installation: Install machinery, guides, controls, lifts and equipment, and accessories in accordance with applicable codes and standards. Installation shall provide quiet, smooth operation free from sidesway, oscillation, or vibration.

3.3 Inspection: At completion of installation, lifts shall be inspected in accordance with ANSI A17.2. All deficiencies shall be corrected and retested.

# SECTION 14420
# CHAIR LIFTS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of chair lifts. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Chair Lifts shall be of size, type, and configuration designated and shall be designed for the applicable stair configuration. Chairs applicable shall be padded, vinyl upholstered type. Chair lifts shall comply with the requirements of ANSI A90.1.

2.2 Operating Equipment: Motors, controllers, casings, guide rails, buffers, buttons, wiring, indicators, hardware, fittings, and all other equipment required to provide fully operational chair lift shall be provided.

2.3 Wiring: All wiring necessary to connect operating buttons, switches, signals, and all electrical equipment on chair lifts shall be provided. Wiring shall be in accordance with the National Electrical Code and shall, except for traveling cables, be installed in conduit, electrical metallic tubing, or metal wireways, except that flexible conduit may be used for short runs. Traveling cables shall be of the best grade for the service and shall be so installed as to provide a proper size loop for the chair lift. Traveling cables shall have a fire resistant outer braid.

3.0 EXECUTION:

3.1 Preparation: Prior to installation of chair lifts, ensure that installation surfaces are true to lines and levels. Check measurements of space for equipment and means of access for installation and operation.

3.2 Installation: Install machinery, guides, controls, chair lifts, equipment, and accessories in accordance with applicable codes and standards. Installation shall provide a quiet, smooth operation, free from sidesway, oscillation, or vibration.

3.3 Inspection: At completion of installation, chair lift shall be inspected in accordance with ANSI A17.2 All deficiencies shall be corrected and retested.

SECTION 14450
VEHICULAR LIFTS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of vehicular lifts. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procuedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Vehicular Lifts: Lifts shall comply with ANSI B153.1. Lifts shall have automatic mechanical lift lock. Lift lock shall be automatically activated when lift is operated to full stroke to prevent accidental lowering.

2.2 Operating Equipment: Motors, controllers, casings, pumps, hydraulic fluid reservoir, cylinder, plunger, piping, buffers, wiring, indicators, hardware, fittings, and all other equipment required to provide a fully operational elevator shall be provided.

2.3 Wiring: All wiring necessary to connect operating buttons, switches, signals, and all electrical equipment on the lift shall be provided. Wiring shall be in accordance with the National Electrical Code and shall be installed in conduit, electrical metallic tubing, or metal wireways, except that flexible conduit may be used for short runs.

3.0 EXECUTION:

3.1 Preparation: Prior to installation of vehicular lifts, ensure that shafts and openings are plumb, level, and in line. Check measurements of space for equipment and clearances for operation.

3.2 Installation: Install machinery, controls, and lift and its equipment and accessories in accordance with manufacturer's instructions and applicable codes and standards, to provide a quiet, smoothly operating installation, free from sidesway, oscillation, or vibration.

# SECTION 14510
# AUTOMATIC CART TRANSPORTATION SYSTEMS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of automatic cart transportation systems. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Automatic Cart Transportation Systems: Automatic cart transportation systems shall be of the size and configuration directed by the Contracting Officer. System shall be complete with manufacturer's standard steel rail system for the capacity required, chain drive, switches, carriers, carts, stops, and other accessories required for a complete installation. Field-painted components shall match adjacent surfaces.

2.2 Operating Equipment: System shall be provided with manufacturer's standard automatic destination control circuitry. Control system shall allow fully automatic delivery of carts to predetermined locations. Motors, indicators, wiring, hardware, fittings, and all other equipment required to provide a fully operational cart transportation system shall be provided.

2.3 Wiring: All wiring necessary to connect buttons, switches, signals, and all electrical equipment shall be provided. Wiring shall be in accordance with the National Electrical Code and shall be installed in conduit, electrical metallic tubing, or metal wireways, except that flexible conduit may be used for short runs.

3.0 EXECUTION:

3.1 Preparation: Prior to installation, ensure that installation surfaces are true to lines and level. Check measurements of space for equipment, means of access for installation, and clearances for operation.

3.2 Installation: Completed installation shall operate smoothly without undue noise, oscillation, or vibration.

SECTION 14560
TRASH CHUTES

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of trash chutes. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work. Contact the fire protection engineering branch for the specific requirements of fire protection.

2.0 PRODUCTS:

2.1 General: Chutes shall be gravity type in accordance with the standards of NFPA 82. Intake doors shall bear the UL Class B, 1-1/2 hour, 250 F rating. Doors shall be tested in accordance with ASTM E 152 Fire Endurance Test.

2.2 Chutes: Chutes shall be manufacturered of galvanized steel, aluminized steel, or stainless steel, as directed. Galvanized steel and aluminized steel shall be minimum 18 gauge. Stainless steel shall be minimum 0.05 inch thick. Diameter of chute shall be as directed. Chutes shall be provided with necessary supports.

2.3 Intake Doors and Frames: Chutes shall be equipped with Type 302 stainless steel, hand hopper type intake doors bearing the UL Class B, 1-1/2 hour rating. Surfaces of doors and frames shall have satin finish. Doors shall be sized in accordance with the requirements of NFPA 82. Frame trim shall be minimum 0.060 inch thick, Type 302 stainless steel. Doors shall be self-closing and positive latching.

2.4 Outlet Doors: Outlet door shall be UL "B" label 1-1/2 hour fire rated, and equipped with a fusible link to be self closing and self latching.

2.5 Vent: Trash chute shall be provided with a roof vent in accordance with NFPA 82. Vent shall extend 4 feet minimum above roof line and be provided with flashing as required to provide a watertight installation. Vent shall be same diameter and material as trash chute. Vent shall be provided with a rain cap and bird screen.

2.6 Sprinklers: Sprinkler shall be provided as required by NFPA 82 and as directed. Sprinklers shall be installed in accordance with NFPA 13.

2.7 Hopper: Each trash chute shall be provided with a hopper type receptacle.

3.0 EXECUTION:

3.1 Preparation: Prior to installation of trash chute, ensure that shafts and openings are plumb, level, and in line. Check measurements of space for materials and means of access for installation.

3.2 Installation: Install trash chute in accordance with applicable codes and standards. Ensure that installation procedures maintain required fire resistance ratings.

SECTION 14570
WATER TREATMENT PLANT TRAVELING SCREENS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for repair and maintenenace of traveling screens for water treatment intake structures. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Replacement Motors and Parts shall have the same characteristics and as the motors and parts to be replaced, unless otherwise approved.

2.2 Replacement Pumps shall comply with design specifications for head, capacity, material of construction, and motor characteristics of the pumps to be replaced.

2.3 Finishes for items replacing existing items that are galvanized or painted shall be finished with like finish in compliance with manufacturer's standard practice.

2.4 Screen Wash Nozzles shall be stainless steel, brass, or bronze. Stainless steel shall be Type 316. Brass shall comply with ASTM B 282. Bronze shall comply with ASTM B 255.

2.5 Screen Metal Fabric shall be stainless steel complying with ASTM A 580.

2.6 Screen Frame shall be steel or stainless steel. Stainless steel parts shall comply with ASTM A 193, A 480, and A 564. Steel shall comply with ASTM A 36. Steel fasteners shall comply with ASTM A 307 or A 325.

3.0 EXECUTION:

3.1 General: Screen, wash pumps, controller, drive equipment, and appurtenances shall be repaired, lubricated, and placed back in service.
3.2 Welding shall be done in compliance with AWS D1.1.

SECTION 14579
PNEUMATIC TUBE SYSTEM

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for repair and maintenance of pneumatic tube systems. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Vacuum Pumps, Compressors, Specialty Components, and Parts shall be the product of the system's original manufacturer. Parts and materials no longer available from the original manufacturer shall be replaced with similar substitute parts and materials, subject to the approval of the Contracting Officer.

2.2 Carrier and Tube Components shall be not lighter than 16-gauge cold-rolled-electric-welded steel, manufactured for pneumatic systems.

2.3 Welding and Brazing materials shall be as specified in Section II of the ASME Boiler and Pressure Vessel Code.

2.4 Electrical Devices shall comply with the requirements of National Electrical Code.

3.0 EXECUTION:

3.1 Safety: Repairs shall be accomplished with either the entire system or applicable portions removed from service by interrupting the power supply and locking the disconnect switch in the off position.

3.2 Performance: In addition to the manufacturer's instructions, all repairs shall be accomplished in compliance with National Electrical Code.

3.3 Flame Cutting, Welding, and Brazing: No cutting by torch or flame, welding or brazing shall be permitted without written authorization from the Contracting Officer.

# SECTION 14580
# PNEUMATIC MESSAGE SYSTEMS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of pneumatic message systems. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Pneumatic Message System: System shall be computer-controlled pneumatic tube type to permit automatic unattended transmission of carriers from any station to any other station. System components shall be designed and located in such a manner that in the event of a defect, components may readily be removed and replaced. Failure of one station shall not interfere with normal functioning of any other station. Number of stations and zones shall be as directed.

2.2 Tubing: Tubing for carrier transmission lines shall be not lighter than 16-gauge cold-rolled-electric-welded steel, manufactured for pneumatic systems. Air lines shall be sized as required for proper system operation.

2.3 Fittings and Hangers: Fittings shall be cast iron, cast aluminum, or fabricated steel. Box connectors, close elbows, tees, coupling sleeves, other fittings, hangers, and supports required for proper installation of the system shall be provided.

2.4 Power Unit: Power units shall be provided for each zone. Power units shall be capable of operating all lines simultaneously and producing an average carrier speed of 25 feet per second. Power units shall be complete with vibration isolators, intake and exhaust mufflers, intake and exhaust piping, screen box, and air valves, if required, and shall be designed for easy access.

2.5 Control Center: The system shall be controlled by a software sensitive, magnetic core or complementary metal oxide semi-conductor memory computer. Computer shall perform logic, control, supervisory, and alarm functions and provide permanent storage for system operating program. Program memory protection shall be provided during power loss.

2.6 Carriers: Three carriers shall be furnished for each station provided. Carriers shall be side opening of full access type, bi-directional.

2.7 Painting:

2.7.1 Sending and Receiving Units shall receive factory- or field-finish standard with the manufacturer. Field finish shall match adjacent surfaces.

2.7.2 Tubing shall be field-painted, when exposed, to match adjacent surfaces.

2.8 Electrical Work: Pneumatic message system shall be provided complete with motors, motor starters, and controls and shall comply with NEMA MG 1. Electrical equipment and wiring shall be in accordance with the National Electrical Code. Motor starters shall be provided complete with properly sized thermal-overload protection. Each motor shall be sized to drive the equipment at the specified capacity without exceeding the nameplate rating of the motor when operating at proper electrical system voltage.

3.0 EXECUTION:

3.1 Preparation: Prior to installation of pneumatic message system, check measurements of spaces for equipment and means of access for installation and operation.

3.2 Fireproofing: Where holes are required in fire and smoke walls for the passage of piping and other accessories, the holes shall be filled with UL approved fireproofing material that equals the wall fire or smoke rating.

3.3 Tests: Test installed system in the presence of the Contracting Officer to determine that the system is functional, operational, and installed in accordance with the specifications. Tests shall be conducted in accordance with the following:

a. Computer simulation and interrogation.

b. Consecutive dispatching to random stations within the zone.

c. Consecutive dispatching to random stations outside the zone.

d. Multi-station dispatching within the zone where all dispatchers are loaded with carriers, random stations are selected, and dispatching begins.

e. Multi-station dispatching outside the zone where all dispatchers are loaded with carriers, random stations are selected, and dispatching begins.

f. Two stations in each zone will be randomly selected to dispatch carriers into other zones.

# SECTION 14583
# PNEUMATIC TRASH AND LINEN CHUTES

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of pneumatic trash and linen chutes. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work. Contact the fire protection engineering branch for the specific requirements of fire protection.

2.0 PRODUCTS:

2.1 General: Pneumatic waste and linen systems shall be vertical, horizontal, or inclined duct systems, having sufficient mechanically-applied airflow to convey refuse or linen to point of disposition without clogging. Systems shall have stations and configurations as directed. Systems shall be in accordance with the standards of NFPA 82.

2.2 Air Velocity: The minimum air velocity in the system shall be 5,000 feet per minute. Blower system shall be designed to provide continuous air supply at no less than the minimum velocity.

2.3 Tubes: Tubes for system shall be a minimum of 16 inches in diameter. Tubes shall be galvanized, aluminized, or stainless steel. Material-conveying lines shall be not lighter than 20 gauge and charging stations or changes in direction of conveying lines shall be not lighter than 16 gauge. In all cases, steel shall be of sufficient thickness to retain its design shape under all operating conditions.

2.4 Fire Protection: Automatic fire dampers shall be installed at all points where the system penetrates fire-resistant partitions or floor assemblies. The system shall shut down automatically upon closing of one of the fire dampers. Sprinklers shall be provided in accordance with the requirements of NFPA 82. Fire separation at service openings and terminal rooms shall be as required by NFPA 82.

2.5 Service Openings: Service openings shall be sized and designed in accordance with NFPA 82. Doors shall bear UL Class B 1-1/2 hour rating.

2.6 Wiring: All wiring necessary to connect motors, switches, and controls shall be provided. Wiring shall be in accordance with the National Electrical Code, and shall be installed in conduit, electrical metallic tubing, or metal wireways, except that flexible conduit may be used for short runs.

3.0 EXECUTION:

3.1 Preparation: Prior to installation of pneumatic trash and linen chutes, ensure that shafts and openings are plumb, level, and in line. Check measurements of space for equipment, accessibility for installation, and clearances for operation.

3.2 Installation: Install machinery, tubes, controls, equipment, and accessories in accordance with the manufacturer's instructions and applicable codes and standards. Install fire protection sprinklers in accordance with NFPA 13. Complete installation shall operate properly without undue noise or vibration. Ensure that installation procedures maintain required fire resistance ratings.

SECTION 14602
CRANES AND HOISTS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of cranes and hoists. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Crane: Crane Manufacturers Association of America (CMAA) 70 for electric overhead traveling cranes or ANSI MH27.1 for underhung cranes and monorail systems.

2.2 Hoist: Electric wire rope type, ANSI/ASME HST-4M.

3.0 EXECUTION: The derrick shall be assembled and installed with the guy wires placed in position, hoisting ropes installed, and the derrick made ready for regular operation. Equipment installed outdoors shall be primed and finish-painted with a suitable corrosion-resistant paint on all parts and components not otherwise made of corrosion-resistant materials or otherwise protected.

SECTION 14650
ASH HOISTS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of ash hoists. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Winches and Sheaves:

2.1.1 Wire Rope Sheaves shall be iron or steel with bronze bushings, furnished either plain or as an assembly of frame, sheave, swivel hook, and axle as required.

2.1.2 Winches shall be of steel construction with bronze bearings on rotating parts. Winches shall have a capacity of not less than 500 pounds, with band action handbrake and drum width adequate for the quantity and diameter of wire rope to be used. Winches shall be marine type with gear cover and shall have corrosion-resistant parts and finish suitable for outdoor use.

2.1.2.1 Power Winches: NEMA 3 weather-protected, with two speeds (30 or 60 fpm) for lifting and a single speed for lowering, automatic upper-limit switch for hook travel, with push-button control.

2.1.2.2 Hand wench shall have spring-operated holding dogs, free-spooling feature, and adjustable handles.

2.1.3 Wire Rope: Wire rope shall be flexible, hoisting grade composed of approximately 7 strands or bundles of small diameter steel wire with a fiber or independent wire rope core.

2.2 Mast and Boom: Mast, boom, and miscellaneous fabricated components shall be provided as required to complete the unit assembly. Boom shall rotate. Fabricated parts shall be finished with a corrosion-resistant paint.

2.2.1 Mast shall telescope where required. Fully extended mast shall allow transport of ash container from bottom of pit to bed of truck without handling container twice.

2.2.2 Ash-Handling Pit shall have watertight door covering where required. Doors shall be mechanically linked to mast so that they automatically open and close with the raising and lowering of the mast.

3.0 EXECUTION: The Contractor shall complete the assembly of any equipment furnished partially assembled and place the items in position as directed. The ash hoist shall be assembled and securely bolted in position, hoisting ropes installed, and the hoist made ready for regular operation. The Contractor shall furnish all miscellaneous hardware items required to complete the installation of all equipment and components. Equipment shall be primed and finish painted with a suitable corrosion-resistant paint on all parts and components not made of corrosion-resistant materials or otherwise protected.

SECTION 15060
MECHANICAL PIPING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of piping. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS: Piping shall comply with ANSI B31.1, where applicable. Piping in pressure systems shall comply with requirements of the ASME Boiler and Pressure Vessel Code, where applicable.

2.1 Steel Pipe:

2.1.1 Pipe: Carbon steel pipe shall comply with ASTM A 53 or A 106. Galvanized pipe shall comply with ASTM A 53. Stainless steel pipe shall comply with ASTM A 312.

2.1.2 Fittings: Malleable iron threaded fittings shall comply with ANSI B16.3. Forged steel threaded and socket weld fittings shall comply with ASTM A 181 and shall be fabricated in compliance with ANSI B16.11. Forged stainless steel threaded and socket weld fittings shall comply with ASTM A 182 and shall be fabricated in compliance with ANSI B16.11. Carbon steel butt welded fittings shall comply with ASTM A 234 and shall be fabricated in compliance with ANSI B16.9. Stainless steel butt welded fittings shall comply with ASTM A 403 and shall be fabricated in compliance with ANSI B16.9.

2.1.3 Flanges: Carbon steel flanges shall comply with ASTM A 181 and shall be fabricated in compliance with ANSI B16.5. Stainless steel flanges shall comply with ASTM A 182 and shall be fabricated in compliance with ANSI B16.5.

2.1.4 Bolting: Carbon steel bolting shall comply with ASTM A 307, Grade B, and shall be fabricated in compliance with ANSI B18.2.1 and B18.2.2. Stainless steel bolting shall comply with ASTM A 193, Grade B8, with hex nuts complying with ASTM A 194, Grade 8F, and shall be fabricated in compliance with ANSI B18.2.1 and B18.2.2.

2.2 Copper and Brass Pipe:

2.2.1 Pipe: Seamless copper pipe shall comply with ASTM B 42. Seamless red brass pipe shall comply with ASTM B 43. Copper pipe to be used with brazing or welding shall be oxygen free and shall comply with ASTM B 302 or B 88.

2.2.2 Fittings: Threaded fittings shall comply with ASTM B 249 and shall be fabricated in compliance with ANSI B16.15. Solder fittings shall comply with ASTM B 88 and shall be fabricated in compliance with ANSI B16.18. Butt welding fittings shall comply with ASTM B 302 or B 88 and shall be fabricated in compliance with ANSI B16.9.

2.2.3 Flanges shall comply with ASTM B 61 and shall be fabricated in compliance with ASME B16.24.

2.2.4 Bolting shall comply with ASTM B 36 and shall be fabricated in compliance with ANSI B18.2.1 and B18.2.2.

2.3 Cast and Ductile Iron Pipe:

2.3.1 Pipe: Bell and spigot pipe shall comply with ASTM A 74 and shall be in compliance with ANSI A112.5.1 and AWWA C106. Bell and spigot pipe is not as readily available as other pipe and shall only be used to repair existing bell and spigot pipe. Push-on type pipe shall comply with ASTM A 377 and shall be in compliance with AWWA C151. Mechanical joint pipe shall comply with ASTM A 377, ANSI and AWWA C111 and C151. Flanged pipe shall comply with ASTM A 377, B16.1, and AWWA C115. Threaded pipe shall comply with ASTM A 377 and shall be threaded at both ends for screwed fittings.

2.3.2 Fittings: Bell and spigot fittings shall comply with ASTM A 74, ANSI A112.5.1, and AWWA C110. Bell and spigot pipe is not as readily available as other pipe and shall only be used to repair existing bell and spigot pipe. Push-on type fittings shall comply with ASTM A 126 or A 536 and AWWA C110. Mechanical joint fittings shall comply with ASTM A 126 or A 536 and AWWA C110 and C111. Flanged fittings shall comply with ASTM A 126 or A 536, ANSI B16.1, and AWWA C110. Threaded fittings shall comply with ASTM A 126 and ANSI B16.4.

2.3.3 Flanges shall comply with ASTM A 126 or A 536, AWWA C115, and ANSI B16.1.

2.3.4 Gaskets: Gaskets for cast-iron soil pipe shall comply with ASTM C 564. Gaskets for mechanical joint or push-on type pipe shall comply with AWWA C111.

2.3.5 Bolting: Alloy steel bolting shall comply with ASTM A 193, Grade B8, and A 194, Grade 8F. Carbon steel bolting shall comply with ASTM A 307, Grade B, and shall be fabricated in compliance with ANSI B18.2.1 and B18.2.2.

2.4 Polyvinyl Chloride Pipe:

2.4.1 Pipe: Pressure rated pipe shall comply with ASTM D 1785. Waste, vent, and drain pipe shall comply with ASTM D 2665. Sewer pipe shall comply with ASTM D 2729.

2.4.2 Fittings: Threaded fittings shall comply with ASTM D 2464. Socket solvent weld type fittings for pressure pipe shall comply with ASTM D 2466 or D 2467. Socket solvent weld type fittings for waste and drain pipe shall comply with ASTM D 2665. Socket solvent weld type fittings for sewer pipe shall comply with ASTM D 2729.

2.4.3 Flange Dimensions shall be in compliance with ASME B16.5.

2.4.4 Bolting shall be alloy steel bolts and nuts complying with ASTM A 193, Grade B8, and A 194, Grade 8F.

2.5 ABS Pipe:

2.5.1 Pipe: Waste and drain pipe shall comply with ASTM D 2661. Sewer pipe shall comply with ASTM D 2751. All other ABS pipe shall comply with ASTM D 1527.

2.5.2 Fittings: Threaded fittings shall be Schedule 80 ABS and shall be industry standard. Socket solvent weld fittings for waste and drain pipe shall comply with ASTM D 2661. Socket solvent weld fittings for sewer pipe shall comply with ASTM D 2751. Socket solvent weld fittings for all other pipe shall be ABS Schedule 40 complying with ASTM D 2468 or ABS Schedule 80.

2.6 Vitrified Clay Pipe:

2.6.1 Pipe: Regular vitrified clay pipe shall comply with ASTM C 700. Perforated vitrified clay pipe shall comply with ASTM C 498.

2.6.2 Fittings shall be regular vitrified clay complying with ASTM C 700.

2.6.3 Compression Joint Sealing Element shall comply with ASTM C 425 and shall be of rubber, plastic, or metal.

2.7 Asbestos Cement Pipe shall not be repaired but shall be replaced with new piping that does not contain asbestos, as directed by the Contracting Officer.

2.8 Polyethylene Pipe:

2.8.1 Pipe: Polyethylene shall comply with ASTM D 2447. Pipe shall be polyethylene SDRPR and shall comply with ASTM D 3035.

2.8.2 Fittings: Butt fusion type fittings shall comply with ASTM D 3261. Socket type heat fusion fittings shall comply with ASTM D 2683. Insert type heat fusion fittings shall comply with ASTM D 2609.

2.9 Conduit Systems:

2.9.1 Carrier Pipe: Carbon steel pipe shall comply with ASTM A 106. Polyvinyl chloride pipe shall comply with ASTM D 1785. Copper pipe shall comply with ASTM B 42. Fiberglass reinforced plastic pipe shall meet commercial standards.

2.9.2 Insulation: For systems 250 degrees or less, polyurethane foam insulation shall comply with commercial standards. For systems over 250 degrees, calcium silicate insulation shall comply with ASTM C 533.

2.9.3 Outer Jacket: For systems 250 degrees or less, polyvinyl chloride outer jacket shall comply with ASTM D 1785 or fiberglass reinforced plastic outer jacket shall meet commercial standards. For Systems over 250 degrees, cast-iron outer jacket shall comply with ASTM A 377, or steel conduit outer jacket shall be epoxy-coated, spiral weld, 10 gauge minimum.

2.10 Gaskets shall comply with ASME B16.21 and/or the following:

2.10.1 Gaskets shall be rubber complying with ASTM C 564.

2.10.2 Gaskets for mechanical joint or push-on type cast-iron or ductile iron pipe shall be rubber complying with AWWA C111.

2.11 Solvent Cement for solvent welding of pipe shall comply with ASTM D 2564, except solvent cement for ABS pipe and fittings shall comply with ASTM D 2235.

2.12 Dielectric Unions and Flanges:

2.12.1 Dielectric unions and flanges shall comply with Fed. Spec. WW-U-531 and requirements of ANSI B16.39 and ANSI B16.24.

3.0 EXECUTION:

3.1 Flame Cutting: No cutting by torch shall be done without authorization from the Contracting Officer.

3.2 Restoration: All disturbed pavement, sodding, soil, and other objects shall be restored to match original condition. Pavement shall be restored with material to maintain the same load bearing capacity as the original.

3.3 Welding: All welding shall be performed in compliance with ANSI B31.1 and/or ASME Boiler and Pressure Vessel Code Section IX, as applicable.

3.4 Solvent Cement Joints shall be made in compliance with ASTM D 2855.

3.5 Heat Fusion Joints in polyethylene pipe and fittings shall be made in compliance with ASTM D 2657.

3.6 Concrete Linings in cast and ductile iron pipe shall be prepared with cement mortar complying with AWWA C104. Pipe leak clamps shall be ductile iron, split sleeve type.

3.7 Protective Covering for Replacement Underground Steel Pipe shall be mechanically applied in a factory or field plant especially equipped for the purpose. Specials, valves, and fittings that cannot be coated and wrapped mechanically shall have the protective covering applied by hand. Joints shall be coated and wrapped by hand. The pipe covering shall consist of a coat of coal-tar primer, a coat of coal-tar enamel, a wrapper of coal-tar-saturated asbestos felt, and a wrapper of kraft paper or a coat of water-resistant whitewash, applied in the order named and complying with the requirements of AWWA C203 in all respects to materials, thicknesses, methods of application, tests, and handling, except that interior lining will not be required. Joints and fittings shall be coated and wrapped in compliance with AWWA C203.

3.8 Hydrostatically Test Pipe Systems where required by ANSI B31.1 or ASME Code.

3.9 Dielectric Unions or Flanges shall be provided for connections between ferrous and nonferrous metallic pipe or equipment.

3.10 Hubless Cast-Iron Soil Pipe shall not be installed under concrete floor slabs or in crawl spaces below kitchen floors.

3.11 Plastic pipe shall not be installed under concrete floor slabs, or in air plenums. Plastic pipe shall not be installed in a pressure piping system in buildings greater than three stories including any basement levels.

SECTION 15100
VALVES

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of valves. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS: Valve pressure/temperature ratings shall equal or exceed the ratings of the valves being replaced. Pressure/temperature ratings shall be in accordance with ANSI B16.5. Valves shall comply with the ASME Boiler and Pressure Vessel Code where applicable.

2.1 Gate Valves shall comply with MIL-V-12126, MIL-V-18110, MIL-V-13803, MIL-V-12125, MIL-V-58039, and MSS SP-80 as applicable.

2.2 Globe Valves shall comply with MIL-C-18434 and with MSS-SP-85, MIL-V-24109, MIL-V-17501, MIL-V-24578, and MSS SP-80 as applicable.

2.3 Check Valves shall comply with MIL-V-6129 and/or MIL-V-10386 and MSS SP-80.

2.4 Needle Valves shall comply with MIL-V-24586 and/or with applicable MSS specifications.

2.5 Ball Valves shall comply with MSS SP-72.

2.6 Butterfly Valves shall comply with Fed. Spec. WW-V-1967 and/or AWWA C504.

2.7 Pressure Relief Valves shall comply with MIL-V-23255 and MIL-V-55341.

2.8 Pressure Regulators shall comply with MIL-V-2962, MIL-V-24384, MIL-V-18318, or MIL-V-16733 as applicable.

2.9 Flow Control Valves shall comply with MIL-V-23254.

2.10 Backflow Preventers shall comply with AWWA C506.

2.11 Vacuum Breakers shall comply with MIL-V-5461 and MS-87005.

2.12 Solenoid Operated Valves: Coil shall be epoxy encapsulated, manufactured to UL 429, and rated for ac voltage.

2.13 Float Valves shall comply with Fed. Spec. A-A-246.

2.14 Stop and Waste Valves shall comply with MIL-V-22052.

2.15 Plugs and Cocks shall comply with MIL-C-1203 and MIL-V-12003.

2.16 Diaphragm Valves shall comply with applicable MSS specifications.

2.17 Calibrated Balancing Valves shall be calibrated so that flow can be determined when the temperature and pressure differential across the valve is known. Valves shall have an integral pointer which registers the degree of valve opening. Each valve shall be constructed with internal seals to prevent leakage and shall be supplied with preformed insulation. Valves Cv rating shall be as indicated. Valve bodies shall be provided with quick connecting hose fittings for a portable

meter to measure the pressure differential. One portable differential meter, suitable for the operating pressure specified, shall be provided. The meter shall be complete with hoses, vent, integral metering connections, and carrying case as recommended by the valve manufacturer.

3.0 EXECUTION:

3.1 Flame Cutting: No cutting by torch shall be done without authorization from the Contracting Officer. Where flame cutting is authorized, at least one person shall be standing by exclusively with a fire extinguisher within 10 feet of the work and within full view of the area. The fire extinguisher shall have been inspected and certified by a licensed service agency within the last 12 months.

3.2 Welding: All welding shall be performed in compliance with ANSI B31.1 and/or ASME Boiler and Pressure Vessel Code Section IX, as applicable.

3.3 Restoration: All disturbed pavement, sodding, soil, and other objects shall be restored to match original condition. Pavement shall be restored with material to maintain the same load bearing capacity as the original.

SECTION 15120
PIPING ACCESSORIES

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of piping accessories. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Filters: Pressure-temperature rating and filter medium particle size retention rating of the replacement filter shall equal or exceed the ratings of the existing filter. Pressure drop at the required capacity shall not exceed that of the replaced filter. Filters shall be constructed in accordance with ASME Code where applicable.

2.2 Strainers shall comply with Fed. Spec. WW-S-2739.

2.2.1 Low Pressure Y-Type Strainers shall have Type 304 stainless steel screens. Bodies of threaded or flanged strainers shall be cast iron. Bodies of butt-weld end strainers shall be Schedule 40 cast carbon steel.

2.2.2 High Pressure Y-Type Strainers shall comply with ASME Code if applicable. Strainers shall have Type 304 stainless steel screens. Bodies of threaded or flanged strainers shall be cast iron. Bodies of butt-weld end strainers shall be Schedule 80 cast carbon steel.

2.3 Traps shall be in accordance with Fed. Spec. WW-T-696, and steam traps shall comply with ASME Code where applicable.

2.3.1 Thermostatic Traps shall be constructed of cast brass. Thermostatic element valve cone shall be stainless steel.

2.3.2 Float and Thermostatic Traps shall have body and cover constructed of cast iron or semi-steel. Thermostatic element shall have stainless steel valve cone and valve seat. Provide stainless steel or seamless copper float.

2.3.3 Inverted Bucket Traps shall have body and cover constructed of cast iron or semi-steel. Bucket shall be brass or stainless steel, with lever mechanism of heat-treated stainless steel.

2.3.4 Thermodynamic Traps shall have body and cover constructed of stainless steel. Disc shall be heat-treated stainless steel.

2.4 Expansion Joints shall comply with standards of the Expansion Joint Manufacturer's Association (EJMA). Replacement expansion joints shall equal or exceed the pressure-temperature ratings of the replaced expansion joint.

2.4.1 Expansion Compensators shall have 2 ply phosphor bronze bellows, brass shrouds, and end fittings for copper piping systems, or 2 ply stainless steel bellows, carbon steel shrouds, and end fittings for steel piping systems.

2.4.2 Rubber Expansion Joints shall be constructed of duck and butyl rubber with full-faced integral flanges, internally reinforced with steel retaining rings.

2.4.3 Slip Joints shall comply with MIL-E-17814 and shall be of the type designed for repacking under pressure.

2.4.4 Flexible Ball Pipe Joints shall be designed for 360 degree rotation, with minimum of 30 degree angular flexing movement for sizes 1/4 inch to 6 inches, 15 degrees for sizes 8 inches and larger. Certify carbon steel joints for environmental shock testing in accordance with MIL-S-4456 or MIL-S-901C. Joints shall comply with Section II of ASME Boiler and Pressure Vessel Code and ANSI B31.1 Power Piping for materials and design of pressure-containing parts and bolting.

2.4.5 Expansion Joints for Grooved Piping shall be combination couplings and nipples constructed of cut grooved short pipe nipples and couplings, or slip-type expansion joints constructed of carbon steel pipe and couplings.

2.5 Pipe Supports: Pipe supports shall comply with MSS SP-58 and SP-69. Contact between dissimilar metals shall be prevented in supporting copper tubing. Those portions of pipe supports which contact the tubing shall be copper-plated, rubbber- or vinyl-coated, or stainless steel. All pipe supports located in sewage wetwells shall be 18-8 stainless steel.

2.6 Valve Boxes shall be of cast iron, extension sleeve type; shall be not less than 5 inches in diameter; shall have a minimum thickness at any point of 3/16 inch; and shall be provided with cast-iron bases and covers. Covers shall have cast thereon an appropriate name designating the service for which the valve is used. All parts of valve boxes, bases, and covers shall be coated by dipping in bituminous varnish.

2.7 Flexible Hoses:

2.7.1 Flexible Hoses for Non-Ferrous Piping shall be bronze hose covered with bronze wire braid with copper tube ends or bronze flanged ends, braze-welded to hose.

2.7.2 Flexible Hose for Ferrous Piping shall be stainless steel hose covered with stainless steel wire braid with NPT steel nipples or 150 psi ANSI flanges, welded to hose.

2.7.3 Rubber Flexible Hoses shall be rubber and butyl construction with integral full-faced duck and butyl flanges, internally steel wire reinforced, and furnished complete with steel retaining rings.

3.0 EXECUTION:

3.1 Flame Cutting: No cutting by torch shall be done without authorization from the Contracting Officer. Where flame cutting is authorized, at least one person shall be standing by exclusively with a fire extinguisher within 10 feet of the work and within full view of the area. The fire extinguisher shall have been inspected and certified by a licensed service agency within the last 12 months.

3.2 Restoration: All disturbed pavement, sodding, soil, and other objects shall be restored to match original condition. Pavement shall be restored with material to maintain the same load bearing capacity as the original.

3.3 Welding: All welding shall be performed in compliance with ANSI B31.1 and with ASME Code Section IX where applicable.

3.4 Y-Type Strainers shall be located in supply line ahead of the following equipment if integral strainer is not included in equipment.

a. Pumps.

b. Steam traps serving steam main drips.

c. Temperature control valves.

d. Pressure reducing valves.

e. Temperature or pressure regulating valves.

3.5 Installation of Steam Traps: Install strainer ahead of trap if not integral with trap.

3.6 Pipe Support Installation: Concrete inserts or L-shaped anchor bolts shall be used to support piping from new cast-in-place concrete. Expansion anchors shall be used to fasten supports to existing concrete and masonry.

3.7 Valve Boxes shall be set plumb. Each valve box shall be placed directly over the valve it serves, with the top of the box brought flush with the finished grade. After being placed in proper position, earth shall be filled in around each valve box and thoroughly tamped on each side of the box.

3.8 Flexible Hoses shall be installed on equipment side of shutoff valves, horizontally and parallel to equipment shafts wherever possible.

SECTION 15160
PUMPS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of pumps. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Worn or Damaged Pump Parts shall be replaced rather than repaired.

2.2 New Pump Impellers, when required, shall be statically balanced before installation.

2.3 Used Impellers shall be checked for balance before reinstallation. Out of balance impellers shall either be balanced or replaced.

2.4 Close Coupled Pumps, when replaced, shall be replaced complete with motor.

3.0 EXECUTION:

3.1 Before Any Work is started, the pump driver shall be locked out and tagged to prevent any driving power to the pump. The pump suction and discharge piping shall be valved off, locked, and tagged, or pipe line blanks shall be installed.

3.2 Before Any Work is performed on pumps in acid or other toxic material service, the pump must be vented and drained (flushed, if possible). Acid-proof personal protection shall be worn until pump and parts have been cleaned and neutralized.

3.3 Gaskets shall be replaced whenever a gasketed joint has been disturbed.

3.4 Flexible Coupling Alignment shall be required if either the pump or motor mounting has been disturbed and shall be to the tolerances specified by the flexible coupling manufacturer.

3.5 Removal and Installation of impellers shall be accomplished using pullers, jacks, crane, or hoist. Impact tools are strictly prohibited.

3.6 Turbine Pumps removed from casings shall be lifted vertically to prevent damage to the pump or the pump casing.

3.7 New Impeller Rings, Gaskets, and Strainer shall be installed before reassembly of turbine pumps.

3.8 Relief Valve in discharge line for positive displacement pumps shall be set and tested at 110 percent of design discharge pressure or as recommended by pump manufacturer for service in which pump is used.

SECTION 15261
INSULATION FOR ABOVEGROUND PIPE

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of insulation for aboveground pipe. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Insulation shall be in accordance with the following.

Service Temperature, F Insulation Material

3,000 Maximum Fiber Blanket, ASTM C 892

1,600 Maximum Calcium silicate, ASTM C 533

1,500 Maximum Expanded perlite, ASTM C 610

1,200 Maximum Preformed mineral fiber, ASTM C 547

800 Maximum Cellular glass, ASTM C 552

225 Maximum Rigid, preformed cellular urethane, ASTM C 591

60 F and below Cellular glass, ASTM C 552 (cold piping) or mineral fiber, Fed. Spec. HH-I-558

2.2 Insulation Jacket Materials shall have fire hazard ratings that do not exceed 75 for flame spread and 150 for fuel contributed and smoke developed, except where otherwise required by the authority having jurisdiction. Test ratings shall be determined in compliance with ASTM E 84 and NFPA 255.

2.3 Accessory Materials, including insulating cements, adhesives, staples, coatings, tapes, bands, and other accessory materials shall be as recommended for the particular application by the manufacturer of the insulation or jacket.

3.0 EXECUTION: Vapor barrier shall be continuous throughout each piping run for cold piping (-30 F to 60 F).

SECTION 15262
INSULATION FOR UNDERGROUND PIPE

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of insulation for underground pipe. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Insulation for Conduit Systems shall be calcium silicate complying with ASTM C 533 or polyurethane foam for low temperature systems (250 F and below).

2.2 Insulation Jackets for Conduit Systems shall be cast iron complying with ASTM A 377 or epoxy-coated spiral weld steel conduit for high temperature systems (above 250 F); or shall be polyvinyl chloride complying with ASTM D 1785 or fiberglass reinforced plastic for low temperature systems (250 F and below).

3.0 EXECUTION:

3.1 Backfill on Pipe System shall be 12 inches minimum.

3.2 Ground Surface shall be resodded or otherwise restored to the condition existing prior to the work.

SECTION 15281
BOILER FIREBOX INSULATION

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of boiler firebox insulation. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Block or Board Insulation:

2.1.1 Mineral Fiber Rock, Slag, or Glass in accordance with ASTM C 612.

2.1.2 Fiber blanket, ASTM C 892.

2.1.3 Calcium Silicate in accordance with ASTM C 533.

2.1.4 Cellular Glass in accordance with ASTM C 552.

2.1.5 Cellular Polyurethane in accordance with ASTM C 591.

2.1.6 Expanded Perlite in accordance with ASTM C 610.

2.2 Blanket Insulation: Mineral fiber rock, slag, or glass in accordance with ASTM C 553 or ASTM C 592.

2.3 Loose Fill Insulation:

2.3.1 Mineral Fiber Rock, Slag, or Glass in accordance with ASTM C 764.

2.3.2 Vermiculite in accordance with ASTM C 516.

2.3.3 Perlite in accordance with ASTM C 549.

2.4 Insulating Cement:

2.4.1 Mineral Fiber Rock, Slag, or Glass in accordance with ASTM C 195 or ASTM C 449.

2.4.2 Exfoliated Vermiculite in accordance with ASTM C 196.

2.5 Castable Refractory in accordance with ASTM C 401.

2.6 Spray-Applied Fibrous Insulation in accordance with ASTM C 720 and ASTM C 762.

2.7 Refractory Supports attached to pressure parts of the boiler shall comply with the ASME Boiler and Pressure Vessel Code.

3.0 EXECUTION:

3.1 Safety: The boiler shall be removed from service, cooled, drained, and purged prior to conducting internal inspection or repairs. No personnel shall enter the boiler until the atmosphere in the boiler has been checked and found to be free of toxic, explosive, or suffocating gases.

3.2 Closing up the Boiler: The repair shall not be covered by replaced or reinstalled materials until authorized.

SECTION 15290
DUCTWORK INSULATION

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of ductwork insulation. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Rigid Fiberglass Ductwork Insulation shall conform to Fed. Spec. HH-I-558, Form A. It shall consist of rigid fibrous glass board with foil facing, vapor sealed and attached to ducts with mechanical fasteners. Density shall be 3 lb/ft3.

2.2. Flexible Fiberglass Ductwork Insulation shall conform to Fed. Spec. HH-I-558, Form B. It shall consist of 3/4 lb/ft3 density fibrous glass blanket with reinforced foil and kraft facing lapped and joints sealed vapor tight.

2.3 Ductwork Insulation shall have a flame spread rating not exceeding 75 and a smoke developed rating not exceeding 150 as determined by test procedures in ASTM E 84. Components such as adhesives, mastics, and cements must meet the same individual ratings as the minimum requirements.

2.4 Adhesives shall conform to Mil. Spec. MIL-A-3316.

2.5 Vapor Barrier shall conform to ASTM C 1136 Type I for exposed ducts and Type I or Type II for concealed ducts.

3.0 EXECUTION: Insulation shall be installed so that finishes are smooth and all joints are tight and sealed.

SECTION 15301
FIRE PROTECTION SYSTEMS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of fire protection systems. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Fire Protection System Materials and Components shall be Underwriters' Laboratories (UL) listed and/or Factory Mutual System (FM) approved for their intended use in accordance with all applicable National Fire Protection Association (NFPA) National Fire Codes.

2.2 Test Reports shall be submitted for all tests required by referenced publications applicable to the particular materials and components furnished for use in the work.

3.0 EXECUTION:

3.1 The Design, Fabrication, Installation, and Testing of fire protection systems shall be in accordance with all applicable NFPA National Fire Codes and their respective appendices. These codes include but are not necessarily limited to the following:

| | |
|---|---|
| NFPA 12 | Carbon Dioxide Extinguishing Systems |
| NFPA 16A | Closed-Head Foam-Water Sprinkler Systems |
| NFPA 17 | Dry Chemical Extinguishing Systems |
| NFPA 1961 | Fire Hose |
| NFPA 1962 | Fire Hose, Care, Maintenance and Use |
| NFPA 1963 | Fire Hose Connections |
| NFPA 20 | Fire Pumps, Centrifugal |
| NFPA 30 | Flammable and Combustible Liquids Code |
| NFPA 11 | Foam Extinguishing Systems |

| | |
|---|---|
| NFPA 11A | Foam Systems, Medium and High Expansion |
| NFPA 16 | Foam-Water Sprinkler and Spray Systems |
| NFPA 12B | Halon 1211 Fire Extinguishing Systems |
| NFPA 12A | Halon 1301 Fire Extinguishing Systems |
| NFPA 24 | Private Fire Service Mains |
| NFPA 231C | Rack Storage of Materials |
| NFPA 13A | Sprinkler Systems, Care, Maintenance |
| NFPA 13 | Sprinkler Systems, Installation |
| NFPA 14 | Standpipe and Hose Systems |
| NFPA 26 | Water Supplies, Valves Controlling |
| NFPA 22 | Water Tanks for Private Fire Protection |

3.2 Scheduling Interruptions and Coordination: At least 48 hours before commencing work on any specific system, the Contractor shall notify the Contracting Officer of all interruptions, if any, that must be made to the system and the estimated period of time the system will be out of service during each interruption. Interruptions shall be made only at the time or times approved by the Contracting Officer. Equipment and standby systems shall be provided for building protection during interruption to the existing systems.

3.3 Tests: All field tests required by applicable standards shall be performed in the presence of the Contracting Officer.

SECTION 15401
INTERIOR PLUMBING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of interior plumbing. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work. Contact the Fire Protection Engineering Branch for requirements of piping material.

2.0 PRODUCTS:

2.1 Drinking Water Dispensers:

2.1.1 Electric Water Coolers shall comply with ARI 1010 and shall use one of the halogenated hydrocarbons as refrigerant. Top surfaces of the dispenser in contact with water shall be stainless steel or porcelain enameled steel. Piping connections from the shutoff or stop valve and outlet valve arrangement shall be chrome-plated brass, copper tubing, or stainless steel.

2.1.2 Drinking Fountains shall comply with Fed. Spec. WW-P-541/6.

2.2 Hot Water Generators and Storage Tanks:

2.2.1 Heating Element for the hot water generator shall consist of U-bend coils, a tube sheet, and air element head. The coil shall be seamless tubing inserted into holes in the tube sheet and secured by expanding. The tube sheet shall be copper alloy or other nonferrous metal. Tubing for the heating element shall be light drawn copper tubing complying with ASTM B 75 or copper alloy tubing complying with ASTM B 111, copper alloy No. 706. Element shall be in accordance with Mil. Spec. MIL-H-12322.

2.2.1.1 Copper Tubing shall be designed for a working pressure of 150 psig steam and shall withstand an internal hydrostatic pressure of 225 psig for not less than 15 seconds without leaking or any evidence of damage.

2.2.1.2 Copper Alloy Tubing shall be designed for a working pressure of 400 psig with 400 F hot water and shall withstand an internal hydrostatic pressure of 600 psig for not less than 15 seconds without leaking or any evidence of damage.

2.2.1.3 The Head for the Heating Element shall be close grained cast iron or fabricated steel for steam service, or cast or fabricated steel for high temperature hot water service. The heads shall be partitioned to separate the steam supply and condensate return. The head shall be equipped with tappings or flanges for the supply, return, air relief, and vacuum breaker connections. The air-relief valve and vacuum breaker connection shall be 1/2 inch pipe size.

2.2.2 New Storage Tanks shall be constructed, tested, and marked in compliance with the ASME Boiler and Pressure Vessel Code, Section VIII. The tank shall be glass-lined steel. Tanks shall be cathodically protected if required by local conditions. Tanks shall be in accordance with Mil. Spec. MIL-T-12295. The thermal efficiency and standby heat loss shall comply with the requirements of ASHRAE 90A.

2.2.3 Storage Tank Repair shall comply with the ASME Boiler and Pressure Vessel Code, Section VIII.

2.2.4 Heaters/Storage Tanks shall be equipped with ASME rated accessories.

2.3 Pneumatic Water Supply Systems:

2.3.1 New Pneumatic Tanks shall be designed for 125 psig working pressure and shall be constructed in compliance with ASME Boiler and Pressure Vessel Code, Section VIII. Tanks shall be equipped with manhole in head, water gauge glass, pressure gauges, water pressure relief valves, and tapped openings for all piping.

2.3.2 Compressor shall be belt-driven by a motor having a maximum speed of 1800 rpm. The motor shall have a manual across-the-line starter and thermal overload protection. Guards complying with OSHA requirements shall be provided for all exposed moving parts.

2.3.3 Control System: Pressure switches shall be of the adjustable type having an operating range of 30 to 90 psig. The switch shall be three position type.

2.3.4 Bladder-Type Pneumatic Tank: An ASME code constructed tank stamped for 125 psig water working pressure shall be provided,unless otherwise indicated. The tank shall be sized as indicated and have a flexible diaphragm made of material conforming to FDA requirements for use with potable water and shall be factory precharged to meet required system pressure.

2.4 Gas Fired Water Heaters:

2.4.1 Water Heater Storage Tank shall be steel with a copper or glass lining and shall comply with ANSI Z21.10.1. Equipment shall comply with the approval requirements of AGA Directory of Certified Appliances and Accessories. For elevations above 2,000 feet, the AGA rating shall be reduced at the rate of 4 percent for each 1,000 feet above sea level. Safety pilot valve shall be supplied to automatically shut off the main gas supply to the burner or burners in the event that the pilot flame is extinguished.

2.4.2 Flue Gas Piping shall be single-wall metal pipe constructed of not less than No. 24 B&S gauge sheet copper or No. 20 gauge galvanized sheet steel.

2.4.3 Relief Valves shall comply with ANSI Z21.22. Relief valves shall be ASME rated.

2.4.4 Thermostat shall be snap action type actuated by water temperature.

2.5 Oil Fired Water Heaters:

2.5.1 Water Heater Tank shall be glass-lined steel. Tanks of 120-gallon capacity, or less, shall be hydrostatically tested to 300 psig. Tanks shall have vertical flue passages or annular flue passages between the tank and the casing. Tanks shall be cathodically protected if required by local conditions.

2.5.2 Burner shall be mechanical pressure atomizing type.

2.5.3 Controls shall consist of a combustion safeguard (primary control) to shut down the burner in event of ignition failure or flame failure, a limit control to prevent overheating in case of thermostat failure, and a thermostat of the adjustable immersion type to control water temperature.

2.5.4 Relief Valve shall comply with ANSI Z21.22. Relief valves shall be ASME rated.

2.5.5 Draft Regulator shall be of the automatic, barometric type designed for installation in the chimney or flue connector at the outlet of the water heater. The draft regulator shall meet the requirements of UL 378.

2.5.6 Flue Gas Piping shall be single wall steel pipe, minimum 28 gauge. Finish shall be zinc coated or oxidized to form blue black color.

2.6 Electric Water Heaters:

2.6.1 Water Heater Tanks shall be glass-lined steel complying with Fed. Spec. W-H-196, with dual heating elements. Tanks shall be cathodically protected if required by local conditions.

2.6.2 Relief Valves shall comply with ANSI Z21.22. Relief valves shall be ASME rated.

2.6.3 Thermostats shall be provided in compliance with UL 174.

2.6.4 Wiring shall comply with NFPA 70.

2.6.5 Heating Elements shall be medium watt density commercial grade incoloy sheathed flanged mounted elements with prewired terminal leads, and element fusing per the National Electrical Code.

2.7 Lavatories:

2.7.1 Lavatories shall be first quality vitreous china or enameled cast iron.

2.7.2 Drains and Jam Nuts shall be cast wrought copper alloy. Strainer shall be copper alloy or corrosion-resisting steel.

2.7.3 Faucets shall be single, center set, combination, or single control mixing type, complying with Fed. Spec. WW-P-541/4.

2.7.4 Stop Valves shall be angle or straight type and constructed of copper alloy, chrome plated.

2.7.5 Traps shall be P-type.

2.7.6 Soap Dispensers shall be glass or metal type with a capacity of 12 fluid ounces for liquid soap.

2.8 Urinals:

2.8.1 Wall-Hung Urinals shall have integral trap and extended shield; shall have washout, blowout, or siphon-jet flushing action; and shall be constructed of first quality vitreous china.

2.8.2 Pedestal Type Urinals shall have integral trap, siphon-jet flushing action, and a bottom outlet for connection to a closet type floor flange. Urinal shall be constructed of first quality vitreous china.

2.8.3 Trough Type Urinals shall be wall-hung with an integral flushing rim and shall be constructed of first quality vitreous china.

2.9 Water Closets:

2.9.1 Elongated Bowl Water Closets shall be of the siphon jet, floor outlet type, for use with a flush valve and constructed of first quality vitreous china. Seats shall be open front, less cover, constructed of molded plastic or wood.

2.9.2 Regular Bowl Water Closets shall be of the siphon jet, floor outlet type, constructed of first quality vitreous china. The tank shall be separate, secured to and supported by the water closet and shall contain a copper, copper alloy, or corrosion-resisting steel float and flush valve with a refill tube, operating lever, and control valve stop and supply pipe. Seats shall be closed front, with cover constructed of molded plastic or wood.

2.9.3 Fittings: Floor flanges, gaskets, bolts, and screws shall be supplied. Flanges may be copper, copper alloy, or cast iron. Gaskets shall be nonstaining wax.

2.10 Sinks:

2.10.1 Kitchen Sink shall be single or double bowl enameled cast iron, porcelain enameled formed steel, or corrosion-resisting formed steel.

2.10.2 Service Sink shall be single bowl, trap standard, floor or wall mounting. Sink shall be constructed of enameled cast iron or vitreous china. Rim guard shall be copper alloy or corrosion-resisting steel.

2.10.3 Faucets shall be a single center set or combination type complying with Fed. Spec. WW-P-541/5. Vacuum breaker shall be provided on faucets where required by codes. Handicapped faucets shall be provided with lever or wrist blades.

2.10.4 Drains shall have a removable metal strainer, jam nut, coupling, and tail piece.

2.10.5 Traps for kitchen sinks shall be P-type chrome plated. Exterior surfaces of traps for service sinks shall be as cast or painted.

2.11 Bathtubs shall be enameled cast iron or porcelain enameled formed steel in compliance with Fed. Spec. WW-P-541/3 or shall be fiberglass reinforced plastic. Drains shall be chrome-plated with pop-up or trip lever stopper.

2.12 Laundry Tubs:

2.12.1 Laundry Tubs shall be double bowl enameled cast iron or corrosion-resisting formed steel with frame, wall, pedestal, or leg support.

2.12.2 Faucet shall be mounted in back of tub and shall be a separate or combination fitting. Combination faucet shall have exposed valve body, union inlet, and swing spout. Finish shall be chrome or nickel plated. Vacuum breakers shall be provided on faucets where required by codes.

2.12.3 Drain shall have a removable metal strainer, jam nut, coupling, and tail piece. Drain shall have a suitable rubber type stopper.

2.12.4 Trap shall be P-type with cleanout plug and shall be chrome-plated.

2.13 Flush Valves: Flush valve shall be a large diaphragm or large piston type exposed style with a side oscillating handle. The flush valve shall have a vacuum breaker; a control stop with or without a cap; a back check in the control stop with or without a cap; a back check in the control stop or anti-siphon within the valve; a flush connection with coupling nuts, gaskets, and spud

flanges; and a wall flange or escutcheon. Exposed surfaces of the flush valve shall have a bright chrome-plated finish. The valve shall be capable of operating without chatter or water hammer and shall deliver 2 gallons minimum for urinals and 4 gallons minimum for water closet per flush at any inlet pressure from 10 psi to 50 psi.

2.14 Showers shall be wall mounted, column, bath, free standing cabinet, or emergency type complying with Fed. Spec. WW-P-541/7. Shower heads and handles shall be copper alloy or corrosion-resisting steel. Escutcheons shall be corrosion-resisting steel or copper alloy. Control valves shall be copper alloy and have metal integral parts of copper alloy, nickel alloy, or corrosion-resisting steel. Control valves shall be thermostatic mixing; pressure balancing; mechanical, either mixing or single control; or separate hot and cold water valves. Shower heads shall be nonadjustable.

2.15 Floor Drains:

2.15.1 Cast-Iron Drains shall comply with ANSI A112.21.1, Figure 3.3. Body shall be cast iron and strainer shall be chrome-plated bronze.

2.15.2 Polyethylene Drains shall be constructed of polyethylene complying with ASTM D 1248.

2.15.3 Gaskets shall be neoprene complying with ASTM C 564 or as recommended by the drain manufacturer.

2.16 Wall Faucets: Provide faucets with vacuum breaker, backflow preventer, brass body, 3/4-inch male inlet threads, hexagon shoulder, and 3/4-inch hose connection. Faucet handle shall be securely attached to stem.

2.17 Wall Hydrants: Provide hydrants with vacuum breaker, backflow preventer, nickel-brass or nickel-bronze wall plate, and detachable key handle. Hydrant shall be self-draining and have 3/4-inch exposed hose thread on spout.

2.18 Lawn Faucets: Provide faucets with either straight or angle brass bodies, and shall be of the compression type. Faucet spout shall have 3/4-inch hose threads, and handle shall be securely attached to stem.

2.19 Yard Hydrants: Yard box or post hydrants shall have valve housings located below frost lines. Hydrants shall be bronze with cast-iron box or casing guard. "T" handle key shall be provided.

2.20 Backwater Valves: Valves shall be of the flap type, hinged orpivoted, with revolving disks. Hinge pivots, disks, and seats shall be nonferrous metal.

3.0 EXECUTION:

3.1 Installation of New Equipment and Repair of Existing Equipment shall comply with NAPHCC National Standard Plumbing Code. Mounting height of fixtures for use by the physically handicapped shall be in accordance with ANSI A117.1.

3.2 Repair of the Pneumatic Pressure Tank shall comply with ASME Boiler and Pressure Vessel Code, Section VIII.

3.3 Testing of Repaired Tanks: After repairs have been completed, hot water generator storage tanks and pneumatic pressure tanks shall be tested in compliance with ASME Boiler and Pressure Vessel Code, Section VIII.

3.4 Flue Gas Piping: New flue gas piping shall be installed in compliance with NFPA 211. New flue gas vent piping shall be installed in compliance with NFPA 54.

3.5 Faucet Repair shall be limited to replacement of washers, renewable seats, or broken handles.

3.6 Air Chambers for prevention of water hammer shall be checked to see if they are waterlogged.

SECTION 15451
STEEL TANKS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of steel tanks. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Tank Materials shall be as required for the service by AWWA D100 or D103 for water tanks, or by API standards for petroleum product tanks.

2.2 New Tanks shall comply with AWWA or API standards as applicable for the service. Storage tanks for flammable liquids shall also comply with UL and NFPA requirements.

2.3 Nozzle Flange Diameters and Drillings shall be in compliance with ANSI B16.5.

2.4 Butt Weld Nozzles shall be in compliance with ANSI B16.25.

3.0 EXECUTION:

3.1 Tank Repair and Installation Work shall comply with applicable requirements of AWWA D100 or D103, or with API standards.

3.2 Welding shall be performed in accordance with AWS D1.1. Pipe welding to nozzles shall be performed in accordance with ASME Boiler and Pressure Vessel Code, Section IX.

SECTION 15452
PLASTIC TANKS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of plastic tanks. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Tank Material shall be reinforced fiberglass polyester in compliance with AWWA D120 for water tanks, or ASTM C 582 for tanks in chemical service.

2.2 New Tanks shall be horizontal, cylindrical tanks and shall comply with AWWA D120 or ASTM D 3299 as applicable. Chemical resistance tests, when required, shall be performed at the fabrication shop in compliance with ASTM C 581.

2.3 Nozzle Flange Diameters and Drillings shall be in compliance with ANSI B16.5.

3.0 EXECUTION: Repair and installation work shall be performed in compliance with recommended procedures and practices of SPII and of PPI, where applicable.

SECTION 15475
POOL EQUIPMENT

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of pool equipment. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Electric Swimming Pool Heaters shall be UL listed and shall conform to the ASME Boiler and Pressure Vessel Code. The heating elements shall be constructed of copper and shall be pre-wired with the connection at the element terminal sealed against moisture. Controls shall include a differential thermostat and a high temperature limit manual reset switch.

2.2 Gas-Fired Swimming Pool Heaters shall conform to the ASME Code and shall be approved by the American Gas Association. Heat exchangers shall be two-or four-pass design with copper-finned tubes. The burner shall be constructed of stainless steel and shall be provided with all necessary valving to meet ASME Code requirements.

2.3 Diatomite Filtration System shall consist of a centrifugal circulating pump, plastic filter elements surrounded by diatomaceous earth coating, a dry chemical feeder for feeding diatomaceous earth, and a modulating level control valve for the filter inlet line.

2.4 Swimming Pool Chlorinators shall be the gaseous chlorine cylinder-mounted type. Materials for construction of chlorinators shall be in accordance with recommendations of the Chlorine Institute.

2.5 Swimming Pool Surge Tank System shall include a surge tank, a vertical pump, and an electronic float switch. The surge tank shall be in compliance with ASME Code requirements for unfired pressure vessels.

2.6 Pool Drains shall be constructed of cast iron.

3.0 EXECUTION:

3.1 Personnel shall not begin repairs on the electric swimming pool heater until power to the heater has been disconnected.

3.2 Chlorine Gas Storage and Use shall be in accordance with recommendations of the Chlorine Institute Inc., Chlorine Manual.

SECTION 15481
COMPRESSED AIR EQUIPMENT

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of compressed air equipment. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 All New Compressed Air Equipment and Materials for Repair or Replacement shall comply with ANSI/ASME B19.3, and ASME Boiler and Pressure Vessel Code, Section VIII.

2.2 New Reciprocating Air Compressors shall be of the single or two-stage, heavy-duty, double-acting, water-cooled or air-cooled, "Y" or "L" cylinder type complete with flange-mounted drive motor. The piston, valve, and cylinder construction shall not require lubrication. Teflon piston rings and Teflon or carbon rider rings shall be used. Compressors shall operate at a speed not in excess of 1,800 rpm.

2.2.1 Bearings: Main crankshaft bearings shall be anti-friction roller or ball type. Connecting rod bearings shall be sleeve type.

2.2.2 Valves: Compressor cylinder valves shall be of the channel, feather, or plate type suitable for service without external lubrication.

2.2.3 Lubrication: Force-feed lubrication system shall lubricate the crankshaft, connecting rod, and crosshead bearings.

2.2.4 Rod Packing: Piston rod packing shall be Teflon or carbon non-lubricating type.

2.2.5 Intake Air Filter - Silencer shall be a pipe-supported dry type capable of removing 95 percent of all particles 10 microns and larger.

2.2.6 Intercooler and Aftercooler shall be a shell-and-tube or plate type.

2.2.7 Motor shall be squirrel-cage induction, dripproof, NEMA Class B, with split-sleeve bearings.

2.3 New Centrifugal and Rotary Screw Compressors shall be of the multi-stage or two-stage type driven by an electric motor through speed-increaser gears.

2.3.1 Intake Air Filter-Silencer shall be a full-capacity dry type capable of removing 95 percent of all particles 10 microns and larger.

2.3.2 Blowoff Silencer shall be a full-capacity blowoff vent type.

2.3.3 Bearings: Centrifugal compressor radial bearings shall be of the pivoted shoe type. Axial bearings shall be Kingsbury-type thrust bearings capable of absorbing thrust in either direction. Rotary screw compressor radial bearings shall be anti-friction roller type. Ball thrust bearings shall be provided to carry the axial load.

2.3.4 Seals: Centrifugal compressors shall be labyrinth or carbon ring-type air and oil seals. Rotary screw compressors shall be stainless steel sealing rings.

2.3.5 Intercoolers and Aftercoolers shall be water-cooled shell and tube type.

2.3.6 Vents and Drains: Vents shall be tapped and plugged. Drains shall be complete with drain valves.

2.3.7 Lubricating Oil System shall be a shaft-driven main oil pump, motor-driven auxiliary oil pump, dual oil coolers, oil reservoir, dual oil filters, pressure switches and gauges, check valves, valves, and interconnecting piping.

2.3.8 Check Valves shall be 150-pound class, carbon steel.

2.4 New Control Air Compressor and Dryer shall be air-cooled with a reciprocating compressor and a single receiver constructed in accordance with ASME Code requirements. Motor shall be NEMA Class B design with built-in overload protection. Unit shall include an air gauge, pop safety valve, external check valve, filter, pressure switch, and drain cock. Air dryer shall be refrigerated type designed for continuous operation with hermetically sealed compressor, heat exchanger, ambient air filter, and automatic drain trap. Oil and water filter shall have aluminum housing with pressure rating of 250 psig at 70 F and include manual drain valve and 10 replacement filters.

2.5 Aftercoolers shall be of the watercooled, shell-and-tube pipeline type with adequate surface area to limit the discharge to the temperature required. The unit shall include moisture separators, gauge glasses, automatic condensate traps, valves, drain piping, and thermal reliefs on the water side.

2.6 Receivers shall meet ASME Boiler and Pressure Vessel Code, Section VIII, Division 1 requirements and shall include pressure gauge, relief valve, shutoff valve, automatic moisture trap, and drain valve. Receivers shall be designed for 200 psi.

2.7 All Rotating Parts and Equipment shall be true, dynamically balanced at the factory, and shall include vibration isolators.

2.8 Safety Guards shall meet OSHA requirements.

2.9 Pressure Regulators shall be designed for a maximum inlet pressure of 125 psi and a maximum temperature of 200 degrees F. Regulators shall be single-seated, pilot-operated with valve plug, bronze body and trim, and threaded connections. Regulator shall include a pressure gauge.

3.0 EXECUTION:

3.1 Repair and Replacement Work done on receiver tanks shall be in accordance with ASME Boiler and Pressure Vessel Code and the NBBI. Repair procedures shall provide structural integrity as required by NB-23.

3.2 Welding shall be performed in compliance with AWS D1.1 and ASME Boiler and Pressure Vessel Code, Section IX.

3.3 Repaired Pressure Parts and Replacement Pressure Parts shall be tested after completion of repair or installation in accordance with the ASME Code.

SECTION 15556
FIRE TUBE BOILERS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for repair and maintenance of fire tube boilers. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS: Replacement parts and materials shall comply with requirements of the ASME Boiler and Pressure Vessel Code for new construction.

3.0 EXECUTION:

3.1 No Personnel shall enter the boiler until the boiler has been removed from service, cooled, drained, and purged and the atmosphere in the boiler has been checked and found to be free of toxic or explosive gases.

3.2 Repair and Maintenance Work shall be performed in accordance with procedures developed by the Contractor that are in compliance with requirements of the ASME Boiler and Pressure Vessel Code and the NB-132 and have been approved by the Contracting Officer.

3.3 Waterside Repairs: Wash drum internals to remove loose scale and soft deposits prior to making repairs.

3.4 Fireside Repairs:

3.4.1 Remove Soot and Other Deposits from furnace tube, fire tubes, and tube sheets.

3.4.2 Cracks at the junction of the furnace tube and tube sheet shall be repaired by welding.

3.4.3 Boiler Shell and Tube Sheet Patches shall be designed and installed in compliance with the National Board Inspection Code Chapter VI. All patches shall comply with the requirements for new construction of ASME Boiler and Pressure Vessel Code, Section I or IV.

3.4.4 Damaged Fire Tubes shall be removed and replaced with new tubes, except for a single leaking fire tube, which may be repaired by plugging at tube sheet at both ends.

3.4.5 Corroded Surfaces may be built up by fusion welding in compliance with the NBBI National Board Inspection Code.

3.4.6 Seal Welds used for fluid tightness shall be applied in compliance with NB-132.

3.5 Closing the Boiler:

3.5.1 Manholes, Handholes, and Gaskets: Clean seating surfaces, replace old gaskets with new gaskets, and reinstall or close all manholes and handholes.

3.5.2 Front and Rear Door: Clean seating surface, replace gaskets, and close front and rear access doors.

3.5.3 The Repair shall not be covered by replaced or reinstalled materials until authorized.

3.6 Inspection and Testing of completed boiler repairs shall be in compliance with the ASME Code.

SECTION 15557
WATER TUBE BOILERS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for repair and maintenance of water tube boilers. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS: Replacement parts and materials shall comply with requirements of the ASME Boiler and Pressure Vessel Code for new construction.

3.0 EXECUTION:

3.1 No Personnel shall enter the steam drum or lower drum until the boiler has been removed from service, cooled, drained, and purged and all steam and water valves, including drain and blowdown valves, have been closed, and locked or tagged. No personnel shall enter the boiler until the atmosphere in the boiler has been checked and found to be free of toxic or explosive gases.

3.2 Repair and Maintenance Work shall be performed in accordance with procedures developed by the Contractor that are in compliance with requirements of ASME Boiler and Pressure Vessel Code and the NB-132 and have been approved by the Contracting Officer.

3.5 Waterside (Internal) Repairs: Wash drum internals to remove loose scale and soft deposits. Turbine the water tubes. Perform chemical cleaning by either circulation or soaking.

3.6 Cracks in Drums shall be repaired in compliance with the NBBI National Board Inspection Code.

3.7 Tube Seat Leaks may be repaired by internal seal welding of the tubes in compliance with NB-132.

3.8 Fireside (External) Repairs:

3.8.1 Clean Deposits from fireside surfaces by washing with hot alkaline water, brushing, scraping, or air lancing. Surfaces shall be dried immediately after washing.

3.8.2 Corroded Surfaces may be built up by fusion welding in compliance with NB-l32, Chapter VI.

3.8.3 Drum Shell Patches shall be designed and installed in compliance with NB-132.

3.8.4 Minor Cracks in tube shall be repaired by replacement of a tube section. Minimum length of replacement tube section shall be 12 inches. Use backing rings when sections are welded into existing tubes. Use the TIG (tungsten-inert-gas) process for the root pass.

3.8.5 For Major Tube Damage, replace entire tube. If only one or two tubes require replacement, the damaged tubes may be removed and the holes plugged if approved by the Contracting Officer.

3.8.6 Seal Welds used for fluid tightness shall be applied in compliance with NB-132.

3.9 Closing the Boiler:

3.9.1 Manholes, Handholes, and Gaskets: Clean seating surfaces, replace old gaskets with new gaskets, and reinstall or close all manholes and handholes.

3.9.2 The Repair shall not be covered by replaced or reinstalled materials until authorized.

3.10 Inspection and Testing of completed boiler repairs shall be in compliance with the ASME Code.

SECTION 15558
HIGH TEMPERATURE WATER BOILERS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for repair and maintenance of high temperature water boilers. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS: Replacement parts and materials shall comply with requirements of the ASME Boiler and Pressure Vessel Code for new construction.

3.0 EXECUTION:

3.1 Personnel shall not enter the boiler until it has been removed from service, cooled, drained, and purged.

3.2 Repair and Maintenance Work shall be performed in compliance with requirements of the ASME Boiler and Pressure Vessel Code and the NBBI National Board Inspection Code, and approved by the Contracting Officer.

3.3 Tubes shall be replaced as specified in NB-23.

3.4 Tube Joints, Headers, and Drums shall be repaired as specified in NB-23.

3.5 Material and Equipment removed for access to the boiler or to make repairs shall be reinstalled following successful completion of performance tests and authorization of the Contracting Officer.

3.6 Repairs to Pressure Parts shall be inspected and tested as specified in NB-23. The Contractor shall submit the Inspection Certificate to the Contracting Officer.

SECTION 15559
CAST-IRON BOILERS AND FIREBOXES

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for repair and maintenance of cast-iron boilers and fireboxes, and furnishing and installation of cast-iron boilers. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS: Replacement parts and materials shall comply with the requirements of the ASME Boiler and Pressure Vessel Code for new construction.

2.1 Gas-Fired, Oil-Fired, and Combination Gas/Oil-Fired Boilers: Boilers shall be rated and tested in accordance with ANSI Z21.13. Boilers shall meet the requirements of the following safety codes and standards: UL 726, UL 795, and UL 296. Boilers shall be provided with combustion controls.

3.0 EXECUTION:

3.1 No Personnel shall enter the boiler until it has been removed from service, cooled, drained, and purged, and the atmosphere has been checked and found to be free of toxic or explosive gases.

3.2 Repair and Maintenance Work shall be performed in accordance with procedures developed by the Contractor, in compliance with requirements of the ASME Boiler and Pressure Vessel Code and NB-132, and approved by the Contracting Officer.

3.3 Clean Fireside Surfaces: Thoroughly clean flueway and firebox surfaces.

3.4 Clean Waterside Surfaces to remove sludge and sediment.

3.4.1 On Steam Boilers, open blowdown valve and flush water until clear while under steam pressure. On water boilers, open boiler drain cock to remove sludge and sediment that have settled to the bottom. Then refill boiler to correct water level for steam boilers or correct water pressure for water boilers.

3.4.2 If Boiler is Shut Down, remove plugs and open drain cock. Wash the inside of the boiler with water to remove sludge and sediment. Fill boiler and drain again. Fill boiler to correct level or pressure.

3.5 Replace Damaged Boiler Section: Clean seating surfaces and replace gaskets or sealant before installing boiler sections.

3.6 Repair Cracks by brazing in compliance with the ASME Boiler and Pressure Vessel Code, Section IV and Section IX.

3.7 Closing the Boiler:

3.7.1 Manholes, Handholes, and Gaskets: Clean seating surfaces, replace old gaskets with new gaskets, and reinstall or close all manholes and handholes.

3.7.2 Other Materials: The repair shall not be covered by replaced or reinstalled materials until authorized.

3.8 Inspection and Testing of completed boiler repairs shall be in compliance with the ASME Code.

SECTION 15560
CLEANING OF BOILERS

1.0 DESCRIPTION OF WORK: This specification covers cleaning of boilers. Products and materials used shall be in accordance with the boiler manufacturer's recommendations and/or shall be as directed by the Contracting Officer. Cleaning procedures shall be developed by the Contractor and shall be in accordance with the boiler manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Equipment required for cleaning, such as acid feed tank and pump, alkaline feed tank and pump, mixer, neutralizer tank and pump, power brushes, high pressure sprays, and other equipment shall be supplied by the Contractor.

2.2 Chemical Cleaning Materials:

2.2.1 Boilout Chemicals shall be trisodium phosphate complying with ASTM D 538, caustic soda complying with ASTM D 456, and soda ash complying with ASTM D 458.

2.2.2 Acid Cleaning Chemicals shall be:

Hydrochloric Acid complying with Fed. Spec. 0-H-765
Ammonium Bifluoride, N2H4F2
Hydroxycetic Acid, CH2OHCOOH, Technical Grade
Formic Acid, HCOOH, Technical Grade
Phosphoric Acid complying with Fed. Spec. 0-0-670
Sulfuric Acid complying with Fed. Spec. 0-S-809
Sulfamic Acid, HSO3NH2

2.2.3 Neutralizing-Passivating Chemicals shall be as follows:

Monosodium Phosphate, H2NaO4P
Di-sodium Phosphate, Na2HPO4
Ammonia, Anhydrous, complying with Fed. Spec. 0-A-445
Hydrazine, Anhydrous, H2NNH2
Sodium Sulfite complying with Mil. Spec. MIL-S-13943
Sodium Nitrate complying with Mil. Spec. MIL-S-322

2.2.4 Flushing Water shall be demineralized water with a conductivity end point of 50 micro-ohms.

2.2.5 Pressure Draining Gas shall be commercially pure, 99.5 percent nitrogen.

2.3 Mechanical Cleaning Materials and Equipment:

2.3.1 Brushes shall be of the type for use with power units.

2.3.2 Washwater shall be hot alkaline washwater for removing ash deposits.

3.0 EXECUTION:

3.1 Clean Boilers of all scale and deposits.

3.2 Inspection: After cleaning, the boiler shall be given a visual inspection for effectiveness of scale removal.

3.3 Welding and Burning: No welding or burning shall be allowed during cleaning operations.

3.4 Alkaline Boilout:

3.4.1 Boilout Chemicals shall be completely dissolved in water before being introduced into the boiler.

3.4.2 Boilout chemicals shall be trisodium phosphate and caustic soda, 1,500 to 2,500 ppm concentration or caustic soda and soda ash, 3,000 ppm concentration.

3.4.3 Boilout Pressure shall be operating pressure for boilers operating at 200 psig and less. For boilers operating at above 200 psig, the boilout pressure shall be 200 psig or one-half the operating pressure, whichever is higher. In no case shall boilout pressure exceed 600 psig.

3.4.4 Concentration of Chemicals and duration of boilout will be dependent upon the scale analysis. Boilout time may vary from 8 to 24 hours with boiler water solids purged by blowdown at approximately 4-hour intervals.

3.4.5 Flush Unit with demineralized water until the effluent is clear of visible solids.

3.5 Acid Cleaning, using either the circulating or soaking method, shall be done in the following sequence.

a. Wash heating surfaces with an acid solvent containing a proper inhibitor.

b. Flush unit with clean water.

c. Neutralize and passivate the unit.

d. Flush the unit with clean water.

3.6 Circulating Method:

3.6.1 Acid Application: Acid cleaning time shall vary from a minimum of 4 hours, depending on scale analysis. Time shall be determined by analyzing samples of return solvent for iron concentration and acid strength.

3.6.2 Flushing: After cleaning, flush unit with demineralized water until pH reaches 6.5.

3.6.3 Neutralization: After flushing, neutralize the unit with ammonia and hydrazine for 2 hours at 200 F.

3.6.4 Final Flush: Final flush with demineralized water until pH reaches 7.5.

3.7 Soaking Method:

3.7.1 Application: Acid cleaning time shall vary from 4 to 8 hours depending on scale analysis. For soft sludges, cleaning time shall be a minimum of 4 hours. Cleaning time shall be 6 hours for thin coatings of hard scale. For heavy deposits, cleaning time shall be a maximum of 8 hours. The time periods noted are actual retention time of the solvent in the unit, including the time of filling and draining. Unit shall be drained under nitrogen pressure.

3.7.2 Flushing: After required cleaning time, flush unit with demineralized water.

3.7.3 Neutralizing: After flushing, the unit shall be neutralized and passivated with a solution of soda ash and boiled out for a period of 4 to 6 hours. The boilout pressure shall be operating pressure for boilers operating at 200 psig and less. For boilers operating at above 200 psig, the boilout pressure shall be 200 psig or one-half the operating pressure, whichever is higher. In no case shall boilout pressure exceed 600 psig.

3.7.4 Final Flush: After boilout, the unit shall be drained and flushed with demineralized water containing sodium nitrate, until the pH reaches 7.5.

3.8 Effluent Neutralization: The solvent effluent drained from the unit shall be neutralized with caustic soda or soda ash to a pH of 6.8 to 8.5.

SECTION 15565
FIREBRICK FIREBOXES FOR BOILERS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for repair and maintenance of fire brick fireboxes for boilers. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Replacement Parts and Materials for pressure parts, or for attachment to pressure parts, shall comply with requirements of the ASME Boiler and Pressure Vessel Code for new construction.

2.2 The Following Refractory Materials shall comply with the requirements of ASTM C 27: fire brick, refractory tile, plastic refractory, castable refractory, and refractory mortar.

3.0 EXECUTION:

3.1 Repair and Maintenance Work shall be performed in accordance with procedures developed by the Contractor that are in compliance with requirements of the ASME Boiler and Pressure Vessel Code and have been approved by the Contracting Officer.

3.2 No Personnel shall enter the boiler until it has been removed from service, cooled, drained, and purged, and the atmosphere in the boiler has been checked with a Burrel or other suitable instrument and found to be free of toxic, explosive, or suffocating gases.

3.3 Fire Tube Boilers:

3.3.1 When Replacing Burner Throat Tile, maintain correct throat diameter and ensure that throat is centered in the furnace.

3.3.2 Repair Burner Throat and Furnace Liner Tile Cracks with high temperature bonding mortar.

3.3.3 Wash Coat Burner Throat and Furnace Liner Tile with high temperature bonding mortar diluted with water.

3.3.4 Patch Cracks, 1/8 inch and larger in width, with high temperature bonding mortar or high temperature plastic refractory.

3.3.5 Patch Gap between castable refractory and baffle tile with high temperature plastic refractory.

3.3.6 Patch Damaged Rear Door Refractory with castable refractory.

3.4 Watertube Boilers: Repair cracks with ceramic fiber. Apply wash coat to burner throat.

3.5 Closing the Boiler: Repairs shall not be covered by replaced or reinstalled materials until authorized.

3.6 Drying Out:

3.6.1 Air Dry: Allow refractory to air dry as long as possible.

3.6.2 Fire Dry: To thoroughly dry refractory by firing, fire boiler intermittently at low rate.

SECTION 15566
FIREBRICK FOR INSULATION OF BOILER FIREBOXES

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of firebrick for insulation of boiler fireboxes. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Replacement Parts and Materials for attachment to pressure parts of the boiler shall comply with requirements of the ASME Boiler and Pressure Vessel Code for new construction.

2.2 Firebrick, Plastic Refractory, Castable Refractory, and Refractory Mortar shall conform to the requirements of ASTM C 27.

3.0 EXECUTION:

3.1 No Personnel shall enter the boiler until it has been removed from service, cooled, drained, purged, and the atmosphere in the boiler has been checked with a Burrel or other suitable instrument and found to be free of toxic, explosive, or suffocating gases.

3.2 Repair and Maintenance Work shall be performed in accordance with procedures in compliance with requirements of the ASME Boiler and Pressure Vessel Code and NB-132, and approved by the Contracting Officer.

3.3 Closing the Boiler: Repairs shall not be covered by replaced or reinstalled materials until authorized.

3.4 Drying Out: Allow refractory to dry as long as possible.

SECTION 15571
OIL-FIRED AND GAS-FIRED BURNERS FOR BOILERS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of oil-fired and gas-fired burners for boilers. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Oil-Fired Burner Pipe, Tubing, Fittings, Flanges, Valves, and Gaskets shall comply with the requirements of ASME B31.1.

2.2 Gas-Fired Burner Pipe, Tubing, Fittings, Flanges, Valves, and Gaskets shall comply with the requirements of ANSI Z223.1.

2.3 Burner and Pilot System and Combustion and Safety Controls shall comply with the requirements of NFPA 85A, 85B, or 85D; or Mil. Spec. MIL-B-18796.

2.4 Electrical Devices: Electrical equipment, control relays, devices, wiring, and enclosures shall comply with the requirements of ANSI C1.

3.0 EXECUTION:

3.1 No Personnel shall enter the boiler until it has been removed from service, cooled, purged and the atmosphere in the boiler has been checked with a Burrel or other suitable instrument and found to be free of toxic, explosive, or suffocating gases.

3.2 Before Welding, Brazing, or Cutting, gas piping shall be purged and the atmosphere checked and found to be free of an explosive gas mixture.

3.3 Oil-Fired Burner Repairs: All oil-fired burners, equipment, and control repairs shall be accomplished in compliance with ANSI B31.1 and C1, NFPA 85A or 85D, and Mil. Spec MIL-B-18796. All welding of piping shall comply with the welding procedures and qualifications of ANSI B31.1.

3.4 Gas-Fired Burner Repairs: All gas-fired burners, equipment, and control repairs shall be accomplished in compliance with ANSI Z223.1 and C1, NFPA 85A or 85B, and Mil. Spec. MIL-B-18796. All welding of piping shall comply with the welding procedures and qualifications of ANSI B31.2.

3.5 Inspection and Testing:

3.5.1 Leak Test all piping.

3.5.2 Pressure Test all piping in compliance with ANSI B31.1 for oil-fired burners or ANSI B31.2 for gas-fired burners.

SECTION 15572
COAL-FIRING SYSTEMS FOR BOILERS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of coal-firing systems for boilers. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Coal-Firing System Equipment and Materials shall comply with the requirements of ANSI B31.1, ASME Boiler and Pressure Vessel Code Section II, and NFPA 85E.

2.2 Burner and Pilot System and Combustion and Safety Controls shall comply with the requirements of NFPA 85E.

2.3 Electrical Devices: Electrical equipment, control relays, devices, wiring, and enclosures shall comply with the requirements of ANSI C1 and NFPA 70.

3.0 EXECUTION:

3.1 No Personnel shall enter the boiler until it has been removed from service, cooled, purged, and the atmosphere in the boiler has been checked with a Burrel or other suitable instrument and found to be free of toxic, explosive, or suffocating gases.

3.2 Before Welding, Brazing, or Cutting, coal piping shall be purged and the atmosphere checked and found to be free of an explosive coal/air mixture.

3.3 Coal-Fired Burner Repairs: All coal-fired burners, equipment, and control repairs shall be accomplished in compliance with ANSI B31.1 and C1, ASME Boiler and Pressure Vessel Code, Section II, and NFPA 85E. All welding of piping shall comply with the welding procedures and qualifications of ANSI B31.1 and ASME Boiler and Pressure Vessel Code, Section IX.

3.5 Testing: Leak test all piping. Pressure test all piping in compliance with ANSI B31.1 and ASME Boiler and Pressure Vessel Code, Section II.

SECTION 15573
DRAFT CONTROL EQUIPMENT

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of draft control equipment. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Structural Steel shall comply with ASTM A 36.

2.2 Steel Pipe shall comply with ASTM A 53.

2.3 Piping Components shall comply with ASTM A 105.

2.4 Flanges, Fittings, and Valves shall comply with ASTM A 181.

2.5 Seamless Copper Tube shall comply with ASTM B 75.

2.6 Insulation shall comply with ASTM C 547.

2.7 Thermal Insulation and Finishing Cement shall comply with ASTM C 449.

2.8 Welding and Brazing Materials shall be as specified in Section II of the ASME Boiler and Pressure Vessel Code.

3.0 EXECUTION:

3.1 Safety: Adequate natural or forced ventilation shall be provided during repair activities conducted in confined spaces. Forced or induced draft fans shall be rendered inoperable before performing internal repairs to the fan casing or adjacent ductwork.

3.2 Repairs shall be accomplished in compliance with NFPA 70.

3.3 Welding and Brazing shall be performed in accordance with Section IX of the ASME Boiler and Pressure Vessel Code.

3.4 Drive Train Components shall be repaired or replaced to transmit power free from vibration at the required torque.

SECTION 15576
BREECHING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of breeching. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Metal Breeching:

2.1.1 Carbon Steel shall comply with ASTM A 568.

2.1.2 Galvanized Steel shall be carbon steel complying with ASTM A 568, galvanized in compliance with ASTM A 123.

2.1.3 Stainless Steel shall comply with ASTM A 167.

2.1.4 High Heat Insulating Refractory shall be an alumina-silica-base castable refractory complying with ASTM C 27.

2.1.5 Acid Resistant Liner shall be phenolic, rubber, and polyester resin liner.

2.1.6 Insulation: Calcium silicate block type insulation shall comply with ASTM C 533. Mineral fiber insulation shall be block type complying with ASTM C 612, Class 1.

2.1.7 Bolts and Nuts: Where breeching is connected to stack by means of a flange, bolts shall be high temperature alloy steel bolts complying with ASTM A 193, with hex nuts complying with ASTM A 194.

2.1.8 Paint for prime coats and finish coats for touchup or refinishing shall be of the high heat-resistant type.

2.2 Masonry:

2.2.1 Mortar and Grout for repair of cracks in reinforced concrete shall comply with ASTM C 476. Mortar for use in the repair or replacement of brick lining in high heat breeching shall be ground fire clay complying with ASTM C 27. Chemical-resistant mortar shall be resin mortar complying with ASTM C 395.

2.2.2 Brick for lining of high heat breeching requiring acid resistance shall be refractory brick complying with ASTM C 27. Brick for breeching requiring acid resistance shall be chemical-resistant brick complying with ASTM C 279, type H.

2.2.3 Inspection Doors shall be heavy-duty cast iron or steel, lined on interior with insulating, castable refractory complying with ASTM C 64.

2.2.4 Insulation: Calcium silicate block type insulation shall comply with ASTM C 533. Mineral fiber insulation shall be block type complying with ASTM C 612, Class 1.

2.3 Refractory Brick:

2.3.1 Brick shall be high heat refractory type complying with ASTM C 27.

2.3.2 Mortar: Fire clay mortar shall be of high heat, ground type complying with ASTM C 27. Chemical-resistant mortar shall be the silica type complying with ASTM C 466.

2.3.3 Refractory shall be of the insulating, castable type complying with ASTM C 27. Chemical-resistant type castable refractory shall be in compliance with ASTM C 401.

2.3.4 Inspection Doors shall be heavy-duty cast iron or cast steel, lined on the interior with insulating castable refractory complying with ASTM C 64.

3.0 EXECUTION:

3.1 Flame Cutting: No cutting by torch shall be done without authorization from the Contracting Officer.

3.2 Welding: All welding shall be performed in compliance with AWS D1.1.

3.3 Installation of Breechings shall be in compliance with NFPA 211.

SECTION 15577
STACKS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of stacks. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Metal Stacks:

2.1.1 Carbon Steel shall comply with ASTM A 568.

2.1.2 Galvanized Steel shall be carbon steel complying with ASTM A 568, galvanized in compliance with ASTM A 123.

2.1.3 Stainless Steel shall comply with ASTM A 167.

2.1.4 Insulating Refractory shall be alumina-silica base castable refractory complying with ASTM C 27.

2.1.5 Acid-Resistant Liner shall be phenolic, rubber, and polyester resin liner.

2.1.6 Insulation: Calcium silicate block type insulation shall comply with ASTM C 533. Mineral fiber insulation shall be block type complying with ASTM C 612, Class 1.

2.1.7 Insulation Jacket: Canvas jacket shall be 8-ounce standard proprietary canvas jacket. Aluminum jacket shall be 0.016 inch thick, corrugated, embossed, or smooth, complying with ASTM B 209, temper H14, Type 3003 or 5010 with 50-pound polyethylene vapor barrier. Supports for aluminum jacket shall be stainless steel Z-clips and bands 0.016 inch thick by 3/4 inch wide.

2.1.8 Bolts and Nuts: Where breeching is connected to stack by means of a flange, bolts shall be high temperature alloy steel bolts complying with ASTM A 193, with hex nuts complying with ASTM A 194.

2.1.9 Steel Rivets shall comply with ASTM A 502.

2.1.10 Steel Structural Wire Rope shall be zinc-coated and shall comply with ASTM A 603.

2.1.11 Paint For Prime Coats and Finish Coats for touchup or refinishing shall be of the high-heat-resistant type.

2.2 Masonry Stacks:

2.2.1 Ceramic Glazed Clay Brick shall comply with ASTM C 126.

2.2.2 Chemical-Resistant Masonry Units shall comply with ASTM C 279.

2.2.3 Castable Refractory shall comply with ASTM C 401.

2.2.4 Mortar for Fireclay Brick shall comply with ASTM C 27. Mortar for chemical-resistant applications shall comply with ASTM C 395. Mortar and grout for reinforced masonry shall comply with ASTM C 476.

2.3 Prefabricated Stacks shall consist of double-wall vent pipe and fittings. All components shall be UL-listed and shall comply with NFPA 211.

3.0 EXECUTION:

3.1 Installation or Repair of all stacks shall be in accordance with NFPA 211.

3.2 Flame Cutting: No cutting by torch shall be done without authorization from the Contracting Officer.

3.3 Welding: All welding shall be performed in compliance with AWS D1.2.

# SECTION 15580
# BOILER FEEDWATER EQUIPMENT

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of boiler feedwater equipment. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Specialty Components and Parts shall be in accordance with applicable requirements of the ASME Boiler and Pressure Vessel Code.

2.2 Welding and Brazing Materials shall be as specified in Section II of the ASME Boiler and Pressure Vessel Code.

3.0 EXECUTION:

3.1 Repairs shall be accomplished with either the entire feedwater system or applicable portions isolated from service and drained.

3.2 All Isolation Valves shall be secured in the closed position, all drain valves secured in the open position, and pumps rendered inoperative before and during repairs to the deaerators, softeners, and chemical feeders.

3.3 Welding shall be performed in accordance with Section IX of the ASME Boiler and Pressure Vessel Code.

3.4 Electrical Work shall comply with the requirements of NFPA 70.

3.5 Drive Train Components shall be repaired or replaced to transmit power free from vibration at the required torque.

3.6 Repair Procedures for receiver vessels shall provide structural integrity as specified in NB-23.

# SECTION 15581
# GAS METERS AND REGULATORS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of gas meters and regulators. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Meters: Meters shall conform to Mil. Spec. MIL-M-18294, Style B, without resetable counter. Meters shall be pipe or pedestal mounted.

2.2 Pressure Regulators: Pressure regulators shall have iron or steel bodies and shall be adjustable for changing the downstream pressure. The regulator shall be adjustable with automatic loading, and shall have automatic pressure relief. The pressure relief shall be diaphragm-operated, spring-loaded type with vent for relief.

2.3 Valves: Valves shall conform to API Spec. 6D, Class 150.

3.0 EXECUTION:

3.1 Installation of Meters shall conform to ANSI B31.8. Permanent gas meters shall be installed with provisions for isolation and removal for calibration and maintenance.

3.2 Installation of Pressure Regulators shall be installed with by-pass line and lubricated plug valves installed in the by-pass line and on each side of the regulator between the regulator and by-pass connections.

3.3 Installation of Strainer shall be upstream of meter.

3.4 Installation of Pressure Reducing Valve at Meter Station shall be provided as needed.

SECTION 15590
FUEL HANDLING SYSTEMS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of fuel handling systems. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Fuel Handling System Components shall comply with applicable requirements of API.

2.2 Fuel Unloading Hose shall be in compliance with applicable requirements of UL 180, 330, 536, and 569 and of ANSI/ASME B31.3.

2.3 Gasoline Dispensing Pumps shall be in compliance with applicable requirements of UL 79 and 87 and of MIL-P-10406.

2.4 Oil/Water Separators shall be of the coalescing type, with coalescing media as required for the application. Separators shall be repaired or constructed in compliance with Section VIII of the ASME Boiler and Pressure Vessel Code.

3.0 EXECUTION:

3.1 Repair and Replacement Work shall be performed in compliance with applicable requirements of NFPA 30, NFPA 70, and the ASME Code.

3.2 Welding shall be performed in accordance with ANSI B31.3 and ASME Boiler and Pressure Vessel Code, Section IX.

3.3 Flushing: Repaired or replaced systems shall be flushed with the same type of fuel intended for use in the system until the outflowing fuel is free of sediment and emulsion and does not appear cloudy or hazy.

SECTION 15610
WARM AIR FURNACES

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of warm air furnaces. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 New Furnace shall comply with the AGA Directory of Certified Appliances and Accessories, NFPA 70, and UL 296, 378, 499, 727, 795, and 900 as applicable.

2.2 Filters may be permanent, cleanable type or throw-away type and shall comply with requirements of UL 900. Face velocity of air at maximum flow rate shall not exceed 360 cubic feet per minute for standard velocity filters and 520 feet per minute for high velocity filters.

2.3 Flues shall be double-walled and constructed of galvanized steel complying with ASTM A 526.

2.4 Controls:

2.4.1 Thermostats shall be low voltage type designed to operate on control circuits not exceeding 30 volts.

2.4.2 Limit Control for Oil or Gas Furnaces shall be designed and installed to shut down the burner when the bonnet air temperature reaches 200 F. Differential shall be fixed at not less than 10 F and not greater than 25 F.

2.4.3 Blower Control shall prevent operation of blower after burner has fired until the discharge air at bonnet reaches a predetermined temperature. Fan "on" setting shall be adjustable within range of 90 F to 140 F. Differential setting may be fixed between 24 F and 36 F or adjustable between 20 F to 50 F. Blower control shall include manual switch.

2.5 Gas Furnaces:

2.5.1 Gas Burners shall be of corrosion-resistant steel and shall be designed, adjusted, rated, and certified to fire natural, manufactured, mixed, or propane gas. Burners rated 400,000 Btuh input or less shall be manually or electrically

ignited, standing pilot type. Burners rated greater than 400,000 Btuh input shall be electrically ignited, proven pilot type.

2.5.2 Heat Exchangers shall be fabricated from steel complying with ASTM A 568.

2.5.3 Gas Valves shall be provided with a safety shutoff that will, in the event of flame failure, cause safety shutdown of the burner; an automatic pilot; and except for furnaces firing propane gas, an automatic gas pressure regulator.

2.5.4 Furnace Housings shall be constructed of not less than 22-gauge steel complying with ASTM A 424, with baked enamel coating.

2.6 Oil Furnaces:

2.6.1 Burners shall be of flange-mounted high pressure atomizing type. Burner ignition shall be by continuous, automatic, cadmium cell control. The burner shall incorporate an oil pump, burner motor, combustion air fan, and burner tube.

2.6.2 Heat Exchangers shall be fabricated from cold-rolled steel complying with ASTM A 568 with radiation shield and combustion chamber of stainless steel complying with ASTM A 167.

2.6.3 Furnace Housings shall be constructed of not less than 22-gauge steel complying with ASTM A 424 with baked enamel coating.

2.7 Electric Furnaces:

2.7.1 Heater Elements shall be helically coiled, nickel-chromium wire, individually sequenced with individual thermal limit controls and fusible links for each element. Entire design shall be UL 499 listed and shall comply with NFPA 70.

2.7.2 Furnace Housings shall be constructed of not less than 22-gauge steel complying with ASTM A 424 with baked enamel coating.

3.0 EXECUTION:

3.1 New Furnace shall be installed in accordance with UL 499, UL 727, or UL 795 as applicable.

3.2 Welding shall be performed in compliance with AWS D1.1.

3.3 Damage to Galvanized Coatings shall be repaired by application of galvanizing repair paint complying with Mil. Spec. DOD-P-21035.

3.4 Corroded Heat Exchangers shall be removed and replaced.

3.5 Flue: Replace corroded sections of flue in compliance with UL 378.

3.6 Controls: Replace defective controls in compliance with NFPA 70.

SECTION 15621
GAS UNIT HEATERS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of gas unit heaters. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 New Unit Heater shall comply with AMCA 99 and 210, AGA Directory of Certified Appliances and Accessories; NFPA 70; and UL Electrical Construction Materials Directory and UL 795.

2.2 Heat Exchangers shall be fabricated from steel complying with ASTM A 569 to form a unitized, multi-section type heat exchanger and combustion chamber for each burner.

2.3 Burners shall be of a corrosion-resistant steel with unitized rows of burners to provide one burner per heat exchanger section and shall have crossover igniter to provide positive ignition of each burner row.

2.4 Housings shall be fabricated from sheet steel of a thickness to provide sufficient strength to ensure rigidity and shall include a flue connection. The housing shall be provided with means for suspension or floor mounting as required.

2.5 Fans shall be the propeller type, fabricated of aluminum or steel, dynamically balanced, and direct motor driven. Fan motors shall be totally enclosed type, and built-in thermal overload protection shall be provided for single-phase motors.

2.6 Controls:

2.6.1 Thermal Limit Control shall be provided to shut off gas supply in the event normal operating temperatures are exceeded.

2.6.2 Fan Delay Switch shall be provided for continuous fan operation after burner shutdown until heat exchanger temperature is reduced to prevent excessive heat build-up.

2.6.3 Gas Valve with Safety Shutoff and Manual Main Shutoff shall be provided with automatic pilot and shall automatically regulate gas pressure and, in the event of flame failure, shall cause safety shutdown of burner.

2.6.4 Thermostat shall be wall-mounted, heavy-duty type with enclosed contacts, with a 3-position selector switch to permit manual fan operation independent of temperature control. Control circuit voltage shall not exceed 30 volts as provided by a factory-installed control circuit transformer.

3.0 EXECUTION:

3.1 Welding shall be in compliance with AWS D1.1.

3.2 Blazing shall be in compliance with ASME Boiler and Pressure Vessel Code, Section IX.

3.3 Damage to Galvanized Coatings shall be repaired by applying galvanizing repair paint complying with Mil. Spec. DOD-P-21035.

SECTION 15622
OIL UNIT HEATERS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of oil unit heaters. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 New Unit Heaters shall comply with AMCA 99 and 210, AGA Directory of Certified Appliances and Accessories; NFPA 70; UL Electrical Construction Materials Directory; and UL 296.

2.2 Heat Exchangers shall be of corrosion-resistant steel and shall include a combustion chamber (primary heating surface) and a heat exchanger (secondary heating surface).

2.3 Burners shall be the high pressure or low pressure atomizing type. The burner shall be completely automatic and shall incorporate an oil pump, burner motor, combustion air fan, burner tube, and automatic ignition.

2.4 Housings shall be fabricated from sheet steel of a thickness to provide sufficient strength to ensure rigidity. The housing shall be provided with means of suspension. Housing shall include a flue connection.

2.5 Fan shall be the propeller type fabricated of aluminum or steel.

2.6 Controls:

2.6.1 Thermal Limit Control shall be provided to shut off oil supply in the event normal operating temperatures are exceeded.

2.6.2 Fan Delay Switch shall be provided for continuous fan operation after burner shutdown until heater exchanger temperature is reduced to prevent excessive heat build-up.

2.6.3 Thermostat shall be unit- or wall-mounted and shall be heavy duty type with enclosed contacts, with a 3-position selector switch to permit manual fan operation independent of temperature control. Control circuit voltage shall not exceed 30 volts as provided by a factory-installed control circuit transformer.

3.0 EXECUTION:

3.1 Welding and Brazing shall be in compliance with AWS D1.1.

3.2 Damage to Galvanized Coatings shall be repaired by applying galvanizing repair paint complying with Mil. Spec. DOD-P-21035.

# SECTION 15661
# AIR-COOLED CONDENSING UNITS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of air-cooled condensing units. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS: All products shall be rated in accordance with ARI 210 and 270.

2.1 Compressor: Provide a hermetic or semi-hermetic compressor with crankcase heaters, inherently protected motors, spring mounts, and capacity modulation.

2.2 Condenser Coils: Provide copper tubes with mechanically bonded aluminum fins.

2.3 Fans and Motor: Provide propeller-type with direct drive or belt drive and vertical discharge. Protect fan with heavy-gauge wire guard. Provide motors which are inherently protected, permanently lubricated, and weatherproof. Motors shall be totally enclosed type or dripproof.

2.4 Casing: Furnish a unit designed for outdoor mounting. Fabricate the casing of heavy-gauge steel that is zinc coated and finished with enamel.

2.5 Controls: Provide safety and operating controls, factory-wired and mounted in an enclosure. Include pressure switches and motor overload devices.

3.0 EXECUTION: Follow manufacturer's recommendations.

SECTION 15670
CONDENSERS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of condensers. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Air-Cooled Condensers:

2.1.1 New Air-Cooled Condenser, when required, shall be a factory-fabricated and assembled unit consisting of coils, fans, and electric motor drive. The condenser shall be designed, fitted, and rated in compliance with recommendations and requirements of ARI 460, ASHRAE 20, and UL 207. Sizing of condenser shall be based on a temperature difference between entering outside air and condensing refrigerant not exceeding 30 F. The saturated refrigerant condensing temperature shall not be over 130 F.

2.1.2 Electric Motor shall be totally enclosed type located within the enclosure and fully protected from the weather. Motor starter shall be magnetic across the line type with general purpose enclosure. Thermal overload protection shall be the manual reset type.

2.1.3 Housing shall be fabricated from sheet carbon steel complying with ASTM A 569.

2.1.4 Refrigerant Piping shall be hard drawn copper, Type L, refrigeration grade complying with ASTM B 75. Valves shall be of brass construction, diaphragm packless or back seating type, specifically designed for refrigeration service.

2.2 Water-Cooled Condensers:

2.2.1 New Condensers shall be of shell-and-tube construction. The condenser shall be designed, fitted, and rated in compliance with the recommendations and requirements of ARI 450, ASHRAE 22, and UL 207. The condenser shall be constructed in compliance with Section VIII of ASME Boiler and Pressure Vessel Code.

2.2.2 Refrigerant Receiver shall comply with Sections II and VIII of the ASME Boiler and Pressure Vessel Code.

2.2.3 Condenser materials for repairs shall be in compliance with Section II of the ASME Boiler and Pressure Vessel Code.

2.2.4 Condenser Tubes shall be fabricated of seamless copper tubing with integral fins, and the tubes shall be individually replaceable and rolled or brazed into the tube sheets of the shell-and-tube unit. The entire bundle shall be removable on shell-and-coil units.

3.0 EXECUTION:

3.1 Condensers shall be repaired and retested in compliance with Section VIII of the ASME Boiler and Pressure Vessel Code.

3.2 Condenser Tubes shall be repaired and retested in compliance with Section VIII of the ASME Boiler and Pressure Vessel Code.

3.3 Welding and Brazing shall be performed in compliance with AWS D1.1 and Section IX of the ASME Boiler and Pressure Vessel Code.

3.4 Damage to Galvanized Coatings shall be repaired by application of galvanizing repair paint complying with Mil. Spec. DOD-P-21035.

SECTION 15680
REFRIGERANT EQUIPMENT

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of refrigerant equipment. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Performance Ratings: The performance rating of each item of the new refrigerant equipment furnished shall comply with the applicable portions of ARI 450, 460, 495, and 590.

2.2 Bearings shall be an exact replacement. Bearing life shall be equal to the bearing to be replaced.

2.2.1 Bearings for reciprocating equipment shall be precision, oil-cooled or babbitted type.

2.2.2 Bearings for centrifugal equipment or rotary screw equipment shall be precision, oil-cooled type.

2.3 Mufflers shall be a hot-gas muffler or an exact replacement as indicated. Muffler shall be able to reduce vibration and noise from pulsation.

3.0 EXECUTION:

3.1 Welding: All welding shall be in compliance with AWS D1.1.

3.2 Damage to Galvanized Coatings shall be repaired by application of galvanizing repair paint complying with Mil. Spec. DOD-P-21035.

3.3 Controls:

3.3.1 Chiller Controls: Replace, adjust, and recalibrate defective parts and assemblies.

3.3.2 Starter Controls: Replace defective contactors and relays as necessary.

3.3.3 Capacity Controls: Adjust guide vane linkages and actuator control in compliance with the manufacturer's specification.

3.4 Noncondensables: Check accumulation rate of noncondensables in absorption refrigerant equipment for compliance with manufacturer's instructions.

SECTION 15683
REFRIGERATION SPECIALTIES

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of refrigeration specialties. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Thermostatic Expansion Valves shall be rated and tested in accordance with ASHRAE 17 or ARI 750.

2.2 Filter Driers shall be sealed in-line type or replaceable core type as required. Filter driers shall be tested and rated in accordance with ASHRAE 63 and ARI 710 and shall meet the requirements of UL 207.

2.3 Sight Glasses for moisture and liquid indication shall be UL listed.

2.4 Refrigerants shall be designated in accordance with ASHRAE 34.

3.0 EXECUTION: Installation of all refrigeration equipment shall comply with ASHRAE 15.

SECTION 15711
NATURAL DRAFT COOLING TOWERS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of natural draft cooling towers. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 New Cooling Towers shall be constructed in compliance with NFPA 214 and Mil. Spec. MIL-C-16278.

2.2 Wood Towers:

2.2.1 Framework shall be repaired with or constructed of redwood complying with CTI STD-103, or Douglas fir complying with CTI STD-114. Douglas fir shall have a preservative treatment in compliance with CTI WMS-112.

2.2.2 Louvers shall be repaired with or constructed of redwood, Douglas fir or west coast hemlock. Douglas fir and hemlock shall have a preservative treatment in compliance with CTI WMS-112.

2.2.3 Water Basin shall be repaired with or constructed of redwood or Douglas fir. Douglas fir shall have a preservative treatment in compliance with CTI WMS-112.

2.3 Metal Towers:

2.3.1 Framework shall be repaired with or constructed of carbon steel complying with ASTM A 36, hot-dipped galvanized in compliance with ASTM A 123.

2.3.2 Louvers shall be repaired with or constructed of carbon steel complying with ASTM A 366, hot-dipped galvanized in compliance with ASTM A 525.

2.3.3 Water Basin shall be repaired with or constructed of carbon steel complying with ASTM A 366, hot-dipped galvanized in compliance with ASTM A 525.

2.4 Glass Fiber Towers:

2.4.1 Framework shall be repaired with redwood complying with CTI STD-103, Douglas fir complying with CTI STD-114, or carbon steel complying with ASTM A 36, hot-dipped galvanized in compliance with ASTM A 123. Douglas fir shall have a preservative treatment in compliance with CTI WMS-112.

2.4.2 Louvers shall be of rigid formed plastic complying with Fed. Spec. L-P-535.

2.4.3 Water Basin shall be repaired or constructed of redwood or Douglas fir or of carbon steel complying with ASTM A 366, hot-dipped galvanized in compliance with ASTM A 525. Douglas fir shall have a preservative treatment in compliance with CTI WMS-112.

3.0 EXECUTION:

3.1 Existing Cooling Tower to be Repaired shall be repaired in compliance with NFPA 214.

3.2 Welding and Brazing shall be performed in compliance with AWS D1.1.

3.3 Damage to Galvanized Coatings shall be repaired by application of galvanizing repair paint complying with Mil. Spec. DOD-P-21035.

3.4 Testing: Upon completion of repair work on a cooling tower or installation of a cooling tower, the repaired cooling tower shall be tested for proper operation in compliance with the manufacturer's specifications, and with CTI ATC-105 and ASME PTC 23 for field performance.

SECTION 15712
FORCED DRAFT AND INDUCED DRAFT COOLING TOWERS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of forced draft and induced draft cooling towers. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 New Cooling Towers shall be constructed in compliance with NFPA 214 and Mil. Spec. MIL-C-16278.

2.2 Wood Towers:

2.2.1 Louvers shall be redwood, complying with CTI STD-103 or Douglas fir or hemlock complying with CTI STD-114. Douglas fir and hemlock shall have a preservative treatment in compliance with CTI WMS-112.

2.2.2 Fill or Contact Surface shall be redwood, complying with CTI STD-103, or Douglas fir or hemlock complying with CTI STD-114. Douglas fir and hemlock shall have a preservative treatment in compliance with CTI WMS-112.

2.2.3 Drift Eliminators shall be redwood, complying with CTI STD-103, Douglas fir or hemlock complying with CTI STD-114, or rigid formed plastic complying with Fed. Spec. L-P-535. Douglas fir and hemlock shall have a preservative treatment in compliance with CTI WMS-112.

2.2.4 Water Distribution Basin shall be redwood, complying with CTI STD-103 or Douglas fir complying with CTI STD-114. Douglas fir shall have a preservative treatment in compliance with CTI WMS-112.

2.2.5 Water Collection Basin shall be redwood, complying with CTI STD-103, Douglas fir complying with CTI STD-114, or carbon steel complying with ASTM A 366 and hot-dipped galvanized in compliance with ASTM A 525. Douglas fir shall have a preservative treatment in compliance with CTI WMS-112.

2.2.6 Framework shall be redwood, complying with CTI STD-103, Douglas fir complying with CTI STD-114, or carbon steel complying with ASTM A 36 and hot-dipped galvanized in compliance with ASTM A 123.

2.2.7 Casing shall be carbon steel, complying with ASTM A 366, hot-dipped galvanized in compliance with ASTM A 525.

2.3 Metal Towers:

2.3.1 Louvers shall be carbon steel, complying with ASTM A 366, hot-dipped galvanized in compliance with ASTM A 525.

2.3.2 Fill or Wet Deck shall be carbon steel in compliance with ASTM A 366 and hot-dipped galvanized in compliance with ASTM A 525, rigid formed plastic complying with Fed. Spec. L-P-535, or stainless steel complying with ASTM A 167.

2.3.3 Drift Eliminators shall be carbon steel, complying with ASTM A 366 and galvanized in compliance with ASTM A 525, rigid plastic complying with Fed. Spec. L-P-535, or stainless steel complying with ASTM A 167.

2.3.4 Water Distribution Basin shall be carbon steel, complying with ASTM A 366, hot-dipped galvanized in compliance with ASTM A 525.

2.3.5 Water Collection Basin or Pan shall be carbon steel, complying with ASTM A 366 and hot-dipped galvanized in compliance with ASTM A 525 or stainless steel complying with ASTM A 167.

2.3.6 Framework shall be carbon steel, complying with ASTM A 36, hot-dipped galvanized in compliance with ASTM A 123; or stainless steel complying with ASTM A 167.

2.3.7 Casing shall be carbon steel, complying with ASTM A 366, hot-dipped galvanized in compliance with ASTM A 525; or stainless steel complying with ASTM A 167.

2.4 Glass Fiber Towers:

2.4.1 Louvers shall be formed rigid plastic complying with Fed. Spec. L-P-535.

2.4.2 Fill shall be rigid plastic complying with Fed. Spec. L-P-535.

2.4.3 Drift Eliminators shall be formed rigid plastic complying with Fed. Spec. L-P-535.

2.4.4 Water Distribution Basin shall be redwood, complying with CTI STD-103, Douglas fir complying with CTI STD-114, carbon steel complying with ASTM A 36 and hot-dipped galvanized in compliance with ASTM A 123, or

carbon steel complying with ASTM A 366 and hot-dipped galvanized in compliance with ASTM A 525. Douglas fir shall have a preservative treatment complying with CTI WMS-112.

2.4.5 Water Collection Basin shall be redwood, complying with CTI STD-103, Douglas fir complying with CTI STD-114, carbon steel complying with ASTM A 36 and hot-dipped galvanized in compliance with ASTM A 123, or carbon steel complying with ASTM A 366 and hot-dipped galvanized in compliance with ASTM A 525. Douglas fir shall have a preservative treatment complying with CTI WMS-112.

2.4.6 Framework shall be redwood, complying with CTI STD-103, Douglas fir complying with CTI STD-114, or carbon steel complying with ASTM A 36 and hot-dipped galvanized in compliance with ASTM A 123. Douglas fir shall have a preservative treatment complying with CTI WMS-112.

2.4.7 Casing shall be carbon steel, complying with ASTM A 366, hot-dipped galvanized in compliance with ASTM A 525.

3.0 EXECUTION:

3.1 Existing Cooling Tower to be Repaired shall be repaired in compliance with NFPA 214.

3.2 Welding shall be performed in compliance with AWS D1.1.

3.3 Damage to Galvanized Coatings shall be repaired by application of galvanizing repair paint complying with Mil. Spec. DOD-P-21035.

3.4 Testing: Upon completion of repair work on a cooling tower or installation of a cooling tower, the repaired cooling tower shall be tested for proper operation in compliance with the manufacturer's specifications, CTI ATC-105, and ASME PTC 23, for field performance.

SECTION 15751
COILS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of coils. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Pressures:

2.1.1 Water Coil Design Working Pressure shall be 200 psig.

2.1.2 Steam Coil Design Working Pressure shall be 200 psig steam.

2.1.3 Each Replacement Water or Steam Coil shall be hydrostatically tested at 250 psig at the factory.

2.1.4 Each Replacement Direct Expansion Coil shall be pneumatically tested at the factory under water at not less than 300 psig. Each coil shall be completely dehydrated and sealed at the factory upon completion of pressure tests.

2.2 Water, Steam, and Direct Expansion Coils:

2.2.1 Tubing shall be round, seamless, copper tubing, complying with ASTM B 75.

2.2.2 Fins shall be aluminum or copper.

2.2.3 Coil Casing shall be made of galvanized sheet steel complying with ASTM A 526, minimum thickness of 14 gauge.

2.2.4 Water or Steam Coil Headers shall be fabricated from steel pipe complying with ASTM A 53, Grade B; extra heavy seamless copper tubing complying with ASTM B 75; or semisteel complying with ASTM A 126, Class C.

2.2.5 Direct Expansion Coil Headers shall be fabricated from extra heavy seamless copper tubing complying with ASTM B 75.

2.2.6 Each Water Coil shall be provided with a plugged vent tap and drain tap.

2.2.7 Each Steam Coil shall be provided with a vacuum breaker.

2.3 Electrical Heating Coils (and Heat Strips):

2.3.1 Resistance Wire shall be nickel-chromium wire.

2.3.2 Tubular Sheath shall be corrosion-resisting in the surrounding medium and suitable for the temperatures required by the particular application.

2.3.3 Insulating Material shall be densely packed, high purity magnesium oxide.

2.3.4 Insulator Supports for directly exposed elements shall be ceramic or porcelain.

2.3.5 Grid and Heat Strip Elements shall have the resistance wire surrounded by the insulation material and enclosed within the tubular sheath. The sheath shall be imbedded and completely sealed within the cast aluminum grid. Electrical terminals shall project through the cast aluminum grid and shall be designed to minimize the entrance of atmospheric moisture into the heating element.

2.3.6 Heat Strip Element resistance wire shall be uniformly spaced along the length of the sheath.

3.0 EXECUTION:

3.1 Fins shall be mechanically bonded or soldered to the tubes. Tubes shall be rolled and bushed, brazed, or welded to headers. Where required, multiple type supports shall be provided to prevent tube sag. The fin tube and header section shall float within the casing to allow free expansion.

3.2 Removing, Saving, Testing, Cleaning, and Recharging Refrigerants:

3.2.1 Refrigerant in a system in which the coil is to be repaired or replaced shall be removed, saved, and reused in recharging the system. When repair or replacement of the coil has been completed, the refrigerant system shall be pressure-tested and recharged with refrigerant.

3.2.2 The Repaired Coil shall be pressure-tested to 300 psig with dry nitrogen and allowed to stand for 24 hours with no pressure drop after repair or replacement of the coil. Then evacuate the system and/or coil with a vacuum pump capable of pulling 1 mm Hg vacuum absolute. Operate the vacuum pump until a vacuum of 2.5 mm Hg absolute is reached. After evacuation, recharge the system with the refrigerant previously removed. Recharge the refrigerant

back into the system through a filter drier with capacity capable of removing foreign materials and moisture in the amount of refrigerant removed. The system shall be replenished with refrigerant to provide a fully charged system.

3.2.3 If the system has lost its full charge of refrigerant, a new suction line and liquid line filter drier, sized as recommended by the condenser manufacturer, shall be provided and the system pressure tested, evacuated, and recharged with refrigerant as specified above.

3.3 Welding shall be in compliance with AWS D1.1.

3.4 Brazing shall be in compliance wit ASME Boiler and Pressure Vessel Code, Section IX.

3.5 Damage to Galvanized Coatings shall be repaired by application of galvanizing repair paint complying with Mil. Spec. DOD-P-21035.

3.6 Testing: Hydrostatically test repaired water and steam coils at 1-1/2 times the maximum working pressure.

SECTION 15760
STEAM AND HOT WATER UNIT HEATERS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of steam and hot water unit heaters. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 New Unit Heaters shall comply with the requirements of AMCA 99 and 210; NFPA 70; and UL Electrical Construction Materials Directory.

2.2 Coils:

2.2.1 Coils shall be constructed of round seamless copper tubing complying with ASTM B 75, mechanically or hydraulically bonded or expanded into fins constructed of copper or of aluminum complying with ASTM B 209. Tube joints shall be made with high temperature brazing alloys complying with ASTM E 56.

2.2.2 Coil Headers shall be fabricated from seamless carbon steel pipe complying with ASTM A 53, extra heavy seamless copper tubing complying with ASTM B 75 or B 251, or semi-steel complying with ASTM A 126, Class C.

2.3 Housings shall be fabricated from sheet steel complying with ASTM A 569 of a thickness and of sufficient strength to ensure rigidity. Unit heater housings shall be provided with means of suspension or floor mounting as required.

2.4 Fan and Drive:

2.4.1 Propeller and Centrifugal Fans shall be fabricated of aluminum or steel.

2.4.2 Centrifugal Fan Shaft shall be sized for maximum fan speed.

2.4.3 Fan Bearings on belt-driven units shall be self-aligning, permanently lubricated, or the periodic lubricating type with accessible lubricating means. Bearings shall be designed to withstand radial and thrust working loads.

2.5 Controls: Unit heaters shall be furnished with unit-mounted line voltage thermostats to provide ON/OFF fan control.

3.0 EXECUTION:

3.1 Welding shall be in compliance with AWS D1.1.

3.2 Brazing shall be in compliance with ASME Boiler and Pressure Vessel Code, Section IX.

3.3 Damage to Galvanized Coatings shall be repaired by applying galvanizing repair paint complying with Mil. Spec. DOD-P-21035.

# SECTION 15765
# CLEANING OF HEAT EXCHANGERS

1.0 DESCRIPTION OF WORK: This specification covers the cleaning of heat exchangers. Products and materials used shall be in accordance with the heat exchanger manufacturer's recommendations and/or shall be as directed by the Contracting Officer. Cleaning procedures shall be developed by the Contractor and shall be in accordance with the heat exchanger manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS

2.1 Equipment required for cleaning such as acid feed tank and pump, alkaline feed tank and pump, mixer, neutralizing tank and pump, power brushes, power cutters, and other related items shall be supplied by the Contractor.

2.2 Chemical Cleaning Materials:

2.2.1 Acid Cleaning Chemicals shall be hydrochloric acid complying with Fed. Spec. O-H-765, ammonium bifluoride NH4HF2, and sulfuric acid complying with Fed. Spec. O-S-809.

2.2.2 Neutralizing Chemicals shall be one percent soda ash solution complying with ASTM D 458 and one percent caustic solution complying with ASTM D 456.

2.2.3 Flushing Water shall be potable having not more than 1,000 ppm total solids.

2.3 Mechanical Cleaning Materials and Equipment:

2.3.1 Hot Water shall be used for high velocity wash.

2.3.2 Powered Brushes shall be of the type for use with power units.

2.3.3 Nylon Brushes shall be of the type blown with high pressure water.

3.0 EXECUTION:

3.1 General: Clean heat exchangers of all scale and deposits. Straighten and clean fins on finned tubes.

3.2 Inspection: After heat exchanger cleaning operation, tubes will all be given a visual inspection by the Contracting Officer for effectiveness of scale removal.

3.3 Welding and Burning: No welding or burning shall be allowed during cleaning operation.

3.4 Acid Wash Time may vary from four to eight hours depending on scale analysis. Time shall represent actual retention of the solvent in the unit, including filling and draining time.

3.5 Effluent Neutralization: Solvent effluent drained from the unit shall be neutralized with caustic in compliance with ASTM D 456 or soda ash in compliance with ASTM D 458, to a pH of 6.8 to 8.5.

SECTION 15781
PACKAGED HEATING AND COOLING UNITS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of air-cooled packaged heating and cooling units, including through-wall, roof top, and computer room type units with electrical heat. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Capacity and Performance shall be based on standard air density (0.075 pounds per cubic foot). Fans shall have a peak static efficiency of not less than 60 percent. Capacity ratings shall be in accordance with ARI 240 and 270.

2.2 Casing shall have a corrosion protective coating. Casing shall have 1/2-inch thick minimum thermal insulation and the compressor compartment shall have acoustical insulation.

2.3 Compressors shall be direct drive semi-hermetic with a maximum operating speed of 1,750 rpm. Each compressor shall have an independent refrigeration circuit with integral sub-cooling unit.

2.4 Evaporator Coils shall be copper tubing with aluminum fins. New coils shall be pressure and leak tested at the factory at 1.5 times the working pressure.

2.5 Filters shall be 2-inch thick throwaway type.

2.6 Condensers shall have copper tubes and aluminum fins. New condensers shall be leak tested at the factory at 1.5 times the working pressure. A separate direct drive fan shall be included for each refrigeration circuit.

2.7 Heating Coil shall be low watt density, fin-tubular construction, protected by thermal safety switches.

2.8 Humidifier of the infrared type shall be provided for computer room type units.

3.0 EXECUTION:

3.1 Welding shall be performed in accordance with AWS D1.1 and/or ASME Boiler and Pressure Vessel Code, Section IX.

3.2 Brazing shall be performed in accordance with ASME Boiler and Pressure Vessel Code, Section IX.

3.3 Damage to Galvanized Coatings shall be repaired with paint complying with Mil. Spec. DOD-P-21035.

SECTION 15782
PACKAGED HEAT PUMPS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of air-cooled packaged heat pumps, including through-wall and roof top type units with supplemental electric heat. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Capacity and Performance shall be based on standard air density (0.075 pounds per cubic foot). Fans shall have a peak static efficiency of not less than 60 percent. Capacity ratings shall be in accordance with ARI 240 and 270.

2.2 Casings shall have a corrosion protective coating. Casing shall have 1/2-inch thick minimum thermal insulation, and the compressor compartment shall have acoustical insulation.

2.3 Compressors shall be direct drive semi-hermetic with a maximum operating speed of 1,750 rpm. Each compressor shall have an independent refrigeration circuit with integral sub-cooling unit. Refrigerant accessories shall include a reversing valve and suction line oil/gas accumulator.

2.4 Evaporator Coils shall be copper tubing with aluminum fins. New coils shall be pressure and leak tested at 1.5 times the working pressure.

2.5 Filters shall be 2-inch thick throwaway type.

2.6 Condensers shall have copper tubes and aluminum fins. New condensers shall be leak tested at the factory at 1.5 times the working pressure. A separate direct drive fan shall be included for each refrigeration circuit.

2.7 Auxiliary Heating Coil shall be low watt density, fin-tubular construction, protected by thermal safety switches.

2.8 Controls shall provide for automatic switchover between cooling and heating cycles.

3.0 EXECUTION:

3.1 Welding shall be performed in accordance with AWS D1.1 and/or ASME Boiler and Pressure Vessel Code, Section IX.

3.2 Brazing shall be performed in accordance with ASME Boiler and Pressure Vessel Code, Section IX.

3.3 Damage to Galvanized Coatings shall be repaired with paint complying with Mil. Spec. DOD-P-21035.

# SECTION 15800
# HUMIDITY CONTROL EQUIPMENT

1.0 DESCRIPTION OF WORK: This section covers the furnishing and installation of humidifiers and dehumidifiers. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Humidifiers shall be pneumatic modulating type.

2.1.1 Steam Separator shall be designed to remove water droplets and particles larger than 3 microns when humidifier is operating at full capacity.

2.1.2 Control Valve shall be stainless steel plug type with pneumatic operator.

2.1.3 Distribution Manifold shall provide uniform dry steam distribution throughout its entire length.

2.1.4 Strainer shall be Y-type.

2.1.5 Steam Trap shall be as recommended by the manufacturer of the steam humidifier and shall be preceded by a drip leg.

2.2 Dehumidifiers shall be free-standing self-contained plug-in type units that are UL listed.

2.2.1 Components shall be housed in a portable 22-gauge steel cabinet.

2.2.2 Capacity Ratings shall be in accordance with AHAM DH-1. Overflow cutoff control shall be provided.

3.0 EXECUTION:

3.1 Steam Supply Manifold for humidifier shall be installed either perfectly level or extending upward vertically in duct. Discharge holes shall point upstream against airflow.

3.2 Welding shall be performed in accordance with AWS D1.1 and ASME Boiler and Pressure Vessel Code, Section IX, where applicable.

SECTION 15830
RADIATORS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of radiators. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 New Radiators shall comply with AGA Directory of Certified Appliances and Accessories; IBR Testing and Rating Code for Finned Tube (Commercial) Radiation, if applicable; NFPA 70; and UL 499 or UL 795, as applicable.

2.2 Cast-Iron Radiators:

2.2.1 Core shall be small tube section constructed of cast iron complying with ASTM A 48.

2.2.2 Core Sections shall be assembled with malleable iron or polytetrafluoroethylene coated steel push nipples.

2.3 Baseboard-Fintube Radiators:

2.3.1 Nonferrous Fintube shall be fabricated of seamless copper tubing, complying with ASTM B 75 and mechanically expanded into aluminum fins.

2.3.2 Ferrous Fintube shall be fabricated of steel pressure tubing complying with ASTM A 450 and mechanically expanded into fins of steel sheet complying with ASTM A 568.

2.3.3 Enclosure, Dampers, and Element Supports shall be fabricated from carbon steel complying with ASTM A 568.

2.4 Radiant Radiators:

2.4.1 Gas Plenum shall be carbon steel with a porcelain enameled finish complying with ASTM A 424 and Fed. Spec. PPP-P-600, or galvanized in compliance with ASTM A 526.

2.4.2 Air Mixer shall be carbon steel with a corrosion-resistant finish complying with ASTM A 526 or ASTM A 568.

2.4.3 Venturi shall be carbon steel complying with ASTM A 526 or ASTM A 568 with a corrosion-resistant finish.

2.4.4 Enclosure shall be carbon steel complying with ASTM A 526 or ASTM A 568.

2.5 Convector Radiators:

2.5.1 Electric Heating Element shall be constructed of nickel chromium wire enclosed within a metal sheath and electrically insulated in the sheath with a densely compacted refractory material.

2.5.2 Hydronic/Steam Heating Elements shall be constructed of seamless copper tubing complying with ASTM B 75 mechanically expanded into aluminum fins. The tube and fin assembly shall be encased in a frame of steel complying with ASTM A 568. Tube headers shall be steel or brass joined to the tubes by high temperature brazing alloys complying with ASTM E 56.

2.5.3 Enclosure, Dampers, Element Supports, and Access Doors (when applicable) shall be fabricated from carbon steel complying with ASTM A 568.

3.0 EXECUTION:

3.1 Welding shall be performed in accordance with AWS D1.1.

3.2 Damage to Galvanized Coatings shall be repaired by application of galvanizing repair paint complying with Mil. Spec. DOD-P-21035.

# SECTION 15840
# INDUCTION UNITS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of induction units. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturers recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 New Induction Units shall include cabinet, primary air plenum with inlet collar, air balancing damper, multi-stage nozzles, coil, drain pan, and discharge stack. Units shall be tested and rated at the factory in accordance with ARI 445.

2.2 Cabinet and Primary Air Plenum shall be constructed of or repaired with 24 gauge galvanized steel with die-cast support frame members. Plenum shall be lined with 3/8-inch thick, 25-pound density insulation, black plastic bonded fiberglass, mat-faced.

2.3 Nozzles shall be provided in vertical strips, precision-molded from heat-resistant thermoplastic material. Nozzles shall be designed for temperature range encountered with pressures up to 3-1/2 inch wg. Nozzle strips shall be mechanically sealed and locked to nozzle frame.

2.4 Dampers shall be multiple-hole design and shall extend the full length of the plenum. Adjustment shall be provided by manual push-pull operator located next to the primary air inlet.

2.5 Coils shall be designed for 300 psi working pressure.

3.0 EXECUTION:

3.1 Induction Units shall be installed level, using shims if required, and anchored to the floor.

3.2 Damage to Galvanized Coatings shall be repaired in compliance with Mil. Spec. DOD-P-21035.

SECTION 15855
AIR HANDLING UNITS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of air handling units. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS: Built-up air handling units (AHUs) shall consist of casings, fan sections, coils, filter boxes, mixing boxes, dampers, and other equipment as required. All AHUs shall be certified in accordance with ARI 430. Coils shall be certified in accordance with ARI 410. Electric heating coils shall meet the requirements of UL and the National Electric Code. AHUs shall also conform to the requirements of NFPA 90A and all applicable SMACNA standards.

3.0 EXECUTION:

3.1 Air Handling Units shall be installed to conform with NFPA 90A and applicable SMACNA standards.

3.2 Welding shall be performed in compliance with AWS D1.1.

SECTION 15860
CENTRIFUGAL FANS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of centrifugal fans. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Fan Performance:

2.1.1 New Fans shall comply with AMCA 210, 300, and 301.

2.1.2 Capacity and Performance of New or Repaired Fans shall be based on standard air density (0.075 pounds per cubic foot). Fans shall have a peak static efficiency of not less than 60 percent.

2.2 Fan Wheel and Shaft:

2.2.1 Aluminum Fan Wheels shall comply with Fed. Spec. QQ-A-596. Fan wheels for wall exhaust fans shall be constructed of aluminum complying with ASTM B 209. Steel for the fan wheels shall comply with ASTM A 366.

2.2.2 Fan Shaft shall be turned, ground, and polished carbon steel alloy.

2.2.3 Fan Shaft shall be tubular with swaged ends accurately finished.

2.3 Fan Housing:

2.3.1 Fan Housing shall be carbon steel sheet complying with ASTM A 569, except wall exhaust fan housings shall be spun aluminum complying with ASTM B 209.

2.3.2 When the fan discharge of the existing housing to be replaced is changeable, discharge of the new housing shall be easily changed in compliance with AMCA 99.

2.4 Inlet Boxes: Steel for repairs shall be carbon steel sheet complying with ASTM A 569.

2.5 Bearings:

2.5.1 Precision Antifriction Bearings shall comply with Fed. Spec. FF-B-171.

2.5.2 Sleeve Bearings shall be self-alining sleeve bearings.

2.5.3 Roller Bearings shall be self-alining, high load capacity, grease-lubricated, heavy-duty, pillow block type.

2.5.4 Wall Exhaust Fan Bearings shall be sealed-in lubrication, antifriction type adequate for both radial and thrust loads occurring in the mounting.

2.6 Fan Belts shall comply with RMA Engineering Standards for Multiple V-Belt Drives. Belts for multiple-belt drives shall be installed in matched sets only.

2.7 Insulation in fan housing shall be mineral fiber complying with Fed. Spec. HH-I-558, Form B, Type 1. Adhesive shall be fire resistive adhesive complying with Mil. Spec. MIL-A-3316.

3.0 EXECUTION:

3.1 Balancing: Centrifugal fan wheels, repaired or new, shall be balanced statically and dynamically.

3.2 Welding shall be performed in compliance with AWS D1.1.

3.3 Damage to Galvanized Coatings shall be repaired by application of galvanizing repair point in compliance with Mil. Spec. DOD-P-21035.

SECTION 15865
AXIAL FLOW FANS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of axial flow fans. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Capacity and Performance shall be based on standard air density (0.075 pounds per cubic foot). Fans shall have a peak static efficiency of not less than 60 percent. New fans shall comply with AMCA 210, 300, and 301.

2.2 Fan Wheel repair material shall be sheet aluminum complying with ASTM B 209. New wheels shall be of airfoil design and shall be statically and dynamically balanced at the factory.

2.3 Fan Shafts shall be turned, ground, and polished steel of suitable size to operate well below first critical speed.

2.4 Fan Housing shall be 22 gauge, welded carbon steel complying with ASTM A 569.

2.5 Propeller Guards, when required, shall be sheet metal complying with ASTM A 366 or hot-dip galvanized were complying with ASTM A 641.

2.6 Bearings shall be sealed-in lubrication, anti-friction type adequate for both radial and thrust loads occurring in the mounting.

2.7 Fan Belt shall comply with RMA Engineering Standards for Multiple V-Belt Drives. Belts for multiple-belt drives shall be installed in matched sets only. Belt guards shall comply with OSHA.

2.8 Insulation in fan housing shall be mineral fiber complying with Fed. Spec. HH-I-545. Adhesive shall be fire resistive adhesive complying with Mil. Spec. MIL-A-3316.

3.0 EXECUTION:

3.1 Welding shall be performed in compliance with AWS D1.1.

3.2 Damage to Galvanized Coatings shall be repaired by application of galvanizing repair in compliance with Mil. Spec. DOD-P-21035.

SECTION 15871
POWER ROOF VENTILATORS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of power roof ventilators. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 PRV Performance:

2.1.1 New PVRs shall comply with AMCA 210, 300, and 301.

2.1.2 Capacity and Performance of new and repaired PRVs shall be based on standard air density (0.075 pounds per cubic foot). Fans shall have a peak static efficiency of not less than 60 percent.

2.2 Fan Wheel shall be centrifugal, axial flow, or turbine type, non-overloading, constructed of aluminum complying with ASTM B 209.

2.3 Fan Shaft shall be turned, ground, and polished steel of suitable size to operate well below first critical speed.

2.4 Bearings shall be sealed-in lubrication, anti-friction type adequate for both radial and thrust load occurring in the mounting.

2.5 Fan Housing shall be spun aluminum complying with ASTM B 209. The housing shall be weatherproof with 360 degrees discharge air pattern.

2.6 Fan Belt shall comply with RMA Engineering Standards for Multiple V-Belt Drives. Belts for multiple-belt drives shall be installed in matched sets only.

2.7 Insulation in fan housing shall be mineral fiber complying with Fed. Spec. HH-I-558, Form B, Type 1. Adhesive shall be fire resistive adhesive complying with Mil. Spec. MIL-A-3316.

2.8 Roof Curb shall be prefabricated, with continuous welded water-tight seams. The curb shall be of the roofed-over, flashing type, with built-in cant strip.

2.9 Back Draft Dampers for installation in the roof curb shall be multiple blade type, constructed of aluminum complying with ASTM B 209.

3.0 EXECUTION:

3.1 Balancing: Centrifugal fan wheels, repaired or new, shall be balanced statically and dynamically. Propeller fans shall be statically balanced.

3.2 Welding shall be performed in compliance with AWS D1.1.

3.3 Damage to Galvanized Coatings shall be repaired by application of galvanizing repair paint in compliance with Mil. Spec. DOD-P-21035.

SECTION 15881
DIFFUSERS, REGISTERS, GRILLES, AND LOUVERS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of diffusers, registers, grilles, and louvers. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Supply Air Ceiling Diffusers shall be constructed of aluminum or steel and shall be furnished with volume control dampers. Provide ceiling-mounted diffusers with rubber gasket sponge and ceiling frames for anti-smudging protection.

2.2 Supply Air Slot Diffusers for sidewall, sill, or floor mounting shall have 1/2-inch bar spacing with 0 degrees or 15 degrees deflection. Construction shall be extruded aluminum. Furnish with volume control damper.

2.3 Return Air Registers shall be constructed of aluminum or steel and shall be furnished with opposed blade volume control dampers.

2.4 Return Air Ceiling Registers shall be constructed of aluminum with aluminum or plastic egg crate grille.

2.5 Grilles shall be as specified for registers, without volume control damper.

2.6 Louvers shall be in accordance with SMACNA Duct Construction Standards - Metal and Flexible. Louvers shall be constructed of aluminum or steel and shall be furnished with birdscreens. Louvers shall bear the AMCA Certified Ratings Seal for air performance and water penetrations ratings as described in AMCA 500.

2.7 Inlets and Outlets shall be sound rated and certified in accordance with ADC 1062R4 in sound power level, dB referenced to 10 to the minus 12 watt, in octave bands 2 through 8. Performance shall be certified in accordance with ADC 1062R4.

2.8 Inlets and Outlets shall follow recommended noise levels as stated in SMACNA Manual for HVAC Systems Duct Design.

3.0 EXECUTION: Diffusers and registers shall be installed in accordance with applicable SMACNA Standards.

3.1 Return Air Registers/Grilles shall be similar to supply air registers/diffusers when applicable.

SECTION 15886
AIR CLEANING DEVICES

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of air cleaning devices. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Throwaway Panel Filters shall be constructed of glass, paper, or fabric media with a UL listing of Class 2 and shall be 1 or 2 inches thick as required. The filters shall have an initial resistance not greater than 0.30 inch w.g. at a face velocity of 500 fpm.

2.2 Extended Surface Self-Supporting Filters shall be constructed of UL-listed Class 1 or Class 2 fibrous media, integral media support, and a rigid galvanized steel frame. Nominal thickness shall be 12 inches. Filter dustspot efficiency shall be rated in accordance with ASHRAE 52 Test Standard.

2.2.1 Filters Rated at 60-65 Percent Dustspot Efficiency shall have an initial resistance not greater than 0.50 inch w.g. at 500 fpm face velocity.

2.2.2 Filters Rated at 80-85 Percent Dustspot Efficiency shall have an initial resistance not greater than 0.60 inch w.g. at 500 fpm face velocity.

2.2.3 Filters Rated at 90-95 Percent Dustspot Efficiency shall have an initial resistance not greater than 0.70 inch w.g. at 500 fpm face velocity.

2.3 Extended Surface Non-Supported Filters shall be constructed of UL-listed Class 1 or Class 2 fibrous media. Individual bags shall be retained by a galvanized steel frame. Filter dustspot efficiency shall be rated in accordance with ASHRAE 52 Test Standard.

2.3.1 Filters Rated at 60-65 Percent Dustspot Efficiency shall have an initial resistance not greater than 0.35 inch w.g. at 500 fpm face velocity.

2.3.2 Filters Rated at 80-85 Percent Dustspot Efficiency shall have an initial resistance not greater than 0.45 inch w.g. at 500 fpm face velocity.

2.3.3 Filters Rated at 90-95 Percent Dustspot Efficiency shall have an initial resistance not greater than 0.55 inch w.g. at 500 fpm face velocity.

2.4 Automatic Renewable Roll Filters shall be constructed of 2-inch thick, viscous-coated, UL-listed Class 1 or Class 2 fibrous media. Filter initial resistance shall be not greater than 0.50 inch w.g. at 500 fpm face velocity. Filter efficiency shall be 80-85 percent when tested in accordance with ASHRAE 52.

2.5 Permanent Washable Panel Filters shall consist of galvanized steel media and frames, 1-inch or 2-inch thickness as required. Filters shall have an initial resistance not greater than 0.10 inch w.g. at 500 fpm face velocity.

2.6 HEPA Filters shall be constructed of UL-listed Class 1 glass fiber media sealed in a rigid casing. Filters shall be rated by the DOP Test Method on 0.3 micron particles. Filter initial resistance shall not be greater than 1.0 inch w.g. for the rated airflow. Filters shall be furnished complete with necessary gaskets.

2.6.1 Filter Rated for 150 fpm Face Velocity with 95 percent DOP efficiency; 6-inch filter depth.

2.6.2 Filter Rated for 250 fpm Face Velocity with 95 percent DOP efficiency; 12-inch filter depth.

2.6.3 Filter Rated for 150 fpm Face Velocity with 99.99 percent DOP efficiency; 6-inch filter depth.

2.6.4 Filter Rated for 250 fpm Face Velocity with 99.99 percent DOP efficiency; 12-inch filter depth.

2.7 Activated Carbon Filters shall be constructed of epoxy-coated perforated steel trays containing the activated carbon. Individual trays shall mount in a gasketed side access housing. The unit shall have an initial resistance of 0.35 inch w.g. at 500 fpm face velocity.

2.8 Electronic Aircleaners shall consist of an electrostatic agglomerator section and a renewable fibrous glass collector. The unit shall provide a dustspot efficiency of 90 percent at 500 fpm face velocity. Typical operating resistance shall be 0.40 inch w.g.

2.9 Dust Collectors shall be the dry centrifugal type complete with integral blower, dust separator, and hopper.

3.0 EXECUTION: Install filters in accordance with applicable sections of NFPA 70, 90A, and 90B.

SECTION 15887
TAILPIPE EXHAUST EQUIPMENT

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of tailpipe exhaust equipment. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Capacity and Performance shall be based on standard air density (0.075 pound per cubic foot). Fans shall have a peak static efficiency of not less than 60 percent.

2.2 Blowers and Accessories shall comply with AMCA 210, 300, and 301. Fan impellers shall be constructed of heavy gauge steel and accurately balanced both statically and dynamically when installed in the assembled fan unit. Impeller and housing in the air stream shall be coated with neoprene, epoxy, phenolic resins, or other material suitable to resist the corrosive gases and temperatures encountered. Fans to be mounted on exterior of building shall be provided with weatherproof covers.

2.3 Exhaust Duct and Fittings for vehicle tailpipe exhaust systems shall be constructed of galvanized sheet steel. Sheets shall conform to Fed. Spec. QQ-S-775, Class D or ASTM A 525. Ductwork shall be constructed with minimum metal gauge thickness and reinforced as required in the SMACNA Duct Construction Standards - Metal and Flexible.

2.3.1 Tailpipe Adapter shall be not less than 20-gauge corrosion-resisting steel. The adapter shall be of the tapered cone type with spring clip or other suitable device for exhaust pipe attachment.

2.3.2 Flexible Exhaust Tubing shall be 0.012 minimum thickness galvanized sheet steel or heat-resistant, reinforced wire, fiberglass, and neoprene tubing.

2.3.3 Dampers shall be of the circular disk type with quadrant locking device or blast gate type.

2.3.4 A Flexible Tubing Suspension System shall be furnished and installed for repaired tailpipe exhaust systems where no such suspension system exists. The flexible tubing suspension system shall suspend the flexible tubing overhead when not in use, allowing it to be lowered to the operating level, when required.

The suspension system installed shall be complete with cable, pulleys, and operating mechanism.

3.0 EXECUTION:

3.1 Ductwork joints in galvanized sheet steel ductwork shall be soldered or otherwise sealed. The lock seam in straight sections shall be located on top of the duct. Seams shall be suitable for 10-inch water gauge static pressure. Ductwork shall be constructed with minimum metal gauge thickness and reinforced as required in the SMACNA Duct Construction Standards - Metal and Flexible.

3.2 Weather-Resistant Finishes of items located outdoors shall meet the requirements of ASTM B 117.

SECTION 15890
DUCTWORK AND ACCESSORIES

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of ductwork and accessories. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Metal Duct and Equipment Casings, Housing, and Plenums shall be fabricated in accordance with SMACNA Duct Construction Standards - Metal and Flexible and shall comply with NFPA 90A, 90B, and 91. Metal gauge shall generally be in accordance with SMACNA standards but in no case shall be less than existing duct gauge.

2.1.1 Galvanized Steel shall comply with ASTM A 527 and with ASTM A 525 for zinc coating.

2.1.2 Black Steel shall comply with ASTM A 569.

2.1.3 Aluminum shall comply with ASTM B 209.

2.1.4 Stainless steel shall comply with ASTM A 167.

2.2 Fibrous Glass Duct shall be fabricated in accordance with SMACNA Fibrous Glass Duct Construction Standards.

2.3 Flexible Duct shall be in accordance with NFPA 90A and SMACNA Duct Construction Standards - Metal and Flexible and shall be UL listed.

2.4 Flexible Connectors shall be in accordance with NFPA 90A and shall be UL listed.

2.5 Sealants shall be in accordance with SMACNA Duct Construction Standards - Metal and Flexible.

2.6 Hangers and Supports shall be constructed of galvanized steel or other corrosion-resistant material in accordance with SMACNA Duct Construction Standards - Metal and Flexible.

2.7 Ductwork Accessories shall be in accordance with SMACNA Duct Construction Standards - Metal and Flexible.

2.8 Paint for Repair of Galvanized Surfaces shall comply with Mil. Spec. DOD-P-21035.

3.0 EXECUTION:

3.1 Ductwork: Damaged sections of duct shall be repaired by patching or by replacing complete sections. Work shall comply with the applicable sections of SMACNA Duct Construction Standards - Metal and Flexible, and NFPA 90A, NFPA 90B, or NFPA 91.

3.2 Flame Cutting: No cutting by torch or flame shall be done without authorization from the Contracting Officer.

3.3 Welding shall be performed in compliance with AWS D1.1.

3.4 Damage to Galvanized Coatings shall be repaired by application of galvanizing repair paint.

SECTION 15915
CONTROL AND FIRE DAMPERS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of control and fire dampers. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 New Control Dampers may be of parallel or opposed blade design and shall be tested in accordance with the requirements of AMCA 500 for the specific performance characteristics required. Construction shall be in accordance with the requirements of SMACNA construction standards, as well as ASHRAE recommendations pertaining to construction of duct accessories.

2.2 New Fire Dampers may be of single blade, multi-blade, or curtain design and shall be tested in accordance with the requirements of UL 555. Fire dampers shall be UL listed and/or FM approved for their intended use. Fire dampers shall also conform to the requirements of the SMACNA Fire, Smoke and Radiation Damper Installation Guide for HVAC Systems.

3.0 EXECUTION:

3.1 Control Damper Installation and Repair Work shall be in compliance with applicable portions of details of construction, as shown in ASHRAE and SMACNA standards.

3.2 Fire Damper Installation and Repair Work for dampers in air conditioning and ventilating duct openings, through walls and floors, shall be in compliance with the requirements of NFPA 90A and the SMACNA Fire, Smoke and Radiation Damper Installation Guide for HVAC Systems. Fire damper installation and repair work for dampers in wall openings without ducts shall be repaired or replaced in compliance with the requirements of NFPA 80, when such openings are not passageways.

# SECTION 15920
# SOUND ATTENUATORS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of sound attenuators. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS: Sound attenuators shall be constructed of galvanized steel with acoustical baffle as required to provide the desired attenuation. Methods for presenting sound attenuation data shall be consistent with the ASHRAE Handbook Series.

3.0 EXECUTION: Installation shall comply with the SMACNA duct construction standards.

SECTION 15951
CONTROL DEVICES FOR MECHANICAL EQUIPMENT

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of control devices for mechanical equipment. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Controls may include sensors, transducers, controllers, controlled devices, and other accessories as required. Typical items include thermostats, humidistats, aquastats, controllers, control valves, dampers, specialized control packages, air supply packages, tubing, control wiring, and panels. Where a complete control system is replaced, all new control components shall be by the same manufacturer.

3.0 EXECUTION:

3.1 All Control Components other than those located in finished spaces shall be clearly tagged.

3.2 Control Valves shall be mounted horizontally with operator up unless otherwise directed by the Contracting Officer.

3.3 Instrument Air for pneumatic controls shall be clean, dry, oil-free compressed air.

SECTION 15990
TESTING AND BALANCING OF HVAC SYSTEMS

1.0 DESCRIPTION OF WORK: This specification covers testing and balancing of HVAC systems.

2.0 PRODUCTS: (Section not used.)

3.0 EXECUTION:

3.1 Test and Balance Contractor shall be certified by the National Environmental Balancing Bureau (NEBB) or the Associated Air Balance Council (AABC).

3.2 Certified Test Reports shall be submitted by the Contractor to the Contracting Officer. Test reports shall comply with the standards, listed below, of the selected test and balance association.

3.2.1 NEBB-01, Procedural Standards for Testing - Adjusting - Balancing of Environmental Systems.

3.2.2 AABC National Standards for Total System Balance (AABC MN-1).

3.3 Test and Balance Work shall be in accordance with the standards of the selected test and balance association. The work shall also comply with the recommendations of ASHRAE pertaining to instruments, measurements and procedures and with SMACNA-07, HVAC Systems - Testing, Adjusting and Balancing.

3.4 Systems shall be tested at near maximum load conditions. Cooling systems shall be tested in summer; heating systems shall be tested in winter.

3.5 Equipment Settings including dampers, valves, and similar equipment shall be marked to show final positions at the completion of balancing.

SECTION 16051
WIRING SYSTEMS EQUIPMENT

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for repair and maintenance of wiring systems equipment. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Copper Wire: ASTM B 3, ASTM B 8.

2.2 Aluminum Wire: ASTM B 230, ASTM B 231.

2.3 Busways and Fittings: UL 857, NEMA BU 1.

2.4 Plugs and Receptacles: UL 498, NEMA WD 1 and NEMA WD 6.

2.5 Conduit: ANSI C80.1, C80.3, and C80.5 and NEMA RN 1.

2.6 Enclosures: NEMA ICS 6 and OS 1.

2.7 Specific Purpose Wiring Devices: NEMA WD 1, NEMA WD 6.

2.8 General Electrical: NFPA 70.

2.9 Flexible Metal Conduit: UL 1.

2.10 Surface Metal Raceways and Fittings: UL 5.

2.11 Liquid-Tight Flexible Steel Conduit: UL 360.

3.0 EXECUTION:

3.1 Coordination: Contractor shall determine that the wiring system has been de-energized. Before de-energization, the Contractor shall ensure that equipment served by the wiring system will not be damaged by the power outage.

3.2 Clearances: Working clearances shall comply with NFPA 70.

SECTION 16211
MOTOR GENERATOR SETS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for repair and maintenenace of motor generator sets. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Batteries: SAE J537 and UL 1236, and IEEE 484 and 485, as applicable.

2.2 Instrument Transformers: ANSI C12.11.

2.3 Motor and Generator: NEMA MG 1 and MG 2.

2.4 Battery Charger: UL 1236.

2.5 Switchgear: NEMA SG 5.

2.6 Electrical Instruments: ANSI C39.1.

3.0 EXECUTION:

3.1 Coordination and Scheduling: Outages shall be scheduled and coordinated in advance with the Contracting Officer.

3.2 Protection: Take precautions to prevent injury to personnel and to avoid damage to equipment and other property in compliance with ANSI C2.

3.3 Maintenance, Repair, or Replacement Work: The Contractor shall check the generator sets in accordance with the manufacturer's instructions and Mil. Std. MIL-STD-705, MIL-HDBK-705, IEEE-43, IEEE-115, and SSPC-PA-1. As a result of the testing or for preventive maintenance, the Contractor shall maintain, repair, or replace any piece of equipment requiring work.

SECTION 16310
ELECTRICAL DISTRIBUTION SYSTEM SUBSTATION EQUIPMENT

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for repair and maintenance of electrical distribution system substation equipment. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS: The maintenance and repair work shall include but not be limited to the following major equipment:

a. Power Transformers.
b. Station Service Transformers.
c. Automatic Tap Changing Transformers.
d. Switchgear.
e. Oil Circuit Breakers.
f. Isolating Switches.
g. Metering Equipment.
h. Relaying Equipment.
i. Station Battery System.
j. Articulated Secondary Unit Substation.
k. Integral Transformer-Load Center.
l. Sulfur Hexafluoride (SF6) Circuit Breakers.

2.1 Power Distribution Panel: NEMA PB 1, U.L. 67.

2.2 Insulating Oil, Electrical (For Transformers, Switches, and Circuit Breakers): ASTM D 923.

2.3 Distribution, Power, and Regulating Transformers: ANSI 462 series as applicable.

2.4 Instrument Transformers: ANSI C57.13.

2.5 Installation and Maintenance of Oil-Immersed Transformers: ANSI/IEEE C57.12.00.

2.6 Voltage Air Switches, Bus Supports, and Switch Accessories: ANSI/IEEE C37.30, C37.34.

2.7 Low-Voltage AC Power Circuit Breakers: ANSI C37.50.

2.8 Electrical Analog Indicating Instruments: ANSI C39.1.

2.9 Primary Unit Substation: NEMA 201.

2.10 Secondary Unit Substation: NEMA 210.

2.11 Molded Case Circuit Breakers: NEMA AB1.

2.12 Watthour Meters: ANSI C12.10.

2.13 Switchboards, Dead Front Distribution: NEMA PB 2.

3.0 EXECUTION:

3.1 Coordination and Scheduling: Outages shall be scheduled and coordinated in advance with the Contracting Officer.

3.2 Protection: Precautions shall be taken to prevent injury to personnel and to avoid damage to equipment and other property in compliance with ANSI C2.

3.3 Workmanship: Work shall be completed in accordance with NFPA 70.

3.4 Interruptions: During interruptions, equipment and standby systems shall be provided to maintain existing electrical service.

3.5 Fences shall be checked for security. Gates and locks shall be checked for proper operation and grounding.

3.6 Oil Handling and Disposal: Oil and oil-contaminated materials shall be handled and disposed of to comply with the latest federal and state requirements.

SECTION 16320
TRANSFORMERS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for repair and maintenance of transformers. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Transformer Assemblies and Components for replacement purposes shall be designed for the same service as existing.

2.2 Transformers covered under this specification are as follows:

2.2.1 Dry Type Transformers.

2.2.2 Instrument Transformers.

2.2.3 Control Transformers.

2.2.4 Grounding Transformers.

2.2.5 Liquid-Filled Transformers.

3.0 EXECUTION:

3.1 Safety: Take precautions in compliance with the National Electrical Safety Code (ANSI/IEEE C2); execute work in compliance with NFPA 70.

3.2 Coordination: Coordinate the work schedule with the Contracting Officer.

3.3 Repairs: Repair and retighten burnt or broken lugs, windings, loose bolts, nuts, and screws. Repair windings in accordance with NEMA ST 20.

3.4 Testing: Perform electrical insulation tests to verify the integrity of any repairs prior to re-energization of the transformers, unless written permission is obtained from the Contracting Officer stating otherwise.

3.5 Oil Handling and Disposal: Handle and dispose of oil and oil contaminated materials in compliance with the latest Environmental Protection Agency requirements.

3.6 Deficiencies, Safety Hazards, and Code Violations: Should the Contractor find or observe any deficiency, safety hazard, or code violation in the existing electrical system, equipment, devices, or installations that is not indicated or specified to be corrected under the contract, it shall be promptly reported to the Contracting Officer. The Contractor may submit recommendations for correction of the deficiency, safety hazard, or code violation with his report.

3.7 Additional Execution Requirements Specific to Each Type of Transformer:

3.7.1 Dry Type Transformers:

3.7.1.1 General: Replacement transformers shall have a winding configuration identical to that of the existing transformer and shall comply with NEMA ST 20 and ANSI C57.12.22.

3.7.1.2 Noise Isolation Pads shall be checked for excessive wear and replaced if necessary.

3.7.1.3 Dust shall be cleaned from transformer winding and enclosure ventilation louvers.

3.7.2 Instrument Transformers:

3.7.2.1 Current Transformers shall be manufactured in compliance with NEMA EI 21.1 and EI 21.2 and shall have an accuracy Class of 0.6 at burden designation of B-0.1 and B-0.2 and an accuracy of 1.2 at B-0.5 as defined in ANSI C57.13 for instrument transformers.

3.7.2.2 Potential Transformers shall have an accuracy of 0.3W, 0.3X, 0.3Y, 1.2Z as defined in ANSI C57.13 for instrument transformers.

3.7.2.3 Fuses: Potential transformers shall be protected on the high and low voltage side by fuses.

3.7.2.4 Repair: No attempt to repair current or potential transformers shall be made.

3.7.3 Control Transformers:

3.7.3.1 Core shall be in compliance with UL 506.

3.7.3.2. Fuses: All ungrounded conductors of primary and secondary of potential transformers shall be protected by fuses.

3.7.3.3 Repair: No attempt to repair control transformers shall be made.

3.7.4 Grounding Transformers:

3.7.4.1 Replacement Zig-Zag Grounding Transformers shall be three-phase zig-zag autotransformers or six single-phase transformers connected zig-zag and shall comply with UL 506.

3.7.4.2 Replacement Wye-Delta Grounding Transformers shall be three-phase transformers or three single-phase transformers connected wye-delta and shall be in compliance with ANSI C57.12.00.

3.7.4.3 Core shall be in compliance with ANSI C57.12.00.

3.7.5 Liquid-Filled Transformers:

3.7.5.1 Replacement Oil-Filled Transformers shall have a winding configuration identical to the existing transformer and shall comply with ANSI C57.12.00.

3.7.5.2 Gaskets shall match existing type removed.

3.7.5.3 Oil Added to Transformers shall be the same type as existing or shall be an oil recommended by the transformer manufacturer. Dielectric strength of oil shall not be less than 30 kV. Mineral oil shall comply with NEMA TR P8. Mineral oil shall not be added to high fire point oils such as askarel and silicone.

3.7.5.4 Repair Leaks by cleaning the leak area and welding or by applying 1/4-inch thick steel plate patch and welding in place. After welding, check the repaired area for leaks, reweld if leaking, reclean, and touch up with paint. Welding shall comply with AWS D1.1.

3.7.5.5 Gaskets, Vacuum, and Liquid Level Gauges found to be defective shall be replaced.

3.7.5.6 Ground Resistance Test Readings shall be performed across phase-to-phase windings and phase-to-ground windings. Tabulate results, and submit them to the Contracting Officer.

3.7.5.7 Dielectric Test shall be performed on oil samples taken from top and bottom filter press connections. Record and submit results to the Contracting Officer.

3.7.5.8 Transformer Liquid Levels shall be checked for correct level and filled if low. Oil added to transformers shall be same type as existing oil or shall be an oil recommended by the transformer manufacturer. Dielectric strength of oil shall not be less than 30 kV. Mineral oil shall comply with ANSI/IEEE C57.91 and C57.92. Mineral oil shall not be added to high fire point oils such as askarel and silicone.

3.7.5.9 Transformer Tap Connections and tap changer shall be tightened.

3.7.5.10 Pressure of Inert Gas in cylinders used to maintain positive pressure inside transformer tank shall be checked. Replace cylinder if pressure fails below transformer manufacturer's recommended level for gas cylinder pressure.

3.7.6 Outages and Testing of Transformers:

3.7.6.1 Service Interruptions shall be held to a minimum. De-energization will be accomplished by others.

3.7.6.2 Preinstallation Test: Existing transformers that have undergone major maintenance and/or repair shall be subjected to insulation resistance tests and insulation high potential tests. The results of the tests shall be furnished to the Contracting Officer.

3.7.6.3 Oil Test: Transformers shall have insulating oil tested.

3.7.6.4 Insulation Test: Transformers shall have insulation tested.

SECTION 16321
ELECTRICAL DISTRIBUTION TRANSFORMERS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of electrical distribution transformers. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Poles-Mounted Transformers: ANSI/IEEE C57 series as applicable.

2.2 Pad-Mounted Transformers: NEMA/IEEE C57 series as applicable.

2.3 Transformer Oil for Oil-Filled Units: ASTM D 923.

3.0 EXECUTION:

3.1 Outages shall be scheduled and coordinated in advance with the Contracting Officer.

3.2 Protection: Take precautions to prevent injury to personnel and to avoid damage to equipment and other property in compliance with ANSI C2.

3.3 Preventive Maintenance, Repair, or Replacement Work: The Contractor shall perform all required tests in accordance with applicable codes and standards and the manufacturer's instructions. The Contractor shall perform preventive maintenance work, repair, replacement of any defective part, or furnish new material when required.

3.4 Oil Handling and Disposal: Oil and oil-contaminated materials shall be handled and disposed of in compliance with the latest Environmental Protection Agency requirements. Oil tests shall be in accordance with ASTM standards.

3.5 Reports: Upon completion of the work, a report of the results of the tests made shall be furnished to the Contracting Officer.

SECTION 16350
HIGH-VOLTAGE DISCONNECTING DEVICES

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for repair and maintenance of high-voltage disconnecting devices. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Insulating Oil: ASTM standards applicable to the oil in use.

2.2 General Electrical: ANSI/IEEE C2.

2.3 Power Fuses and Fuse Disconnecting Switches: ANSI C37.46, NEMA SG 2.

2.4 Automatic Circuit Reclosers For AC Systems: ANSI C37.60.

2.5 Automatic Line Sectionalizers For AC Systems: ANSI C37.63, NEMA SG 13, ANSI C37.63.

2.6 Power Switching Equipment: NEMA SG 6.

2.7 Distribution Cutouts and Arrestor Combination Mounting: ANSI C37.36B, ANSI C37.42.

3.0 EXECUTION:

3.1 Scheduling and Coordination: Contractor shall ensure that power interruptions have been scheduled and approved.

3.2 Protection: Precaution, in compliance with ANSI/IEEE C2, shall be taken to prevent injury to personnel and to avoid damage to equipment and property.

3.3 Oil Handling and Disposal: Oil and oil contaminated materials shall be handled and disposed of to comply with the latest federal and state regulations.

SECTION 16370
OVERHEAD ELECTRICAL DISTRIBUTION SYSTEMS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for repair and maintenance of overhead electrical distribution systems. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Conductors: ANSI C8.35, QQ-W-343; ANSI/IEEE C2, ASTM B 8, B 228, B 229, B 230, B 231, B 232; NEMA WC3, WC5, and WC7.

2.2 Insulators: ANSI C29.1, C29.2, C29.3, C29.4, C29.5, C29.6, C29.7, C29.8, C29.9, and NEMA HV 2.

2.3 Poles: ANSI 05.1; AWPA C4, C25, P1, P8, P9; and CSA A14.

2.4 Crossarms: REA DT-5B, AWPA C25, ANSI C2, ANSI C135.33.

2.5 Hardware: EEI TDJ-1, TD-2, TDJ-3, TD-4, TDJ-5, TDJ-6, TDJ-7, TDJ-9, TDJ-10, TD-11, TD-12, TDJ-17, TDJ-22, and TDJ-23 as applicable.

3.0 EXECUTION:

3.1 Scheduling and Coordination: Contractor shall ensure that power interruptions and blocking of thoroughfares have been scheduled and approved.

3.2 Line Clearing: Chemicals used in line clearing operations shall be in compliance with the latest federal and state requirements.

3.3 Safety Precautions: Precautions shall be taken to prevent injury to personnel and to avoid damage to equipment and other property in compliance with ANSI/IEEE C2.

SECTION 16375
UNDERGROUND ELECTRICAL DISTRIBUTION SYSTEMS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for repair and maintenance of underground electrical distribution systems. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Conductors: ASTM D 4727, ASTM D 1352, ASTM D 1679, ACIE NO. 1-68, ICEA NO. S-19-81, NO. S-66-524, and NO. S-68-516, NEMA WC 7 and NEMA WC 8, and UL 854, as applicable.

2.2 Conduits: NEMA TC 2 and NEMA TC 6, UL 6, UL 514B, and UL 543 as applicable.

2.3 Tape: U.L.

2.4 Insulators: ANSI C29 8 and C29 9.

2.5 General Electrical: ANSI C2, NFPA 70.

2.6 Testing: IEEE 48.

2.7 Concrete: Aggregate, ASTM C 33; Portland cement, ASTM C 150, Type 1; compressive strength 4,000 psi at 28 days.

3.0 EXECUTION:

3.1 Coordination: Contractor shall ensure that power interruptions and blocking of thoroughfares have been scheduled and approved.

3.2 Tests: All underground lines, splices, and terminations that have undergone maintenance, repair, or are new installation shall be tested before placement in service.

3.3 Ductbank: No dips or low points that retain water are permissible. Conduit shall be encased with not less than 3 inches of concrete when not direct-buried.

3.4 Manholes and Handholes shall be spaced and installed so as not to exceed the pulling tensions of the cables to be pulled. Maximum pulling tensions shall be as recommended by the cable manufacturer.

SECTION 16390
ELECTRICAL DISTRIBUTION SYSTEM GROUNDING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of electrical distribution system grounding. Products shall match existing materials and/or shall be directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS: (Section not used.)

3.0 EXECUTION:

3.1 Coordination and Scheduling: Contractor shall ensure that power interruptions have been scheduled and approved.

3.2 Outages: Service interruptions shall be limited in number and duration, and the extent of lines involved shall be held to a minimum.

3.3 Protection: Take precautions, in compliance with ANSI C2, to prevent injury to personnel and to avoid damage to equipment and other property.

3.4 Workmanship: Installation shall be in compliance with IEEE 80 and 142. Install protective moulding, staples and conduit as recommended by these standards.

3.5 Trenching: Exercise care when digging trenches for installation or testing of ground equipment. Protect adjacent structures and properly shore excavations.

3.6 Grounding shall comply with NFPA 70, ANSI C2, and IEEE 80 and 142. Ground neutral conductors, cable shields, metallic cable sheaths and armor, metallic conduits, pothead bodies, junction boxes, lightning arresters, fence enclosures, and noncurrent-carrying metallic parts of equipment. Ground rods shall be made of copper, or copper-clad steel not less than 1-inch by 8 feet long and, except those installed in manholes, shall be driven into the earth at least 9 feet. Ground connections in earth shall not be backfilled until after inspection by the Contracting Officer. Repairs and maintenenace of the grounding system shall include resistance measurements and tightening of all bolted connections.

SECTION 16411
ELECTRICAL DISTRIBUTION SYSTEM CAPACITOR BANKS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of electrical distribution system capacitor banks. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Material: New capacitors shall comply with NEMA CP 1 and shall not use impregnant containing polychlorinated biphenyls (PCB).

3.0 EXECUTION:

3.1 Outages shall be scheduled and coordinated in advance with the Contracting Officer.

3.2 Protection: Take precautions to prevent injury to personnel and to avoid damage to equipment and other property in compliance with ANSI C2.

3.3 Maintenance and Repair Work: Workmen shall allow the capacitor time to discharge and then short capacitor terminals together and ground before touching any live parts. Capacitors shall be checked in accordance with NEMA CP 1 and NFPA 70. Perform the necessary preventative maintenance, repair, or replacement of any of the components.

3.4 Oil Handling and Disposal: Oil and oil-contaminated materials shall be handled and disposed of to comply with he latest Environmental Protection Agency requirements.

SECTION 16415
ELECTRICAL DISTRIBUTION SYSTEM VOLTAGE REGULATORS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of electrical distribution system voltage regulators. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Material: New regulators shall comply with ANSI C57.15. New oil shall comply with ASTM D 923.

3.0 EXECUTION:

3.1 Outages shall be scheduled and coordinated in advance with the Contracting Officer.

3.2 Protection: Take precautions to prevent injury to personnel and to avoid damage to equipment and other property in compliance with ANSI C2.

3.3 Maintenance and Repair Work: All maintenance and repair work shall be accomplished and in compliance with applicable ANSI C57-series and ASTM standards.

3.4 Oil Handling and Disposal: Oil and oil-contaminated materials shall be handled and disposed of to comply with the latest Environmental Protection Agency requirements.

3.5 Test Reports on field tests made in compliance with ANSI C57.15 shall be submitted to the Contracting Officer.

SECTION 16440
INTERIOR LOW-VOLTAGE DISCONNECTING DEVICES

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for repair and maintenance of interior low-voltage disconnecting devices. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Switch Box (Enclosed): UL 98.

2.2 Fuse Holders and Fuses: ANSI/UL 512, 198.2, 198B, and ANSI C97.1 as applicable.

2.3 Molded Case Circuit Breakers: NEMA AB 1.

2.4 General Electrical: NFPA 70.

3.0 EXECUTION:

3.1 Coordination: Contractor shall determine that the disconnecting device has been de-energized. Before de-energization, the Contractor shall ensure that equipment served by the disconnecting device will not be damaged by the power outage.

3.2 Clearances: Work clearances required by NFPA 70 shall be provided.

SECTION 16470
PANELBOARDS AND LOAD CENTERS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for repair and maintenance of panelboards and load centers. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Panelboards: NEMA PB 1, and PB 1.1.

2.2 Fuses and Fuse Holders: ANSI/UL 512, 198.

2.3 Molded Case Circuit Breakers: NEMA AB 1.

2.4 General Electrical: NFPA 70.

2.5 Enclosures Beyond Repair: Replace with the same size and type in compliance with NEMA ICS. Carbon steel, ASTM A 366; stainless steel, ASTM A 176; galvanized sheet steel, ASTM A 526.

3.0 EXECUTION:

3.1 Coordination: Contractor shall determine that equipment served by panelboards and load centers will not be damaged before or after power is cut off and that power to the panelboards and load centers has been disconnected or cut off.

3.2 Clearances: Working clearances required by NFPA 70 shall be provided.

3.3 Tests: All devices and systems that have undergone maintenance, repair, or are new installation shall be tested before placement in service.

SECTION 16480
ELECTRIC MOTORS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for repair and maintenance of electric motors. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 General: Parts shall be factory-made. Existing bolts and screws that are rusted, corroded, cross-threaded, or otherwise defective and are removed due to repair work shall be replaced with new bolts and screws.

2.2 Motor Assemblies and Components for replacement purposes shall be designed for same service as existing. Repaired rotors shall be balanced. Brushes worn to within 20 percent of usable length shall be replaced with same type and size brushes.

2.3 New Motor shall be of like kind and of the same size, performance rating, and characteristics as the existing motor to be replaced and shall comply with NEMA MG 1 and UL 1004.

2.4 Products included in these specifications are:

2.4.1 Single Phase Induction Motor.

2.4.2 Universal Motor.

2.4.3 Polyphase Squirrel-Cage Induction Motor.

2.4.4 Polyphase Wound Rotor Induction Motor.

2.4.5 Polyphase Synchronous Motor.

2.4.6 Direct Current Motor.

3.0 EXECUTION:

3.1 Compliance: Take precautions in accordance with the National Electrical Safety Code. Workmanship shall be executed in compliance with NFPA 70.

3.2 Scheduling and Coordination: Contractor shall determine that required notices have been given and that equipment served by the motor will not be damaged due to motor shutdown.

3.3 Lubrication, Operation, and Adjustment: Before operational testing, thoroughly clean electric motor of all foreign material, and lubricate all electric motors or parts requiring lubrication with the types of lubricants recommended by the electric motor manufacturer.

3.4 Deficiencies, Safety Hazards, and Code Violations: Should the Contractor find or observe any deficiency, safety hazard, or code viola- tion in the existing electrical system, equipment, devices, or installations that is not indicated or specified to be corrected under the contract, it shall

be promptly reported to the Contracting Officer. The Contractor may submit recommendations for correction of such deficiency, safety hazard, or code violation with his report.

3.5 Requirements Specific To Each Motor Type:

3.5.1 Single-Phase Induction Motors:

3.5.1.1 Single-Phase Induction Motors shall comply with ANSI/IEEE 114.

3.5.1.2 Frame Sizes shall comply with NEMA MG 13.

3.5.2 Universal Motors:

3.5.2.1 Armature: Core of armatures shall be built up of annealed and insulated laminations. Commutator shall be built up of hard drawn, hard rolled copper segments insulated from each other by mica in compliance with NEMA MG 1.

3.5.2.2 Armature Assembly shall be dynamically balanced for smooth operation in compliance with NEMA MG 1.

3.5.2.3 Bearings shall be sleeve bearing or ball bearing type complying with NEMA MG 1.

3.5.2.4 Brushholders shall be in compliance with NEMA MG 1.

3.5.2.5 Brushes shall be in compliance with NEMA CB 1.

3.5.2.6 Shaft shall be in compliance with NEMA MG 1.

3.5.3 Polyphase Squirrel-Cage Induction Motors:

3.5.3.1 Polyphase Squirrel-Cage Induction Motors shall comply with NEMA MG 1.

3.5.3.2 Frame Size shall comply with NEMA MG 13.

3.5.4 Polyphase Wound Rotor Induction Motors:

3.5.4.1 Polyphase Wound Rotor Induction Motor shall comply with NEMA MG 1.

3.5.4.2 Frame Size shall comply with NEMA MG 13.

3.5.4.3 Brushes shall be in compliance with NEMA CB 1.

3.5.4.4 Stator shall be rewound with conductors of same gauge and material as the existing stator.

3.5.4.5 Rotor shall be rewound with conductors of same gauge and material as the existing rotor.

3.5.5 Polyphase Synchronous Motors:

3.5.5.1 Polyphase Synchronous Motor shall comply with NEMA MG 1.

3.5.5.2 Frame Size shall comply with NEMA MG 13.

3.5.5.3 Brushes shall comply with NEMA CB 1.

3.5.6 Direct Current Motors:

3.5.6.1 Armature core shall be built up of annealed and insulated laminations. Commutator shall be built up of hard drawn, hard rolled copper segments insulated from each other by mica in compliance with NEMA MG 1.

3.5.6.2 Armature Assembly shall be dynamically balanced for smooth operation in compliance with NEMA MG 1.

3.5.6.3 Bearings shall be ball bearing or sleeve bearing type in compliance with NEMA MG 1.

3.5.6.4 Brushholders shall be in compliance with NEMA MG 1.

3.5.6.5 Frame size shall comply with NEMA MG 13.

3.5.6.6 Shaft shall be in compliance with NEMA MG 1.

3.5.6.7 Brushes shall be in compliance with NEMA CB 1.

3.6 Outages and Testing of Electric Motors:

3.6.1 Outages and service interruptions shall be held to a minimum. De-energization will be accomplished by station forces.

3.6.2 Preinstallation Test: Existing motors that have undergone major maintenance and/or repair shall be subjected to insulation resistance tests and insulation high potential tests. Furnish the results of the tests to the Contracting Officer.

SECTION 16495
RECREATIONAL VEHICLE (RV) OUTLETS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of recreational vehicle outlets. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 30A, 20A Receptacle Pedestal: Midwest No. U041GP4 or approved equal. Each recreational vehicle outlet shall be pedestal mounted with one 30A, 120V receptacle and one 20A, 120V duplex receptacle. Each receptacle shall be protected by a dedicated integrally mounted thermal magnetic circuit breaker. The 20A circuit breaker shall be of the ground fault circuit interrupter (GFCI) type. The unit mounting pedestal shall include loop feed lugs rated for at least 100A, 240 volts, and a wire size of 250 kcmil. Similar lugs shall be provided to accommodate the equipment grounding conductor. The complete assembled unit shall be U.L. listed and shall be NEMA 3R construction. The pedestal cover shall be readily removable and shall provide direct access to the loop feed lugs. Pedestal shall be pad mounted.

2.2 50A, 30A, 20A Receptacle Pedestal: Midwest No. U075GP4 or approved equal. Each recreational vehicle outlet will be pedestal mounted with one 50A, 240V receptacle, one 30A, 120V receptacle, and one 20A, 120V duplex receptacle. Each receptacle shall be protected by a dedicated integrally mounted thermal magnetic circuit breaker. The 20A circuit breaker shall be of the ground fault circuit interrupter (GFCI) type. The unit mounting pedestal shall include loop feed lugs rated for at least 100A, 240 volts, and a wire size of 250 kcmil. Similar lugs shall be provided to accommodate the equipment grounding conductor. The complete assembled unit shall be U.L. listed and shall be NEMA 3R construction. The pedestal cover shall be readily removable and shall provide direct access to the loop feed lugs. Pedestal shall be pad mounted.

2.2 Concrete Pad: Pad shall be 24-inches square, 6-inches thick. Exposed edges shall be chamfered 1-inch. Reinforcement shall be provided consisting of #4 steel placed 12-inches from each edge. Concrete shall be a minimum of 3000 psi at 28 days. Top of pad shall extend 1-inch above finished grade.

3.0 EXECUTION: Contractor shall comply with provisions of the National Electric Code.

SECTION 16501
POLES FOR STREET AND AREA LIGHTING SYSTEMS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for poles for street and area lighting systems. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Wood Poles: ANSI 05.1 and shall be preservative-treated.

2.2 Steel, Aluminum, and Concrete Poles: ASTM A 500, ASTM B 209, and AASHTO Standards.

2.3 Steel Poles:

2.3.1 Structural Steel: ASTM A 36.

2.3.2 Zinc Coating: ASTM A 123.

2.3.3 Poles shall be chemically cleaned after fabrication and shall be hot-dipped galvanized in compliance with ASTM A 123.

2.4 Aluminum Poles shall be of high-strength aluminum having a yield strength of 34,000 psi.

2.5 Concrete Poles: Prestressed steel reinforced, cast type in compliance with ACI 318 and 437. Cement shall comply with ASTM C 150.

2.6 Painting: Materials shall match that of existing or adjacent pole finish.

3.0 EXECUTION:

3.1 Safety Precautions shall comply with applicable requirements of the National Electrical Safety Code.

3.2 Wood Pole Setting: In normal firm ground, minimum pole setting depths shall be as follows: for pole lengths of 20 feet, 25 feet, 30 feet, and 35 feet the minimum depth shall be 5 feet, 5 feet 6 inches, and 6 feet, respectively. For pole lengths up to 100 feet the minimum depth shall be 10 percent of length for both straight and curved lines, plus 2 feet for straight lines and 10 percent of length

plus 2 feet 6 inches for curves and corners. In rocky or swampy ground, pole setting depths shall be respectively decreased or increased as required by local power company published standards and as approved by the Contracting Officer. In swampy ground, a bog shoe may be used.

3.3 Wood Pole Inspections:

3.3.1 Visually Inspect Standing Wood Poles for ground-line heart rot, aboveground heart rot, pole top heart rot, shell rot, mechanical damage, eroded foundations, large splits, and lightning damage.

3.3.2 Coat Surfaces with creosote-base wood preservative coating compound and wrap with impregnated felt bandage in compliance with wood pole preservative materials supplier's instructions.

3.4 Wood Pole Decay Maintenance:

3.4.1 Ground-Line Heart Rot shall be treated with an approved fumigant.

3.4.2 Wood Poles with surface decay below grade shall be replaced with new poles.

3.5 Concrete Repair: Repair spalling in pole foundations and concrete poles by thoroughly coating with 2,000 psi shear strength epoxy resin, applying 3,000 psi 28-day concrete, and finishing to restore original configuration of the concrete.

3.6 Steel Pole Maintenance: Steel poles that are corroded shall be chemically cleaned of rust and scale and painted.

SECTION 16502
BALLASTS AND TRANSFORMERS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of luminaire ballasts and transformers. Products shall match existing materials and/or shall be directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Constant-Current Transformers shall be of the automatic, moving-coil types designed to maintain the secondary current within 1 percent of rating when operating under normal loading conditions. A protective relay that will automatically disconnect the transformer from the line on open series circuit shall be provided as an integral component of the transformer. Transformers shall be rated 10 kW, 2,400 volts, 60 hertz primary and 6.6 amperes secondary.

2.2 Fluorescent Ballasts shall be high-power factor type, Class P rated, and CBM certified, rated for single or two-lamp operation. Ballasts shall be lead type for minimum starting temperature of plus 50 F.

2.3 High-Intensity Discharge Ballasts shall be high-power factor, single lamp type. Ballasts shall be Type 2, weatherproof for outdoor use.

2.4 Lamp Ballasts: ANSI C82.1, C82.4, UL 935, and UL 1029 as applicable.

2.5 Series Isolation Transformers for airfield lighting systems shall be equal to the original transformers in accordance with Air Force Manual (AFM) 14, Part II, Visual Air Navigation Facilities.

2.6 Transformers, Regulators, and Reactors shall be in compliance with the requirements of NEMA/IEEE C57.

3.0 EXECUTION: Contractor shall comply with provisions of the National Electric Code.

3.1 Maintenance and Repair of Regulators shall include cleaning or replacement of dirty or burned contacts, replacement of worn or broken mechanical parts and electrical insulation, cleaning and tightening connections, replacement of leaking seals and gaskets, replacement of burnt oil, stopping of tank leaks, securing of loose or broken mounts, repair of shorted windings, and testing of regulator against varying loads and for shorts and high resistances.

3.2 Temporary Wiring Modifications shall be made in order that the lighting system shall remain in operating condition, except for the item being repaired or replaced, during normal lighting periods.

3.3 Outages: Service interruptions shall be scheduled in advance with the Contracting Officer.

SECTION 16503
STREET AND AREA LIGHTING CONTROLS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for street and area lighting controls. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Photocontrols shall be of the light-sensitive photo conductor cell type with integral line resistor and relay circuit having a line voltage circuit contact and capacitor and an across-the-line protective lightning arrester. Plug-in locking type shall be in compliance with UL 773.

2.2 Replacement Relay for control of circuit shall match mounting, voltage, and wattage of existing relay.

2.3 Electronic Control Units shall be solid-state, transistorized, printed circuit type having no operating moving parts.

3.0 EXECUTION:

3.1 Temporary Wiring Modifications shall be made in order that the lighting system shall remain in operating condition during normal lighting periods, except for the control unit being repaired or replaced.

3.2 Photocontrol, Timers, and Electronic Control Units shall be inspected for proper operation and repaired or replaced as required.

3.3 Safety: Contractor shall comply with applicable provisions of the National Electric Code.

SECTION 16510
LUMINAIRES

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of luminaires. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Lamps: ANSI C78 series, C79 series.

2.2 Fixtures: UL 781, 844, 595, 1570, 1571, 1572.

2.3 Lamp Bases and Holders: UL 496, 542, and ANSI C81 series.

2.4 Ballasts: UL 935, 1029, and ANSI C82 series.

2.5 General Electrical: NFPA 70.

2.6 All Luminaires shall be designated "IES distribution type" as referred to in the IES Lighting Handbook.

2.6.1 Luminaires shall be adjusted to achieve lighting levels and patterns specific to the application as recommended by the manufacturer. Each luminaire shall bear the UL label.

2.6.2 Only the Luminaire Being Repaired or Replaced shall be disconnected from its source of supply during the normal operating hours of the lighting system.

2.6.3 Luminaire Heads or Housings shall be die-cast aluminum with slip-fitter mounting and provided with 1-1/4 inch through 2-inch slip-fitter fittings. Luminaire heads shall have standard dimensions for interchangeable standard optical assemblies. Heads shall be internally wired and rated at 600 volts.

2.6.4 Enclosed Luminaire shall consist of an Alzak-finished aluminum reflector and enclosing refractor mounted on a standard luminaire head.

2.6.5 Open Luminaires shall consist of an Alzak-finished aluminum reflector with shielding reflector on house side providing IES Type I distribution, mounted on a standard luminaire head.

2.7 Incandescent Luminaires:

2.7.1 Luminaires Shall Be Enclosed Type for filament lamps with IES Type I distribution and shall have a glass refractor providing IES Type I distribution.

2.7.2 Floodlights Shall Be Enclosed Type with adjustable support brackets. Enclosed floodlights shall be Class HD having a beam spread of 10 to 18 degrees. Open type floodlights shall have a beam spread of 70 to 100 degrees.

2.8 Fluorescent Luminaires shall be the enclosed type.

2.9 High Intensity Discharge Luminaires shall be enclosed type for HID lamps with IES Type I distribution. Enclosed luminaires shall have an enclosing glass refractor providing IES Type I distribution.

3.0 EXECUTION:

3.1 Protection: Take precaution in accordance with ANSI C2.

3.2 All Service Interruptions shall be scheduled in advance with the Contracting Officer.

3.3 Workmanship: NFPA 70.

SECTION 16611
UNINTERRUPTIBLE POWER SYSTEM (UPS)

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for repair and maintenance of uninterruptible power systems. Products shall match existing materials or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Batteries: NEMA PE 1 for safety requirements and IEEE 485 for sizing.

2.2 Battery Charger: UL 1236.

2.3 Switchgear: NEMA SG 5.

2.4 Emergency and Standby Power Systems: IEEE 446.

3.0 EXECUTION:

3.1 Coordination and Scheduling: Outages shall be scheduled and coordinated in advance with the Contracting Officer.

3.2 Protection: Take precautions to prevent injury to personnel and to avoid damage to equipment and other property in compliance with ANSI/IEEE C2.

3.3 Maintenance, Repair, or Replacement Work: The Contractor shall check the UPS in accordance with the manufacturer's instructions and Mil. Std. MIL-STD-202 and IEEE 446. If instructed by the Contracting Officer, the Contractor shall check for electromagnetic compatibility in accordance with Mil. Std. MIL-STD-461 and MIL-STD-462. As a result of the testing or for preventive maintenance, the Contractor shall maintain, repair, or replace any piece of equipment requiring work.

SECTION 16640
CATHODIC PROTECTION OF STEEL WATER TANKS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for the repair and maintenance of cathodic protection of steel water tanks. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Contractor's Qualification: A qualification such as NACE accredited corrosion specialist or a Senior Corrosion Technologist is required to perform or to supervise the inspection of the cathodic pro-tection system. The contractor making the repair and installing new equipment, material, or components shall be under the direct supervision of a NACE accredited corrosion specialist or a Senior Corrosion technologist with a minimum of five years of experience in design and installation of cathodic protection systems for steel water tanks.

2.2 Approval: All repair or replacement material and equipment shall be NACE approved.

3.0 EXECUTION:

3.1 Inspection: The inspection of the cathodic protection system shall be made in compliance with applicable NACE standards. The inspection shall include a potential profile of the submerged structures together with visual and electrical tests.

3.1.1 Tank-to-Water Potential Tests: Adjust the rectifier voltage or amperage so as to satisfy design current densities or specified voltage. Document readings, and note any reading below -0.85 volts versus the copper-copper sulfate half-cell or silver-silver chloride half-cell (using conversion chart). Successive potential readings shall be made with the tank full of water and the reference electrode placed at various depths, starting at 1 foot below the surface of the water and continuing at 3-foot intervals to the bottom of the tank. (A vertical inspection profile shall be taken along the wall between each anode string.) The tank bottom shall also be traversed equidistant from all distributed anodes. Inspect risers by placing reference electrode along the side wall of the riser and measuring at 3-foot intervals as far as possible.

3.1.2 Polarization of the submerged steel surfaces to a tank-to-water potential shall be at least a negative 0.85 volts.

3.1.3 Voltage Measurements Between Tank and Electrode: When inspecting new well-coated tanks, the voltage measured between the tank and reference electrode that is placed at any point along the coated surface shall not exceed negative 1.2 volts.

3.1.4 The Rectifier shall be free from any restriction that inhibits free air circulation. Keep air-cooled rectifiers free from dust accumulation, clogged filters or screens, brush, grass, or nests. Fill oil-cooled rectifiers to the proper level, and change the oil when it becomes cloudy. Dispose of oil that is removed as directed by the Contracting Officer.

3.1.4.1 Output Measurement: Measure and record the current and voltage output. Compare the readings obtained against the previous readings.

3.1.4.2 Stack Tests: Inspect the semi-conductor stacks to ensure that they are functioning properly and have not exceeded their useful life. The two quantities that shall be measured are

reverse current leakage and forward voltage drop. When either of these values increase beyond limits set by the components manufacturer, replace the stack.

3.1.4.3 Meter Tests: Check the meters in the rectifier for accuracy by using portable instruments (voltmeter and ammeter) of known accuracy.

3.1.5 Visual Inspection of the water tank shall be conducted while the Contractor is inspecting the anodes and wiring. At the direction of the Contracting Officer, lower the water level to expose as much of the wiring as practical to inspect for deteriorated insulation, faulty connections, etc. Inspect the interior surface for condition of coating and apparent rust or calcareous build up. In systems using permanent anodes, determine if the anode shall last until the next inspection. Record broken, damaged, and missing anodes. Inspect wiring to the anodes. Replace wire that has deteriorated insulation.

3.1.6 Reference Electrodes and Connecting Wires shall be inspected by the Contractor to determine whether they are capable of operation until the next annual inspection.

3.1.7 Reports: Record and submit all data. Corrosion control records shall follow recommendations found in NACE RP0169.

3.2 Maintenance and Repair:

3.2.1 Compliance: The maintenance, repair, and installation of replacement materials shall be in compliance with accepted NACE practices. Install all materials and equipment in compliance with the recommendations of NACE or the manufacturer or to comply with the contract documents. Contractor shall replace all broken, missing, deteriorated, or otherwise unserviceable components determined during inspection.

3.2.2 Workmanship: The maintenance, repair, and installation of repair materials shall be under the supervision of the Contractor's NACE Accredited Corrosion Specialist or Senior Corrosion Technologist. Installation shall be performed by personnel who are specifically trained in this work by the manufacturer and who are engaged full time in the installation and servicing of cathode protection equipment. Electrical work shall be in compliance with the requirements of the National Electrical Code.

3.2.3 Testing Methods: Upon completion of repair, the Contractor shall test, adjust, and place in service the cathodic protection system by the following methods:

3.2.3.1 Testing: Adjust the voltage of the rectifier so as to cause a sufficient current to flow to polarize all parts of the structure to at least -0.85 volts. With a given amount of current flowing, voltage measurement shall be made from the tank to a copper-sulfate reference electrode in contact with the water. Successive potential readings shall be made with a calibrated voltmeter, with the tank full of water and the reference electrode placed at various depths starting at 1 foot below the surface of the water and continuing at 3-foot intervals to the bottom of the tank. The tank bottom shall also be traversed and readings taken every 3 feet in a single horizontal direction. In making these tests, place the reference electrode midway between two tank anodes and suspend close to, but not touching, the side or bottom of the tank. The distance between the reference electrode and the wall shall not exceed 1 inch for all readings. If any parts of the structure register voltages more negative than minus 1.2 volts, note this in a deficiency checklist.

3.2.3.2 Rectifier Adjustment: Final adjustment of the rectifier output current shall be made so that repeated voltage readings taken as specified above for testing fall between the limits of minus 0.75 to minus 1.2 volts when measured against the reference electrode.

3.2.3.3 Signs: The Contractor shall paint or stencil his name, date of inspection of the system, and due date of next inspection at a place on site designated by the Contracting Officer.

3.2.3.4 Reports: After final adjustment, place the cathodic pro-tection system in service, record the conditions of the system as left by the Contractor, and submit the report to the Contracting Officer.

3.3 Operating and Maintenance Instructions: The Contractor shall contribute technical data to the cathodic protection records file maintained by the installation. These technical records shall include such items as: manufacturer's data on installed equipment, operating instructions, lists of repair parts, names and addresses of sources of parts and services, current price lists, repair and maintenance instructions, and construction specifications and shop drawings. When the system has been modified or new components have been added, the Contractor shall prepare and furnish the Contracting Officer two complete sets of typewritten or printed instructions covering the maintenance and operation of the installation. The instructions shall cover proper adjustment of the direct current flow, a brief description of cathodic protection principles, a single line operating diagram, anode consideration with reference to local freezing conditions, trouble-shooting checklists, and any other pertinent information concerned with the proper care and maintenance of the installation.

SECTION 16641
CATHODIC PROTECTION SYSTEM
FOR UNDERGROUND UTILITIES

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of cathodic protection systems for underground utilities. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Contractor's Qualification: A qualified person, such as a NACE-accredited Corrosion Specialist or a Senior Corrosion Technologist, is required to perform or supervise the inspection of the cathodic protection system. The contractor making the repair and installing new equipment, material, or components shall be under the direct supervision of a NACE accredited corrosion specialist or a Senior Corrosion technologist with a minimum of five years of experience in design and installation of cathodic protection systems for
underground piping systems.

2.2 Standard Products: Materials and equipment to be used in the repair or replacement of a cathodic protection system shall be a product of a manufacturer regularly engaged in the manufacture of the product, shall meet the NACE requirements, and shall essentially duplicate materials and equipment that have been in satisfactory use at least two years.

3.0 EXECUTION:

3.1 Inspection: A complete inspection of the system shall be made in compliance with NACE RP0169. All findings shall be made in the form of a written report as directed by the Contracting Officer.

3.1.1 Sacrificial (Galvanic) Anode System: Inspect foreign or neighboring structures to determine if a structure is being made more positive by the cathodic protection system. When structure-to-soil (electrolyte) potentials indicate that a neighboring structure is being made more positive, bonding shall be required to avoid damage. Inspect all underground metallic structure within 100 feet of the anode.

3.1.2 Impressed Current (Rectifier Ground Bed) System:

3.1.2.1 Component Inspection: Make inspection of the individual components to ensure that all parts are operating properly. The inspection shall include, but not be limited to, checking unevenness of the temperature or the stacks, hot or warm joints or contacts, arc burn paths, discolored insulators, watt-hour meter for creep, poor insulation, faulty lightning arresters, fuses, and cleanliness of the rectifier stack.

3.1.2.2 Stack Tests: Inspect the semi-conductor stacks to ensure that they are functioning properly and have not exceeded their useful life. The two quantities that shall be measured are reverse current leakage and forward voltage drop. When either of these values increase beyond limits set by the components manufacturer, replace the stack.

3.1.2.3 Interference Tests: Inspect foreign or neighboring structures to determine if a structure is being made more positive by the cathodic protection system. When structure-to-soil potentials indicate that a neighboring structure is being made more positive, the Contractor must make

recommendations in report to avoid damage. Inspect and test all underground metallic structure within 1000 feet of the ground bed and all crossings of the protected structure. Test stations shall be provided at all crossings.

3.2 Maintenance and Repair: After the installation of anodes, the Contractor shall inspect the system and reinspect it again 2 to 4 weeks later. In the event that the system, when repaired, will not provide the required protection, as evidenced by the final tests and measurements, the Contractor, together with the Contracting Officer, shall determine the cause of the deficiency and the corrective measures necessary. After the necessary corrective measures have been determined, the contract may be modified as required. All repair or replacement material/equipment shall be NACE approved and similar to original materials. Installation shall be in compliance with the recommendations of the manufacturers as approved by the Contracting Officer to comply with the contract documents. Replacement materials that are installed shall comply with the applicable portions of NACE RP0169.

3.2.1 Sacrificial (Galvanic) Anode System:

3.2.1.1 General: Replacing anodes includes boring the hole or trenching, installing the anode, welding or splicing the electrical lead, adjusting the output, and installing test stations. Replacement of anodes shall comply with installation procedures found in NACE RP0169.

3.2.1.2 Anode Output Adjustment: If required, install a resistor or resistance wire to prevent the anode from delivering excess current. The resistance wire, if used, shall be a nichrome wire, No. 16 or 22 AWG with type TW insulation.

3.2.1.3 Placing the System into Service: Upon completion of all phases of the cathodic protection system, it shall be checked and adjusted for optimum performance before placing in regular service.

3.2.2 Impressed Current (Rectifier Ground Bed) Systems:

3.2.2.1 General: Replacing anodes includes boring the hole or trenching, installing the anode, welding or splicing the electrical lead, adjusting the output, and installing test stations. Replacement of anodes shall comply with installation procedures in NACE RP0169.

3.2.2.2 Installation: Install anodes similarly to the anodes in the initial installation. Replacement anodes are normally installed in auger-bored holes drilled adjacent to the damaged or deteriorated anode. Install anodes below the center line of the protected structure. Anodes may be emplaced horizontally if obstructions are encountered. Backfill material shall consist of coke breeze compacted in 6-inch layers. Foreign material shall be excluded from the backfill.

3.2.2.3 Electrical Splices and Connections: Negative cable connections shall be thermit-welded in compliance with the weld manufacturer's instruction. Cover the connection with an approved backfill shield placed over the weld connection. The shields shall be sized to cover the exposed metal.

3.2.2.4 Placing the System into Service: Upon completion of all phases of the cathodic protection system, it shall be checked and adjusted for optimum performance before placing in regular service.

3.2.2.5 Interference Testing: Make interference testing on all structures installed under this contract to locate damage being caused by existing or new impressed current cathodic protection systems or other sources of interference. It shall be the Contractor's responsibility to correct all interferences.

3.3 Maintenance and Operating Instructions: The Contractor shall contribute technical data to the cathodic protection records file maintained by the installation. These technical records shall include such items as manufacturers' data on installed equipment, operating instructions, lists of repair parts, names and addresses or sources of parts and services, current price lists, repair and maintenance instructions, construction specifications and shop drawings, and as-built drawings of the system.

3.3.1 Consolidation of Records: The Contractor shall consolidate all cathodic protection records including surveys, inspections, operating data, maps, charts, location of leaks (leak maps), and manufacturers' parts manual.

3.3.2 Updating Records: Update existing cathodic protection location maps to show any changes in location or addition of test points or stations, anodes, wiring, etc.

3.3.3 Manuals: When the system has been modified or new components have been added, the Contractor shall prepare and furnish the Contracting Officer six copies of operation and maintenance manuals of the cathodic protection system for guidance of using agency personnel. Prepare manual with contents as determined by the Contracting Officer.

# SECTION 16670
# LIGHTNING ARRESTERS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of lightning arresters. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS: Arresters shall comply with ANSI/IEEE 28 and ANSI C62.2.

3.0 EXECUTION:

3.1 Scheduling and Coordination: Contractor shall ensure that power interruptions have been scheduled and approved.

3.2 Workmanship shall be in compliance with ANSI C2.

3.3 Cleaning: Clean work areas and materials of dirt, grime, grease, and debris.

3.4 Expulsion Arresters shall be inspected for depleted fiber material and thin walls. Report deficiencies to the Contracting Officer.

SECTION 16721
FIRE ALARM AND DETECTION EQUIPMENT

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of fire alarm and detection equipment. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Control Unit and Annunciator: FM Approval Guide, UL 864.

2.2 Lamps shall be long-life neon.

2.3 Contacts shall be rated 5 amperes, 120 volts.

2.4 Power Supply shall be solid-state, UL 864 for dc systems, FMS for ac systems. No attempt to repair solid-state components shall be made.

2.5 Heat Detectors:

2.5.1 Fixed Temperature, Self-Restoring Heat Detector shall have bimetallic element to close electrical contacts when heated.

2.5.2 Combination Fixed Temperature and Rate-of-Rise, Self-Restoring Heat Detector shall have both a bimetallic element to close electrical contacts and a rate-of-rise element with an air chamber, a flexible metal diaphragm, and a moisture-proof vent. Rate-of-rise element shall be independent of fixed temperature action and shall respond when the rate of temperature rise exceeds 15 F per minute.

2.5.3 Fixed Temperature Rate Compensated Heat Detectors shall have an expansible outer shell sensitive to surrounding air temperature, which compensates for thermal lag of external temperature.

2.5.4 Fixed Temperature, Nonrestorable Heat Detector shall have phosphor bronze spring held under tension by a fusible link to hold open contacts. Indicator hole shall appear in the detector chamber seal to indicate the fired detector.

2.5.5 Combination Fixed Temperature and Rate-of-Rise, Nonrestorable Heat Detector shall have a phosphor bronze spring held under tension by a fusible link to hold open contacts and a rate-of-rise element with an air chamber, a flexible metal diaphragm, and a moisture-proof vent. Rate-of-rise element shall be independent of fixed temperature action and shall respond when the rate of temperature rise exceeds 15 F per minute.

2.6 Flame Detector shall consist of a silicon photo-electric cell located behind a convex, infrared filter lens. Time delays to prevent false actuation shall be three seconds, ten seconds, or thirty seconds.

2.7 Fire Alarm Transmitters and Receivers:

2.7.1 Emergency Power Supply shall be a completely automatic unit consisting of batteries, battery charging unit to automatically maintain the batteries, and an inverter to change dc battery power to 120 volt, 60 hertz ac power.

2.7.2 Control Relays: Replacement relays shall be totally enclosed with heat and shock-resistant dust covers.

2.7.3 Trouble Buzzer shall be integrally mounted in the control unit.

2.8 Single Station Smoke Detectors (Self-Contained):

2.8.1 Detector Base shall be plug-in type plastic base.

2.8.2 Detectors shall be self-contained control unit that accepts either ionization, photo-electric, or flame detectors. Ionization detectors shall be of the dual chamber type. Ionization detectors shall comply with UL 268 and UL 217. Photo-electric detectors shall comply with UL 268.

2.9 Duct Smoke Detectors shall be either ionization type or photo-electric type. Ionization detector shall be of the dual chamber type. Ionization detectors shall comply with UL 268 and photo-electric detectors shall comply with UL 268.

2.10 Interlocks:

2.10.1 Contact Rating: At 277 volts, contacts shall be rated 15 amperes at 75 percent power factor.

2.10.2 Horsepower Rating: Contacts shall be rated for 1-1/2 horsepower at 230 volts.

2.10.3 Contact Voltage: Minimum contact voltage rating shall be 277 volts.

2.10.4 Coil Voltage shall be selected to suit voltage of system.

2.11 Batteries: ULC listed.

2.12 End-of-Line Resistors, Balancing Resistors, and Diodes: Compatible with system installed.

2.13 Manual Stations: UL 38, flush or semi-flush mounted, pull-lever type.

2.14 Wiring: NFPA 70 and 72.

2.15 Audible Alarms: UL listed for fire protection service, UL 464/486N.

3.0 EXECUTION:

3.1 Coordination: Prior to commencement of work in any facility having any form of fixed fire protection, contact the fire department. Contractor shall determine that disconnection of equipment will not create a false alarm.

3.2 Workmanship: NFPA 70 and 72.

3.3 Defective Ionization Detectors that are replaced shall be returned to manufacturer for proper disposal.

SECTION 16730
CLOCK AND PROGRAM SYSTEMS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for repair and maintenance of clock and program systems. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Time and Control: UL 863 and 916.

2.2 General Electrical: NFPA 70.

3.0 EXECUTION: Contractor shall determine that required notices have been given and that power to the equipment has been disconnected.

SECTION 16770
PUBLIC ADDRESS EQUIPMENT

1.0 DESCRIPTION OF WORK: The specification covers the furnishing and installation of public address equipment. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Broadcast Microphone Cables: EIA RS-215.

2.2 Audio Cable Connectors: EIA RS-297.

2.3 Capacitors: EIA RS-153, RS-164, RS-198, and RS-395, as applicable.

2.4 Ceramic-Base Printed Circuits: EIA RS-161 and RS-162.

2.5 Component Parts: Standard test method of EIA RS-186.

2.6 Thermoplastic Hook-Up Wire: EIA RS-230 and ASTM B 286.

2.7 Inductors: EIA RS-175 or RS-197.

2.8 Loudspeakers: EIA RS-278 and RS-SE-103.

2.9 Microphones: EIA RS-SE-105.

2.10 Panel Mounting Racks: EIA RS-310.

2.11 Resistors: EIA RS-155, RS-172, RS-196, RS-303, RS-322, and RS-344.

2.12 Sound System: EIA RS-160.

2.13 Tape Equipment: NAB Magnetic Tape (Reel-to-Reel) Recording and Reproduction Standards.

2.14 Transformers: EIA RS-174, RS-180, RS-183, and RS-393.

2.15 AM-FM Tuners: The AM-FM tuners shall have a tuning range of 540 kHz to 1605 kHz for AM and 88 to 108 MHz for FM and shall comply with FCC Rules and Regulations, Part 15. Controls shall include AM-FM selector switch, power switch with pilot light, signal strength meter, and tuning control with illuminated dial scale.

2.16 COMPACT DISC PLAYER:

Player shall have three beam laser pickup, dual Digital-to-Analog converters, random access and random mode programmable playback. Player shall have capability to play up to 6 discS automatically. Player shall as a minimum conform to the following:

Frequency: 10 - 20,000 Hz Plus or Minus 1 dB

Signal-to-Noise: Minimum of 100 dB

Dynamic Range: Minimum of 96 dB

Total Harmonic Distortion: Maximum of 0.007% at 1KH2

Channel Separation: Minimum 90 dB at 1 KH2

Quantization: Minimum of 16 Bits Linear per channel

Conversion Rate: Minimum 4 x Oversampling

Disc Size: 5 inch

2.17 Magnetic Tape Equipment: Tape equipment shall be provided for monophonic recording and playback, of at least 30 dB dynamic range of input signal. The record and playback heads shall be separate with the playback head arranged to monitor while the recording is made. Hum and noise shall be at least 50 dB below full output.

2.17.1 Cassette Tape Equipment: Tape speed shall be 1-7/8 ips. Frequency response shall be within ±3 dB from 40 hertz to 14,000 hertz, with less than 0.16 percent wow and flutter. Signal to noise ratio shall be at least 50 dB.

2.17.2 Automatic Tape Reproducer: At a tape speed of 7-1/2 ips, the reproducer shall have a frequency response within ±2 dB from 40 hertz to 15,000 hertz. Wow and flutter shall be not greater than 0.25 percent; and signal to noise ratio, not less than 50 dB.

2.18 Preamplifiers:

2.18.1 Microphone Preamplifiers: If required, microphone preamplifiers shall be matched to the microphone.

2.18.2 Mixer Preamplifier: Preamplifier shall be of the general purpose type, to mix and control at least five inputs. Equalization shall meet the requirements of RIAA Publication, Standard Recording and Reproducing Characteristics. Preamplifier shall be provided with independent low-frequency and high-frequency tone controls to adjust bass and treble response at the output, a monitor volume control, monitor jack, illuminated volume unit meter, power switch, and master volume controls.

2.18.3 Radio Frequency Preamplifier: The preamplifier shall have a minimum of 14 dB gain over the FM band with a noise figure not greater than 4.2 dB.

2.19 Power Amplifiers: Frequency response shall be within ±1 dB from 25 hertz to 19,000 hertz, and total harmonic distortion shall not exceed 0.5 percent at rated output.

Output shall incorporate automatic resetting, protective electronic circuitry to prevent amplifier damage of any kind due to amplifier output opens or shorts.

2.20 Equipment Racks: Equipment shall be mounted in 19-inch racks in accordance with EIA RS-310. Ventilated rear panels, solid side panels, and solid top panels shall be provided.

2.21 AM/FM Antenna. The AM/FM antenna shall be roof-mounted suitable for both AM and FM reception and shall cover all frequency bands specified for radio tuners. Coaxial cable attenuation shall not exceed 2.5 dB over the FM radio band.

3.0 EXECUTION:

3.1 Connections to Existing System: Alarm or emergency systems shall not be interrupted. If required, work shall be scheduled after normal working hours. Existing disturbed work shall be restored to its original condition, including maintenance of wiring continuity.

3.2 Temporary Shutdowns: Temporary shutdowns of existing systems shall be made at times that will not interfere with normal operation of existing facilities, and only with written consent of the Contracting Officer.

SECTION 16795
FIBER OPTIC CABLE TRANSMISSION SYSTEM

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of fiber optic transmission system. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Fiber Optic Cable: EIA 455-25B, EIA 455-30B, EIA 455-33A, EIA 455-41A, EIA 455-46A, EIA 455-47B, EIA 455-51A, EIA 455-53A, EIA 455-61, EIA 455-65, EIA 455-81A, EIA 455-82B, EIA 455-88, EIA 455-91, EIA 455-104A, EIA 455-170, EIA 455-171, and EIA 455-177A, as applicable.

2.2 Fiber Optic Receivers: EIA 170, EIA 232E, and EIA 485 as applicable.

2.3 Fiber Optic Transmitters: EIA 170, EIA 232E, and EIA 485 as applicable.

2.4 Fiber Optic Modems: EIA 232 E and EIA 485 as applicable.

2.5 Fiber Optic Connectors: EIA 455-13. Connectors shall be of stainless steel.

2.6 Fiber Optic (FO) Repeaters: For simplex circuits, the repeater shall consist of an FO receiver connected to an FO transmitter. For Duplex circuits, the repeater shall consist of a pair of FO receivers that are connected to a pair of FO transmitters.

2.3 Fiber Optic Transceivers: EIA 170, EIA 232E, and EIA 485 as applicable.

2.8 Enclosures: NEMA 250.

3.0 EXECUTION: Contractor shall comply with provisions of the National Electric Code.

SECTION 16865
INSTITUTIONAL ELECTRIC HEATING EQUIPMENT

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for repair and maintenance of institutional electric heating equipment. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Controls: NEMA DC 4, UL 20, UL 917, and UL 1020.

2.2 Heaters: UL 499.

2.3 General Electrical: NFPA 70.

2.4 Asbestos Usage: Materials containing asbestos shall not be used if nonasbestos materials are available.

3.0 EXECUTION:

3.1 Coordination: Contractor shall determine that heating equipment has been de-energized. Temporary heaters shall be supplied if required to maintain temperature.

3.2 Motor Repair: Electric motors to be repaired shall be done by a shop specializing in the repair of motors.

SECTION 16870
ELECTRIC UNIT HEATERS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of electrical unit heaters. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Heating Element shall have nickel-chromium wire packed in high purity magnesium oxide enclosed in a corrosion-resistant sheath. The embedded sheath shall be the manufacturer's standard design.

2.2 Housing shall be fabricated from sheet steel complying with ASTM A 569. The housing shall be provided with means for suspension. Deflector blades shall be constructed of same material as housing and shall be manufacturer's standard design and operation.

2.3 Fan shall be the propeller type fabricated of aluminum or steel.

2.4 Controls:

2.4.1 Thermal Overload Cutout of the Manual Reset Type shall be provided to disconnect elements in the event normal operating temperatures are exceeded.

2.4.2 Thermostat shall be unit or wall mounted and shall be heavy-duty type with enclosed contacts as specified by the manufacturer, with a 3-position selector switch to permit manual fan operation independent of temperature control. Control circuit voltage shall not exceed 30 volts as provided by a factory-installed control circuit transformer.

2.5 Asbestos Usage: Materials containing asbestos shall not be used if nonasbestos materials are available.

3.0 EXECUTION:

3.1 Coordination and Scheduling: Contractor shall ensure that power interruptions have been scheduled and approved.

3.2 Workmanship: Installation work shall be in compliance with the National Electric Code.

SECTION 16901
CENTRAL MONITORING, CONTROL, AND INSTRUMENTATION

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for repair and maintenance of central monitoring, control, and instrumentation equipment. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Drawings and Data: Drawings and data on existing monitoring control and instrumentation equipment should be requested from the Contracting Officer.

2.2 Sensing Elements or Transducers: Devices that sense the condition, state, or value of a process variable and produce an output that reflects that condition.

2.3 Measurement and Signal Conditioning: Devices that condition and transmit the signal generated by the sensing element and transducers.

2.4 Control Devices: Include any device that performs a definite function in control system, such as any switch (limit, pressure, temperature, on-off, etc), valves, solenoid, relays, and solid-state control elements.

2.5 Central Monitoring and Control Devices: Include any device that either monitors the signal generated by the transmitters or control devices (indicators, recorders, annunicators, etc.) or provides a final control action from the signal generated by the transmitter such as controllers, computers, etc.

2.6 Product Codes and Standards:

2.6.1 Safety Requirements for Electrical Measuring and Controlling: ANSI C39.5.

2.6.2 Industrial Control Equipment: ANSI/UL 508.

2.6.3 Electrical Analog Indicating Instruments: ANSI C39.1.

2.6.4 Instrument Transformers: ANSI C57.13.

2.6.5 Industrial Controls and Systems: NEMA ICS.

2.6.6 National Electrical Code: NFPA 70.

2.6.7 Limit Controls: UL 353.

2.6.8 Test Code for Industrial Controls: IEEE 74.

2.6.9 Master Test Code for Resistance Measurement: IEEE 118.

2.6.10 Master Test Code for Electrical Measurement in Power Circuits: IEEE 120.

2.6.11 Dynamic Response Testing of Process Control Instrumentation: ISA S26.

3.0 EXECUTION:

3.1 Protection: Take precautions to prevent injury to personnel and to avoid damage to equipment and other property in compliance with ANSI/IEEE C2.

3.2 Power Supplies that may be a hazard during the performance of the work shall be locked out.

3.3 Testing: Check the operation of each instrument after it is returned to service. Adjust each instrument to operate properly over the design range.

3.4 Report: A final report shall be prepared after the maintenance, repair, or replacement has been accomplished. A list of all equipment worked on, the service performed on each piece of equipment, and calibration data shall be included in the report. The report shall be typed and furnished to the Contracting Officer.

SECTION 19120
DEMOLITION

1.0 DESCRIPTION OF WORK: This specification covers the dismantling, salvage, demolition, and disposal of designated structures, utilities, and/or materials as directed by the Contracting Officer.

2.0 PRODUCTS: (Not Used).

3.0 EXECUTION:

3.1 Submittals: Procedures proposed for the accomplishment of all demolition and salvage work, including a detailed description of the methods and equipment to be used for each operation and the scheduled sequence of operations, shall be submitted to the Contracting Officer for approval. Operations which involve interruption of utility services or the handling of toxic or hazardous materials shall be scheduled and approved by the Contracting Officer at least 48 hours prior to the start of such operations.

3.2 Clearances and Permits: Obtain as required from local authorities.

3.3 Salvage: Title to all materials and equipment to be demolished is vested in the Government. Unsalvageable materials shall be disposed of as directed by the Contracting Officer. Materials and equipment for Government salvage or reuse shall be carefully removed and delivered to a storage site designated by the Contracting Officer.

3.4 Protection of Existing Work: All necessary precautions shall be taken to ensure against damage to existing work that is to remain in place or is to remain the property of the Government. Damaged areas shall be repaired or replaced with new products to match existing surrounding surfaces. Shoring, bracing, and supports shall be provided as required and structural elements shall not be overloaded. Care shall be taken to prevent unscheduled interruptions to any utility service.

3.5 Protection From Weather: The interior of buildings and all materials and equipment shall be protected from the weather at all times.

3.6 Dust and Dirt Control: Dust and dirt resulting from demolition operations shall be controlled to prevent spread into occupied portions of buildings and to avoid creation of a nuisance to the surrounding area. Use of water will not be permitted when it will result in, or create, hazardous or objectionable conditions such as ice, flooding, and pollution.

3.7 Burning: Burning at the project site for the disposal of refuse and debris will not be permitted.

3.8 Explosives: The use of explosives will not be permitted.

3.9 Hazardous Materials: Extreme care and caution shall be exercised at all times when handling toxic or hazardous materials in order to prevent harm to personnel and property and to prevent environmental contamination. Federal and state regulations governing handling, transportation, and disposal of such materials shall be rigidly adhered to.

3.10 Utilities: Temporary interruptions, disconnections, and relocation of existing utilities and removal of abandoned utility services shall be as directed by the Contracting Officer.

3.11 Cleanup: Debris and rubbish shall not be allowed to accumulate in buildings or on site. Local regulations regarding hauling and disposal shall be followed.