DEPARTMENT OF THE ARMY
US ARMY ENGINEER DIVISION, SOUTHWESTERN
1100 COMMERCE STREET, SUITE 831
DALLAS TX 75242-1317

REPLY TO
ATTENTION OF

CESWD-PDP

09 MAR 2017

MEMORANDUM FOR Commander, Little Rock District, P.O. Box 867 Little Rock, AR, 72203-0867

SUBJECT: McClellan-Kerr Arkansas River Navigation System (MKARNS) Tainter Gate Recapitalization Study, Arkansas and Oklahoma - Review Plan Approval

1. References:

a. EC 1165-2-214, Civil Works Review Policy, 15 Dec 12, ECB 2016-9 dated 4 Mar 16.

b. Memorandum, CESWL-PPMD, 06 March 2017, subject: MKARNS Tainter Gate Recapitalization Study, Arkansas and Oklahoma - Review Plan Approval Request (Encl 1).

c. Memorandum, CESAM-PD-D, 31 August 2016, subject: Review Plan for the McClellan-Kerr Arkansas River Navigation System (MKARNS) Tainter Gate Recapitalization Study, Arkansas and Oklahoma (Encl 2).

2. In accordance with reference 1.a., I hereby approve the enclosed Review Plan (RP) for the subject project study.

3. The RP has been prepared in accordance with the referenced guidance and has been reviewed and cleared for approval by the McClellan-Kerr Arkansas River Navigation System (MKARNS) Tainter Gate Recapitalization Study, Arkansas and Oklahoma - Review Plan Approval (PCXIN-RED) (Encl 2). An Independent External Peer Review is required since the project will exceed $200,000,000. However, an exclusion will be requested as required by reference 1.a.

4. Please post the final approved RP with a copy of this memorandum to the District's public internet website and provide the internet address to the PCXIN-RED and Southwestern Division. Before posting document to the District website, the names of USACE employees should be removed.

5. The SWD point of contact is Ms. Lanora Wright, CESWD-PDP, at 469-487-7032.

David C. Hill

2 Encls

DAVID C. HILL
Brigadier General, USA
Commanding

O&M FY16 MKARNS
Tainter Gate Recapitalization Study
Arkansas and Oklahoma

P2 Project No: 458418

REVIEW PLAN

Little Rock District

PCX Endorsement Date: 31 Aug 2016
MSC Approval Date: 9 Mar 2017
Last Revision Date: 9 Mar 2017

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

March 2017

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1. PURPOSE AND REQUIREMENTS

A. Purpose. This Review Plan defines the scope and level of peer review for the McClellan-Kerr Arkansas River Navigation System (MKARNS) Tainter Gate Recapitalization Study and Environmental Assessment, Arkansas and Oklahoma.

B. References

(1) Engineering Circular (EC) 1165-2-214, Civil Works Review Policy, 15 December 2012, ECB 2016-9 dated 4 Mar 16.
(2) EC 1105-2-412, Assuring Quality of Planning Models, 31 Mar 2011
(3) Engineering Regulation (ER) 1110-1-12, Quality Management, 30 Sep 2006
(4) ER 1105-2-100, Planning Guidance Notebook, Appendix H, Policy Compliance Review and Approval of Decision Documents, Amendment #1, 20 Nov 2007
(5) Cost and Schedule Risk Analysis Guidance, 17 May 2009
(6) Project Management Plan, 25 May 2016

C. Requirements. This review plan was developed in accordance with EC 1165-2-214, which establishes an accountable, comprehensive, life-cycle review strategy for Civil Works products by providing a seamless process for review of all Civil Works projects from initial planning through design, construction, and operation, maintenance, repair, rehabilitation, and replacement (OMRR&R). The EC outlines four general levels of review: District Quality Control (DQC), Agency Technical Review (ATR), Independent External Peer Review (IEPR), and Policy and Legal Compliance Review. In addition to these levels of review, decision documents are subject to cost engineering review and certification (per EC 1165-2-214) and planning model certification/approval (per EC 1105-2-412).

2. REVIEW MANAGEMENT ORGANIZATION (RMO) COORDINATION

The RMO for the peer review effort described in this Review Plan is the Planning Center of Expertise, Inland Navigation and Risk-Informed Economics Division (PCXIN-RED).

The RMO is responsible for managing the overall peer review effort described in this Review Plan. The RMO will coordinate with the Cost Engineering Agency Technical Review and Mandatory Center of Expertise (MCX) to ensure the appropriate expertise is included on the review teams to assess the adequacy of cost estimates, construction schedules and contingencies. The study has no anticipated life safety issues.

3. STUDY INFORMATION

A. Decision Document. The project is O&M FY16 MKARNS Tainter gate Recapitalization Study, Arkansas and Oklahoma. The decision document will be a Major Rehabilitation Report (MRR) and a Finding of No Significant Impact (under the National Environmental Policy Act (NEPA)). The NEPA document will be an Environmental Assessment (EA). The purpose of the study is to document the project delivery team's

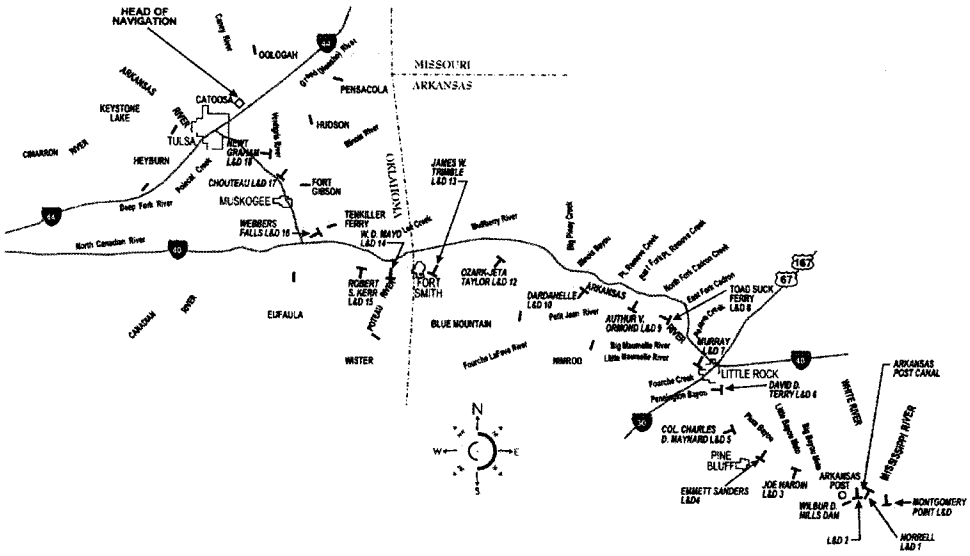
(PDT) evaluation of alternatives that address rehabilitation and replacement of dam tainter gates to provide for long-term sustainability of the navigation system. It is anticipated that the integrated report and EA will require approval from the Southwestern Division Major Subordinate Command (MSC) and USACE Headquarters (HQUSACE). The EA is expected to satisfy all requirements under the NEPA.

B. Study/Project Description. The McClellan-Kerr Arkansas River Navigation system includes portions of three rivers, reaching from the mouth of the White River in Arkansas to the head of navigation on the Verdigris River near Catoosa, Oklahoma. The system uses a series of eighteen locks and dams to form navigation pools with a minimum 9-foot depth along its 445-mile length.

Sixteen of the system's dams have a total of 225 tainter gates that are used to regulate pool elevations to maintain minimum navigation depths. The gates were placed into service between 1967 and 1970, yielding an average time in service of about 47 years.

The study area is defined as the portion of the system between Lock #2 (NM 13.3) and the head of navigation (NM 444.8), the portion of the system which includes pools formed by dams with tainter gates.

Figure 1. McClellan-Kerr Arkansas River Navigation System Map



C. Factors Affecting the Scope and Level of Review.

- The project will involve evaluation of tainter gate repair/rehabilitation techniques that have been used on the system in the past and also replacement of tainter gates. While fairly large in physical size, the work is not considered to be unique or complex, nor is it expected to cause significant environmental impacts. Therefore an EA/FONSI is being prepared.
- The study is not expected to be controversial. Work on the project would be

conducted within the footprint of existing infrastructure, most using techniques that have been used successfully in the past.

- The study is not expected to have significant interagency interest.
- Only minor public interest is expected. The expectation is that commercial navigation interests will be supportive of the project, as its primary objective is to find a long-term solution to maintain system reliability.
- The project is for navigation and modifications that will not be justified by life safety and it does not involve significant threat to human life/safety assurance.
- The Governor of Arkansas has not requested a peer review by independent experts.
- The final major rehabilitation report, EA, and supporting documentation will contain standard engineering, economic, and environmental analyses and information.
- The project is estimated to cost more than $200,000,000, although the project does not include public safety concerns, significant controversy, a high level of complexity or significant economic, environmental and social effects to the nation (which would require the preparation of an Environmental Impact Study). It is recognized that an exclusion from Type I IEPR for a project costing more than $200 Million can only be granted by the Chief of Engineers and that the request for an exclusion must comply with paragraph 15, Risk-Informed Decisions on Appropriate Reviews, of ER 1165-2-214.

D. In-Kind Contributions. The project is fully federally funded.

4. DISTRICT QUALITY CONTROL

A. All decision documents (including supporting data, analyses, environmental compliance documents, etc.) and in-kind products shall undergo DQC. DQC is an internal review process of basic science and engineering work products focused on fulfilling the project quality requirements defined in the Project Management Plan (PMP). The home district shall manage DQC. Documentation of DQC activities is required and should be in accordance with the Quality Manual of the District and the home MSC.

B. Documentation of DQC. All DQC comments, responses, and associated resolutions accomplished throughout the review process will be documented. DQC records will be provided to the ATR team for each ATR event and the ATR team will provide comments as to the adequacy of the DQC effort for the associated product.

C. Products to Undergo DQC. The draft and final MRR/EA (decision document) including feasibility-level design of the recommended plan and all technical appendices will undergo DQC prior to release from the District for external reviews (e.g., ATR). All DQC reviews will be complete and closed out before external reviews are initiated.

D. Required DQC Expertise. Required expertise for DQC includes individuals from Planning, Economics, Environmental, Operations, Structural Engineering, Hydraulic Engineering, Civil Engineering, and Cost Engineering.

Table 1: District Quality Control Team Composition & Experience

DQC Team	Expertise Required
DQC Lead / Planning	The DQC Lead should be a senior professional with extensive experience in preparing Civil Works decision documents and conducting DQC. The lead should also have the necessary skills and experience to lead a team through the DQC process. The DQC lead should also be a senior water resources planner with experience in formulation, evaluation, and selection of alternatives for inland navigation projects.
Economics	The reviewer review shall have extensive knowledge of the principles and guidelines of economic analysis as it relates to inland navigation systems.
Environmental	The reviewer shall be an expert in the NEPA process. The reviewer shall be familiar with the impacts to inland navigation systems.
Operations – Navigation	The reviewer shall have extensive knowledge and experience with operation and maintenance of inland navigation systems. The individual will not be part of the PDT to ensure an unbiased review.
Hydrology and Hydraulic Engineering	The reviewer should be an expert in hydrology and hydraulics related to inland navigation systems and the use of HEC computer modeling. A registered professional engineer (PE) is preferred. The individual will not be part of the PDT to ensure an unbiased review.
Civil Engineer/ Structural Engineer	The reviewer(s) should be a subject matter expert and should have extensive experience in the design and maintenance of hydraulic steel structures related to inland navigation systems. A registered professional engineer (PE) is preferred. The individual will not be part of the PDT to ensure an unbiased review.

Cost Engineering	The reviewer should be familiar with cost estimating for Civil Works construction and maintenance projects in MCACES. Review includes construction schedules and contingencies for any document that requires Congressional authorization. The reviewer will be a Certified Cost Technician, Certified Cost Consultant, or Certified Cost Engineer. The Cost Engineering Directory of Expertise will assign this team member as part of a separate effort coordinated by the DQC team lead in conjunction with the District Project Manager. The individual will not be part of the PDT to ensure an unbiased review.

5. AGENCY TECHNICAL REVIEW (ATR).

ATR is mandatory for all decision documents (including supporting data, analyses, environmental compliance documents, etc.) and any in-kind products. The objective of ATR is to ensure consistency with established criteria, guidance, procedures, and policy. The ATR will assess whether the analyses presented are technically correct and comply with published USACE guidance, and that the document explains the analyses and results in a reasonably clear manner. ATR is managed within USACE by the designated RMO and is conducted by a qualified team from outside the home district that is not involved in the day-to-day production of the project/product. ATR teams will be assigned by the RMO, comprised of senior USACE personnel, and may be supplemented by outside experts as appropriate. The ATR team lead will be from outside the home MSC.

A. Products to Undergo ATR. The ATR team will review the draft and final MMR/EA to include the planning-level design of the recommended plan, technical appendixes, and any supporting documentation that is not contained in the technical appendices. This review will occur following completion of DQC and the ATRT Lead will be given a copy of the DQC comments/certification sheets. The ATR team will also be informally engaged throughout the alternative evaluation and draft report phases and will complete interim reviews on specific products as necessary.

B. Required ATR Team Expertise. Below is a list of anticipated disciplines for the ATR team. This list will be revised if the expertise needed for the review changes as the study progresses. The expertise represented on the ATR team reflects the significant expertise involved in the work effort and generally mirrors the expertise on the PDT. The PDT made the initial assessment of expertise needed based on the PMP and the factors affecting the scope and level of review outlined in Section 3 of the review plan. In addition to the expertise outlined below, ATR reviewers should be experienced in reviewing products resulting from risk-informed decision-making following SMART Planning processes. The RMO will determine the final make-up of the ATR team. The names, organizations, contact information, credentials, and years of experience of the ATR members will be included in Attachment 1 once the ATR team is established.

Table 2: Agency Technical Review Team Composition & Expertise Required

ATR Team	Expertise Required
ATR Lead / Planning	The ATR Lead should be a senior professional with extensive experience in preparing Civil Works decision documents and conducting ATR. The lead should also have the necessary skills and experience to lead a virtual team through the ATR process. The ATR lead should also be a senior water resources planner with experience in formulation, evaluation, and selection of alternatives for inland navigation projects.
Economics	The reviewer shall have extensive knowledge of the principles and guidelines of economic analysis as it relates to navigation systems.
Environmental	The reviewer shall be an expert in the NEPA process. The reviewer shall be familiar with the impacts to inland navigation systems.
Hydrology and Hydraulic Engineering	The reviewer should be an expert in hydrology and hydraulics related to inland navigation systems and the use of HEC computer modeling. A registered professional engineer (PE) is preferred.
Civil Engineer/Structural Engineer	The reviewer(s) should be a subject matter expert and should have extensive experience in the design and repair of hydraulic steel structures related to inland navigation systems. A registered professional engineer (PE) is preferred.
Cost Engineering	The reviewer should be familiar with cost estimating for Civil Works construction and ecosystem restoration projects in MCACES. Review includes construction schedules and contingencies for any document that requires Congressional authorization. The reviewer will be a Certified Cost Technician, Certified Cost Consultant, or Certified Cost Engineer. The Cost Engineering Directory of Expertise will assign this team member as part of a separate effort coordinated by the ATR team Lead in conjunction with the District Project Manager.
Operations – Navigation	The reviewer shall have extensive knowledge and experience with heavy maintenance and repairs of inland navigation systems.

C. Documentation of ATR. DrChecks review software will be used to document all ATR comments, responses and associated resolutions accomplished throughout the review process. Comments should be limited to those that are required to ensure adequacy of the product. The four key parts of a quality review comment will include:

(1) The review concern – identify the product's information deficiency or incorrect application of policy, guidance, or procedures;

(2) The basis for the concern – cite the appropriate law, policy, guidance, or procedure that has not been properly followed;

(3) The significance of the concern – indicate the importance of the concern with regard to its potential impact on the plan selection, recommended plan components, efficiency (cost), effectiveness (function/outputs), implementation responsibilities, safety, Federal interest, or public acceptability; and

4) The probable specific action needed to resolve the concern – identify the action(s) that the reporting officers must take to resolve the concern.

In some situations, especially addressing incomplete or unclear information, comments may seek clarification in order to then assess whether further specific concerns may exist.

The ATR documentation in DrChecks will include the text of each ATR concern, the PDT response, a brief summary of the pertinent points in any discussion, including any vertical team coordination (the vertical team includes the district, RMO, MSC, and HQUSACE), and the agreed upon resolution. If an ATR concern cannot be satisfactorily resolved between the ATR team and the PDT, it will be elevated to the vertical team for further resolution in accordance with the policy issue resolution process described in either ER 1110-1-12 or ER 1105-2-100, Appendix H, as appropriate. Unresolved concerns can be closed in DrChecks with a notation that the concern has been elevated to the vertical team for resolution.

At the conclusion of each ATR effort, the ATR team lead will prepare a Review Report summarizing the review. Review Reports will be considered an integral part of the ATR documentation and shall:

- Identify the document(s) reviewed and the purpose of the review;
- Disclose the names of the reviewers, their organizational affiliations, and include a short paragraph on both the credentials and relevant experiences of each reviewer;
- Include the charge to the reviewers;
- Describe the nature of their review and their findings and conclusions;
- Identify and summarize each unresolved issue (if any); and
- Include a verbatim copy of each reviewer's comments (either with or without specific attributions), or represent the views of the group as a whole, including any disparate and dissenting views.

ATR may be certified when all ATR concerns are either resolved or referred to the vertical team for resolution and the ATR documentation is complete. The ATR Lead will prepare a Statement of Technical Review certifying that the issues raised by the ATR team have been resolved (or elevated to the vertical team). A Statement of Technical Review should be completed, based on work reviewed to date, for the draft report and final report. A sample Statement of Technical Review is included in Attachment 2.

6. INDEPENDENT EXTERNAL PEER REVIEW (IEPR)

- Decision on IEPR. Based on a risk-informed decision process, Type I IEPR is not considered warranted for the MMR/EA. An exclusion request will be prepared and forwarded to HQUSACE for review and approval. It is recognized that an exclusion from Type I IEPR for a project costing more than $200 Million can only be granted by the Chief of Engineers.
- Details of the Type I IEPR risk informed decision summary are provided below:
- The project does not involve significant threat to human life.
- Based on the number of gates to be assessed, the cost of one or more of the alternatives to be studied will likely exceed the $200 million threshold in EC 1165-2-214.
- The NEPA document will likely be an EA.
- Evaluation of alternatives and arriving at the tentatively selected plan will involve complex hydraulic modeling and assessment of impacts to the area's ecosystems.
- There is not expected to be significant Federal and State agency interest.
- There is not a diverse and complex set of stakeholder concerns. The Governor of Arkansas has not requested an independent peer review.
- Type II IEPR is not anticipated as the project does not involve hurricane and storm risk management and flood risk components.
- The MRR/EA would not substantially benefit from an IEPR due to the limited number of alternatives being considered in the gate replacement or gate refurbishing.

7. POLICY AND LEGAL COMPLIANCE REVIEW

All decision documents will be reviewed throughout the study process for their compliance with law and policy. Guidance for policy and legal compliance reviews is addressed in Appendix H, ER 1105-2-100. These reviews culminate in determinations that the recommendations in the reports and the supporting analyses and coordination comply with law and policy, and warrant approval or further recommendation to higher authority by the home MSC Commander. DQC and ATR augment and complement the policy review processes by addressing compliance with pertinent published Army policies, particularly policies on analytical methods and the presentation of findings in decision documents.

8. COST ENGINEERING AGENCY TECHNICAL REVIEW AND MANDATORY CENTER OF EXPERTISE REVIEW AND CERTIFICATION

All decision documents shall be coordinated with the Cost MCX, located in the Walla Walla District. The MCX will assist in determining the expertise needed on the ATR team and Type I IEPR team (if required) and in the development of the review charge(s). The MCX will also provide the Cost Engineering MCX certification. The RMO is responsible for coordination with the Cost Engineering MCX.

9. MODEL CERTIFICATION AND APPROVAL

EC 1105-2-412 mandates the use of certified or approved models for all planning activities to ensure the models are technically and theoretically sound, compliant with USACE policy, computationally accurate, and based on reasonable assumptions. Planning models, for the purposes of the EC, are defined as any models and analytical tools that planners use to define water resources management problems and opportunities, to formulate potential alternatives to address the problems and take advantage of the opportunities, to evaluate potential effects of alternatives and to support decision making. The use of a certified/approved planning model does not constitute technical review of the planning product. The selection and application of the model and the input and output data is still the responsibility of the users and is subject to DQC, ATR, and IEPR (if required).

EC 1105-2-412 does not cover engineering models used in planning. The responsible use of well-known and proven USACE developed and commercial engineering software will continue and the professional practice of documenting the application of the software and modeling results will be followed. As part of the USACE Scientific and Engineering Technology (SET) Initiative, many engineering models have been identified as preferred or acceptable for use on Corps studies and these models should be used whenever appropriate. The selection and application of the model and the input and output data is still the responsibility of the users and is subject to DQC, ATR, and IEPR (if required).

A. Planning Formulation/ Economic Models. The following planning models are anticipated to be used in the development of the decision document:

Model Name and Version	Brief Description of the Model and How It Will Be Applied in the Study	Certification / Approval Status
Failure Probability Spreadsheet	Estimates tainter gate failure probability relative to age of gate and extent of repairs/rehab conducted.	One-time use approval needed.
Impact to Navigation Spreadsheet	Will incorporate lock failure probability functions and historical and projected cargo volumes for each lock under evaluation.	One-time use approval needed.

B. Engineering Models. The following engineering models are anticipated to be used in the development of the decision document:

Model Name and Version	Brief Description of the Model and How It Will Be Applied in the Study	Certification / Approval Status
HEC-RAS	One-dimensional unsteady state backwater model	Enterprise
MCACES MII	Software to estimate cost	Enterprise

10. REVIEW SCHEDULES AND COSTS

A. ATR Schedule and Cost. The ATR schedule and cost estimate is presented below.

Task	Date	Estimated Cost
ATR of draft Major Rehabilitation Report and EA, including Cost Engineering Review	May, 2017 (45 Days)	$50K
Final ATR	Aug, 2017 (14 Days)	$15K
Total:		$50K-$65K

B. Type I IEPR Schedule and Cost. n / a

C. Model Certification/Approval Cost. During plan formulation, the PDT used a model that was not certified for preliminary screening. As the PDT moves towards the TSP, all models listed for use are certified or will only require approval for use in this feasibility study.

Model	Use	Approval Status, Review Needs	Funding Estimate for Reviews and Technical Support
Failure Probability Spreadsheet	Plan Formulation	Not approved, One Time Use	$12,000.00
Impact to Navigation Spreadsheet	Economic	Not approved, One Time Use	$12,000.00

11. PUBLIC PARTICIPATION

The public will be invited to comment directly to the PDT through a public review of the draft major rehabilitation report and EA. This Review Plan will be posted to the District web site for public review once it is approved by the MSC.

12. REVIEW PLAN APPROVAL AND UPDATES

The Southwestern Division Commander is responsible for approving this Review Plan. The Commander's approval reflects vertical team input (involving district, MSC, RMO, and HQUSACE members) as to the appropriate scope and level of review for the decision document. Like the PMP, the Review Plan is a living document and may change as the study progresses. The home district is responsible for keeping the Review Plan up to date. Minor changes to the review plan since the last MSC Commander approval are documented in Attachment 3. Significant changes to the Review Plan (such as changes to the scope and/or level of review) should be re-approved by the MSC Commander

following the process used for initially approving the plan. The latest version of the Review Plan, along with the Commanders' approval memorandum, should be posted on the Home District's webpage. The latest Review Plan should also be provided to the RMO and home MSC.

13. Points of Contact

Points of contact for this review plan are as follows: