US Army Corps of Engineers®

Vicksburg District

Review Plan
U.S. Army Corps of Engineers
Mississippi Valley Division
Vicksburg District

Steele Bayou Vertical Lift Gates

MSC Approval Date: *Pending*

Last Revision Date: *None*

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1. Purpose and Requirements

a. Purpose

This Review Plan (RP) for the replacement of the Steele Bayou Drainage Structure vertical lift gates will ensure a quality-engineering project is developed by the Corps of Engineers in accordance with EC 1165-2-214, "Civil Works Review Policy". The RP shall lay out a value added process that assures the correctness of the information shown. The District Chief of Engineering has assessed that the risk of the project is not significant; therefore a Safety Assurance Review (SAR) will not be required.

Guidance and Policy References

- EC 1165-2-214, Civil Works Review Policy, 15 December 2012
- ER 1110-1-12, Quality Management, 31 March 2011
- EM 1110-2-1913 Design and Construction of Levees, 30 April 2000
- MSC and/or District Quality Management Plan(s)
- ETL 1110-2-584 Design of Hydraulic Steel Structures, 30 June 2014

b. Requirements

This RP 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, replacement and rehabilitation (OMRR&R). The EC outlines four general levels of review: District Quality Control/Quality Assurance (DQC), Agency Technical Review (ATR), Independent External Peer Review (IEPR), and Policy and Legal Compliance Review. The RP identifies the most important skill sets needed in the reviews and the objective of the review and the specific advice sought, thus setting the appropriate scale and scope of review for the individual project. This RP should be provided to Project Delivery Team (PDT), DQC, and ATR Teams. An IEPR will not be part of this RP, and the exclusion explaining the risk-based decisions can be found in Attachment 3.

c. Review Management Organization

The Mississippi Valley Division (MVD), the Major Subordinate Command (MSC), is the Review Management Organization (RMO) for this project. Contents of this RP have been coordinated with the Risk Management Center (RMC) and MVD. The RMC has delegated RMO authority to MVD. In-Progress Review (IPR) team meetings with MVD will be scheduled on an "as needed" basis to discuss programmatic, policy, and technical matters. The MVD District Support Team member will be the point of contact

for vertical, technical, and policy coordination. Vicksburg District (MVK) will assist the RMO with management of the ATR reviews and development of the draft ATR charges.

2. Project Description and Information

a. Project Description

FC/MR&T, Yazoo River Basin
Yazoo Backwater
Issaquena County, Mississippi
Steele Bayou Drainage Structure
Vertical Lift Gates Construction

The purpose of this project is to remove the existing four (4) vertical lift gates for the Steele Bayou Drainage Structure and replace them with gates meeting current standards.

b. Project Sponsor

The Project Sponsor is the Mississippi Levee Board. However, this project is considered major maintenance for which USACE has responsibility; therefore, the Sponsor will not be supplying any products to review.

3. District Quality Control

a. Requirements

All implementation documents (including supporting data, analyses, environmental compliance documents, etc.) shall undergo a DQC. The DQC efforts completed thus far include a 90% and a 95% review. The DQC efforts that remain to be completed prior to award include finalizing the Biddability, Constructability, Operability, Environmental and Sustainability (BCOES) review. All computations, drawings or sketches shall undergo a rigorous independent check as part of the standard Quality Control (QC) process. Quality checks may be performed by staff responsible for the work, such as supervisors, work leaders, team leaders, designated individuals from the senior staff, or other qualified personnel. However, they should not be performed by the same people who performed the original work, including managing/reviewing the work, in the case of contracted efforts. Quality checks include a review of the alternatives considered, schedules, budgets, means and methods of construction, and whether lessons learned have been considered. DQC is assuring the math and assumptions are correct by having a checker initial each sheet of the computations. Checking is accompanied by a red check mark or similar annotation next to the item that has been checked. For drawings the checker shall place a red check mark or similar annotation on each dimension/elevation, note or reference showing concurrence with the correctness of the information show. Additionally, the PDT is responsible to ensure consistency and

effective coordination across all project disciplines during project design and construction management. See Attachment 2 for PDT and DQC members and disciplines.

b. Documentation

Documentation of DQC activities is required and should be in accordance with the Quality Manual of MVK and MVD. All DQC reviews are conducted and managed by the District DQC Coordinator. All comments, responses, and back checks will be conducted in DrChecks, and included with final design documentation.

4. Agency Technical Review

a. Requirements

ATR is mandatory for all implementation documents (including supporting data, analyses, environmental compliance documents, etc.). The ATR efforts will include a review by an experienced Hydraulic Steel Structures (HSS) structural designer outside of MVD. This review will take place after the 95% DQC review and prior to BCOES review completion. Comments, responses, and back check will all be documented in DrChecks and will be included with final design documentation. 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, went through robust DQC, and comply with published USACE guidance, and whether the document explains the analyses and results in a reasonably clear manner for the public and decision makers. The PDT should obtain ATR agreement on key data such as hydraulic and structural parameters prior to the 95% review. This is consistent with the requirement that the ATR members shall not be involved in the day-to-day production of the project/product. A site visit will not be scheduled for the ATR Team.

b. Documentation of ATR

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

c. Comment Resolution

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 includes 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.

d. Products to Undergo ATR

The products to be reviewed will be Plans, Specifications, and Design Documentation Report (DDR).

e. Required ATR Team Member Expertise and Requirements

ATR teams will be comprised of senior USACE personnel and may be supplemented by outside experts as appropriate. The ATR Lead will be from outside MVD. The ATR team member will be chosen based on each individual's qualifications and experience with similar projects. All ATR reviewers will be certified in CERCAP: https://maps.crrel.usace.army.mil/apex/f?p=105:53:14975649327116::NO:::. See Attachment 2 for the ATR member.

ATR Lead and Structural Engineer: The ATR Lead is a senior professional outside MVD with extensive experience in preparing Civil Works documents and conducting ATRs. The Lead has the necessary skills and experience to lead a virtual team through the ATR process. The ATR Lead may also serve as a reviewer for a specific discipline, in this case, Structural Engineering. Also, this member shall be experienced and proficient in performing hydraulic steel structure analysis, steel structure fabrication processes, and the design of hydraulic steel structures.

f. Completion and Certification of the ATR

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

(1) Identify the document(s) reviewed and the purpose of the review;

(2) Disclose the names of the reviewers, their organizational affiliations, and include a short paragraph on both the credentials and relevant experiences of each reviewer;

(3) Include the charge to the reviewers;

(4) Describe the nature of their review and their findings and conclusions;

(5) Identify and summarize each unresolved issue (if any); and

(6) 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 completion of ATR and Certification of ATR. It will certify that the issues raised by the ATR team have been resolved (or elevated to the vertical team). The completion and certification should be completed based on the work reviewed to date for the project. A Sample Completion of ATR and Certification of ATR are included as Attachment 1.

5. Independent External Peer Review (IEPR)/Safety Assurance Review (SAR) - Decision on Type II IEPR

A Type II IEPR SAR will not be required during the implementation phase of the design and construction activities associated with the plans, specifications, or the DDR. A risk-informed decision was made as to whether IEPR is appropriate based on the factors outlined in EC 1165-2-214, Appendix E, Section 2(a) thru (c). Accordingly, an exclusion for an IEPR was obtained. See Attachment 3 for risk information, the MVK Chief of Engineering's recommendation for exclusion from IEPR, and endorsement from the USACE Risk Management Center (RMC).

6. Policy and Legal Compliance Review

All implementation documents will be reviewed throughout the project for their compliance with law and policy. 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 MSC Commander. DQC and ATR augment and complement the policy review processes by addressing compliance with pertinent published Army policies.

7. Review Schedule and Costs

a. Schedule of Reviews

To the extent practicable, reviews should not extend the design schedule but should be embedded in the design process. Reviewers should be involved at key decision points and are encouraged to provide timely, over-the-shoulder comments. Below is an overall review schedule that shows timing and sequence of all reviews.

PROJECT PHASE/SUBMITTAL	REVIEW START DATE	REVIEW END DATE
DQC Review 90% (DTR)	29 August 2016	12 September 2016
DQC Review 95% (DOR)	27 March 2017	10 April 2017
ATR Review	01 May 2017	12 May 2017
BCOES	May 2017	June 2017

b. ATR Schedule and Cost

The preliminary review schedule is listed in the table in paragraph a. of this section. The cost for the ATR will be approximately $5,000.

8. Public Participation of Review Plan

As required by EC 1165-2-214, the approved RP will be posted on MVK's public website (http://www.mvk.usace.army.mil/Missions/Civil-Works/Peer-Review-Plans/). The public will have 30 days to provide comments on the documents. After all comments have been submitted, the comments will be provided to the PDT. This is not a formal comment period. If and when comments are received, the PDT will consider them and decide if revisions to the RP are necessary. This engagement will ensure that the peer review approach is responsive to the wide array of stakeholders and customers, both within and outside the federal government.

9. Review Plan Approval and Updates

The MSC for this RP is MVD; therefore, the MSC Commander is responsible for approving this RP. The Commander's approval reflects vertical team coordination between MVK, MVD, and RMC as to the appropriate scope and level of review for the project. The RP is a living document and may change as the study progresses; MVK is responsible for keeping the RP up to date. Significant changes to the RP (such as changes to the scope and/or level of review) should be re-approved by the MSC Commander following the process used for initial approval of the plan. The latest version of the RP, along with the Commanders' approval memorandum, will be posted on MVK webpage http://www.mvk.usace.army.mil/Missions/Civil-Works/Peer-Review-Plans/. The latest RP will also be provided to MVD.

10. Engineering Model Certification and Approval

The use of certified or approved engineering models is required for all activities to ensure the models are technically and theoretically sound, compliant with USACE policy, computationally accurate, and based on reasonable assumptions. 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. 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). The following engineering models are anticipated to be used:

MODEL	STATUS
STAAD.PRO	Complete

11. Review Plan Points of Contact

NAME/TITLE	ORGANIZATION	EMAIL/PHONE
Jonathan Pennington, Project Coordinator	CEMVK-OD-MP	Jonathan.D.Pennington@usace.army.mil 601-631-5015
[redacted]		

ATTACHMENT 1: COMPLETION OF AGENCY TECHNICAL REVIEW

The Agency Technical Review (ATR) has been completed for the *Steel Bayou Drainage Structure Vertical Lift Gates* for *Vicksburg District*. The ATR was conducted as defined in the project's Review Plan to comply with the requirements of EC 1165-2-214. During the ATR, compliance with established policy principles and procedures, utilizing justified and valid assumptions, was verified. This included review of: assumptions, methods, procedures, and material used in analyses, alternatives evaluated, the appropriateness of data used and level obtained, and reasonableness of the results, including whether the product meets the customer's needs consistent with law and existing US Army Corps of Engineers policy. The ATR also assessed the District Quality Control (DQC) documentation and made the determination that the DQC activities employed appear to be appropriate and effective. All comments resulting from the ATR have been resolved and the comments have been closed in DrChecks[sm].

SIGNATURE _____ Date _____

[redacted]
ATR Team Leader
CELRH-DSPC-GE

SIGNATURE _____ Date _____

[redacted]
Project Manager
Office Symbol

SIGNATURE _____ Date _____

[redacted]
Deputy Chief, Business Technical Division
CEMVD-RB-T

CERTIFICATION OF AGENCY TECHNICAL REVIEW

Significant concerns and the explanation of the resolution are as follows: *Describe the major technical concerns and their resolution.* As noted above, all concerns resulting from the ATR of the project have been fully resolved.

SIGNATURE _____ Date _____

[redacted]
Chief, Engineering Division
CEMVK-EC

SIGNATURE _____ Date _____

[redacted]
Dam Safety Officer

CEMVK-EC-G

[1] Only needed if some portion of the ATR was contracted

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ATTACHMENT 3: ADDITIONAL INFORMATION ON RISK DRIVERS

Safety Assurance Review (SAR) is not required. The factors from EC 1165-2-214, Civil Works Review, Appendix E were used to assess this project's threat to human life as shown further in this attachment. The Project Delivery Team and the Chief of Engineering and Construction concur that a Type II IEPR is not required. See signature page at the end of this attachment.

Yazoo Backwater, FC/MR&T, Yazoo River Basin

RATIONALE FOR RECOMMENDATION TO NOT CONDUCT A TYPE II IEPR SAFETY ASSURANCE REVIEW (SAR)

Risk Based Determination of Need to NOT conduct a Type II IEPR (aka SAR). Per EC 1165-2-214, the below factors determine whether or not an SAR should be conducted. These factors and their relevancy to this project are discussed below.

Factor	Relevancy to this Project
1) Would the project's failure pose a significant threat to human life?	NO Due to none of the hydraulically loaded components of each gate being classified as fracture critical, catastrophic failure is highly improbable and would not pose a significant threat to human life. Also, based on the evaluation performed by Hydraulics Branch showing that complete loss of a gate until stoplogs were set would not pose a significant threat to human life.
2) Does the project involve the use of innovative materials or techniques where the engineering is based on novel methods, presents complex challenges for interpretations, contains precedent-setting methods or models, or presents conclusions that are likely to change prevailing practices?	NO The original design of the gates from 1965 was checked to current standards in ETL 1110-2-584 and any required changes were incorporated. The changes required to meet current standards include upgrading to a higher grade steel, improved fatigue resistant details at joints and connections, addition of cathodic protection, and ensuring a higher quality fabrication by requiring American Welding Society (AWS) D1.5, Bridge Welding Code be utilized.
3) Does the project design require redundancy, resiliency, or robustness*?	NO The project does not require redundancy, resiliency, or robustness; however, conservative design guidance, ETL 1110-2-584, was used.
4) Does the project have unique construction sequencing or a reduced or overlapping design construction schedule?	NO This is a standard construction project.

** Redundancy. Redundancy is the duplication of critical components of a system with the intention of increasing reliability of the system, usually in the case of a backup or failsafe.*
Resiliency. Resiliency is the ability to avoid, minimize, withstand, and recover from the effects of adversity, whether natural or manmade, under all circumstances of use.
Robustness. Robustness is the ability of a system to continue to operate correctly across a wide range of operational conditions (the wider the range of conditions, the more robust the system), with minimal damage, alteration or loss of functionality, and to fail gracefully outside of that range.

RECOMMENDATION REGARDING TYPE II IEPR (SAR)

Based on the above assessment, it is the risk-informed recommendation of the Project Delivery Team and the Chief of Engineering and Construction that Type II IEPR (SAR) is NOT required for this project.

The decision to not conduct a Type II IEPR (SAR) is recommended by:

[redacted]

[redacted] Date

Chief, Engineering and Construction Division

The above recommendation ___x___ is endorsed ___ is NOT endorsed

by the Review Management Organization (RMO), the USACE Risk Management Center (RMC):

[redacted]

Signature of RMO Date

With an endorsement, the Review Management Organization shifts to the MSC, the Mississippi Valley Division. If the RMC does not endorse, an IEPR will be conducted and they will remain the RMO.

ATTACHMENT 4: REVIEW PLAN REVISIONS

Revision Date	Description of Change	Page / Paragraph Number