



DEPARTMENT OF THE ARMY
SOUTHWESTERN DIVISION, CORPS OF ENGINEERS
1100 COMMERCE STREET, SUITE 831
DALLAS, TEXAS 75242-1317

15 JAN 2016

CESWD-RBT

MEMORANDUM FOR Commander, Fort Worth District

SUBJECT: Review Plan approval for Navarro Mills Dam, Slide Repair Pre-Construction, Engineering, and Design, Navarro County, Texas

1. References:

a. EC 1165-2-214, Water Resources Policies and Authorities - Civil Works Review, 15 Dec 2012.

b. Final Review Plan for Navarro Mills Dam Slide Repair Pre-Construction, Engineering, and Design (PED) Activities and Risk Management Center endorsement (Encl).

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

3. Please post the final approved RP with a copy of this memorandum to the District's public internet website. Prior to posting to the District website, the names of USACE employees should be removed.

4. The SWD point of contact for this action is Mr. Michael Southern, CESWD-RBT, at 918-669-7148.

Encl

A handwritten signature in black ink, appearing to read "D. C. Hill", is positioned above the typed name.

DAVID C. HILL
Brigadier General, USA
Commanding

CF:
CESWF-PM-C/ Kingston (w/encl)



DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS
RISK MANAGEMENT CENTER
12596 WEST BAYAUD AVE., SUITE 400
LAKEWOOD, CO 80228

REPLY TO
ATTENTION OF

CEIWR-RMC

24 Nov 2015

MEMORANDUM FOR: Commander, Fort Worth District, ATTN: CESWF-PM-C

SUBJECT: Risk Management Center Endorsement – Navarro Mills Dam, Slide Repair, Review Plan

1. The Risk Management Center (RMC) has reviewed the Review Plan (RP) for – Navarro Mills Dam, Slide Repair, dated 22 November 2015, and concurs that this RP complies with the current peer review policy requirements outlined in EC 1165-2-214 “Civil Works Review Policy”, dated 15 December, 2012.
2. This review plan was prepared by Fort Worth District, reviewed by SWD, and the RMC, and all review comments have been satisfactorily resolved. For this project a Type II IEPR will not be performed.
3. The RMC endorses this document to be approved by the MSC Commander. Upon approval of the RP, please provide a copy of the approved RP, a copy of the MSC Commander’s approval memorandum to the RMC Senior Review Manager (rmc.review@usace.army.mil).
4. Thank you for the opportunity to assist in the preparation of this RP. Please coordinate all aspects of the Agency Technical Review and the Independent External Peer Review (as appropriate) efforts defined in the RP. For further information, please contact me at 601-631-5896

Sincerely,

A handwritten signature in black ink that reads "Dustin C. Herr".

Dustin C. Herr, P.E.
Review Manager
Risk Management Center

CF:
CEIWR-RMC (Mr. Snorteland)
CENAD-DQM (Division Quality Manager)



US Army Corps of Engineers

Navarro Mills Dam [454838]

Slide Repair Review Plan

For Implementation Documents and Other Work Products Southwestern Division (SWD)

Fort Worth District
Southwestern Division
U.S. Army Corps of Engineers

22 November 2015

11 December 2015 Revised



MSC Approval Date: _____

Last Revision Date: _____

THE INFORMATION CONTAINED IN THIS REVIEW PLAN IS DISTRIBUTED SOLELY FOR THE PURPOSE OF PREDISSEMINATION PEER REVIEW UNDER APPLICABLE INFORMATION QUALITY GUIDELINES. IT HAS NOT BEEN FORMALLY DISSEMINATED BY THE U.S. ARMY CORPS OF ENGINEERS. IT DOES NOT REPRESENT AND SHOULD NOT BE CONSTRUED TO REPRESENT ANY AGENCY DETERMINATION OR POLICY.



US Army Corps of Engineers

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US Army Corps
of Engineers®

Fort Worth District

1. Purpose and Requirements

a. Purpose

This Review Plan is intended to ensure a quality-engineering project is developed by the Corps of Engineers. This Review Plan has been developed for Navarro Mills Dam Slide Repair. This Review Plan was prepared in accordance with EC 1165-2-214, "Civil Works Review Policy". The Review Plan shall layout a value added process that assures the correctness of the information shown. This Review Plan describes the scope of review for the current phase of work, and is included in the Project Management Plan (P2 #454838).

b. Guidance and Policy References

- EC 1165-2-214, Civil Works Review Policy, 15 December 2012
- ER 1110-1-12, Quality Management, 31 Mar 2011
- ER 1110-2-1156, Safety of Dams – Policy and Procedure, 31 Mar 2014

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, replacement and rehabilitation (OMRR&R). The EC outlines three general levels of review: District Quality Control/Quality Assurance (DQC), Agency Technical Review (ATR), and Policy and Legal Compliance Review. The Review Plan 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 Review Plan should be provided to PDT, DQC, and ATR Teams. An Independent External Peer Review (IEPR) is not required for this work due to the minor scope and a determination was made by the district Chief of Engineers that the project does not pose a significant threat to life safety.

d. Review Management Organization

The USACE Risk Management Center (RMC) is the Review Management Organization (RMO) for this project. The SWD Dam Safety Program Manager will be the POC for vertical team coordination. This review plan will be updated for each new project phase. Fort Worth District will assist the RMC with management of the ATR review and development of the draft ATR "charges".

2. Project Description and Information

a. Project Background

Navarro Mills Dam project is located at River mile 63.9 on Richland Creek, about 16 miles southwest of Corsicana, Navarro County, Texas. It is located adjacent to State Highway No. 31 northeast of, and or near the community of Dawson.

The dam consists of a rolled earth filled embankment 7,540 feet in length which length includes a 280 foot reinforced concrete gated spillway. The gated spillway is flanked on each side by 96.5 foot non-overflow sections. The service bridge across the spillway is a reinforced concrete structure 13 feet wide. The flow of water is regulated by six 40'x 39' tainter gates with sills at elevation 414.0, and two manually operated 36-inch slide gates with inverts at elevation 400.0. A 3-foot thick drainage blanket is provided on the downstream embankment foundation. There is a 20-foot wide roadway across the crest of the dam for maintenance purposes.

Authorizations: The project was authorized by the Flood Control act approved 3 September 1954 (Public Law 780, 83rd Congress, 2d Session), in accordance with recommendations of the Chief of Engineers contained in House Document No. 498 (83rd Congress, 2d Session), and as modified by the provisions of the Flood Control Act approved 3 July 1958 (Public Law 85-500, 85th Congress, 2d Session).

b. Project Description

The Navarro Mills slides were due to inadequate drainage of runoff. As with most of Texas, the dam was constructed out of low to high plasticity clay. Desiccation cracks form during dry periods which then fill with water when it rains. This process often produces landslides when the cracks are located at the top of a slope as is with our case. What makes Navarro Mills Dam worse than others is the inadequate drainage which directs the flow of rain water toward the slope instead of away from the slope.

Because of these situations it was determined that the best fix was to make the slope more shallow from a 2H:1V to a 2.5/3H:1V slope depending on the space available. The slope will transition to tie into the wrap-around embankment as shown best in Figure 9 of attachment 3. The reduction of the slope serves the dual purpose of reducing the susceptibility of the slope to sliding as well as enabling better maintenance of the slope which will aid in the accessibility and observation of the slope. The drainage above the slopes will be directed away from the slope in all areas as much as possible. The goal is to make it so that the only runoff that the slopes will ever see is the rain that falls directly on them. The estimated cost of the repair is \$1,825,000.

3. District Quality Control

a. Requirements

All implementation documents (including supporting data, analyses, environmental compliance documents, etc.) shall undergo a DQC. A DQC is an internal review process of basic science and engineering work products focused on fulfilling the project quality requirements defined in the Project Schedule. The home district shall manage the DQC. Documentation of DQC activities is required and should be in accordance with the Quality Manual of the District and the home MSC. The 100 percent Plans and Specifications will undergo DQC at an approximate cost of \$15,000.00 which includes the minimum expertise required as outlined in EC 1165-2-214. 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 have lessons learned been considered. DQC is assuring the math and assumptions are correct by having a checker initial each sheet of the computations. 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

DrChecks review software will be used (concurrently) with ATR review to document all review 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 and follow the guidelines outlined in paragraph 4.b.

4. Agency Technical Review

a. Requirements

ATR is mandatory for all implementation documents (including supporting data, analyses, environmental compliance documents, etc.). The 100 percent Plans and Specifications will undergo ATR. Refer to paragraph 6.a for funding and schedule showing when ATR activities will be performed. The objective of ATR is to ensure consistency with established criteria, guidance, procedures, and policy. The ATR will assess (concurrently) whether the analyses presented are technically correct, comply with published USACE guidance, and that 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 geotechnical parameters during the review process. The goal is to have consensus of the ATR team, especially when key decisions are made. The ATR Lead should be invited virtually to all PDT meetings, in order to understand the design efforts and to know when to engage other ATR members for concurrence on key decisions.

Value added Lessons Learned from the ATR team should be shared early on to have the best chance of being adopted by the PDT. Most of the ATR effort for this specific project will be accomplished after completion of design to ensure design specifications are technically correct and comply with published USACE guidance.

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 due to time constraints for obligating supplemental emergency funding.

b. Documentation of ATR

DrChecks review software will be used (concurrently) with DQC review 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

100 percent Design Plans and Specifications (P&S) as well as the project DDR that detail the Navarro Mills Dam Slide Repair are the only products that will undergo ATR.

e. Required ATR Team Expertise and Requirements

ATR teams will be 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. See Attachment 2 for ATR members.

The following provides an estimate of the disciplines and experience required for the ATR of Navarro Mills Dam Slide Repair. The ATR team will be chosen based on each individual’s qualifications and experience with similar projects. All EC reviewers will be certified in CERCAP: https://team.usace.army.mil/sites/ERDC-CRREL/PDT/atr_certification/default.aspx . See Attachment 2 for ATR members.

ATR Lead: The ATR team lead is a senior professional outside the home MSC 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, Geotechnical Engineering.

Geotechnical Engineer - shall have experience in the field of geotechnical engineering, analysis, design, and construction of earthen dams. The geotechnical engineer shall have experience in subsurface investigations, rock and soil mechanics, internal erosion (seepage and piping), slope stability evaluations, erosion protection design, and earthwork construction. The geotechnical engineer shall have knowledge and experience in the forensic investigation of seepage, settlement, stability, and deformation problems associated with high head dams and appurtenances constructed on rock and soil foundations.

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 in Attachment 1.

5. 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 home MSC Commander. DQC and ATR augment and complement the policy review processes by addressing compliance with pertinent published Army policies.

6. Review Schedule and Costs

a. Schedule of Reviews

To the extent practical, 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. Provide an overall review schedule that shows timing and sequence of all reviews.

PROJECT PHASE/SUBMITTAL	REVIEW START DATE	REVIEW END DATE
DQC Review 100%	23 November 2015	30 November 2015
MSC Review 100%	23 November 2015	30 November 2015
RMC Review 100%	23 November 2015	30 November 2015
ATR Review 100%	23 November 2015	30 November 2015

b. ATR Schedule and Cost

The review schedule is provided in the table listed in paragraph 6.a of this section. The cost for the ATR is approximately \$4,000.00. For updates to the schedule and cost of the ATR please see the schedule located in Project FOA: M2 Project: 454838 - Navarro Mills Slide Repairs.

7. Review Plan Approval and Updates

The MSC for this is the Southwestern Division. The MSC Commander is responsible for approving this Review Plan. The Commander's approval reflects vertical team input (involving the Fort Worth District, MSC, and RMC) as to the appropriate scope and level of review for the study and endorsement by the RMC. Like the PMP, the Review Plan is a living document and may change as the study progresses; the district is responsible for keeping the Review Plan up to date. Minor changes to the review plan since the last MSC Commander approval will be documented in an Attachment to this plan. Significant changes to the Review Plan (such as changes to the scope and/or level of review) should be re-endorsed by the RMC and 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, will be posted on the District's webpage <http://www.swf.usace.army.mil> and linked to the HQUSACE webpage. The latest Review Plan should also be provided to the RMO and home MSC.

8. Review Plan Points of Contact

NAME/TITLE	ORGANIZATION	EMAIL/PHONE
	CESWF-PM-C	_____
	CESWF-EC-G	_____
	CESWF-EC-G	_____
	CESWF-EC	_____
	CESWD-RBT	_____



	CESWT-DS	_____
	CEIWR-RMC	_____
	CEIWR-RMC	_____



ATTACHMENT 1: COMPLETION OF AGENCY TECHNICAL REVIEW

The Agency Technical Review (ATR) has been completed for the Plans and Specifications for the Navarro Mills Dam Slide Repair at Navarro Mills Dam in Navarro County, Texas. 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 DrCheckssm.

CELRH-DSPC-
GS
Date

CESWF-PM-C
Date

CEIWR-RMC
Date

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.

CESWF-EC
Date