DEPARTMENT OF THE ARMY
MISSISSIPPI VALLEY DIVISION, CORPS OF ENGINEERS
P.O. BOX 80
VICKSBURG, MISSISSIPPI 39181-0080

REPLY TO
ATTENTION OF:

CEMVD-PD-SP

5 October, 2012

MEMORANDUM FOR Commander, St. Louis District

SUBJECT: Review Plan Approval for Prairie du Pont/Fish Lake Levee Systems, Decision Document, Limited Reevaluation Report (LRR), Underseepage Design Deficiency Correction Study, St. Clair and Monroe Counties, IL

1. References:

a. Email message, MVS, 13 September 2012, subject: Review Plan Prairie du Pont-Fish Lake LRR (encl 1).

b. Memorandum, CESPD-PDP, 13 September 2012, subject: Prairie du Pont Levee and Sanitary District & Fish Lake Drainage and Levee District, IL, Limited Reevaluation Report Review Plan (encl 2).

2. The enclosed Review Plan (encl 3) for Prairie du Pont Levee and Sanitary District & Fish Lake Drainage and Levee District, IL, Limited Reevaluation Report has been prepared in accordance with EC 1165-2-209. The Review Plan has been coordinated with the Flood Risk Management Planning Center of Expertise (FRM-PCX) and concurred with by the FRM-PCX. Because of the potential life safety risks, Type I Independent External Peer Review (IEPR) was recommended for this study. Type II IEPR, or Safety Assurance Review (SAR) is anticipated on the project design and implementation document. As such, SAR was done in type I IEPR for the Feasibility Study.

3. MVD hereby approves this Review Plan, which is subject to change as circumstances require, consistent with study development under the Project Management Business Process. Subsequent revisions to this Review Plan or its execution will require new written approval from this office. Non-substantive changes to this Review Plan do not require further approval. The District should post the approved Review Plan to its web site.

4. The MVD point of contact is [redacted], CEMVD-PD-SP, [redacted].

Building Strong!

[redacted]

3 Encls

Major General, USA
Commanding

[redacted]

From: [redacted]
Sent: Thursday, September 13, 2012 3:08 PM
To: [redacted]
Cc:
Subject: Updated PdP/FL Review Plan (UNCLASSIFIED)
Attachments: Review Plan_Prairie Du Pont-Fish Lake LRR (13Sept2012).docx; Prairie Du Pont_Fish Lake RP_PCX Memo_091312.pdf

Categories: Prairie DuPont

Classification: UNCLASSIFIED
Caveats: NONE

[redacted]

We have updated the Prairie du Pont/Fish Lake Review Plan to reflect and support the absence of the final ATR. We have coordinated our revisions with the PCX and I have attached the updated Review Plan along with a memo from the PCX recommending its approval.

Please let me know if you have any questions.

Thank you,

[redacted]
U.S. Army Corps of Engineers
St. Louis, Missouri
Regional Planning and Environmental Division North
[redacted]

Classification: UNCLASSIFIED
Caveats: NONE

DEPARTMENT OF THE ARMY
SOUTH PACIFIC DIVISION, U.S. ARMY CORPS OF ENGINEERS
1455 MARKET STREET
SAN FRANCISCO, CALIFORNIA 94103-1398

REPLY TO
ATTENTION OF

CESPD-PDP

13 September 2012

MEMORANDUM FOR [redacted] St. Louis District

SUBJECT: Prairie du Pont Levee and Sanitary District & Fish Lake Drainage and Levee District, IL, Limited Reevaluation Report Review Plan

1. The Flood Risk Management Planning Center of Expertise (FRM-PCX) has reviewed the Review Plan (RP) for the subject study and concurs that the RP satisfies peer review policy requirements outlined in Engineering Circular (EC) 1165-2-209 Civil Works Review Policy, dated 31 January 2010.

2. The review was performed by Michelle Kniep of the St. Louis District. The RP comments and responses documenting the review are attached.

3. The FRM-PCX recommends the RP for approval by the MSC. Upon approval of the RP, please provide a copy of the approved RP, a copy of the MSC Commander approval memorandum, and the link to where the RP is posted on the District website to [redacted] FRM-PCX National Program Manager [redacted] and [redacted] FRM-PCX Regional Manager for MVD [redacted].

4. Thank you for the opportunity to assist in the preparation of the RP. Please coordinate the Agency Technical Review and Independent External Peer Review with [redacted]

[redacted]
Program Manager, FRM-PCX

Encl

DECISION DOCUMENT REVIEW PLAN

Limited Reevaluation Report
Underseepage Design Deficiency Correction Study

Prairie Du Pont Levee and Sanitary District &
Fish Lake Drainage and Levee District
St. Clair and Monroe Counties, Illinois

St. Louis District

September 13, 2012

MSC Approval Date: *05 October 2012*
Last Revision Date: *None*

US Army Corps
of Engineers ®

DECISION DOCUMENT REVIEW PLAN

Limited Reevaluation Report
Underseepage Design Deficiency Correction Study

Prairie Du Pont Levee and Sanitary District &
Fish Lake Drainage and Levee District
St. Clair and Monroe Counties, Illinois

St. Louis District

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1. PURPOSE AND REQUIREMENTS

a. Purpose. This Review Plan defines the scope and level of peer review for the Prairie Du Pont Levee and Sanitary District & Fish Lake Drainage and Levee District (PDP-FL) Underseepage Design Deficiency Correction Study. The study area is located in St. Clair and Monroe Counties, Illinois on the east bank of the Mississippi River across from St. Louis County, Missouri.

Upon completion of the study, the appropriate corrective action needed in order to make the project function as initially intended in a safe, viable and reliable manner will be determined. Corrective action will be proposed as a Recommended Plan. The Recommended Plan, along with other considerations including research methods will be published in the Limited Revelation Report (LRR) Decision Document.

b. References

(1) Engineering Circular (EC) 1165-2-209, Civil Works Review Policy, 31 Jan 2010.
(2) EC 1105-2-412, Assuring Quality of Planning Models, 31 March 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) Project Management Plan (PMP) for Prairie Du Pont Levee and Sanitary District & Fish Lake Drainage and Levee District Underseepage Design Deficiency Correction Project, (May 11, 2011).

c. Requirements. This review plan was developed in accordance with EC 1165-2-209, 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. In addition to these levels of review, decision documents are subject to cost engineering review and certification (per EC 1165-2-209) and planning model certification/approval (per EC 1105-2-412).

(1) District Quality Control/Quality Assurance (DQC). All **decision documents** (including supporting data, analyses, environmental compliance documents, etc.) 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 Major Subordinate Command (MSC).

(2) Agency Technical Review (ATR). ATR is mandatory for all **decision documents** (including supporting data, analyses, environmental compliance documents, etc.). 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 US Army Corps of Engineers (USACE) guidance, and that the document explains the analyses and results in a reasonably clear manner for the public and decision makers.

ATR is managed within USACE by a designated Risk Management Organization (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 comprised of senior USACE personnel and may be supplemented by outside experts as appropriate. To assure independence, the leader of the ATR team shall be from outside the home MSC.

(3) Independent External Peer Review (IEPR). IEPR may be required for **decision documents** under certain circumstances. IEPR is the most independent level of review, and is applied in cases that meet certain criteria where the risk and magnitude of the proposed project are such that a critical examination by a qualified team outside of USACE is warranted. A risk-informed decision, as described in EC 1165-2-209, is made as to whether IEPR is appropriate. IEPR panels will consist of independent, recognized experts from outside of the USACE in the appropriate disciplines, representing a balance of areas of expertise suitable for the review being conducted. There are two types of IEPR:

(a) Type I IEPR. Type I IEPR reviews are managed outside the USACE and are conducted on project studies. Type I IEPR panels assess the adequacy and acceptability of the economic and environmental assumptions and projections, project evaluation data, economic analysis, environmental analyses, engineering analyses, formulation of alternative plans, methods for integrating risk and uncertainty, models used in the evaluation of environmental impacts of proposed projects, and on biological opinions of the project study. Type I IEPR will cover the entire decision document or action and will address all the underlying engineering, economics, and environmental work, not just one aspect of the study. For decision documents where a Type II IEPR (Safety Assurance Review) is anticipated during project implementation, safety assurance shall also be addressed during the Type I IEPR per EC 1165-2-209.

(b) Type II IEPR. Type II IEPR, or Safety Assurance Review (SAR), are managed outside the USACE and are conducted on design and construction activities for hurricane, storm, and flood risk management projects or other projects where existing and potential hazards pose a significant threat to human life. Type II IEPR panels will conduct reviews of the design and construction activities prior to initiation of physical construction and, until construction activities are completed, periodically thereafter on a regular schedule. The reviews shall consider the adequacy, appropriateness, and acceptability of the design and construction activities in assuring public health safety and welfare.

(4) 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.

(5) All decision documents shall be coordinated with the Cost Engineering DX, located in the Walla Walla District. The DX 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 DX will also provide the Cost Engineering DX certification. The RMO is responsible for coordination with the Cost Engineering DX.

(6) Model Certification/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. Use of engineering models is also subject to DQC, ATR, and IEPR.

2. REVIEW MANAGEMENT ORGANIZATION (RMO) COORDINATION

The RMO is responsible for managing the overall peer review effort described in this Review Plan. The RMO for decision documents is typically either a Planning Center of Expertise (PCX) or the Risk Management Center (RMC), depending on the primary purpose of the decision document. The RMO for the peer review effort described in this Review Plan is the ***Flood Risk Management Planning Center of Expertise.***

The RMO will coordinate with the Cost Engineering Directory of Expertise (DX) to conduct ATR of cost estimates, construction schedules and contingencies.

With the exception of District Quality Control/Quality Assurance, all reviews shall be managed by an office outside the home district and shall be accomplished by professionals that are not associated with the work that is being reviewed. The USACE organization managing a particular review effort is designated the Review Management Organization (RMO) for that effort.

When preparing to initiate review of a USACE product, the "charge" to the reviewers on both the ATR teams and IEPR panels will contain the instructions regarding the objective of the review and the specific advice sought. Review should be conducted to identify, examine, and comment upon assumptions that underlie analyses (i.e. public safety, economic, engineering, environmental, real estate, and others) appropriate to the "charge," as well as to evaluate the soundness of models and analytic methods. Panels should also be able to evaluate whether the interpretations of analyses and conclusions are reasonable. To provide effective review, in terms of both usefulness and credibility of results, the charge should give reviewers the flexibility to bring important issues to the attention of decision makers. However, reviewers should be explicitly instructed in the charge to not make a recommendation on whether a particular alternative should be implemented, as the MSC Commander is ultimately responsible for the final decision on this work product. The RMO is responsible for preparing the charge, in coordination with the Project Delivery Team and the MSC.

3. STUDY INFORMATION

a. Decision Document. The Prairie Du Pont Levee and Sanitary District & Fish Lake Drainage and Levee District (PDP-FL) Underseepage Design Deficiency Correction project is a post authorization report.

According to ER 1105-2-100 (April 22, 2000) page 4-4, MSC level approval from the Mississippi Valley Division is required for a post authorization Limited Reevaluation Report.

The project is located on the east bank of the Mississippi River between river miles 166 and 175, above the Ohio River. The northern portion of the levee lies in St. Clair County, IL and the southern portion in Monroe County, IL. The project also occupies portions of two independent Levee Districts. The northern portion of the levee in St. Clair County is administered by the Prairie Du Pont Sanitary and Levee District, while the southern portion of the levee is administered by the Fish Lake Drainage and Levee District.

The existing PD-FL project was authorized by the Flood Control Act of 1936, and was expanded to include the Fish Lake area in the Flood Control Act of 1954. The original purpose was to reduce flooding of agricultural areas.

The evaluation of the existing PD-FL flood risk management levee system does not require additional Congressional authorization. The study and construction of design deficiency corrections within an existing project is authorized by the existing project authority. According to Engineer Regulation (ER) 1165-2-119, Modifications to Completed Projects, a design or construction deficiency is a flaw in the Federal design or construction of a project that significantly interferes with the project's authorized purposes or full usefulness as intended by Congress at the time of original project development. Corrective action, therefore, falls within the purview of the original project authority

In order to comply with National Environmental Policy Act (NEPA) requirements, an Environmental Assessment (EA) will be performed. NEPA documentation addresses the scope and nature of the project's impact on the environment as a result of acquiring new information, changed conditions, or changes in the project. The EA analysis will result in a finding of no significant impact (FONSI), or a Supplemental Environmental Impact Statement. Guidance regarding NEPA documentation is contained in ER 200-2-2.

b. Study/Project Description. The PDP-FL Limited Reevaluation Report is a single-purpose, structural Flood Risk Management (FRM) study. The study will evaluate and document engineering and design alternatives to the current design deficiencies that are causing levee system underseepage. The Recommended Plan will be justified by economic or safety considerations, consistent with protecting the Nation's environment.

As summarized above in Section 3(a), the existing PD-FL project was authorized by the Flood Control Act of 1936, and was expanded to include the Fish Lake area in the Flood Control Act of 1954. The original purpose was to reduce flooding of agricultural areas. The study and construction of design deficiency corrections within an existing project is authorized by the Flood Control Act of 1970, Section 216, Review of Completed Projects.

The Prairie Du Pont and Fish Lake Levee Districts consist of a 15.2 mile urban design levee system, completed in 1951, with seepage berms, relief wells, gravity drains, and pumping stations to evacuate interior drainage (a more detailed description of features can be found in the main LRR document). There is a total of approximately 19,700 acres of drainage area, 12,890 of which is bottomland . The project area consists of urban and agricultural development, with several farmsteads flanking the levee. The PDP-FL levee system serves the Villages of Dupo and East Carondelet protecting a population of about 4,500. The levee system also protects the Jefferson Barracks Bridge approach, which crosses the Mississippi River and carries traffic for Interstate 255 (part of the St. Louis Beltway) and U. S. Highway 50. Development along I-255 is expected to continue according to St. Clair and Madison County's future land use and zoning plans.

The project was initially intended to function based on relief well and seepage berm system design criteria set forth in the 1956 Technical Memorandum No. 3-430, "Investigation of Underseepage, Mississippi River Levees – Alton to Gale, Illinois," prepared by the Waterways Experiment Station, Vicksburg, Mississippi. At the time, the design basis set forth in the Alton to Gale investigation represented the best engineering design of underseepage control features; however studies by CEMVS have shown that the original design of these features does not provide an adequate level of safety.

During the floods of 1993 and 1995 CEMVS engineers observed serious levee underseepage within the PDP-FL levee system, such as sand boils, quick soil conditions, and relief well piping conditions that significantly interfere with the project's authorized purpose or full usefulness as intended by Congress at the time of original project development and authorization. Relief wells within the system are functionally inadequate; groundwater conditions have caused deterioration, such as well screen build-up of bacteria and minerals that slow down and hinder relief well performance; and the existing number of relief wells is insufficient to manage underseepage and maintain levee stability. In addition, observations by CEMVS engineers indicate the development of high uplift gradients, sand boils and heavy seepage along reaches of the system where there are no seepage control measures in place at all.

CEMVS engineers therefore anticipate that future flood events will produce underseepage earlier and to a greater extent than previously observed. These conditions put the levee system at risk of failure during a high water event, which endangers the lives of residents, and would result in significant damage to the urban and agricultural development behind the levee.

Preliminary engineering and cost analysis by the CEMVS Project Delivery Team indicates that relief wells and seepage berms will be the primary control features recommended.

Possible alternatives considered for this Flood Risk Management project were:

- No Action.
- Relief Well Construction.
- Seepage Berm Construction.
- Combination of possible alternatives.

No Action: No Federal action is recommended.

Relief Well: Relief wells are constructed on the protected side of the levee to relieve excessive hydrostatic pressures beneath a levee during flooding conditions.

Seepage Berm: Berm constructed of low permeability material on the protected side of the levee that holds seepage water, which serves to counteract upward seepage forces resulting from flooding.

After analyzing these alternatives and comparing them based on life-cycle costs, it was determined that a combination of relief wells and seepage berms was the lowest cost alternative that met the planning objectives. The current tentatively selected plan consists of 130 new relief wells, grouting shut 162 existing relief wells, 5 new pump stations, and 28,500 linear feet of seepage berms.

With the implementation of this plan, the PDP-FL levee system will be able to withstand a flood measuring 52.0 feet on the Mississippi River gage at St. Louis.

Vertical team implementation guidance for Preconstruction, Engineering, and Design (PED) of this underseepage design deficiency correction study indicates that a 905(b) reconnaissance report, dated August 2004, described problems and recommended federal interest in follow-up analysis for both design deficiencies and reconstruction of various project components. Policy guidance directed addressing the design deficiency portions with PED resumption, and addressing reconstruction with a cost-shared Feasibility Study.

This Review Plan is for the underseepage Design Deficiency Correction Study, and only addresses design deficiency corrections and not reconstruction components. Reconstruction components will be addressed under a separate cost-shared Feasibility Study.

This project is cost-shared 75% Federal, and 25% Non-Federal. The study area is located in the Illinois 12th Congressional District, which is currently held by Congressman Jerry Costello.

Each of the Non-Federal Sponsors will be expected to sign the Amended Design Agreement and Project Management Plan (PMP). Non-Federal project Sponsors are as follows:

- Prairie Du Pont Sanitary and Levee District
- Fish Lake Drainage and Levee District
- Monroe County Flood Prevention District
- St. Clair County Flood Prevention District
- Southwest Illinois Flood Prevention District Council

The tentatively selected plan is estimated to cost approximately $[redacted].

c. Factors Affecting the Scope and Level of Review.

- This study will not likely be challenging. The project is an underssepage design deficiency correction study that is not unusual or outside the scope of typical CEMVS flood risk management studies.

- A preliminary assessment by the PDT identifies project risks in the following areas:

  Project and Program Management. Project schedule has been compressed with no time contingency. Any major scope changes arising out of reviews and new engineering regulations, that require design changes, could impact the project.

  Technical. Berms as a recommended underseepage control feature in several design reaches will require borrow material. All proposed borrow sites must be screened for Hazardous, Toxic, Radioactive Waste (HTRW) contaminants, cultural resources, and biological factors including threatened and endangered species (See Environmental and Regulatory paragraphs below for impacts resulting from contaminants and/or biological factors).

  Environmental and Regulatory. Monitoring during construction will ensure environmental compliance in regards to endangered species. It is possible that Pallid Sturgeon, an endangered species, exists in dredge locations. Avoiding or limiting impact to endangered species could have an affect on project schedule.

  After performing analysis that is documented in an Environmental Assessment (EA), it has been determined that the project will not cause adverse impacts and therefore a Finding Of No Significant Impact (FONSI) has been drafted. Further environmental analysis will be done during the design and construction process and could result in supplemental NEPA documents.

  A Section 401 water quality certification (permit) is necessary. The 401 certification is issued by the Illinois Environmental Protection Agency. Their review includes an anti-degradation assessment and this process alone can, and usually does, take at least 1 year.

  A Phase I Environmental Site Assessment was conducted in conformance with the scope and limitations of ASTM Practice E for the Prairie Du Pont Levee Project. The amended assessment has revealed no evidence of recognized environmental conditions in connection with this project. If contamination is detected during construction, a Phase II assessment will be conducted. If hazardous material is discovered, USACE will coordinate the handling and disposal with the appropriate levee district, local municipality, and state agency.

- The proposed project is likely to have significant economic, environmental, and /or social effects to the Nation for the following reasons:

  - The study area is moderately urbanized; therefore the public's safety is at risk if the levee were to fail. The loss of human life indicates a significant social effect to the Nation.

  - The estimated total cost of the project is greater than $[redacted]. A project with a cost greater than $[redacted] requires a mandatory Type I IEPR and indicates a significant economic effect to the Nation.

- The proposed project involves significant threat to human life/safety assurance. According to EC 1165-2-209, Appendix E, "A SAR [Safety Assurance Review] shall be conducted on design and construction activities for…flood risk management projects...where potential hazards pose a significant threat to human life." This project is a design deficiency correction activity on a flood

risk management project. The public's safety is at risk if the levee system was to fail. There would be economic impact due to the loss of lives, homes, and farmsteads. The District Chief of Engineering concurs with this assessment of life safety risk.

- The proposed project has interagency and public interest. There are expectations that FEMA will revise Flood Insurance Rate Maps in the area. Unless design deficiency corrections are made, the designation of the area behind the project levee could change from "protected" to a "flood hazard" area.

  USACE and CEMVS will not be the designated professional engineer to certify the levees, however; CEMVS objectives are to design a correction to the levee system for a water surface elevation equivalent to 52.0 feet on the St. Louis Mississippi River gage. At the same time, the Levee District has retained a private engineering firm to design a correction to the system so that it will be able to withstand an approximate 100-year flood event. CEMVS is coordinating design efforts with the Levee District with the objective of avoiding duplication in the design and construction of levee system features.

- The project/study is not expected to be highly controversial. The project is an underseepage design deficiency correction study that is not unusual or outside the scope of typical CEMVS flood risk management studies.

- This study is not expected to contain influential scientific information or be a highly influential scientific assessment. The project is an underseepage design deficiency correction study that is not unusual or outside the scope of typical CEMVS flood risk management studies.

- The proposed project will not likely be based on novel methods, involve the use of innovative materials or techniques, present complex challenges for interpretation, contain precedent-setting methods or models, or present conclusions that are likely to change prevailing practices. The project is an underseepage design deficiency correction study that is not unusual or outside the scope of typical CEMVS flood risk management studies.

- The proposed project design will not require redundancy, resiliency, and/or robustness above typical Corps requirements. The design will not duplicate or provide back-up system features. The objective of the design deficiency corrections to the levee system are to provide the authorized level of protection against a flood event measuring 52.0 feet of the St. Louis Mississippi River gage. The levee system features (pump stations, closure structures, relief wells, and seepage berms) are design features inherent to a flood protection system for the design event, which is the authorized level of protection as stated above.

- The proposed project will not have unique construction sequencing or a reduced or overlapping design construction schedule. Significant project features will not be accomplished using the Design-Build or Early Contractor Involvement (ECI) delivery systems.

d. In-Kind Contributions. Products and analyses provided by non-Federal sponsors as in-kind services are subject to DQC, ATR, and IEPR. The non-Federal sponsor will not be providing In-Kind Contributions.

4. DISTRICT QUALITY CONTROL (DQC)

a. Documentation of DQC. The St. Louis District will manage District Quality Control. Documentation of DQC activities will be in accordance with the Quality Manual of the St. Louis District and the responsible MSC. The DQC of products and reports will also cover any necessary National Environmental Policy Act (NEPA) documents and other environmental compliance products.

MSC and St. Louis District quality manuals, or equivalent, will prescribe specific procedures for the conduct of DQC including documentation requirements and maintenance of associated records for internal audits to check for proper DQC implementation. Relevant DQC records will be provided to the ATR team.

DQC 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 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 be 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.

Quality checks and reviews will be conducted during the development process and are carried out as routine management practice. Quality checks will 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 will not be performed by the same people who performed the original work, including managing/reviewing the work in the case of contracted efforts.

Project Delivery Team (PDT) reviews are performed by members of the PDT to ensure consistency and effective coordination across all project disciplines. Additionally, the PDT is responsible for a complete reading of any reports and accompanying appendices prepared by or for the PDT to assure the overall coherence and integrity of the report, technical appendices, and the recommendations before approval by the St. Louis District Commander.

A copy of all comments and responses from DQC will be provided to the ATR team at each review in the form of a Quality Assurance Review Memo.

DQC efforts will include the necessary expertise to address compliance with published Corps policy. When policy and/or legal concerns arise during DQC efforts that are not readily and mutually resolved by the PDT and the reviewers, the St. Louis District will seek immediate issue resolution support from the MSC and HQUSACE in accordance with the procedures outlined in Appendix H, ER 1105-2-100 or other appropriate guidance.

b. Products to Undergo DQC. Products that will undergo District Quality Control are as follows:

1. Alternative Formulation Briefing (AFB) Package.

2. Final LRR w/ NEPA Documentation

Because there were no significant changes as a result of AFB, no DQC was performed on the final draft of the report, only the final report with associated NEPA documentation.

c. Required DQC Expertise. St. Louis District expertise will include plan formulation, economics, civil design (including mechanical, structural, electrical), biology/NEPA, hydraulics/hydrology, cost engineering, real estate/lands, cultural resources, and geotechnical engineering.

5. AGENCY TECHNICAL REVIEW (ATR)

a. Products to Undergo ATR. The products that will undergo Agency Technical Review are as follows:

1. Alternative Formulation Briefing (AFB) Package - complete.

Because no major technical changes resulted from the AFB, public review, or IEPR, neither the Final Draft LRR nor the Final LRR will undergo ATR. There were no technical comments during the AFB review or the public review.

There were technical comments submitted during the IEPR related to geotechnical engineering, environmental/NEPA, and economics. However, these comments did not result in technical changes to the design or the report.

- Geotechnical Engineering: The geotechnical comments related to the need for more discussion of design methods and current conditions. In response to these comments, more discussion/details were added to the report, but no technical changes were made.
- Environmental/NEPA: The environmental comments related to questions regarding location of potential contaminants, clarification of project impacts, and methods for long-term monitoring of mitigation areas. Additional information and clarification was provided to the panel and more details were added to the report, but no technical changes were made to the report or NEPA documents.
- Economics: The economics comments related to the costs/benefit analysis of a railway switch station and of operation and maintenance (O&M) considerations. Additional rationale was added to the report and some of the economic numbers related to O&M changed. However, the change in some costs and benefits were not big enough to change the current benefit-to-cost ratio (1.2).

After consultation with the ATR lead and Division reviewers, it was determined that the changes were not significant enough to warrant another ATR.

b. Required ATR Team Expertise. The names, organizations, contact information, credentials, and years of experience of the ATR members can be found in Attachment 1.

The PDT recommends using the same ATR Team Members that were assembled for the Prairie du Pont/Fish Lake Flood Risk Management Design Deficiency Correction LRR. ATR Team Members will be familiar with the deficiencies and recommended plans that are consistent within both projects. Assembling the same team will maximize resources and should aid in reducing review times.

ATR Team Members/Disciplines	Expertise Required
ATR Lead	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. Typically, the ATR lead will also serve as a reviewer for a specific discipline (such as planning, economics, environmental resources, etc).
Planning	The Planning reviewer should be a senior water resources planner with experience in levee system Design Deficiency Correction studies.
Economics	Team member will be experienced in civil works and related flood risk reduction projects; and have a thorough understanding of the Hydrologic Engineering Center – Flood Damage Analysis (HEC-FDA) model.
Environmental Resources	Team member will be experienced in the National Environmental Policy Act (NEPA) process and analysis; and have a biological or environmental background that is relevant to the project area.
Cultural Resources	Team member will be experienced in cultural resources and tribal issues, regulations, and laws.
Geotechnical Engineering	Team member will be experienced in levee design, post-construction evaluation, relief well construction and construction of subsurface soil/cement/bentonite walls in deep subsurface environments (120+ feet below ground). A registered professional engineer is recommended.
Hydrology & Hydraulic Engineering	Team member will be an expert in the field of floodplain hydraulics and hydrology, and have a thorough understanding of application of levees, floodwalls, closure structures, gravity drains, pump stations, seepage well flows and channel design.
Civil Engineering	Team member may be a structural or geotechnical reviewer, depending on individual qualifications. Team member will have experience in utility relocations, positive closure requirements and internal drainage for levee construction. A registered professional engineer is suggested.
Mechanical and Electrical Engineering	Team members will have experience in mechanical engineering specifically pump station sizes and types, etc. and electrical engineering specifically pump-station power, controls, etc. A registered professional engineer is suggested.
Structural Engineering	Team members will have experience in pump-station, flood-wall construction, and gate closure structures. A registered professional engineer is suggested.

Cost Estimating	Team member will be familiar with cost estimating for similar civil works projects using the Microcomputer Aided Cost Engineering System (MCACES) model. Team member will be a Certified Cost Technician, Certified Cost Consultant, or Certified Cost Engineer.
Real Estate	Team member will be experienced in Federal civil work real estate laws, policies and guidance. Member will have experience working with relevant non-federal sponsor real estate issues.

In addition to the disciplines described in the above table, a risk reviewer would normally be included on the ATR team. According to ER 1105-2-101, Risk Analysis for Flood Damage Reduction Studies, all flood damage reduction studies must undergo a full risk and uncertainty analysis. This study is primarily a geotechnical analysis to determine corrections for deficient underseepage controls. As a result, the risk and uncertainty analysis would focus on quantifying key geotechnical variables, parameters, and components that would be subject to probabilistic analysis. This type of analysis requires a methodology and model that have not been fully developed yet. After coordination with the RMC and the MVD Engineering and Construction Division, it was determined in a 19 June 2012 memo from the St. Louis District Chief, Engineering and Construction Division, that the full risk and uncertainty analysis would be done at the beginning of the plans and specifications phase. As a result, a risk reviewer was not included on the ATR team.

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 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 be 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 or PCX, 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 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 AFB, draft report, and final report. A sample Statement of Technical Review is included in Attachment 2.

6. INDEPENDENT EXTERNAL PEER REVIEW (IEPR)

a. Decision on IEPR.

An IEPR is required based on the criteria in EC 1165-2-209, Appendix D, and the Water Resources Development Act of 2007which says a Type I IEPR is mandatory if certain factors are present. In this case, the factor present is a "significant threat to human life". And when life safety issues exist, a Type I IEPR that includes a Safety Assurance Review (SAR) of the design and construction activities for hurricane and storm damage reduction and flood damage reduction projects is required according to Section 2035 of WRDA 2007.

b. Products to Undergo Type I IEPR.

1. Final Draft LRR w/ NEPA documentation.

c. Required Type I IEPR Panel Expertise.

The PDT recommends nominating the same IEPR panel members assembled for the Prairie du Pont/Fish Lake Flood Risk Management Design Deficiency Correction LRR that was submitted in 2011. IEPR panel members will be familiar with the deficiencies and recommended plans that are consistent with both submittals. Assembling the same team will maximize resources and should aid in reducing review times. The Corps of Engineers may nominate candidates to participate in the IEPR, but the Outside Eligible Organization will select the panel members.

IEPR reviewers will be required to posses experience and qualifications equal to or greater than ATR

members identified in Section 4(b) above.

IEPR Panel Members/Disciplines	Expertise Required
Engineering	Panel member will have a master's degree or higher education from a University with an accredited program in the discipline of engineering; and/or specific work experience of 20 + years in the discipline. Panel members should also have specific experience in the design and construction of flood protection civil works with emphasis on embankments, pump stations, relief wells, closure structures, berm construction, and relief wells. Panel member should be familiar with or have experience with USACE Civil Works policy and procedures.
Environmental	Panel member will have a master's degree or higher education from a University with an accredited program in the discipline of biology with a specialization in floodplain management or closely related study; and/or specific work experience of 20 + years in the discipline. Panel member will have knowledge and experience with National Environmental Policy Act (NEPA) processes and analysis. Experience as an Environmental Professional as defined under 40 CFR 312 is not required, but desirable. Panel member should be familiar with or have experience with USACE Civil Works policy and procedures.
Economics	Panel member will have a master's degree or higher education from a University with an accredited program in the discipline of economics; and/or specific work experience of 20 + years in the discipline. Panel member will be familiar with the USACE Civil Works benefit-cost process and it would beneficial for the panel member to have knowledge of the USACE HEC-FDA (Flood Damage Analysis) model. Panel member should be familiar with or have experience with USACE Civil Works policy and procedures.

d. Documentation of Type I IEPR. The IEPR panel will be selected and managed by an Outside Eligible Organization (OEO) per EC 1165-2-209, Appendix D. Panel comments will be compiled by the OEO

and should address the adequacy and acceptability of the economic, engineering and environmental methods, models, and analyses used. IEPR comments should generally include the same four key parts as described for ATR comments in Section 4.d above. The OEO will prepare a final Review Report that will accompany the publication of the final decision document and shall:

- 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; 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.

The final Review Report will be submitted by the OEO no later than 60 days following the close of the public comment period for the draft decision document. USACE shall consider all recommendations contained in the Review Report and prepare a written response for all recommendations adopted or not adopted. The final decision document will summarize the Review Report and USACE response. The Review Report and USACE response will be made available to the public, including through electronic means on the internet.

7. MODEL CERTIFICATION AND APPROVAL

a. Planning 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
HEC-FDA Model, version 1.2.5	*Hydrologic Engineering Center Flood Damage Analysis (HEC-FDA) Model. The model will be used to compute economic benefits.*	*Certified*
WHAG	*The Wildlife Habitat Appraisal Guide (WHAG) was used for mitigation requirements determination.*	*Allowed for Use*

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
Crystal Ball software, version 11.1.1.3.00	*Excel based model will be used to identify, quantify, and analyze risk related to total project costs, to include planning, engineering and design costs. The model will be used to develop a contingency*	*Allowed for Use*

	percentage that will be applied to the selected plan.	
Bentley InRoads V8i, version 08.11.05.47	*InRoads will be used to develop models of certain design features for the purposes of developing earthwork quantities.*	*Allowed for Use*

8. REVIEW SCHEDULES AND COSTS

a. ATR Schedule and Cost.

ATR Activity	Est. Start Date	Est. End Date	Est. Cost
Alternative Formulation Briefing (AFB) Package.	April 30, 2012	June 15, 2012	$ [redacted]
TOTAL COST			**$** [redacted]

Notes:
(1) Start and End dates also allow time for the PDT to respond to, and close out all ATR comments.
(2) Dates for ATR of Final Draft LRR and Final LRR are not included because it has been determined that these reviews are not necessary (see section 5.a).

b. Type I IEPR Schedule and Cost.

Type I IEPR Activity	Est. Start Date*	Est. End Date*	Est. Cost
Final Draft LRR w/ NEPA documentation.	July 19, 2012	September 7, 2012	$ [redacted]
TOTAL COST			**$** [redacted]

***Note:** Start and End dates also allow time for the PDT to respond to, and close out all IEPR comments.

c. Model Certification/Approval Schedule and Cost.

Model Certification Activity	Est. Start Date	Est. End Date	Est. Cost
Any models being used in the study are either USACE certified or approved for use. See Section 6 above. Based on project scope, the PDT does not anticipate the need for additional models.			
TOTAL COST			**$** [redacted]

9. PUBLIC PARTICIPATION

The public will have opportunities for comment on the LRR Decision Document after the final draft is prepared. An electronic version of the draft report and appendices will be posted at http://www.mvs.usace.army.mil/pm/pm-reports.html. The schedule for public participation is as

follows:

Public Participation Activity	Est. Start Date	Est. End Date
Public Review/Open House	July 20, 2012	August 20, 2012

10. REVIEW PLAN APPROVAL AND UPDATES

The ***Mississippi Valley 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.

11. REVIEW PLAN POINTS OF CONTACT

Public questions and/or comments on this review plan can be directed to the following points of contact:

- St. Louis District Office: Project Manager 314-331-8169
- Mississippi Valley Division Office (MSC): District Support Team POC 601-634-5293
- Flood Risk Management PCX (RMO): Program Manager 415-503-6852

ATTACHMENT 1: TEAM ROSTERS

*Names of team members have been redacted for public view.

ATTACHMENT 2: SAMPLE STATEMENT OF TECHNICAL REVIEW FOR DECSION DOCUMENTS

COMPLETION OF AGENCY TECHNICAL REVIEW

The Agency Technical Review (ATR) has been completed for the *<type of product>* for *<project name and location>*. The ATR was conducted as defined in the project's Review Plan to comply with the requirements of EC 1165-2-209. 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 _____ _____

Name Date
ATR Team Leader
Office Symbol/Company

SIGNATURE _____ _____

Name Date
Project Manager
Office Symbol

SIGNATURE _____ _____

Name Date
Architect Engineer Project Manager[1]
Company, location

SIGNATURE _____ _____

Name Date
Review Management Office Representative
Office Symbol

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 _____ _____

Name Date
Chief, Engineering Division
Office Symbol

SIGNATURE _____ _____

Name Date
Chief, Planning Division
Office Symbol

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

ATTACHMENT 3: REVIEW PLAN REVISIONS

Revision Date	Description of Change	Page / Paragraph Number

ATTACHMENT 4: ACRONYMS AND ABBREVIATIONS

Term	Definition
AFB	Alternative Formulation Briefing
ASA(CW)	Assistant Secretary of the Army for Civil Works
ATR	Agency Technical Review
CSDR	Coastal Storm Damage Reduction
DPR	Detailed Project Report
DQC	District Quality Control/Quality Assurance
DX	Directory of Expertise
EA	Environmental Assessment
EC	Engineer Circular
EIS	Environmental Impact Statement
EO	Executive Order
ER	Ecosystem Restoration
FDR	Flood Damage Reduction
FEMA	Federal Emergency Management Agency
FRM	Flood Risk Management
FSM	Feasibility Scoping Meeting
GRR	General Reevaluation Report
HQUSACE	Headquarters, U.S. Army Corps of Engineers
IEPR	Independent External Peer Review
ITR	Independent Technical Review
LRR	Limited Reevaluation Report
MSC	Major Subordinate Command
NED	National Economic Development

Term	Definition
NER	National Ecosystem Restoration
NEPA	National Environmental Policy Act
O&M	Operation and maintenance
OMB	Office and Management and Budget
OMRR&R	Operation, Maintenance, Repair, Replacement and Rehabilitation
OEO	Outside Eligible Organization
OSE	Other Social Effects
PCX	Planning Center of Expertise
PDT	Project Delivery Team
PAC	Post Authorization Change
PMP	Project Management Plan
PL	Public Law
QMP	Quality Management Plan
QA	Quality Assurance
QC	Quality Control
RED	Regional Economic Development
RMC	Risk Management Center
RMO	Review Management Organization
RTS	Regional Technical Specialist
SAR	Safety Assurance Review
USACE	U.S. Army Corps of Engineers
WRDA	Water Resources Development Act