



DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DIVISION, GREAT LAKES AND OHIO RIVER
CORPS OF ENGINEERS
550 MAIN STREET
CINCINNATI, OH 45202

7 January 2013

CELRD-PD

MEMORANDUM for Pittsburgh District Commander, ATTN: COL William Graham, 1000 Liberty Avenue Room 2200, Pittsburgh, PA 15222-4186

SUBJECT: Approval of Updated Review Plan for the Upper Ohio Navigation Study, Pennsylvania

1. The attached updated Review Plan for the Upper Ohio Navigation Study has been prepared in accordance with EC 1165-2-209 "Civil Works Review" dated 31 January 2010.
2. The updated Review Plan has been coordinated with the Planning Center of Expertise for Inland Navigation and as the Review Management Office (RMO) supports MSC approval of the subject review plan. The Review Plan includes independent external peer review.
3. I concur with the revisions made to the Review Plan dated 8 November 2007 and approve the enclosed RP for the Upper Ohio River Navigation Improvement Project Feasibility Study. Subsequent revisions to this Review Plan or its execution will require new written approval from this office and is subject to change as circumstances require, consistent with study development under the Project Management Business Process.
4. The District is requested to post the RP to its website. Prior to posting, the names of all individuals identified in the RP should be removed.
5. The point of contact for the PCX-IN's endorsement of the subject review plan is Mr. Wesley W. Walker and can be reached at 304-399-5848. The point of contact for the MSC's approval is Gary Mosteller, P.E., and can be reached at 513-684-3159.

Margaret W. Burcham
MARGARET W. BURCHAM
Brigadier General, USA
Commanding

Encls

1. Memo from Kevin Logan, dated: 6 December 2012
2. Memo from Wesley Walker, dated: 15 November 2012
3. Review Plan

cf:

CECW-LRD (Prettyman-Beck)

PCX for Inland Navigation (Walker)



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
PITTSBURGH DISTRICT, CORPS OF ENGINEERS
WILLIAM S. MOORHEAD FEDERAL BUILDING
1000 LIBERTY AVENUE
PITTSBURGH, PA 15222-4186

CELRP-PM-PM

6 December 2012

MEMORANDUM FOR Commander, U.S. Army Corps of Engineers, Great Lakes and Ohio River Division, ATTN: CELRD-PDS-O (Mr. Gary Mosteller) 550 Main Street, Cincinnati, Ohio 45202-3222

SUBJECT: Upper Ohio Navigation Study, Pennsylvania Review Plan Update Submittal

1. Please find enclosed an updated Review Plan (RP) and Planning Center of Expertise for Inland Navigation (PCXIN) Endorsement Memorandum for the Upper Ohio Navigation Study, Pennsylvania for your review and approval. This RP was originally completed and approved on 8 November 2007. This update has been completed in accordance with EC 1165-2-209 "Civil Works Review" dated 31 January 2010 and reflects the current status of the Study.
2. Request review and approval prior to 15 December 2012 to ensure compliance with CECW Memorandum dated 22 August 2012 Subject: Civil Works Response to the Engineer Inspector General "Inspection of USACE Civil Works Review Processes".
3. Your approval memorandum, PCXIN Endorsement Memorandum and the Updated Review Plan will all be posted on the District Website in accordance with EC 1165-2-209.
4. If you have any questions or need additional information, please contact the undersigned at (412) 395-7309.

Kevin Logan, PMP
Chief, Project Management Section
Programs & Project Management Branch

Enclosures

1. Upper Ohio Review Plan
2. PCXIN Endorsement Memo



REPLY TO
ATTENTION OF
CELRH-NC

DEPARTMENT OF THE ARMY
HUNTINGTON DISTRICT, CORPS OF ENGINEERS
502 EIGHT STREET
HUNTINGTON, WEST VIRGINIA 25701-2035

15 November 2012

MEMORANDUM FOR Commander, Pittsburgh District

SUBJECT: Review Plan for the Upper Ohio River Navigation Improvement Project Feasibility Study, Pennsylvania

1. The enclosed Review Plan (RP) has been presented to the Planning Center of Expertise for Inland Navigation (PCXIN) for its review and endorsement in accordance with EC1165-2-209 "Civil Works Review" dated 31 January 2010. This is an update of the previously approved Review Plan dated 08 November 2007.
2. The Upper Ohio River is defined as Emsworth, Dashields, and Montgomery (EDM) locks and dams, these are the first three navigation projects on the upper Ohio River. The primary purpose of the feasibility study is to investigate navigation improvement opportunities for these/ upper three locks and dams. They are the oldest and smallest on the Ohio River. The study shall address structural and operational condition, adequacy of capacity, environmental issues, and the corresponding economic benefits and costs of various alternative improvement plans.
3. PCXIN staff has reviewed the plan for technical sufficiency and policy compliance. Because the potential magnitude and cost of the project, the Feasibility Study and associated documents do meet the IEPR criteria of EC 1165-2-209. All of the Planning Models utilized in the development of the decision document are certified.
4. I concur with the findings of the PCXIN technical staff and endorse the enclosed review plan for the Upper Ohio River Navigation Improvement Project Feasibility Study. Following approval by the Great Lakes and Ohio River Division, the Pittsburgh District is requested to post the RP to its web site and provide the link to the PCXIN for their use. Prior to posting, the names of the individuals in the RP should be removed.
5. If you have any questions or need additional information, please contact Ms. Beth Cade of my staff at (304) 399-5848.

Encl

WESLEY W. WALKER
Co-Technical Director
PCX for Inland Navigation

DECISION DOCUMENT

REVIEW PLAN

UPPER OHIO RIVER NAVIGATION IMPROVEMENT PROJECT FEASIBILITY STUDY PENNSYLVANIA EMSWORTH, DASHIELDS, AND MONTGOMERY (EDM)

Pittsburgh District

MSC Approval Date: *November 8, 2007*

Last Revision Date: *7 January 2013*



US Army Corps
of Engineers®

REVIEW PLAN

UPPER OHIO RIVER NAVIGATION IMPROVEMENT PROJECT FEASIBILITY STUDY PENNSYLVANIA EMSWORTH, DASHIELDS, AND MONTGOMERY (EDM)

TABLE OF CONTENTS

1. PURPOSE AND REQUIREMENTS	1
2. REVIEW MANAGEMENT ORGANIZATION (RMO) COORDINATION	1
3. STUDY INFORMATION	2
4. DISTRICT QUALITY CONTROL (DQC)	4
5. AGENCY TECHNICAL REVIEW (ATR)	7
6. INDEPENDENT EXTERNAL PEER REVIEW (IEPR)	12
7. POLICY AND LEGAL COMPLIANCE REVIEW	14
8. COST ENGINEERING DIRECTORY OF EXPERTISE (DX) REVIEW AND CERTIFICATION	14
9. MODEL CERTIFICATION AND APPROVAL	14
10. REVIEW SCHEDULES AND COSTS	16
11. PUBLIC PARTICIPATION	18
12. REVIEW PLAN APPROVAL AND UPDATES	18
13. REVIEW PLAN POINTS OF CONTACT	18
ATTACHMENT 1: TEAM ROSTERS.....	19
ATTACHMENT 2: SAMPLE STATEMENT OF TECHNICAL REVIEW FOR DECISION DOCUMENTS	23
ATTACHMENT 3: REVIEW PLAN REVISIONS	24
ATTACHMENT 4: ACRONYMS AND ABBREVIATIONS	25

1. PURPOSE AND REQUIREMENTS

a. **Purpose.** This Review Plan defines the scope and level of peer review for the Upper Ohio River Navigation Study, Pennsylvania (Upper Ohio Study). The Upper Ohio Study has progressed under three evolutions of Peer Review Guidance (EC-1105-2-408, 31 May 2005; EC 1165-2-209, 1 Sep 2009; and EC 1165-2-209, 31 Jan 2010) with an approved Peer Review Plan, 8 Nov 2007. The current Review Plan references the former plan for the preceding ITR and EPR reviews and describes the subsequent ATR and IEPR reviews with the level of detail required by the current guidance.

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 Mar 2011
- (3) Engineering Regulation (ER) 1110-1-12, Quality Management, 30 Sep 2006
- (4) ER 1105-2-100, Planning Guidance Notebook, Appendix H, Policy Compliance Review and Approval of Decision Documents, Amendment #1, 20 Nov 2007
- (5) Upper Ohio Project Management Plan (PMP), 7 April 2004, Approved 17 August 2004.
- (6) 08504 LRD-QC/QA Procedures for Civil Works
- (7) Peer Review Plan, Upper Ohio River, Emsworth, Dashields, and Montgomery (EDM) Feasibility Study, 8 Nov 2007
- (8) Engineering Circular (EC) 1165-2-209 Civil Works Review Policy, 31 Jan 2010
- (9) Engineering Circular (EC) 1105-2-408, Peer Review of Decision Documents, 31 May 2005

c. **Requirements.** This review plan was developed in accordance with EC 1165-2-209 dated 31 January 2010, 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).

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 Planning Center of Expertise for Inland Navigation PCXIN.

The RMO will coordinate with the Cost Engineering Directory of Expertise (DX) to ensure the appropriate expertise is included on the review teams to assess the adequacy of cost estimates, construction schedules and contingencies.

3. STUDY INFORMATION

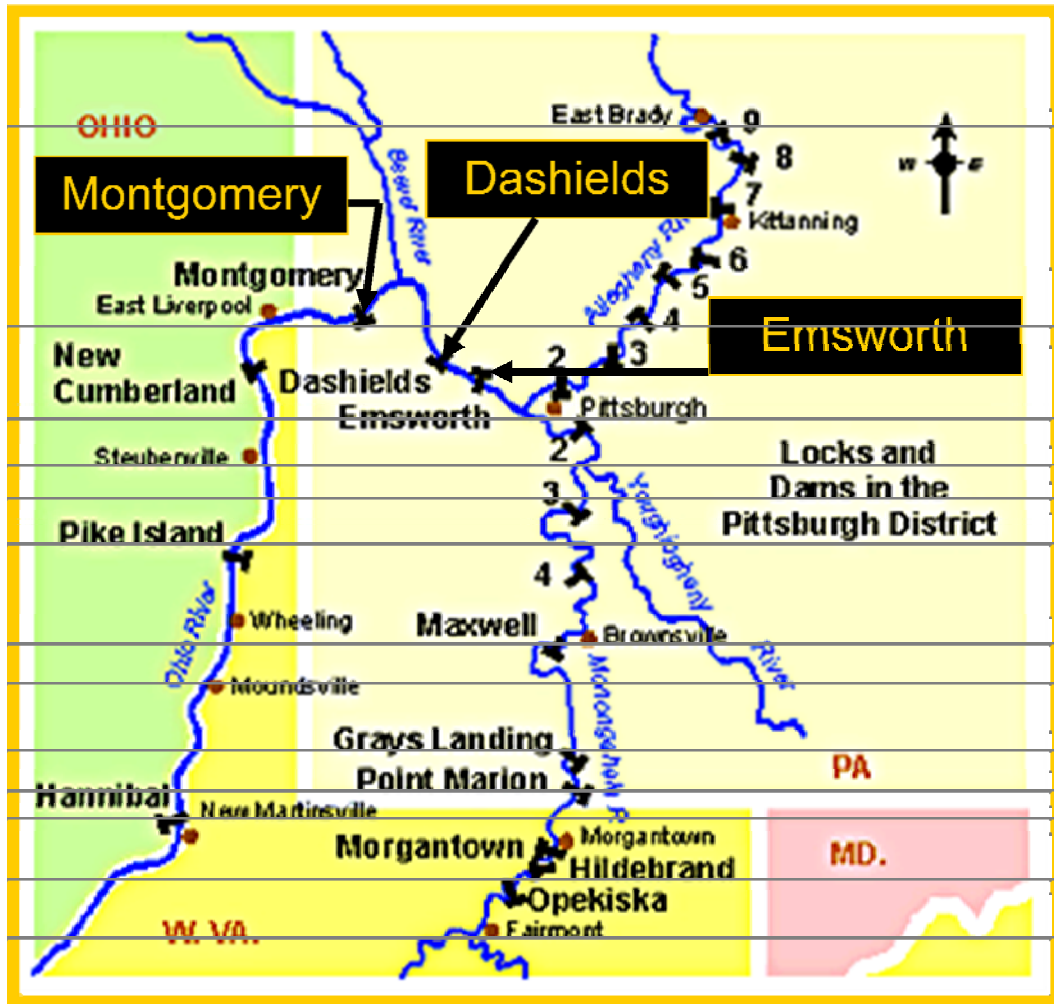
a. **Decision Document.** This navigation improvements feasibility study will identify the best long-term comprehensive program for maintaining safe and reliable navigation through Emsworth, Dashields, and Montgomery Locks and Dams, the three upper locks on the Ohio River, while striving to achieve environmental sustainability. An Environmental Impact Statement (EIS) is integrated into the Upper Ohio Study and is a tiered document from the final Programmatic Environmental Impact Statement (PEIS) developed with the Ohio River Mainstem System Study (ORMSS), completed in 2011. The Upper Ohio Study will integrate all documentation relevant to compliance with the National Historic Preservation Act and its implementing regulation. The District is also complying with the NHPA through a program alternative Programmatic Agreement executed in 2009. This document will require a Chief's report and Congressional Authorization. The EIS will be integrated into the final report.

b. **Study/Project Description.**

The U.S. Army Corps of Engineers, Great Lakes and Ohio River Division conducted a navigation system study of the 19 existing locks on the Ohio River from Pittsburgh, Pennsylvania to Cairo, Illinois. The study was initiated in 1992 and is referred to as the Ohio River Mainstem System Study (ORMSS). ORMSS was conducted by a team of specialists comprised of members from Louisville, Huntington, Nashville, and Pittsburgh districts with significant contributions from academic institutions, other federal and state agencies, and consulting firms.

One product of this system study was a System Investment Plan (SIP), which identified navigation investment priorities ranging from aggressive maintenance to major rehabilitations to new lock construction. Though this study made no specific recommendations for authorizations, it did indicate where feasibility studies should be pursued. The Upper Ohio River locks were identified as a priority for feasibility study. The Upper Ohio River defined as Emsworth, Dashields, and Montgomery (EDM) locks and dams, are the first three navigation projects on the upper Ohio River and comprise three of the four remaining locks and dams built prior to World War II. The Upper Ohio River, EDM, Navigation Improvement Project – Feasibility Study commenced in FY 2003.

The primary purpose of the feasibility study is to investigate navigation improvement opportunities for the upper three locks and dams. They are the oldest and smallest on the Ohio River. The study shall address structural and operational condition, adequacy of capacity, environmental issues, and the corresponding economic benefits and costs of various alternative improvement plans. The work involves plan formulation, conceptual engineering analysis, environmental and cultural considerations, economic analysis, and preparation of a real estate plan. The Feasibility Report is 100% federally funded and portions of Preliminary Engineering and Design (PED) and the entire project construction phase will be cost shared 50-50 with the Inland Waterways Trust Fund.



c. Factors Affecting the Scope and Level of Review.

There are several factors which will affect the study:

- The Feasibility Scoping Documentation and Lock Modernization Alternatives (LMA) Reviews were accomplished under prior Peer Review Guidance and an approved PRP and are not covered in this review.
- A Technical Oversight Committee (TOC) will serve as a team of senior-level technical experts to advise and steer the project delivery team (PDT). Membership is based on recognized technical expertise and is chaired by the LRD Chief of Planning and Policy Division. The TOC involvement is anticipated to occur throughout the entire study as needed. The TOC is not intended to serve as an additional layer of technical review, or as a substitute for agency technical review (ATR), rather the objective is to provide the PDT with expert technical resources for consultation as the feasibility study progresses.
- The District will require a Type 1 IEPR for the Upper Ohio River Navigation Improvement Feasibility Study as the cost of the project is greater than forty-five million dollars and will require a significant effort to ensure environmental compliance. This study is not likely to contain influential scientific information nor is it a highly influential scientific assessment.

- The feasibility study will use tools and data only recently developed as part of the Navigation Economic Technologies (NETS) program and tools still under development by the University of Tennessee. This NETS and University of Tennessee work represents significant new scientific information and tools. These tools and data are being used to evaluate and screen plans that could recommend hundreds of millions of dollars of navigation efficiency improvements. For these reasons, the feasibility study shall be subjected to both an IEPR and an ATR.
- There is HQ guidance that the ATR of the Feasibility Report shall happen both before and after the IEPR focusing on any changes and responses to the review input.
- There are several planning models that will be used in the study that are in the model certification process or were approved for single use for the ORMSS or Upper Mississippi River Navigation and Environmental Sustainability Program.
- Specific construction sequencing will need to be incorporated into the overall plan to ensure river traffic disruptions are kept to a minimum and the river stays open during the construction phase. Unknown funding levels will play a key role in the risk of completing the project in an efficient timeframe minimizing impacts to navigation and ensuring safe and reliable navigation on the Upper Ohio River. Assumptions have been made in the report that once the project is authorized and funding appropriated, efficient funding will be provided to complete the project in an efficient manner. Schedule and Costs risks have been incorporated into the Total Project Cost to cover this assumption not occurring as planned.
- The study will not be justified by life safety and is not likely to involve significant threat to human life/safety assurance. Typically Navigation Dams are used for navigation and not flood control.

- d. In-Kind Contributions.** Products and analyses provided by non-Federal sponsors as in-kind services are subject to DQC, ATR, and IEPR. There are no in-kind products anticipated at this time as a Non-Federal Sponsor is not required for this phase of the project.

4. DISTRICT QUALITY CONTROL (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 MSC.

- a. Documentation of DQC.** Documentation of DQC will follow the procedures as outlined in 08504 LRD-QC/QA Procedures for Civil Works. PDT DQC comments will be kept by the Project Engineer until revisions have been made to the documents. Upon completion of the documents, individual DQC comments may be destroyed. A final Statement of Technical Review will be provided to the ATR Team verifying DQC was performed on the documents.



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CELRP-ED

CELRPR 1110-1-1

Regulation
No. 1110-1-1

30 January 1998

QUALITY MANAGEMENT PLAN

b. Quality Control Plan. The QCP shall be a document defining the general QC activities outlined in the district's QMP and describing unique QC activities for a specific product or project. As such the length and level of detail should be commensurate with the risk, complexity, and cost of the product, and conform to the approved Project Management Plan (PMP). An example of a QCP is included as Addendum D-2. The QCP will include:

- (1) A purpose statement.
- (2) A statement of applicability. Outline the scope of work for the QCP. For multiple product projects, address how the plan will be modified to include future products, if applicable.
- (3) A list of references to any information that is part of the QCP by reference.
- (4) A general paragraph that provides descriptive information about the project.
- (5) A description of the risks inherent to the project.
- (6) The identification of the technical criteria that is to be used in product formulation.
- (7) The name and discipline of the design team members.
- (8) The name and discipline of the ITRT members.
- (9) A statement regarding any special considerations and/or crucial design features that must be addressed.
- (10) A statement identifying the office responsible for QA.

(11) A statement defining the expected customer involvement.

(12) A list of review milestones that defines the level of in-progress review that will be performed.

(13) The independent technical review (ITR) budget for the included products in terms of allotted review time and dollars.

(14) A statement of the measures to be used for conflict resolution between design/study and independent technical review teams or within teams.

b. Products to Undergo DQC.

DQC will evaluate the sufficiency of designs presented and the quality of studies used to select alternatives. Below is a list of products for review:

- Upper Ohio Navigation Study Integrated Main Report
- Economics Appendix
 - Ohio River Navigation Investment Model (ORNIM Version 5.1)
 - Upper Ohio Capacity Attachment
 - Projected Traffic Demand
 - Addendum 2 Non-coal
 - Addendum 1 Coal
 - Transportation Rate Analysis
 - Upper Ohio River External Effects
- Engineering Appendix
 - Engineering Appendix GE-General Engineering Reference Data Appendix
 - Engineering Appendix Document ED-1 Emsworth Engineering DFR
 - Engineering Appendix Document ED-2 Dashields Engineering DFR Site Appendix
 - Engineering Appendix Document ED-3 Montgomery Engineering DFR Site Appendix
- Environmental Appendix
 - Benthic Substrate Characterization
 - Clean Water Act, Section 404(b)(1)
 - Construction Impact and Mitigation Analysis
 - Cumulative Effects Assessment
 - Ecosystem Restoration Study
 - Endangered Species Act
 - Environmental Justice
 - Fish and Wildlife Planning Aid Report Update
 - Fish and Wildlife Coordination Act Report ORMSS
 - Fish Passage Study
 - Hazardous, Toxic, and Radioactive Waste
 - Phase I Report

- Phase II Report
 - Hydro acoustic Survey
 - Invasive Species Issues
 - Larval Fish Survey
 - Mussel Survey
 - Prior Environmental Reports
 - Work Area Natural Resource Study
- Cultural Resources
 - Locks and Dams NRHP evaluations
 - Work Area Studies
 - NER Area Studies
 - ORMS Programmatic Agreement
 - Upper Ohio Navigation Memorandum of Agreement
- Two Lock Modernization Analysis Appendix
- Ohio river Mainstem Systems Study: System Investment Plan, Programmatic Environmental Impact Statement, and Record of Decision
- Phase I Cultural Resource Assessment
- Upper Ohio Navigation Study, Pennsylvania Real Estate Plan
- Upper Ohio Work and Lay down Areas, Phase II Archaeological Investigations, Excavation Plans and Cost Estimates
- Memorandum of Agreement among the US Army Corps of Engineers, Pittsburgh District, The Pennsylvania State Historic Preservation Officer, and The Advisory Council on Historic Preservation

c. Required DQC Expertise.

DQC checks will be performed by qualified staff within each discipline to include engineering, construction, operations, risk and reliability, environmental, HTRW, economics, plan formulation, real estate, cost engineering and legal. Supervisors within each area of responsibility will assign appropriate qualified staff to perform QC on their respective products. Personnel performing QC shall have the necessary expertise to address compliance with published Corps policy.

5. 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 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 the designated RMO and is conducted by a qualified team from outside the home district that is not involved in the day-to-day production of the project/product. ATR teams will be comprised of senior USACE personnel and may be supplemented by outside experts as appropriate. The ATR team lead will be from outside the home MSC.

a. Products to Undergo ATR.

Upper Ohio Navigation Study Integrated Main Report

- Economics Appendix
 - Ohio River Navigation Investment Model (ORNIM Version 5.1)
 - Upper Ohio Capacity Attachment
 - Projected Traffic Demand
 - Addendum 2 Non-coal
 - Addendum 1 Coal
 - Transportation Rate Analysis
 - Upper Ohio River External Effects
- Engineering Appendix
 - Engineering Appendix GE-General Engineering Reference Data Appendix
 - Engineering Appendix Document ED-1 Emsworth Engineering DFR
 - Engineering Appendix Document ED-2 Dashields Engineering DFR Site Appendix
 - Engineering Appendix Document ED-3 Montgomery Engineering DFR Site Appendix
- Environmental Appendix
 - Benthic Substrate Characterization
 - Clean Water Act, Section 404(b)(1)
 - Construction Impact and Mitigation Analysis
 - Cumulative Effects Assessment
 - Ecosystem Restoration Study
 - Endangered Species Act
 - Environmental Justice
 - Fish and Wildlife Planning Aid Report Update
 - Fish and Wildlife Coordination Act Report ORMSS
 - Fish Passage Study
 - Hazardous, Toxic, and Radioactive Waste
 - PHASE I Report
 - PHASE II Report
 - Hydro acoustic Survey
 - Invasive Species Issues
 - Larval Fish Survey
 - Mussel Survey
 - Prior Environmental Reports
 - Work Area Natural Resource Study
- Cultural Resources
 - Locks and Dams NRHP evaluations
 - Work Area Studies
 - NER Area Studies
 - ORMS Programmatic Agreement
 - Upper Ohio Navigation Memorandum of Agreement
- Two Lock Modernization Analysis Appendix
- Ohio river Mainstem Systems Study: System Investment Plan, Programmatic Environmental Impact Statement, and Record of Decision
- Phase I Cultural Resource Assessment
- Upper Ohio Navigation Study, Pennsylvania Real Estate Plan

- Upper Ohio Work and Lay down Areas, Phase II Archaeological Investigations, Excavation Plans and Cost Estimates
- Memorandum of Agreement among the US Army Corps of Engineers, Pittsburgh District, The Pennsylvania State Historic Preservation Officer, and The Advisory Council on Historic Preservation

b. Required ATR Team Expertise.

ATR Team Members/Disciplines	Expertise Required
ATR Lead	The ATR lead should be a senior professional with extensive experience in reviewing Civil Works decision documents and conducting ATR. The lead should also have the necessary skills and experience to lead a virtual team through the ATR process. The ATR lead may also serve as a reviewer for a specific discipline (such as planning, geology, environmental resources, etc).
Planning	The Planning reviewer should be a senior water resources planner with 10 – 15 years experience as a plan formulator who has worked with project teams, to identify and evaluate measures and alternatives using appropriate planning methodologies to address the probable failure modes. Must have extensive experience reviewing the analysis with which the measures and alternatives were evaluated and that they are sufficiently comprehensive and complete to result in approval of a recommended alternative. Review the documentation of the selection of a recommended plan and ensure the team used an approved plan selection methodology.
Economics	Up to four economics reviewers with 5-10 years of experience each or equivalent education from the USACE may be required provide the needed expertise and experience in the economics categories of: Overall economic analysis, Forecasting for inland navigation, Externalities, Navigation capacity, performance and system reliability as well as Transportation Rate analysis.
Environmental & Cultural Resources	Up to three Environmental Resources experts may be required with expertise in cultural resources: archaeological, tribal, and other resources related to urban and suburban construction; NEPA and EIS requirements as well as Fish Passage and modeling associated with projections and design. Including a Fish biologist with 5 to 10 years of experience working with the assessment of construction impact on fish, and related ecosystem species and habitat. Should have experience working on design or construction teams that work in or around fresh water rivers. Should have detailed knowledge of the National Environmental Protection Act, Endangered Species Act with regional knowledge of specific regulatory requirements, tribal treaty obligations and Federal Services regulations.
Hydraulic Engineering	Hydraulic engineer with 5-10 years experience or equivalent education assessing hydraulic retention structures. Should have direct design or construction management experience with dam

	rehabilitation projects especially with regard to spillways, stilling basins and drainage pipes and tunnels.
Geotechnical Engineering	Geotechnical engineer with 5-10 years of experience and graduate study in soils engineering or related field. Must have dam safety experience through participation in dam safety expert panels, risk evaluation/mitigation studies or similar experience with hydraulic retaining structures. Should have several years of direct experience with hydraulic retaining structure rehabilitation projects as either designer or construction project engineer. Must be adroit with the USACE risk informed approach to dam risk decision making. Should have design or construction experience evaluating slope sufficiency under a seismic load using geological analysis provided. Should have design or construction management experience with underground concrete structures including necessary worksite earthwork preparation and workflow management.
Civil Engineering	Civil Engineer(s) with at least 5-10 years of experience in Lock and Dam construction and major rehabilitation and system reliability. Also knowledge of LTMS changes with large and small scale measures.
Structural Engineering	Structural engineer with experience evaluating dam structural elements such as spillway and regulating gates. Should have design experience or education evaluating reinforced concrete structures with emphasis on seismic analysis of buried concrete structures.
Electrical Engineering	Electrical Engineer with 5-10 years of experience in Lock and Dam construction and rehabilitation, maintenance, refurbishing, and risk assessment of electrical systems.
Mechanical Engineering	Mechanical Engineer with 5-10 years of experience in Lock and Dam construction and rehabilitation, maintenance, refurbishing and risk assessment of mechanical systems including during construction.
Cost Engineering	Engineering cost estimator should have 5-10 years experience working with estimating complex, phased costing of multi-year civil construction projects. Should have direct experience working with hydraulic retention structures in a design or construction management capacity.
Construction	Construction expert with at least 5-10 years of experience on Lock and Dam construction and rehabilitation. Understanding of construction issues related to concurrent navigation, and operations, safety, and cost.
Operations	Operations expertise and experience with at least 5-10 years of experience and demonstrated ability for evaluating operations related to Lock and Dam construction and rehabilitation on inland navigation routes.

Real Estate	The Real Estate reviewer should be a reviewer with experience in inland navigation and the issues related to construction and rehabilitation of large structures in an urban setting.
Risk and Reliability	An expert in Risk and Reliability with at least 5-10 years of experience evaluating inland navigation Lock and Dam constructions/replacement/and rehabilitation.
Hazardous, Toxic and Radioactive Waste (HTRW)	An expert with at least five years of experience related to HTRW and its application to Corps of Engineers civil works projects.

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 been properly followed;
- (3) The significance of the concern – indicate the importance of the concern with regard to its potential impact on the plan selection, recommended plan components, efficiency (cost), effectiveness (function/outputs), implementation responsibilities, safety, Federal interest, or public acceptability; and
- (4) The probable specific action needed to resolve the concern – identify the action(s) that the reporting officers must take to resolve the concern.

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

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

At the conclusion of each ATR effort, the ATR team 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)

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:

- **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 biological opinions of the project study. Type I IEPR will cover the entire decision document or action and will address all 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.
 - **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.
- a. Decision on IEPR.** This decision document will identify the best long-term comprehensive program for maintaining safe and reliable navigation through Emsworth, Dashields, and Montgomery Locks and Dams, the three upper locks on the Ohio River, while striving to achieve environmental sustainability. The decision document meets the risk and magnitude criteria for a Type I IEPR. Information presented in the decision document will not be based on novel methods or contain precedent-setting methods or models, and will not present complex challenges. The potential for controversy and uncertainties of predictions and outcomes is considered likely based on the past

challenges. Costs associated with this project would exceed the \$45 million threshold for completing Type I IEPR, and the decision document requires an EIS. For these reasons, a Type I IEPR will be performed. Based on EC 1165-2-209 guidelines, the cost for the IEPR is estimated to be approximately \$150,000. Type II IEPR (SAR) is not appropriate at this time, but may be appropriate in the future during implementation (design and construction) of any recommended alternative; if it is determined there are life safety concerns.

- b. Products to Undergo Type I IEPR.** Upper Ohio Navigation Study Integrated Main Report and EIS, with technical appendices, will be submitted for review by the IEPR.
- c. Required Type I IEPR Panel Expertise.** The IEPR Panel will be comprised of individuals external to the Corps. These individuals will be chosen based on expertise, experience, and/or skills. The expertise/disciplines represented on the IEPR panel may be similar to those at the ATR team, but may be more specifically focused. In general, fewer disciplines and individuals are required unless a study is exceptionally large or complex. The Outside Eligible Organization (OEO) will determine the final participants on the IEPR panel.

d. Required Type I IEPR Panel Expertise.

IEPR Panel Members/Disciplines	Expertise Required
Economics	The Economics Panel Member (s) should be a recognized in transportation economics including experience with financing transportation infrastructure and national and international logistics and transportation requirements. Member must have at least ten years experience directly related to water resource transportation economic evaluation or review with a minimum MS degree or higher in economics. At least 5 years experience directly working for or with USACE is highly recommended.
Environmental	The NEPA Impact Assessment Panel Member should be a scientist from academia, a public agency, a non-governmental entity, or an Architect-Engineer or Consulting Firm with a minimum 10 years demonstrated experience in evaluating and conducting NEPA analyses for public works projects. The Panel Member should have a minimum MS degree or higher in an appropriate field of study. Experience should encompass determining the scope and appropriate methodologies for environmental impact analyses for projects and programs with high public and interagency interests and having project impacts to nearby sensitive habitats along the Ohio River or similar riverine system. Active participation in related professional societies is encouraged.
Engineering	Member should be a Registered Professional Engineer from academia, or a public agency, whose primary mission centers around lock and dam design and construction along the inland waterways system. Experience should include at least 10 years experience in risk and reliability analysis of lock and dam systems. Active participation in related professional societies is encouraged.
Plan Formulation	Member should be from academia, a public agency, a non-governmental entity, or an Architect-Engineer or Consulting Firm with at least a Bachelors degree and a minimum of 10 years

	demonstrated experience in planning and the plan formulation process. Experience should include previous water resource transportation projects. Five years experience directly dealing with the Corps of Engineers planning process as outlined in ER-1105-2-100, Planning Guidance Notebook is highly recommended.
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e. 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. POLICY AND LEGAL COMPLIANCE REVIEW

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

8. COST ENGINEERING DIRECTORY OF EXPERTISE (DX) REVIEW AND CERTIFICATION

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.

9. MODEL CERTIFICATION AND APPROVAL

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

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

- a. Planning 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	Approval Status
Barge Costing Model	The barge costing model (BCM) is used in the inland navigation business line to estimate the transportation cost of shipping commodities by barge. The model was developed by transportation specialist at the Tennessee Valley Authority (TVA) and has been used and improved over the past 30 years.	Approved for Use – 31 January 2012
Greenmont Energy Model	The GEM model is a detailed linear program-type model of the electric utility and coal industries. The GEM models every power plant of every generation type in the United States and Canada and, for the coal-fired plants, models every unit. For every year over a pre-determined forecasting horizon, the model forecasts the least-cost combination of inputs (or, more correctly, the least cost strategies), within constraints, for the North American power plants to produce needed generation, which itself is forecast separately and regionalized. The GEM is a proprietary model developed by Greenmont Energy LLC.	Proprietary Model and cannot be certified by the Corps. Outputs approved by HQ 31 January 2011
Waterway Analysis Model (WAM)	WAM – WAM is a lock simulation model that is used to estimate delays at a project given an increase in traffic levels and/or a decrease in lock availability. WAM has a track record of use for over 30 years by the Huntington navigation center. The second version of the model review plan is at HQ.	Approved for Use 15 August 2011

Navigation Investment Model (NIM)	NIM is a partial equilibrium transportation cost model focused on the inland navigation system and, in particular, the effect of lock reliability and size on waterway transportation costs and the determination of equilibrium traffic levels. The conceptual basis of the model is basically the same as that of earlier models used by the Huntington navigation center over the past three decades; i.e. the model calculates lockage times, including delays, to compute trip travel times. NIM differs from previous models in that it simulates lock reliability, shipper response to unscheduled service disruption, and optimizes the timing of component replacements. The calculations performed by NIM produce the estimated transportation costs of the existing and proposed alternative systems, which can then be used to estimate, and optimize, the benefits of the recommended with-project plan. ORNIM is the single most important model in the study.	Approved as a Corporate Model 16 Feb 2012
Navigation Predictive Analysis Technique	NAVPAT – Navigation Predictive Analysis Technique (NAVPAT) measures the effects of transient towboat passages on available aquatic habitat quality. It was developed by the Louisville District in the 1980s and has been refined and used in planning studies by the Louisville and Huntington Districts, as well as in the ORMSS. The model is useful in comparing the relative effects of project alternatives, but cannot predict absolute impacts to any fish species or group of species/life stages. There are less than five people who could currently run the model, none in LRD.	
Fish Passage	Fish Passage Connectivity Index (FPCI) model – the fish passage model is an adaptation of the Fish Passage Effectiveness Index developed by the Corps for the Upper Mississippi Navigation and Ecosystem Sustainability Program, in conjunction with ERDC and the USFWS. The model provides a means of quantifying and comparing the potential for a fish passage alternative to pass targeted fish species upriver. The Upper Mississippi model is awaiting certification, and is a single use model.	The final report did not recommend implementation of fish passage so certification of this model is not required.

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

There are no Engineering Models to be used in the development of the decision document.

10. REVIEW SCHEDULES AND COSTS

a. ATR Schedule and Cost.

Review Date	Topic
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Review Date	Topic
May 2007	Feasibility Scoping Documents
June 2007	LDA "2 for 3" Alternatives
Apr-May 2010	AFB
Apr-May 2011	Preliminary Draft Feasibility Report
Jun-July 2012	Phase II HTRW
Jun 2013	Final Feasibility Report

ATR Costs.

- Study ATR - \$495,000

b. Type I IEPR Schedule and Cost.

Task	Action	Projected Due Dates (Est: Actual TBD based on funding)	Running Days from NTP (calendar days)
1	a. Receive SOW and Preliminary Charge b. Prepare draft work plan c. RMO provides feedback on draft plan d. Conference call e. Final work plan		15
2	a. Recruit and screen up to 8 peer reviewers; prepare summary information b. Submit list to RMO c. RMO comments on conflicts of interest d. Complete subcontracts for reviewers		30
3	Submit final draft charge RMO approves final charge		Concurrent
4	IEPR Kickoff meeting	March 2013	65
5	a. Begin review of Draft Feasibility Report b. Input comments into DRChecks®		95
6	Complete review of final draft of Draft Feasibility Report	April 2013	140
7	Prepare and submit Type 1 IEPR report	NLT June 2013	

d. Type 1 IEPR Costs.

- Type 1 IEPR - \$300,000

- c. Model Certification/Approval Schedule and Cost.** Model certifications are scheduled to be completed by end of FY 12 or before Civil Works Review Board. Model documentation, modification and certification costs are estimated at \$924,200 for the study.

11. PUBLIC PARTICIPATION

There are several mechanisms in place for Public input and review. During the development of the report, the study team will schedule meetings with other Federal agencies, state agencies and interested stakeholders. As currently planned, a series of public meetings would be held after the draft feasibility report is available for public review and comment.

Once approved, the latest version of the Review Plan, along with the Commanders' approval memorandum, will be posted on the Pittsburgh District's public webpage and available for comment. No specific comment review period will be identified but the Review Plan is a living document and as such, any public comments received will be evaluated and the Review Plan revised if necessary.

The Draft Feasibility Report is scheduled to be posted for public review during the 2nd quarter of FY13. This review will be done in concurrence with the IEPR.

12. REVIEW PLAN APPROVAL AND UPDATES

The Great Lakes and Ohio River Division Commander is responsible for approving this Review Plan. The Commander's approval reflects vertical team input (involving district, MSC, RMO, and HQUSACE members) as to the appropriate scope and level of review for the decision document. Like the PMP, the Review Plan is a living document and may change as the study progresses. The home district is responsible for keeping the Review Plan up to date. Minor changes to the review plan since the last MSC Commander approval are documented in Attachment 3. Significant changes to the Review Plan (such as changes to the scope and/or level of review) should be re-approved by the MSC Commander following the process used for initially approving the plan. The latest version of the Review Plan, along with the Commanders' approval memorandum, should be posted on the Home District's webpage. The latest Review Plan should also be provided to the RMO and home MSC.

13. REVIEW PLAN POINTS OF CONTACT

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

- Kevin Logan, Project Manager, Upper Ohio River Study Product Delivery Team, Kevin.P.Logan@usace.army.mil, (412)-395-7309.
- Rebecca Seal Soileau, Peer Review Manager, ATR Manager, PCXIN, St. Paul District, Rebecca.S.Soileau@usace.army.mil, (651)-290-5756
- Beth Cade, IEPR Manager, PCXIN, Huntington District, Beth.A.Cade@usace.army.mil, (304)-399-5848
- Review Managing Organization: US Army Corps of Engineers – Huntington District, Planning Center of Expertise for Inland Navigation (PCXIN), (304) 399-6938

ATTACHMENT 1: TEAM ROSTERS

TABLE 1: Project Delivery Team		
Functional Area	Name	Office
Project Manager		CELRP-PM-PM
Project Management		CELRP-PM-PM
Lead Engineer		CELRP-TSD
Cost Engineering		CELRP-TSD
Cost Engineering/Cost & Schedule Risk Assessment		CELRP-EC-NT
Mechanical Engineering		CELRP-TSD
Electrical Engineering		CELRP-TSD
Civil Engineering		CELRP-TSD
Hydraulics and Hydrology		CELRP-TSD
Civil Engineering		CELRP-TSD
HTRW		CELRP-TSD
HTRW		CELRP-TSD
Real Estate		CELRP-R
Legal		CELRP-OC
Legal		CELRP-OC
Division – Vertical Team Member		CELRD
Economics		CELRP-BR-E
Plan Formulation		CELRP-BR-E
Environmental		CELRP-BR-E
Environmental		CELRN
Environmental		CELRN
Economics		CELRH
Economics		CELRH
Economics		CELRH
Economics		CELRH
Operations		CELRP-OP-MS
IEPR Review Manager PCXIN		CELRH
Cost engineering Center of Expertise		NWW

TABLE 2: Agency Technical Review Team–AFB		
NAME	DISCIPLINE	OFFICE
	ATR Review Manager -- PCXIN	CEMVP
	Plan Formulation	CESWT
	Environmental	CESAW
	Environmental	CELRE
	Economics	CEMVN
	Economics	CESWT
	Economics	CEIWR
	Economics	CEMVR
	Engineering	CELRH
	Electrical	CELRH
	Mechanical	RMC R&R DX
	Civil/Structural	CELRN
	Construction	CEMVP
	Operations	CELRH-OR
	Geotechnical	CEMVP
	Hydraulics	CEMVR
	Risk & Reliability	CENAE
	Cost Engineering	CELRH
	Real Estate Plan	CELRN
	Cost Engineering DX	CENWW

TABLE 3: Agency Technical Review Team—Feasibility Report		
NAME	DISCIPLINE	OFFICE
	ATR Review Manager -- PCXIN	CEMVP
	Plan Formulation	CESWT
	Environmental	CESAW
	Environmental	CELRE
	Environmental	CENAE
	Economics	CEMVN
	Economics	CESWT
	Economics	CEMVR
	Engineering	CELRH
	Electrical	CELRH
	Mechanical	RMC R&R DX
	Civil/Structural	CELRN
	Construction	CEMVR
	Operations	CELRH-OR
	Geotechnical	CEMVP
	Hydraulics	CEMVR
	Risk & Reliability	CENAE
	Cost Engineering	CELRH
	Real Estate Plan	CELRN
	Cost Engineering DX	CENWW

Cost Engineering DX team:

██████████, (CENWW), (Team Lead),

TABLE : 4 Agency Technical Review Team—Phase II HTRW Report		
NAME	DISCIPLINE	AFFILIATION
	ATR Review Manager -- PCXIN	CEMVP
	Environmental Reviewer	CELRE

Technical Oversight Committee (TOC):

TABLE 5: Technical Oversight Committee		
NAME	DISCIPLINE	AFFILIATION
	Chief, Planning & Policy Division	LRDOR
	Chief, Technical Services Division	CELRP
	PDS-P	CELRD
	Supervisory Economist	CELRP
	ED-T	CELRD
	RBT	CELRD
	PDS-R	CELRD
	PDS-P	CELRD
	CD-O	CELRD
	PDC	CELRD

Vertical Team (VT)

The Vertical Team consists of members of the HQUSACE and Great Lakes and Ohio River Division Offices, the Technical Oversight Committee, and the Executive Steering Group. The Vertical Team plays a key role in facilitating execution of the project in accordance with the PMP. The Vertical Team is responsible for providing the PDT with Issue Resolution support and guidance as required. The Vertical Team will remain engaged seamlessly throughout the project via teleconferences as required.

Independent External Peer Review Teams

These teams have not been established as of the date of this draft of the PMP, but the teams will be identified in updates of this document as they are assigned.

ATTACHMENT 2: SAMPLE STATEMENT OF TECHNICAL REVIEW FOR DECISION 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 DrCheckssm.

SIGNATURE

Name

ATR Team Leader

Office Symbol/Company

Date

SIGNATURE

Name

Project Manager

Office Symbol

Date

SIGNATURE

Name

Architect Engineer Project Manager¹

Company, location

Date

SIGNATURE

Name

Review Management Office Representative

Office Symbol

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.

SIGNATURE

Name

Chief, Engineering Division

Office Symbol

Date

SIGNATURE

Name

Chief, Planning Division

Office Symbol

Date

¹ Only needed if some portion of the ATR was contracted

ATTACHMENT 3: REVIEW PLAN REVISIONS

Revision Date	Description of Change	Page / Paragraph Number
20 August 2012	Updated Peer Review Process and Team Lists	

ATTACHMENT 4: ACRONYMS AND ABBREVIATIONS

<u>Term</u>	<u>Definition</u>	<u>Term</u>	<u>Definition</u>
AFB	Alternative Formulation Briefing	NED	National Economic Development
ASA(CW)	Assistant Secretary of the Army for Civil Works	NER	National Ecosystem Restoration
ATR	Agency Technical Review	NEPA	National Environmental Policy Act
CSDR	Coastal Storm Damage Reduction	O&M	Operation and maintenance
DPR	Detailed Project Report	OMB	Office and Management and Budget
DQC	District Quality Control/Quality Assurance	OMRR&R	Operation, Maintenance, Repair, Replacement and Rehabilitation
DX	Directory of Expertise	OEO	Outside Eligible Organization
EA	Environmental Assessment	OSE	Other Social Effects
EC	Engineer Circular	PCX	Planning Center of Expertise
EIS	Environmental Impact Statement	PDT	Project Delivery Team
EO	Executive Order	PAC	Post Authorization Change
ER	Ecosystem Restoration	PMP	Project Management Plan
FDR	Flood Damage Reduction	PL	Public Law
FEMA	Federal Emergency Management Agency	QMP	Quality Management Plan
FRM	Flood Risk Management	QA	Quality Assurance
FSM	Feasibility Scoping Meeting	QC	Quality Control
GRR	General Reevaluation Report	RED	Regional Economic Development
Home District/MS	The District or MSC responsible for the preparation of the decision document	RMC	Risk Management Center
HQUSACE	Headquarters, U.S. Army Corps of Engineers	RMO	Review Management Organization
IEPR	Independent External Peer Review	RTS	Regional Technical Specialist
ITR	Independent Technical Review	SAR	Safety Assurance Review
LRR	Limited Reevaluation Report	USACE	U.S. Army Corps of Engineers
MSC	Major Subordinate Command	WRDA	Water Resources Development Act