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

CELRD-PD 5 March 2012

MEMORANDUM FOR COMMANDER, Huntington District

SUBJECT: Review Plan for the Greenup Lock Improvement, Greenup, Kentucky and Ohio General Reevaluation Report.

1. The attached Review Plan (RP) for the Greenup Lock Improvement, Greenup, Kentucky and Ohio General Reevaluation Report (GRR) is presented to the Great Lakes and Ohio River Division for approval in accordance with EC 1165-2-209 "Civil Works Review" dated 31 January 2010.

2. The Greenup Lock and Dam structure is located on the Ohio River downstream of the confluence of the Big Sandy River and is adjacent to Greenup County, Kentucky, and Scioto County, Ohio. Construction of the locks was initiated in October 1955 and was placed in operation in November 1959. The lock includes a main chamber and auxiliary chamber. The main lock chamber is 110 feet wide x 1,200 feet long, and the auxiliary lock is 110 feet wide (w) x 600 feet long (l). The dam is a non-navigable, moveable gated structure with a top length of 1,287 feet including a hydroelectric power generating plan that was constructed in 1982. Construction of the dam began in June 1958 and the pool was raised to its full height in June 1962. The Greenup Lock Improvements Projects is recommended from The J.T. Myers and Greenup Lock Improvements Interim feasibility Report dated April 2000. The recommendation of that report was authorized in WRDA 2000. The authorized lock improvement project consists of construction to extend the auxiliary lock chamber downstream to a size of 110 feet w by 1,200 feet l.

3. The Inland Navigation Center of Expertise (PCXIN) has reviewed the attached Review Plan for technical sufficiency and policy compliance and provided its endorsement via letter (attached). This project meets several of the mandatory triggers (exceeds $45 Million, Environmental Impact Statement, etc.) as outlined in EC 1165-2-209 that would require it to undergo a Type Independent External Peer Review (IEPR). Consequently a Type I IEPR will be required.

4. The District is requested to post the RP to its web site and provide the link to the PCXIN for their files. Prior to posting, the names of all individuals identified in the RP should be removed.

5. If you have any questions or need additional information, please contact Dr. Hank Jarboe, CELRD-PDS-P, at (513) 684-6050.

2 Encls

JOHN C. ZIMMERMAN, P.E.
Chief, Planning and Policy Division
Great Lakes and Ohio River Division

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

REPLY TO
ATTENTION OF

CELRH-NC

16 February 2012

MEMORANDUM FOR Commander, Huntington District

SUBJECT: Review Plan for the Greenup Lock Improvement, Greenup, Kentucky and Ohio General Reevaluation Report.

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.

2. The Greenup Lock and Dam structure is located on the Ohio River downstream of the confluence of the Big Sandy River and is adjacent to Greenup County Kentucky and Scioto County Ohio. Construction of the locks was initiated in October 1955 and was placed in operation in November 1959. The lock includes a main chamber and auxiliary chamber. The main lock chamber is 110-feet x 1,200-feet, and the auxiliary lock is 110-feet x 600-feet. The dam is a non-navigable, moveable gated structure with a top length of 1,287 feet including a hydroelectric power generating plant in 1982. Construction of the dam itself began in June 1958 and the pool was raised to its full height in June 1962. The Greenup Lock Improvements Project is recommendation from The J.T. Myers and Greenup Lock Improvements—Interim Feasibility Report that dated April 2000. The recommendation of that report was authorized in WRDA 2000. The authorized lock improvement project consists of construction to extend the auxiliary lock chamber downstream to a size of 110-feet by 1,200-feet. The report also recommended that the District proceed with a Major Rehabilitation study.

3. The Greenup Lock Improvement Project requires an economic update for the time lapse requirement and also due to changes of several inputs to the economic analysis. Conditions have changed as well as several factors that affect the economic analysis since the original authorization of the Greenup Lock Improvements Interim Feasibility Study. Given these changed conditions, a General Reevaluation Report is the appropriate level of economic update.

4. PCXIN staff has reviewed the plan for technical sufficiency and policy compliance. Because the potential magnitude and cost of the project, the GRR and associated documents do meet the IEPR criteria of EC 1165-2-209. Type II IEPR would be required on any design or construction activity resulting from a GRR recommendation. In the development of the decision document, certain models will be employed. The Planning Models are the Navigation Investment Model (NIM) that is pending certification and IWR Planning Suite Version 2.0 that is already certified. The Engineering Models

anticipated to be used is Computer Aided Structural Engineering Program (CASE) and CCELL Circular Cofferdam Analysis Program #: X0040 Version Date: 11/3/10; RISA 3D – Structural Analysis Version 9.1.1 and MCACES 2nd Generation (MII).

5. I concur with the findings of the PCXIN technical staff and endorse the enclosed review plan for the Greenup Lock Improvement; Greenup, Kentucky and Ohio General Reevaluation Report. Following approval by the Great Lakes and Ohio River Division, the Huntington 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.

6. If you have any questions or need additional information, please contact Ms. Julie W. McGuire acting as Review Manager on behalf of my staff at (251) 690-2607.

Encl

WESLEY W. WALKER
Technical Director
PCX for Inland Navigation

REVIEW PLAN

Greenup Lock Improvement
Greenup, Kentucky and Ohio
General Reevaluation Report

Huntington District

MSC Approval Date: Pending
Last Revision Date: None

US Army Corps
of Engineers ®

REVIEW PLAN

Greenup Lock Improvement, Greenup, Kentucky and Ohio
General Reevaluation Report

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1. PURPOSE AND REQUIREMENTS

a. Purpose. This Review Plan defines the scope and level of peer review for the Greenup Lock Improvement, Greenup, Kentucky, General Reevaluation Report.

b. References

(1) Engineering Circular (EC) 1165-2-209, Civil Works Review Policy, 31 Jan 2012
(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) Greenup Locks and Dam Extension Project, Project Management Plan
(6) Huntington District Qualtrax
(7) J.T. Myers and Greenup Lock Improvements—Interim Feasibility Report

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).

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 Inland Navigation Planning Center of Expertise.

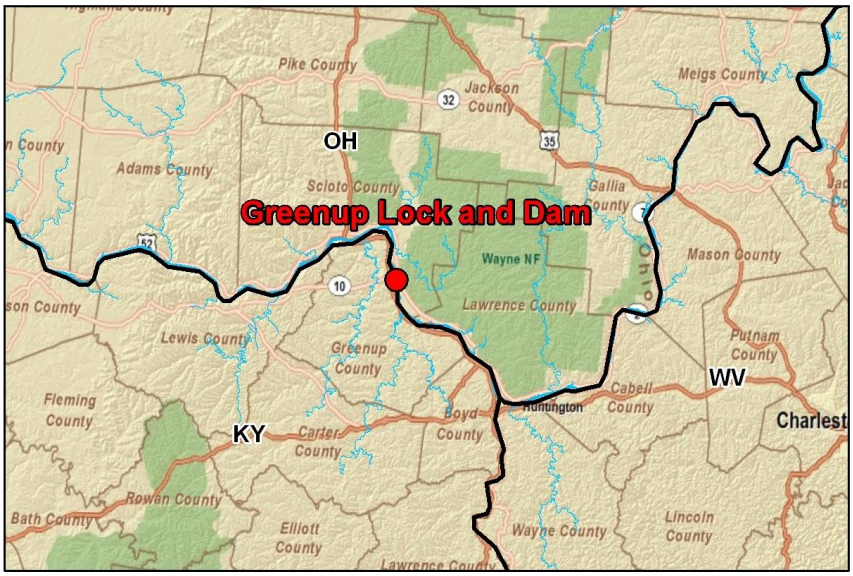
The RMO will coordinate with the Cost Engineering Directory of Expertise (DX) to ensure the appropriate expertise is included on the review teams to assess the adequacy of cost estimates, construction schedules and contingencies.

3. STUDY INFORMATION

a. Decision Document. A General Reevaluation Report (GRR) is being prepared for the Greenup Lock Improvement, Greenup, Kentucky and Ohio Project. The GRR will accomplish a required economic update for the project due to time lapsed, changed conditions and analysis inputs. Additional detail regarding the need for a GRR level economic update will be provided in the section below. It is expected that this GRR will require Congressional authorization. The J.T. Myers and Greenup Lock Improvements—Interim Feasibility Report dated April 2000 which is the original authorizing document, contained an Environmental Impact Statement (EIS). The GRR will have a supplemental EIS.

b. Study/Project Description. The Greenup Locks and Dam structure is located on the Ohio River downstream of the confluence of the Big Sandy River and is adjacent to Greenup County Kentucky and Scioto County Ohio. It is approximately five miles downstream of Greenup, Kentucky. Figure 1 provides a location map of the project. The project was authorized by the River and Harbor Act of 3 March 1909, Sixieth Congress, 2nd Session (P.L. 60-317). The Ohio River is the largest tributary of the Mississippi River. It is approximately 981 miles long and is located in the Eastern United States. The Ohio River allows for commercial navigation from the Great Lakes to its confluence with the Mississippi River. The project is single-purpose to provide inland navigation on this portion of the Ohio River.

Figure 1



Construction of the locks was initiated in October 1955 and the locks were placed in operation in November 1959. Construction of the dam itself began in June 1958 and the pool was raised to its full height in June 1962. The lock includes a main chamber and auxiliary chamber. The main lock chamber is 110-feet x 1,200-feet, and the auxiliary lock is 110-feet x 600-feet. The dam is a non-navigable, moveable gated structure with a top length of 1,287 feet including a hydroelectric power generating plant in 1982. The hydroelectric power plant replaced a 245 foot fixed weir with a 223 foot open crest. The dam has nine tainter gates, a clear span of 100 feet between 14 foot intermediate piers and 15 foot end piers, with a damming height of 35 feet above the sills, and clearance above maximum high water when fully raised of approximately 5 feet.

The Greenup Locks Improvements Project is recommendation from The J.T. Myers and Greenup Lock Improvements—Interim Feasibility Report that dated April 2000. That study considered problems and opportunities associated with the locks and dam resulting from age, reliability and heavy traffic demands. The recommendation of that report was authorized project in WRDA 2000. In summary, the authorized lock improvement project consists of construction to extend the auxiliary lock chamber downstream to a size of 110-feet by 1,200-feet. The plan includes float-in approach walls, augmentation of the fill/empty system, a miter gate quick change-out system, downstream mooring cells, R.C. Byrd Dry Dock and environmental mitigation. The report also

recommended that the District proceed with a Major Rehabilitation study. The economic analysis from the approved report estimated a benefit-to-cost ratio of 2.5 to 1. The cost of construction of the project would be shared 50 percent federal and 50 percent from the Inland Waterways Trust Fund.

A budgetary economic update was prepared and presented in the Greenup Locks and Dam Limited Reevaluation Report (LRR) dated June 2006. The project economics were based on a Fiscal Year 2006 price level. The BCR from that report was 6.78 to 1. The authorized Greenup Lock Extension project is currently in the Preconstruction Engineering and Design (PED) phase with funding provided from the General Investigation appropriation. PED funds have been requested each year since fiscal year (FY) 2000 and an allocation received each year. Construction funds have been requested each year since FY 2004. To date, the project has not received construction funds (CG). Per EC 1105-2-100, a project in GI must have an economic update every three years. For Greenup an economic update is required since it has been six years. For additional information, if a project is a continuing construction project funded through the Construction General (CG) appropriation, an economic update is required after five years per EC 11-2-200.

Along with the recommendation to construct a lock extension, the 2000 feasibility report also recommended a Major Rehabilitation Study to address problems associated with the aging locks and dam structure. Operations and Maintenance funding was first requested in FY 2009 to initiate that study. That study effort is ongoing. Funds for this effort were first received in FY 2010 with some funding received each year since. Additionally, Operations and Maintenance funds were requested for main chamber miter gate replacement starting in FY 2009. In January 2010, an anchorage arm broke on the downstream middle wall gate leaf. This event emphasized the urgency for miter gate replacement in the main lock chamber. The fabrication of the first set of miter gates is complete and scheduled for installation in FY12. Those gates will be installed at the downstream end of the main chamber. Funds to fabricate the second set of miter gates were first received in FY 2011 and those gates are scheduled for installation in FY14. The second set of miter gates will be installed at the upstream end of the main chamber.

Economic updates are classified in four levels per EC 1105-2-100 and the Draft Final Methodology for Conducting Economic Updates dated January 2011. The proper level of update is dependent on the scope of changes since the most recent economic update. Those factors range from time lapsed to a project requiring new plan formulation. The Greenup Project requires an economic update for the time lapse requirement and also due to changes of several inputs to the economic analysis since the LRR was prepared. The input changes are summarized in the following narrative. The miter gates in the main lock chamber are scheduled for replacement thus increasing the reliability of that component. In the previous analysis the lack of reliability of the miter gates was a significant contributor to the project benefits. As part of the Major Rehabilitation study's Probable Fail Mode Analysis, another lock component was identified to have reliability concerns. The middle lock wall is constructed with a "pansy bed" design. Due to this design and evidence of cracks, there are now structural integrity concerns with the middle wall thus introducing a new component to the analysis with reliability issues. In recent years, lock traffic has decreased with the likely cause being the recession. Additionally, new traffic forecasts are under development and long term traffic is anticipated to be lower than previously used forecasts. Several factors could contribute to a lower trend including the recession, new environmental regulations and shale gas production in the region. Additional factors suggesting ongoing federal interest include impacts to the aquatic environment resulting from queuing traffic waiting to lock through; traffic delays associated with

lock closure and typical problems associated with the aging of a heavily used navigation structure. Initial analysis incorporating some adjustment for these changes along with updated project cost indicates that the BCR for the authorized plan may be less than unity. A GRR is the appropriate level of economic update given the changes outlined above.

This review plan is intended to cover the GRR which will be the decision document. The GRR will present the updated economic analysis for the authorized plan, evaluate the current problems and opportunities, determine if there is a remaining federal interest and formulate measures/alternatives plans. The project purpose is inland navigation. At this point in the study those measures/alternative are expected to range from small scale such as mooring cells and scheduling (non-structural) to large scale such as lock extension plans (structural). Those measures/alternatives are estimated to range in cost from $2 to $250 million.

c. **Factors Affecting the Scope and Level of Review.** The Feasibility Scoping Meeting documentation (FSM); Alternative Formulation Briefing documentation (AFB); draft GRR and final GRR will undergo review by the Project Delivery Team (PDT), DQC and ATR. Because of the estimated project cost of $250 million, which is greater than the $45 million threshold specified in Section 2034 of WRDA 2010, IEPR will be conducted on this project.

A supplemental EIS is anticipated, however the project is not likely to have substantial adverse impacts on fish and wildlife species or their habitat and not likely to have more than negligible adverse impact on species listed as endangered or threatened, or to the designated critical habitat of such species, under the Endangered Species Act, prior to implementation of mitigation. There is potential to recommend solutions that may improve the conditions for an endangered aquatic species. This will require interagency coordination with the U.S. Fish and Wildlife Service.

The GRR is not likely to contain influential scientific information or be a highly influential scientific assessment. The parts of the study that will be the most challenging include development and certification of the Ohio River Navigation Model (ORNIM) for the economics effort. Risks associated with the ORNIM model certification are low since this certification process is already underway as part of other projects. Currently the model is awaiting certification from HQ upon resolution of comments. New traffic forecasts are also under development and will be used in the GRR economic analysis. The risks associated with the forecasts are related to the consequences of non-performance on the project economics.

It is important to note that the project probably does not involve significant threats to human life since the project's primary purpose is to facilitate inland navigation traffic. The lock passes inland barge tows and recreation crafts along a reach of the Ohio River. Non-performance or failure of the locks and dam could result in significant economic consequences for the navigation industry and the associated economic impact. To illustrate the importance of Greenup Locks and Dam, a few statistics are provided below.

- Greenup is ranked as the 8th busiest lock out of 198 Corps lock sites based on tonnage.
- Average annual tonnage from 2000-2010 was 64 million tons.
- Energy related commodities dominate traffic with the majority being coal (63%) and petroleum products (14%).
- Main lock chamber closures have resulted in excess of $31 million in transportation delay costs in the last 12 years.

- A FY10 closure of the main lock for 26 days resulted in 258 tows being affected and estimated transportation delay costs of $5.2 million.

If a lock extension or similar project was recommended, the design would require considerations for redundancy, resiliency and/or robustness because of the importance of this large scale navigation infrastructure project. Given the potential impacts to navigation traffic as a result of any construction, there may be unique construction sequencing and/or overlapping of a design and construction schedule. If these things are considered, the appropriate reviews and considerations will be addressed.

All consequences related to project non-performance will be addressed through a Type I IEPR (including a safety assurance review).

d. In-Kind Contributions. Products and analyses provided by non-Federal sponsors as in-kind services are subject to DQC, ATR, and IEPR. The in-kind products and analyses to be provided by the non-Federal sponsor include: No in-kind contributions anticipated.

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 the DQC will utilize the DrChecks review software to document all DQC comments, responses and associated resolutions accomplished through the DQC review process. The DQC documentation will be provided to the ATR team.

b. Products to Undergo DQC. The DQC team will review the Feasibility Scoping Meeting documentation (FSM); Alternative Formulation Briefing documentation (AFB); the draft GRR and Supplemental EIS and the final GRR and Supplemental EIS for the Greenup Locks and Dam Improvement Project.

c. Required DQC Expertise. The DQC team shall include a plan formulator, inland navigation economist, biologist, civil/structural engineer and a cost engineer.

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.** The ATR team will review the Feasibility Scoping Meeting documentation (FSM); Alternative Formulation Briefing documentation (AFB); the draft GRR and Supplemental EIS and the final GRR and Supplemental EIS for the Greenup Locks and Dam Improvement Project. The first ATR review will be of the FSM documentation. This review shall occur when the FSM documentation is completed and after is has undergone the DQC. The FSM is planned for spring 2012. Upon satisfactory resolution of the ATR process, the FSM will be conducted. The subsequent ATR reviews will take place at the appropriate times; however the project schedule is not fully developed at this time. Those dates will be indicated in a review plan update.

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 preparing Civil Works decision documents and conducting ATR. The lead should also have the necessary skills and experience to lead a virtual team through the ATR process. The ATR lead may also serve as a reviewer for a specific discipline (such as planning, economics, environmental resources, etc).
Plan Formulator	The ATR Planner should be a senior professional with experience in planning/formulation of navigation projects.
Economics	The ATR Economist shall have a strong understanding of economic models and studies relative to inland navigation. The team member should have experience with the ORNIM model, as well as traffic forecasting, transportation rate studies, and lock capacity calculations.
Biologist/Environmental	The ATR Biologist will be technically proficient in NEPA and other applicable environmental statues. The reviewer should also be technically proficient on the subjects of large river mussel communities and Threatened and Endangered Species. They should also be familiar with the navigation operations on large rivers and those impacts on freshwater unionids. Note: There are potential benefits from the reformulation of the Greenup Lock Extension project that include protection and habitat improvements to local mussel beds. It is believed that these diverse mussel beds are currently impacted by navigation operations along the river.
Civil/Structural Engineering	The ATR Civil/Structural Engineer shall be a senior professional with significant experience in civil/structural design on navigation locks.
Cost Engineering	The Cost Engineering review will be coordinated with the Cost Engineering Center of Expertise in Walla Walla, Washington
Operations and Maintenance (O&M)	The ATR O&M reviewer shall have a thorough understanding of the operations and maintenance of inland navigation structures.
Construction	The ATR Construction reviewer shall be experienced in contruction of inland navigation structures.

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, 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. Because the potential magnitude and cost of the project, the GRR and associated documents do meet the IEPR criteria of EC 1165-2-209. Type II IEPR would be required on any design or construction activity resulting from a GRR recommendation. Factors to be considered during the IEPR process are discussed in Section 3. c.

Primarily those factors most relevant for IEPR should focus on the consequences of economic non-performance; the models and forecast accuracy that will be used to develop project benefits; along with a project design that will incorporate redundancy, resiliency, and /or robustness to assure the satisfactory performance in a critical navigation infrastructure project.

It is anticipated that the project recommendation may require a Type II (SAR) and will be addressed during the Type I IEPR process.

b. Products to Undergo Type I IEPR. Type I IEPR will be conducted on the draft GRR and Supplemental EIS concurrent with public review. A risk exists if the IEPR finds problems then the document would have to be recirculated to the public after problems were resolved. It is anticipated that the IEPR

effort will be initiated early in the study process so that milestone documents including the FSM and AFB may be provided to the panel once completed.

c. **Required Type I IEPR Panel Expertise.** At this preliminary stage in the study process, the PDT recommends the following list of disciplines for the IEPR panel. However, these may be modified/updated in a review plan supplement if necessary as the study details develop. Details regarding experience and credentials will be added with a review plan supplement.

IEPR Panel Members/Disciplines	Expertise Required
Plan Formulator	TBD
Economics – Inland Navigation Economist	TBD
Environmental – NEPA Compliance Expert	TBD
Civil Engineering	TBD
Structural Engineer	TBD
Cost Engineer	TBD
Operations & Maintenance	TBD
Construction	TBD

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. 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	Certification / Approval Status
Navigation Investment Model (NIM)	The NAVIGATION INVESTMENT MODEL (NIM) is a partial equilibrium model that was built in 1994 by Oak Ridge National Laboratories in collaboration with the PCXIN. NIM has been given verbal approval by the OWPR for corporate use.	Verbal approval by OWPR

IWR Planning Suite Version 2.0 (will be used only if mitigation is required)	The IWR Planning Suite model assists with formulating plans, cost effectiveness and incremental analysis. It also includes a module for easy calculations of equivalent annual average values, total net values annualizing of non-monetary benefits and calculating costs	Certified

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	Approval Status
CASE (Computer Aided Structural Engineering) Program - CCELL Circular Cofferdam Analysis Program #: X0040 Version Date: 11/3/2010	CASE – CCELL provides the capability to analyze and design circular sheetpile structures. The program is owned by the USACE and supported by ERDC as part of a suite of design tools. For this study CASE – CCELL will be used to design the cofferdam.	Structural CoP Preferred Model
RISA 3D - Structural Analysis Version 9.1.1	RISA 3D provides the capability to perform two dimensional and three dimensional structural analyses of various steel and concrete structures. The program will be used to perform a three dimensional LRFD (Load and Resistance Factor Design) analysis of the three dimensional steel space truss slide gate structure.	Contractor performs independent QC to ensure results are satisfactory.
MCACES 2nd Generation (MII)	Is software developed by Project Time and Cost, Inc. (PT&C), MII is a detailed cost estimating application used by the USACE and its A-E contractors for military, civil works and hazardous, toxic and radioactive waste (HTRW) projects. MII was first released in June 2003 and replaced the MCACES and MCACES for Windows programs. MII will be used to develop the updated estimate for the authorized alternative and the estimate for the screening level alternative.	USACE Cost D/X required

10. REVIEW SCHEDULES AND COSTS

a. ATR Schedule and Cost. ATR is expected to be performed at the FSM, AFB, draft GRR and Supplemental EIS and the final GRR and Supplemental EIS. At this time, the project schedule is not fully developed so actual schedule dates are not available. The review plan will be updated accordingly once dates are available.

The first ATR for FSM is planned for spring 2012. The ATR for each milestone review is estimated to cost between $40,000 to $50,000.

b. Type I IEPR Schedule and Cost. An IEPR will be conducted on the draft GRR and Supplemental EIS concurrently with public review. The schedule for the study and this activity are not fully developed, but the IEPR will likely occur in FY13. The IEPR is estimated to cost $200,000 to $350,000.

c. Model Certification/Approval Schedule and Cost. The only planning model requiring certification is ORNIM. The certification process is underway and the cost covered as part of other studies. Currently, the ORNIM model is currently at HQ for certification pending resolution of comments.

11. PUBLIC PARTICIPATION

The public will have an opportunity to comment on the document as part of the National Environmental Policy Act (NEPA) compliance activities, including circulation of the draft and final GRR and Supplemental EIS. This peer review plan once approved will be posted to a public website and is open for public comment. All comments and responses including public, ATR and IEPR will be documented throughout the study process and included with the document at the various milestone report stages.

12. REVIEW PLAN APPROVAL AND UPDATES

The Huntington District 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:

- Natalie McKinley, Lead Planner (LRH), (304) 399-5842
- Hank Jarboe, Lead Planner (LRD), (513) 684-6050
- Wesley Walker, PCXIN Manager, (304) 399-6938

ATTACHMENT 1: TEAM ROSTERS

PDT Members

PDT Members	Discipline	Office Symbol	Telephone	Email
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PCXIN Points of Contact

PCXIN	Position	Office Symbol	Telephone	Email
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ATR Panel Members

ATR Panel Members[1]	Discipline	Office Symbol	Telephone	Email
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Robert Burstynowicz	Civil/Structural	CELRP-EC-NS	412-395-7391	robert.burstynowicz@usace.army.mil
David Buccini	Mechanical	CELRP-EC-NT	412-395-7267	David.L.Buccini@usace.army.mil
Tom Andre	Cost	CELRP-EC-NT	412-395-7306	Thomas.Andre@usace.army.mil
Tom Szelest	Operations & Maintenance	CENAO-WR-OD	757-201-3274	Thomas.J.Szelest@usace.army.mil
TBD	Construction			

[1] The PDT is willing to make recommendations as to appointees to the ATR Panel.

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 General Reevaluation Report for Greenup Lock Improvements Project, Kentucky and Ohio. 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 _____ _____

Julie W. McGuire
ATR Team Leader
CESAM-PD-FE

Date

SIGNATURE _____ _____

Michael Keathley
Project Manager
CELRH-PM-PP-P

Date

SIGNATURE _____ _____

Name
Architect Engineer Project Manager[1]
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 _____ _____

John J. Jaeger
Chief, Engineering Division
CELRH-EC

Date

SIGNATURE _____ _____

Amy K. Frantz
Chief, Planning Division
CELRH-PD

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

ATTACHMENT 4: ACRONYMS AND ABBREVIATIONS

Term	Definition	Term	Definition
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/MSC	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