



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

REPLY TO  
ATTENTION OF:

12 DEC 2012

CEMVD-PD-N

MEMORANDUM FOR Commander, New Orleans District  
(ATTN: CEMVN-PM-B)

SUBJECT: Louisiana Coastal Area Hydrodynamic Study, Main Channel of  
the Mississippi River Decision Document, Review Plan Approval

1. References:

- a. Memorandum, CEMVN-PM-B, 10 December 2012, SAB (encl).
- b. Memorandum, CEMVD-PD-N, 6 December 2012, subject:  
Louisiana Coastal Area Program, Mississippi River Hydrodynamic  
Technical Report and Tool Development, New Orleans District,  
Ecosystem Planning Center of Expertise Recommendation for Review  
Plan (RP) Approval.
- c. Engineering Circular (EC) 1165-2-209, Change 1, Civil  
Works Review Policy, dated 31 January 2012.

2. I hereby approve this RP. The subject RP provided under  
reference 1.a. was reviewed by Mississippi Valley Division staff.  
The RP includes agency technical review and independent external  
peer review through the Louisiana Water Resources Council, is  
endorsed for approval by the Ecosystem Planning Center of Expertise,  
and is consistent with the purpose and policy of EC 1165-2-209.  
Subsequent revisions to this RP or its execution will require new  
written approval from this office.

3. The RP is to be posted to the District website.

4. The POC for this action is Mr. Jim Wojtala, CEMVD-PD-N, at  
(601) 634-5931.

A handwritten signature in black ink, appearing to read "Edward E. Belk, Jr.", written in a cursive style.

EDWARD E. BELK, JR., P.E., SES  
Director of Programs

Encl

CF:  
CECW-MVD (J. Redican)

# **REVIEW PLAN**

**Louisiana Coastal Area  
Mississippi River Hydrodynamic Study  
Main Channel of the Mississippi  
River  
Technical Report and Tool Development**

**New Orleans District  
Mississippi Valley Division  
Engineering Research and Development Center**

**MSC Approval Date:** December 12, 2012  
**Last Revision Date:** November 28, 2012



**US Army Corps  
of Engineers®**



**REVIEW PLAN**

**Louisiana Coastal Area Program  
Mississippi River Hydrodynamic Study  
Technical Report and Tool Development**

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## 1. PURPOSE AND REQUIREMENTS

a. **Purpose.** This plan defines the scope and level of peer review for the Louisiana Coastal Area (LCA) Mississippi River Hydrodynamic Study (MS Hydro). The MS Hydro Project has been identified as a large-scale, long-term feature recommended for study in the U.S. Army Corps of Engineers New Orleans District (CEMVN) 2004 LCA, Louisiana, Ecosystem Restoration Study (LCA Study) and is authorized to be studied under Section 7003 of the Water Resource Development Act (WRDA) 2007 (Public Law 110-114), as well as resolutions of the U.S. House of Representatives and Senate Committees on Public Works, dated 19 April 1967 and 19 October 1967, respectively. This plan establishes the appropriate level and independence of review and presents the detailed requirements for review documentation. This review plan, a stand-alone document, is a component of the study's Project Management Plan (PMP).

### 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 2012
- (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) New Orleans District Program Management Plan, August, 2011
- (6) Quality Management Plan, US Army Corps of Engineers, New Orleans District, 6 Oct 2006.

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 review levels: 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/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 review effort described in this 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 this Review Plan is the National Ecosystem Restoration Planning Center of Expertise (ECO-PCX).

At this point we do not see the need to 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, because this project does not include construction.

## 3. STUDY INFORMATION

a. **Documents.** The documents generated during this study will document the details of field data collection and analysis, geomorphic analysis, and the creation and testing of a suite of mathematical models which will seek to inform users about the hydrodynamics and sediment transport capabilities of the lower Mississippi River. These tools will be designed to support and inform a closely related study title Mississippi River Delta Management study and other projects on the Mississippi River. This study is evaluating large scale design features, cumulative impacts and system response to

external factors such as increases in relative sea-level rise. Design and construction are not part of this project. The Chief of Engineers will approve the report. This study will not require Congressional authorization.

- b. **Study/Project Description.** Overall, the LCA authority includes requirements for comprehensive coastal restoration planning, program governance, project modification investigations, a Science and Technology program, restoration project construction, a program for beneficial use of dredged material, feasibility studies for restoration plans, and other elements. In total, the LCA program has authority for 25 elements falling into various categories including investigations, research, demonstrations, and construction. This project is focused on applied research of the MS River

Excerpts from WRDA 2007 outlining the project authority are listed below:

*TITLE VII—LOUISIANA COASTAL AREA*

*SEC. 7001. DEFINITIONS.*

*(1) COASTAL LOUISIANA ECOSYSTEM.—The term “coastal Louisiana ecosystem” means the coastal area of Louisiana from the Sabine River on the west to the Pearl River on the east, including those parts of the Atchafalaya River Basin and the Mississippi River Deltaic Plain below the Old River Control Structure and the Chenier Plain included within the study area of the restoration plan.*

*(3) RESTORATION PLAN. — The term “restoration plan” means the report of the Chief of Engineers for ecosystem restoration for the Louisiana Coastal Area dated January 31, 2005.*

*(5) COMPREHENSIVE PLAN. — The term “comprehensive plan” means the plan developed under section 7002 and any revisions thereto.*

*SEC. 7003. LOUISIANA COASTAL AREA.*

*(a) IN GENERAL.— The Secretary may carry out a program for ecosystem restoration, Louisiana Coastal Area, Louisiana, substantially in accordance with the report of the Chief of Engineers, dated January 31, 2005.*

*(b) PRIORITIES.—*

*(1) IN GENERAL.— In carrying out the program under subsection*

*(a), the Secretary shall give priority to—*

*(A) any portion of the program identified in the report described in subsection (a) as a critical restoration feature;*

*(B) any Mississippi River diversion project that—*

*(i) will protect a major population area of the Pontchartrain, Pearl, Breton Sound, Barataria, or Terrebonne basins; and*

*(ii) will produce an environmental benefit to the coastal Louisiana ecosystem;*

*(C) any barrier island, or barrier shoreline, project that—*

*(i) will be carried out in conjunction with a Mississippi River diversion project; and*

*(ii) will protect a major population area;*

*(D) any project that will reduce storm surge and prevent or reduce the risk of loss of human life and the risk to public safety;*

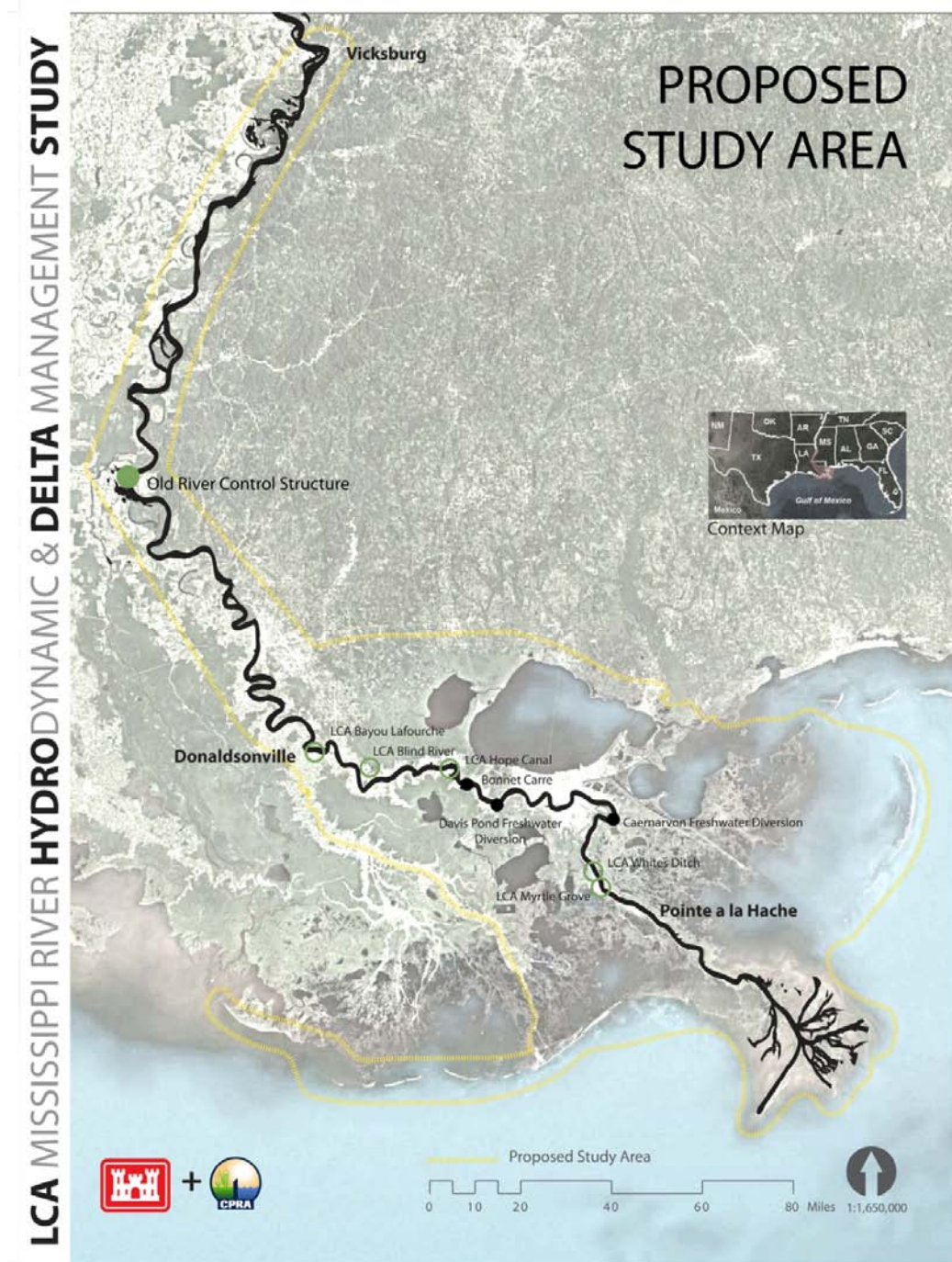
The State of Louisiana Coastal Protection and Restoration Authority and the USACE signed a Feasibility Cost Share Agreement on 15 August 2011 which supports both the Mississippi River Hydrodynamic study and the Mississippi River Delta Management Study .

The study area of the Mississippi River Hydrodynamic Study is focused on the main stem Mississippi River and is primarily a data collection, data synthesis, and modeling effort that will provide future without project river conditions, a cumulative effects analysis of all near term existing or planned river projects, and future with project conditions that will add any new project features developed under the Delta Management study. The Hydrodynamic Study is critical because it will evaluate and quantify the amount and location of sediment and water available for ecosystem restoration and any changes to river shoaling, erosion, velocities, stages and salinity resulting from actions recommended by the MS River Delta Management project and other restoration and navigation projects. The comprehensive hydrodynamic river data and modeling will be used adaptively and programmatically to provide decision-making criteria and management strategies to sustain the three Corps missions of ecosystem restoration, navigation, and flood risk management on the Mississippi River. More specifically, the analysis completed through the MS Hydro Study will provide the capability to track the evolution of deposition and accretion in the navigation channel including effects from future subsidence and sea level rise, and to monitor the associated dredging requirements and future water surface elevations in the river. Models will also provide a technical basis to inform other, non-Corps efforts on the changes that occur to authorized purposes in the river with broader support and less controversy.

As stated above, one of the many purposes of the MS Hydro study is to support the Mississippi River Delta Management study. The large study area for the Delta Management project is in Louisiana's 1<sup>st</sup>, 2<sup>nd</sup>, and 3<sup>rd</sup> Congressional Districts. It is a single-purpose ecosystem restoration effort in the Pontchartrain, Breton Sound, and Barataria Basins in Southeastern Louisiana and falls within portions of St. James, St. John the Baptist, Orleans, St. Bernard, St. Charles, Jefferson, Lafourche, and Plaquemines Parishes. These basins are among the Nation's most biologically productive estuaries. The basins cover most of southeast Louisiana minus Terrebonne basin and equates to approximately 2.3 million acres. The dominant habitat types in the study area are bottomland hardwood forest (natural levee forest); wooded swamp; fresh, intermediate, brackish, and saline marshes and associated fresh to saline water bodies. Major navigation channels in the area include the Mississippi River, the Inner Harbor Navigation Canal, the Gulf Intracoastal Waterway (GIWW) and Barataria Bay Waterway. The Delta Management Study will analyze system-wide features on a large-scale to greatly increase sediment deposition in areas surrounding the river. River diversions and alternative navigation channel alignments and other actions may be considered. If channel realignments are considered in detail, the study will be rescoped and a new feasibility cost share agreement and PMP would be required to complete a full assessment of the technical, operational, social, economic, and environmental factors associated with such a significant endeavor. The primary features that are being considered for restoration are sediment diversions and placement of dredged sediments. This study will assess multiple restoration strategies that can significantly change the geomorphology and hydrology in targeted basins. Land building processes and the full effects of freshening ecosystems through river diversions are still debated within government agencies, academic circles, and the public. These alternatives will be further analyzed to provide conclusions to support management decisions. System-wide analysis of three primary basins surrounding the lower river (Barataria, Breton Sound and Pontchartrain), is being considered over a 50-year period (2070) with future without project scenarios of relative sea-level rise impacts extending for 100 years. The base year condition (the time the project is operational) of the 50-year period of analysis is assumed to be 2020 based on signing of the Feasibility Cost Share Agreement in 2011, a 5-year feasibility study duration (2016), 1-year Pre-construction Engineering and Design (2017), and a 3-year construction period (2020).

It is thought by many that sediment introduction features from the Mississippi River are required in coastal Louisiana to offset wetland loss due to sea level rise and subsidence, storm loss, and numerous anthropogenic disturbances. Sustainable land forms are needed to retain critical

ecosystems as well as to buffer coastal communities from storms. It has been commonly thought that hundreds of millions of tons of sediments from the Mississippi River are lost to the deep water of the Gulf of Mexico each year. Recent research has shown that these traditional ideas may be out-dated, and based on measurements taken over 300 miles north of the Gulf of Mexico, clearly demonstrating the need for current and accurate assessments of the hydrodynamics and sediment transport capabilities of the Mississippi.



**Figure 1: Map of Study Area.** The project area is extended up river for the purposes of using data from sampling stations in Vicksburg and Natchez, MS for establishing modeling boundary conditions.



**Factors Affecting the Scope and Level of Review.** The Mississippi River Hydro PDT seeks to conduct “in progress” or phased IEPR of several complex technical tasks including river and basin hydrodynamic, sediment and salinity transport modeling; river geomorphic analyses. This approach for peer review is requested because of the criticality of receiving feedback on the front-end and at intermediate stages of the modeling studies on multiple, complex tasks related to redistribution of riverine resources for coastal restoration and the potential effects on navigation and flood risk management. We envision interim review comments with one final report and that the same review team will participate in all phases.

The reviews would occur at periodic check points throughout the study as tasks are being executed. Currently we envision three checkpoints at about the 30% completion point, 60% completion and then final review. The “in progress” review would follow the constructs outlined in EC 1165-2-209 (EC). This “in progress” methodology was employed in the IPET project and was highly successful, and the EC points out that Type I IEPR will be more effective if the review panel maintains communication with USACE during the review. IEPR of remaining study tasks and the final report and recommendations would be conducted in the traditional sense and are expected to be expedited due to the IEPR panelist’s involvement throughout the study.

The Mississippi River Hydro PDT has coordinated the development of this review plan with the Corps MSC, ECO-PCX and other interdisciplinary PCXs as needed. Dave Robbins, IEPR Manager, assigned to manage all IEPR actions in accordance with Section 7009 of WRDA 2007, has been contacted to discuss the feasibility of this effort. Dave indicated that he would support our efforts and has previously helped set up "phased" reviews for other projects. The CSDR-PCX is the lead PCX to assist regional districts through MVD to conduct IEPR through the Louisiana Water Resources Council as required in WRDA 2007, Section 7009.

The review panel for IEPR will be completely independent from USACE and will be assembled in accordance with guidelines set forth in EC 1165-2-209. The “in progress” portion of the review will focus on addressing engineering and environmental technical work. Reviewers will be required to be experts in the field of river and wetland hydrodynamics, sediment and salinity transport, river geomorphology, and ecological modeling and assessment because of the extreme sensitivities, and complexities associated with study tasks. As the EC states all biases held by the reviewers must be disclosed so as to disqualify prospective reviewers if necessary. Reviewers will not be expected to resolve fundamental controversies but to provide unbiased, sound, technical and engineering input to the modeling and analytical tasks. Care will be taken as outlined in the EC to ensure that communication with the review panel does not compromise the reviewer’s independence. The review panel will not make a recommendation on whether a particular alternative should be implemented, as alternatives analysis will occur only in the Delta Management portion of the study.

**c. In-Kind Contributions.** Products and analyses provided by non-Federal sponsors as in-kind services are also subject to DQC, ATR, and IEPR. The in-kind products and analyses to be provided by the non-Federal sponsor include: field data collection, data management, one-dimensional and multi-dimensional modeling. MVN will lead the overall study with in-kind products submitted by the non-federal sponsor.

#### **4. DISTRICT QUALITY CONTROL (DQC)**

All decision documents (including supporting data, analyses, environmental compliance documents, etc.) shall undergo DQC. DQC is meant to be a rigorous internal review process of basic science and engineering work products focused on fulfilling the project quality requirements defined in the Project Management Plan (PMP). MVN, in coordination with ERDC, shall manage DQC. Documentation of

DQC activities is required and will be in accordance with the Quality Manual of the District and the home MSC.

- a. **Documentation of DQC.** DQC is the review of basic science and engineering work products focused on fulfilling the project quality requirements defined in the Project Management Plan. It is managed in the home district and may be conducted by senior staff or other qualified personnel in the home district as long as they are not doing the work involved in the study, including contracted work that is being reviewed. In this case, we will also include “DQC” by ERDC staff, as the reports are primarily authored by ERDC personnel with MVN participation, with one study unit lead by MVN with team participation. Basic quality control tools include a Quality Management Plan providing for seamless review, quality checks and reviews, supervisory reviews, Project Delivery Team (PDT) reviews, etc. Additionally, the PDT is responsible for a complete reading of the report to assure the overall integrity of the report, technical appendices and the recommendations before approval by the District Commander. According to the MVN Program Management Plan all decision documents and their supporting analysis will undergo DQC. Verification from Planning Division of products will occur before the release of data /or final products to another office/division, but may include reviewers and PDT members from other functional areas. Verifications will be documented and become part of the project’s records. See Attachment 2 for Example Verification Documentation. DQC members will be selected early in the project life, and DQC members will be invited to participate in the IEPR “in progress” reviews so that they can use that time to become more familiar with the study and informed about technical concerns that the study is addressing. DQC comments will be provided and responded in Word documents.

**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 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.** Specific products to undergo ATR include Draft Reports and Final Reports (including supporting documentation).
- b. **Required ATR Team Expertise.** The ATR Team will be comprised of individuals outside of the home district that have not been involved in the development of the document and will be chosen based on expertise, experience, and/or skills. The members will roughly mirror the composition of the PDT. It is anticipated that the team will consist of 3-4 reviewers. The ATR Team should include:

<b>ATR Team Members/Disciplines</b>	<b>Expertise Required</b>
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 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

ATR Team Members/Disciplines	Expertise Required
	(such as planning, economics, environmental resources, etc).It is envisioned that the ATR lead will also lead the MS River Delta Management ATR to insure coordination between reviews and to apply technical information from the MS Hydro effort to the MS River Delta Management review.
Hydrology/Hydraulic Engineering	Reviewer must be familiar with river hydraulics and both one-dimensional and multi-dimensional modeling in large river systems, for instance HEC-6, ADH, Delft 3-D, FVCOM and Flow 3-D.
Sediment Transport/Fluvial Geomorphology	Familiarity with transport of both cohesive and fine sand sediments in large river systems is necessary, knowledge of the effects of salinity on sediment flocculation and settling is desirable.

**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 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 resolution in accordance with the 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 it has been elevated for resolution.

At the ATR conclusion, the ATR team will prepare a Review Report. These 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 copy of each reviewer's comments, or represent the views of the group as a whole, including any disparate and dissenting views.

ATR may be certified when all 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.

As with the DQC members, ATR members will be named early in the project life and will be invited to attend and participate in the “in progress” IEPR events.

## 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.
- Decision on IEPR.** Due to the critical nature of the outputs of the modeling suite and the level of decisions that the field data collection and modeling suite will inform, we seek independent external peer review Type I to insure the overall quality of the product and establish credibility within the Louisiana restoration community and Mississippi River management communities.
  - Products to Undergo IEPR.** Detailed work plans, interim work products, draft reports and final reports will all be reviewed by the IEPR team, along with interpretations of field data collection results and geomorphic analyses.

**c. Required IEPR Panel Expertise.**

<b>IEPR Team Members/Disciplines</b>	<b>Expertise Required</b>
Hydrology/Hydraulic Engineering	Reviewer must be familiar with river hydraulics and one-dimensional modeling of hydraulics and sediment transport in large river systems. An example of a pertinent model is HEC-6.
Hydrology/Hydraulic Engineering	Reviewer must be familiar with river hydraulics and multi-dimensional modeling of hydraulics and sediment transport in large river systems. Pertinent model types include ADH-2D, Delft 3-D, FVCOMM and Flow-3D.
Sediment Transport/Fluvial Geomorphology	Familiarity with transport of both cohesive and fine sand sediments in large river systems is necessary, knowledge of the effects of salinity on sediment flocculation and settling is desirable.

**Documentation of 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 Assessment Report. IEPR comments should generally include the same four key parts as described for ATR comments in Section 5.c above.

In accordance with EC 1165-2-209, the IEPR panel must be provided with a statement of work and charge questions. Below are examples of the charge questions which will need to be answered.

- (1) Are the methods utilized for field data collect sufficient and well documented? Are the conclusions drawn from field data collect well-substantiated? Is the field data effort sufficient to support the needs of the project?
- (2) Is the scope for the geomorphic analysis adequate? Are the conclusions drawn from this effort well-substantiated? Have the geomorphic conclusions been adequately integrated into the other study components?
- (3) Are the one-dimensional models used sufficient for the purposes of the study? Have the model assumptions been well-documented? Are the conclusions drawn from the modeling efforts well substantiated?
- (4) Are the multi-dimensional models used sufficient for the purposes of the study? Have the model assumptions been well-documented? Are the conclusions drawn from the modeling efforts well substantiated?
- (5) Are all aspects of the study well-documented and clearly communicated?

The OEO will prepare an interim Review Report on the draft document. The interim Review Report 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.

If the OEO agrees, DrChecks review software will be used to document all IEPR 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 USACE draft responses may be conveyed back to the OEO informally (orally) to facilitate discussion but will ultimately be conveyed in writing. Upon conveyance of the USACE draft responses to the OEO, a conference will be held, modifications made to the draft response document as necessary, and then finalized in a final interim Review Report. The OEO will prepare Interim Review comments for each of the two interim “in-progress” meetings and then a final review report. This report will accompany the publication of the final 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 each of the IEPR meetings. USACE shall consider all recommendations contained in the Review Report and prepare a written response for all recommendations adopted or not adopted. The final 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 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.

This project will not make a recommendation for implementation, so Cost Engineering is not necessary.

## **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 are being used whenever appropriate. Two of the models used by our cost-sharing partners are not currently on the list – we will be working to gain SET approval for the use of these models.

- a. **Planning Models.** The following planning models are anticipated to be used in the development of the decision document: None
- b. **Engineering Models.** Engineering models assist in the evaluation of the existing and future conditions to gauge the effects of the tentatively selected plan on the Mississippi River, the surrounding environment, and the availability of water and sediments for restoration purposes, but are not used to determine the outputs for the benefits of the plan itself. Engineering models involved the application of science and can be used in both the design of the project alternative measures as well as the assessment of effects. The following engineering models are anticipated to be used in the development of the MS Hydro assessment:

Model Name and Version	Brief Description of the Model and How It Will Be Applied in the Study
HEC-6T	HEC-6T is a version of the one-dimensional model HEC-6 (developed by the Hydraulic Engineering Center, Davis, CA) which has been modified to better simulate sediment transport in the Mississippi River. This model will be used to generate Future Without Project scenarios under no action, and various relative sea level rise scenarios over 50 and 100 year time spans. It will also be used to address the cumulative impacts of multiple diversion scenarios over 50- and 100-year simulations.
HEC-RAS	Information from the HEC-6T model will be used to develop a HEC-RAS, which includes modernized data entry and data output tools, GIS linkages, and allows coupling of sediment transport computations with unsteady flow.
AdH/SEDLIB-2D	This model will be applied from the Old River Control Structure to the Gulf and provides information on multi-grain sediment classes, and cohesive and non-cohesive sediment types. The relative computational efficiency permits model simulations for longer temporal periods than a fully 3-D approach, but the simplifications inherent in depth averaging do not allow it to investigate salinity intrusion or other inherently 3D phenomenon.
Delft-3D	The model domain for this model will be segmented in two pieces – one from Bonnet Carre’ to the Head of Passes which will focus only on hydrodynamics and sediment, the other from Empire to the Gulf which will

	focus on hydrodynamics, sediment transport and salinity processes, included salt wedge interactions. As with most 3D models, it is not possible to simulate long durations with this model.
FV-COM-3D	This model will be used for short duration hydrodynamic and salinity simulations and will integrate the river from RM 102 south with the Bird's Foot Delta and the receiving basins. This will allow the model to fully investigate the changes due to multiple restoration strategies on salinity dynamics, including the salt wedge, with the river channel as a function of multiple large diversions. It will also provide open-water boundary conditions to the Delft-3D and AdH models.
Flow-3D	This model will be used for high resolution near-field or local application near areas of interest such as Bonnet Carre, Davis Pond, Upper Breton Sound, White Ditch and Myrtle Grove. This model has the ability to efficiently model intake structures and diversion channels and to efficiently calculate the diverted sediment load with break-down into various sediment classes. This model will also provide water-sediment diversion coefficients (per sediment size class) to the regional HEC-6T model.

## 10. REVIEW SCHEDULES AND COSTS

**Schedule and Cost.** The anticipated cost of the reviews is approximately \$10, 000 for DQC, \$50,000 for ATR and \$200,000 for IEPR, including travel costs.

<b>Review Milestone</b>	<b>DQC/ATR/IEPR Team Involvement</b>	<b>Scheduled Date</b>
Initial In Progress Review meeting	X	Feb 2013
Mid-Term In Progress Review meeting	X	Nov 2013
ATR of Draft Report	X	Sep 2014
IEPR of Draft Report	X	Sep 2014
Chief's Report of Delta Management report with MS Hydro documentation included		Nov 2015

## 11. PUBLIC PARTICIPATION

Release of the reviewed MS Hydro reports will be made by posting the reports on the LCA websites. Application of the models to scenarios evaluated under the MS River Delta Management study will be included in that report and will be subject to customary public review and comment as outlined in the review plan for that report.

## 12. REVIEW PLAN APPROVAL AND UPDATES

The Mississippi Valley Division Commander is responsible for approving this Review Plan. The Commander's approval reflects vertical team input and concurrence (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 plan can be directed to the following staff:

- Cherie Price, Plan Formulator, MVN, 504-862-2737
- Barb Kleiss, Technical Lead, MVD, 601-634-5520
- Loren Wehmeyer, Coastal Hydraulics Lab, ERDC, 601-634-2923
- Jodi Creswell, ECO-PCX Program Manager, 309-794-5448
- Beth Marlowe, Regional Integration Team, 202-761-0297

## ATTACHMENT 2: STATEMENT OF TECHNICAL REVIEW FOR DECISION DOCUMENTS

### COMPLETION OF AGENCY TECHNICAL REVIEW

The Agency Technical Review (ATR) has been completed for the feasibility report for the Louisiana Coastal Area (LCA) Program Modification of Davis Pond Diversion. 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<sup>sm</sup>.

*SIGNATURE*

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Name

ATR Team Leader

Office Symbol/Company

\_\_\_\_\_

Date

*SIGNATURE*

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Name

Hydraulic Engineer

Office Symbol

\_\_\_\_\_

Date

*SIGNATURE*

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Name

Hydraulic Engineer/Fluvial Geomorphologist

Company, location

\_\_\_\_\_

Date

*SIGNATURE*

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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

Gregory B. Miller

Chief, Planning Division

CEMVN-PD-P

\_\_\_\_\_  
Date

SIGNATURE

Ty V. Wamsley, Ph.D.

Division Chief, Coastal and Hydraulics Laboratory

CEERD-C

\_\_\_\_\_  
Date

## STATEMENT OF DISTRICT QUALITY CONTROL

CEMVN-PD

DATE: January 2012

### MEMORANDUM FOR RECORD

SUBJECT: District Quality Control – Louisiana Coastal Area WRDA 2007, Section 7006 (e)(1) Projects Feasibility Report

1. Reference:  
EC 1165-2-209, 31 Dec 2009, subject: Civil Works Review Policy.
2. EC 1165-2-209 Paragraph 5(d) requires that all civil works planning, engineering, and O&M products must undergo District Quality Control (DQC).
3. MVN has conducted a DQC review of the subject product in accordance with EC 1165-2-209 Paragraph 8. The Project Delivery Teams (PDTs) have conducted a review of the product (including appendices). It has also been reviewed by the Plan Formulation Branch Chief. It meets the requirements of technical sufficiency for a Final Feasibility Report.
4. CEMVN-PD recommends transmittal and approval of the report.

Troy G. Constance  
Chief, Regional Planning and  
Environment Division South

**ATTACHMENT 3: REVIEW PLAN REVISIONS**

<b>Revision Date</b>	<b>Description of Change</b>	<b>Page / Paragraph Number</b>

**ATTACHMENT 4: ACRONYMS AND ABBREVIATIONS**

<b><u>Term</u></b>	<b><u>Definition</u></b>	<b><u>Term</u></b>	<b><u>Definition</u></b>
AAHU	Average Annual Habitat Units	LCA	Louisiana Coastal Area
AFB	Alternative Formulation Briefing	MSC	Major Subordinate Command
ASA(CW)	Assistant Secretary of the Army for Civil Works	NEPA	National Environmental Policy Act
ATR	Agency Technical Review	O&M	Operation and maintenance
CE/ICA	Cost effectiveness and Incremental Cost Analysis	OMB	Office and Management and Budget
CPRA	Louisiana Coastal Protection and Restoration Authority	OMRR&R	Operation, Maintenance, Repair, Replacement and Rehabilitation
DQC	District Quality Control/Quality Assurance	OEO	Outside Eligible Organization
DX	Directory of Expertise	OCPR	Louisiana Office of Coastal Restoration and Protection
EC	Engineer Circular	PCX	Planning Center of Expertise
ECO-PCX	National Ecosystem Restoration Planning Center of Expertise	PDT	Project Delivery Team
EIS	Environmental Impact Statement	PMP	Project Management Plan
EO	Executive Order	PL	Public Law
ER	Ecosystem Restoration	QMP	Quality Management Plan
FS	Feasibility Study	QA	Quality Assurance
FSM	Feasibility Scoping Meeting	QC	Quality Control
HQUSACE	Headquarters, U.S. Army Corps of Engineers	RMO	Review Management Organization
IEPR	Independent External Peer Review	USACE	U.S. Army Corps of Engineers
IPR	In Progress Review	WRDA	Water Resources Development Act
ITR	Independent Technical Review	WVA	Wetlands Value Assessment