Final Independent External Peer Review Report Mississippi River Ship Channel (MRSC) Gulf to Baton Rouge, Louisiana, General Reevaluation Report (GRR)

Prepared by
Battelle Memorial Institute

Prepared for
Department of the Army
U.S. Army Corps of Engineers
Deep Draft Navigation Planning Center of Expertise
Baltimore District

Contract No. W912HQ-15-D-0001
Task Order: 0018

May 4, 2017

BATTELLE
It can be done

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Final Independent External Peer Review Report Mississippi River Ship Channel (MRSC) Gulf to Baton Rouge, Louisiana, Draft Integrated General Reevaluation Report (GRR) & Supplemental Environmental Impact Statement (SEIS)

Executive Summary

PROJECT BACKGROUND AND PURPOSE

Construction of the Mississippi River Ship Channel (MRSC), Gulf to Baton Rouge, Louisiana project was planned for construction in 3 phases. Construction of Phase I was completed in December of 1987 and provided a depth of 45 ft. from Donaldsonville, LA (River Mile 181.0) to the Gulf of Mexico. Construction of Phase II was completed in December 1994 and involved deepening of the MRSC to a depth of 45 ft. between Donaldsonville, Louisiana (River Mile 181.0) to Baton Rouge and included dredging eight river crossings to an equivalent depth. Prior to proceeding with construction of Phase III, a general reevaluation study and an accompanying general reevaluation report (GRR), and supplemental environmental impact statement (SEIS) is required due to potential changed conditions and assumptions related to the MRSC depth, economic development, and environmental assessments since the 1981 Feasibility Report. The general reevaluation study will examine whether navigation improvements to deepen the existing Federal project for the MRSC are warranted and in the Federal interest. This will be accomplished by assessing existing and future conditions; evaluating related problems and opportunities; developing potential alternatives and evaluating/comparing the costs, benefits, and feasibility of those alternatives; writing a supplemental environmental impact statement; and identifying a recommended plan.

The scope of the study includes evaluation of alternatives to deepen the MRSC between depths of 45 feet and 50 feet for the next phase of construction. The evaluation of alternatives was limited to a depth of 50 feet at the request of the non-Federal Sponsor. Currently, the crossings in the Mississippi River are at depths of 45 feet, based on a depth below the Low Water Reference Plane, and the lower Mississippi River is at a depth of 48.5 feet Mean Lower Low Water (MLLW). The general reevaluation study will identify the depth that creates the greatest net benefits, up to a depth of 50 feet MLLW. At initiation, the study recognized there was a need to reevaluate the construction phasing of the project. Within the general reevaluation study, the alternative depths are limited to a depth not to exceed 50 feet. Therefore, future construction phases beyond the three phases originally planned are required to fully implement the authorized project.

Independent External Peer Review Process

Independent, objective peer review is regarded as a critical element in ensuring the reliability of scientific analysis. U.S, Army Corps of Engineers (USACE) is conducting an Independent External Peer Review (IEPR) of the MRSC Gulf to Baton Rouge, Louisiana, Draft Integrated GRR and SEIS (hereinafter: MRSC

IEPR). As a 501(c)(3) non-profit science and technology organization, Battelle is independent, free from conflicts of interest (COIs), and meets the requirements for an Outside Eligible Organization (OEO) per guidance described in USACE (2012). Battelle has experience in establishing and administering peer review panels for USACE and was engaged to coordinate this IEPR. The IEPR was external to the agency and conducted following USACE and Office of Management and Budget (OMB) guidance described in USACE (2012) and OMB (2004). This final report presents the Final Panel Comments of the IEPR Panel (the Panel). Details regarding the IEPR (including the process for selecting panel members, the panel members' biographical information and expertise, and the charge submitted to the Panel to guide its review) are presented in appendices.

Based on the technical content of the MRSC review documents and the overall scope of the project, Battelle identified potential candidates for the Panel in the following key technical areas: Civil Works planning, economics, biological resources and environmental law, hydrology/hydraulics engineering, and geotechnical/civil engineering. Battelle screened the candidates to identify those most closely meeting the selection criteria and evaluated them for COIs and availability. USACE was given the list of final candidates to confirm that they had no COIs, but Battelle made the final selection of the four-person Panel.

The Panel received electronic versions of the MRSC decision documents (868 pages total) to be reviewed, along with a charge that solicited comments on specific sections of the documents to be reviewed. Following guidance provided in USACE (2012) and OMB (2004), USACE prepared the charge questions, which were included in the draft and final Work Plans.

The USACE Project Delivery Team (PDT) briefed the Panel and Battelle during a kick-off meeting held via teleconference at the start of the review to provide the Panel an opportunity to ask questions of USACE and clarify uncertainties. Other than Battelle-facilitated teleconferences, there was no direct communication between the Panel and USACE during the peer review process. The Panel produced individual comments in response to the charge questions.

IEPR panel members reviewed the MRSC decision documents individually. The panel members then met via teleconference with Battelle to review key technical comments and reach agreement on the Final Panel Comments to be provided to USACE. Each Final Panel Comment was documented using a four-part format consisting of (1) a comment statement; (2) the basis for the comment; (3) the significance of the comment (high, medium/high, medium, medium/low, or low); and (4) recommendations on how to resolve the comment. Overall, 15 Final Panel Comments were identified and documented. Of these, two were identified as having medium/high significance, three had a medium significance, seven had medium/low significance, and three had low significance.

Battelle received public comments from USACE on the MRSC project (approximately one public meeting transcript and twelve written comments, totaling 91 pages of comments) and provided them to the IEPR panel members. The panel members were charged with determining if any information or concerns presented in the public comments raised any additional discipline-specific technical concerns with regard to the MRSC review documents. After completing its review, the Panel identified one new issue and subsequently generated one Final Panel Comment that summarized the concern.

Results of the Independent External Peer Review

The panel members agreed on their "assessment of the adequacy and acceptability of the economic, engineering, and environmental methods, models, and analyses used" (USACE, 2012; p. D-4) in the MRSC review documents. Table ES-1 lists the Final Panel Comment statements by level of significance. The full text of the Final Panel Comments is presented in Section 4.2 of this report. The following summarizes the Panel's findings.

Based on the Panel's review, the report is well-written, concise, and logically presented the engineering, environmental, economic, and plan formulation issues. The report provided a balanced assessment of the economic, engineering, and environmental issues of the overall project; however, the Panel identified several elements of the report that should be clarified or revised.

Plan Formulation and Economics: The Panel believes that the GRR/SEIS could present a clearer analysis of how the population and employment sectors of the economy would benefit from the traffic growth and efficiency resulting from the MRSC project. The Panel also thinks additional information on the shipping operations section of Appendix D would strengthen the GRR/SEIS. Finally, the Panel could not find clear information on which specific commodities would benefit from the project and what the magnitude of those benefits might be; since that information was likely developed during the benefit-cost analysis process, the Panel suggests adding it to the GRR/SEIS.

Engineering: One of the Panel's primary engineering-related concerns is that the effects of the three relative sea level rise (RSLR) scenarios and the dredging costs associated with them are not addressed in the review documents. Although the GRR/SEIS states that RSLR will be considered during the feasibility level design, the Panel believes that it should be fully evaluated during the current stage to assess how RSLR and sedimentation may affect ship draft and project dredging costs. In addition, the Panel is concerned that the GRR/SEIS uses existing maintenance dredging records to predict future dredging quantities in certain sections of the river, rather than using the results of the HEC-6T one-dimensional (1D) sediment model. The Panel believes that this approach may result in the underestimation of future maintenance dredging costs and suggests that USACE run the HEC-6T 1D sediment model using the historic hydrologic record as the upstream input and the three RSLR scenarios as downstream boundary conditions. Another concern of the Panel is the lack of 1D and three-dimensional (3D) modeling of the potential change in salt wedge location due to dredging and RSLR, and the resulting implications for project costs if the sedimentation rates and saline impacts on water intakes are not properly evaluated. The Panel also noted that two-dimensional (2D) modeling was not conducted at the river crossings to accurately estimate future sedimentation and future annual dredging needs. From a geotechnical standpoint, the Panel agrees that not enough information is presented in the GRR/SEIS on subsurface conditions, particularly the stability of the dredged slopes. Since the instability of these slopes may lead to higher maintenance costs, the Panel suggests that USACE add a description of subsurface conditions and stability analyses of the configuration of the dredge slopes to the GRR/SEIS. Of lesser concern, the Panel observed that the dredged material could be evaluated further for different beneficial uses, including as a source of construction material, and that the upward trend in ship draft depth presented in the GRR/SEIS is supported by only three years of data, when more recent data are available.

Environmental: The Panel noted that the use of connector vessels has not been evaluated as a potential alternative to deepening the MRSC, and this omission may increase the risk of a legal challenge based

on compliance with the National Environmental Policy Act (NEPA). The Panel recommends considering this alternative and describing whether the alternative is feasible in the GRR/SEIS. The Panel also observed that no monitoring program or adaptive management plan is presented for the intertidal coastal wetland habitat beneficial use sites, and suggests that USACE develop a plan to strengthen project documentation and potentially reduce future project costs. Finally, the Panel recommends that a statement in the Executive Summary about the environmental consequences not being fully assessed yet be qualified with additional information on what environmental assessments will be conducted in the future.

Table ES-1. Overview of 15 Final Panel Comments Identified by the MRSC IEPR Panel

No.	Final Panel Comment
Significance – Medium/High	
1	The effects of the three relative sea level rise (RSLR) scenarios and resulting dredging costs are not provided.
2	The justification for using existing maintenance dredging records while disregarding the sediment modeling results to predict future dredging quantities is unclear, since omitting the one-dimensional (1D) sediment model lowers project cost estimates.
Significance – Medium	
3	Modeling has not been conducted to show how dredging and sea level rise will change the salt water wedge location, which may affect sedimentation rates and water intakes.
4	The use of connector vessels has not been considered or discussed as a potential alternative to deepening the MRSC.
5	Two-dimensional hydrodynamic modeling has not been conducted at the crossings, which affect the crossings' sedimentation estimates.
Significance – Medium/Low	
6	The effects of traffic growth and efficiency gains on the population and employment sectors as a result of the project are not addressed in the socioeconomic discussion.
7	The underlying basis for the assumptions on ship operations in the channel and the sources of the information presented in the shipping operations discussion in Appendix D are not identified.
8	The report does not provide sufficient geotechnical subsurface information or analyses, particularly on the stability of the dredged slopes, even though the channel slope configuration is presented in Appendix C.
9	Appendix C and the GRR/SEIS appear to contradict each other regarding the description of one of the RSLR scenarios.
10	A monitoring schedule and a methodology for assessing the success of the beneficial use sites have not been presented in the GRR/SEIS.
11	The beneficial use of the material dredged from the river crossings has not been given sufficient consideration.
12	A report assessing essential fish habitat (EFH) is not presented in the GRR/SEIS.
Significance – Low	
13	Even though more recent data are available, only three years' worth of data are used to support the upward trend in ship drafting greater than 45 feet.

Table ES-1, continued. Overview of 15 Final Panel Comments Identified by the MRSC IEPR Panel

No.	Final Panel Comment
14	The GRR/SEIS does not specify which commodities will benefit from the deepening of the Mississippi River channel and the magnitude of the benefits by commodity.
15	The Executive Summary states that the environmental consequences of the project have not been fully assessed, but provides no information on existing data gaps and ongoing or future assessments.

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LIST OF ACRONYMS

1D	one-dimensional
2D	two-dimensional
3D	three-dimensional
ADM	Agency Decision Milestone
AHP	Above Head of Passes
ATR	Agency Technical Review
BCR	Benefit to Cost Ratio
BHP	Below Head of Passes
CE/ICA	Cost Effectiveness/Incremental Cost Analysis
COI	Conflict of Interest
CWRB	Civil Works Review Board
DrChecks	Design Review and Checking System
EC	Engineer Circular
EFH	Essential Fish Habitat
ER	Engineer Regulation
ERDC	Engineer Research and Development Center
ETL	Engineer Technical Letter
ERDC	Engineer Research and Development Center
GRR	General Reevaluation Report
HarborSym	Harbor Simulation Model
HEC-RAS	Hydrologic Engineering Center's River Analysis System
H&H	Hydrology/Hydraulics
IEPR	Independent External Peer Review
IWR	Institute for Water Resources
LaDOTD	Louisiana Department of Transportation and Development
LWRC	Louisiana Water Resources Council
LWRP	Low Water Reference Plane
MLLW	Mean Lower Low Water
MP	Mile Post
MRSC	Mississippi River Ship Channel

NED	National Economic Development
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NRC	National Resource Council
OEO	Outside Eligible Organization
O&M	Operations and Management
OMB	Office of Management and Budget
PDT	Project Delivery Team
RSLR	Relative Sea Level Rise
SEIS	Supplemental Environmental Impact Statement
TSP	Tentatively Selected Plan
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
WRDA	Water Resources Development Act
WVA	Wetland Value Assessment

1. INTRODUCTION

Construction of the Mississippi River Ship Channel (MRSC), Gulf to Baton Rouge, Louisiana project was planned for construction in 3 phases. Construction of Phase I was completed in December of 1987 and provided a depth of 45 ft. from Donaldsonville, LA (River Mile 181.0) to the Gulf of Mexico. Construction of Phase II was completed in December 1994 and involved deepening of the MRSC to a depth of 45 ft. between Donaldsonville, Louisiana (River Mile 181.0) to Baton Rouge and included dredging eight river crossings to an equivalent depth. Prior to proceeding with construction of Phase III, a general reevaluation study and an accompanying general reevaluation report (GRR), and supplemental environmental impact statement (SEIS) is required due to potential changed conditions and assumptions related to the MRSC depth, economic development, and environmental assessments since the 1981 Feasibility Report. The general reevaluation study will examine whether navigation improvements to deepen the existing Federal project for the MRSC are warranted and in the Federal interest. This will be accomplished by assessing existing and future conditions; evaluating related problems and opportunities; developing potential alternatives and evaluating/comparing the costs, benefits, and feasibility of those alternatives; writing a supplemental environmental impact statement; and identifying a recommended plan.

The scope of the study includes evaluation of alternatives to deepen the MRSC between depths of 45 feet and 50 feet for the next phase of construction. The evaluation of alternatives was limited to a depth of 50 feet at the request of the non-Federal Sponsor. Currently, the crossings in the Mississippi River are at depths of 45 feet, based on a depth below the Low Water Reference Plane (LWRP), and the lower Mississippi River is at a depth of 48.5 feet Mean Lower Low Water (MLLW). The general reevaluation study will identify the depth that creates the greatest net benefits, up to a depth of 50 feet MLLW. At initiation, the study recognized there was a need to reevaluate the construction phasing of the project. Within the general reevaluation study, the alternative depths are limited to a depth not to exceed 50 feet. Therefore, future construction phases beyond the three phases originally planned are required to fully implement the authorized project.

Independent, objective peer review is regarded as a critical element in ensuring the reliability of scientific analysis. The objective of the work described here was to conduct an Independent External Peer Review (IEPR) of the Mississippi River Ship Channel (MRSC) Gulf to Baton Rouge, Louisiana, Draft Integrated General Reevaluation Report (GRR) & Supplemental Environmental Impact Statement (SEIS) (hereinafter: MRSC IEPR) in accordance with procedures described in the Department of the Army, U.S. Army Corps of Engineers (USACE), Engineer Circular (EC) *Civil Works Review* (EC 1165-2-214) (USACE, 2012) and the Office of Management and Budget (OMB), *Final Information Quality Bulletin for Peer Review* (OMB, 2004). Supplemental guidance on evaluation for conflicts of interest (COIs) was obtained from the *Policy on Committee Composition and Balance and Conflicts of Interest for Committees Used in the Development of Reports* (The National Academies, 2003).

This final report presents the Final Panel Comments of the IEPR Panel (the Panel) on the existing engineering, economic, environmental, and plan formulation analyses contained in the MRSC IEPR documents (Section 4). Appendix A describes in detail how the IEPR was planned and conducted, including the complete schedule followed in executing the IEPR. Appendix B provides biographical information on the IEPR panel members and describes the method Battelle followed to select them. Appendix C presents the final charge to the IEPR panel members for their use during the review; the final

charge was submitted to USACE in the final Work Plan according to the schedule listed in Table 1. Appendix D presents the organizational conflict of interest form that Battelle completed and submitted to the Institute for Water Resources (IWR) prior to the award of the MRSC IEPR.

2. PURPOSE OF THE IEPR

To ensure that USACE documents are supported by the best scientific and technical information, USACE has implemented a peer review process that uses IEPR to complement the Agency Technical Review (ATR), as described in USACE (2012).

In general, the purpose of peer review is to strengthen the quality and credibility of the USACE decision documents in support of its Civil Works program. IEPR provides an independent assessment of the engineering, economic, environmental, and plan formulation analyses of the project study. In particular, the IEPR addresses the technical soundness of the project study's assumptions, methods, analyses, and calculations and identifies the need for additional data or analyses to make a good decision regarding implementation of alternatives and recommendations.

In this case, the IEPR of the MRSC was conducted and managed using contract support from Battelle, which is an Outside Eligible Organization (OEO) (as defined by EC 1165-2-214). Battelle, a 501(c)(3) organization under the U.S. Internal Revenue Code, has experience conducting IEPRs for USACE.

3. METHODS FOR CONDUCTING THE IEPR

The methods used to conduct the IEPR are briefly described in this section; a detailed description can be found in Appendix A. Table 1 presents the major milestones and deliverables of the MRSC IEPR. Due dates for milestones and deliverables are based on the award/effective date listed in Table 1. Note that the actions listed under Task 6 occur after the submission of this report. Battelle anticipates submitting the pdf printout of the USACE's Design Review and Checking System (DrChecks) project file (the final deliverable) on June 30, 2017. The actual date for contract end will depend on the date that all actions for this IEPR are conducted and subsequently completed.

Table 1. Major Milestones and Deliverables of the MRSC IEPR

Task	Action	Due Date
1	Award/Effective Date	3/8/2017
	Review documents available	3/17/2017
	Public comments received from USACE	3/17/2017
	Battelle submits draft Work Plan*	3/17/2017
	Battelle submits final Work Plan*	3/29/2017
2	Battelle submits list of selected panel members	3/17/2017
	USACE confirms the panel members have no COI	3/22/2017
3	Battelle convenes kick-off meeting with USACE	3/15/2017
	Battelle convenes kick-off meeting with USACE and panel members	3/30/2017

Table 1. Major Milestones and Deliverables of the MRSC IEPR (continued)

Task	Action	Due Date
4	Panel members complete their individual reviews	4/13/2017
	Panel members provide draft Final Panel Comments to Battelle	4/24/2017
	Battelle sends public comments to panel members for review	4/11/2017
	Panel develops additional Final Panel Comment with regard to the public comments	4/26/2017
5	Battelle submits Final IEPR Report to USACE	5/4/2017
6[a]	Battelle convenes Comment Response Teleconference with panel members and USACE	6/15/2017 (estimated)
	Battelle submits pdf printout of DrChecks project file to USACE	6/30/2017
	Agency Decision Milestone (ADM) meeting[b]	5/23/2017
	Contract End/Delivery Date	3/7/2018

[a] *Task 6 occurs after the submission of this report.*

[b] *The ADM meeting was listed in the Performance Work Statement under Task 3 but was relocated in this schedule to reflect the chronological order of activities.*

Battelle identified, screened, and selected four panel members to participate in the IEPR based on their expertise in the following disciplines: Civil Works planning, economics, biological resources and environmental law, hydrology/hydraulics engineering, and geotechnical/civil engineering[1].The Panel reviewed the MRSC documents and produced 16 Final Panel Comments in response to 20 charge questions provided by USACE for the review. This charge included two overview questions and one public comment question added by Battelle. Battelle instructed the Panel to develop the Final Panel Comments using a standardized four-part structure:

1. Comment Statement (succinct summary statement of concern)
2. Basis for Comment (details regarding the concern)
3. Significance (high, medium/high, medium, medium/low, or low; in accordance with specific criteria for determining level of significance)
4. Recommendation(s) for Resolution (at least one implementable action that could be taken to address the Final Panel Comment).

Battelle reviewed all Final Panel Comments for accuracy, adherence to USACE guidance (EC 1165-2-214, Appendix D), and completeness prior to determining that they were final and suitable for inclusion in the Final IEPR Report. There was no direct communication between the Panel and USACE during the

[1] Battelle identified one candidate who was able to serve in a dual role as both the economics and the Civil Works planning expert.

preparation of the Final Panel Comments. The Panel's findings are summarized in Section 4.1; the Final Panel Comments are presented in full in Section 4.2.

4. RESULTS OF THE IEPR

This section presents the results of the IEPR. A summary of the Panel's findings and the full text of the Final Panel Comments are provided.

4.1 Summary of Final Panel Comments

The panel members agreed on their "assessment of the adequacy and acceptability of the economic, engineering, and environmental methods, models, and analyses used" (USACE, 2012; p. D-4) in the MRSC review documents. Table ES-1 lists the Final Panel Comment statements by level of significance. The full text of the Final Panel Comments is presented in Section 4.2 of this report. The following summarizes the Panel's findings.

Based on the Panel's review, the report is well-written, concise, and logically presented the engineering, environmental, economic, and plan formulation issues. The report provided a balanced assessment of the economic, engineering, and environmental issues of the overall project; however, the Panel identified several elements of the report that should be clarified or revised.

Plan Formulation and Economics: The Panel believes that the GRR/SEIS could present a clearer analysis of how the population and employment sectors of the economy would benefit from the traffic growth and efficiency resulting from the MRSC project. The Panel also thinks additional information on the shipping operations section of Appendix D would strengthen the GRR/SEIS. Finally, the Panel could not find clear information on which specific commodities would benefit from the project and what the magnitude of those benefits might be; since that information was likely developed during the benefit-cost analysis process, the Panel suggests adding it to the GRR/SEIS.

Engineering: One of the Panel's primary engineering-related concerns is that the effects of the three relative sea level rise (RSLR) scenarios and the dredging costs associated with them are not addressed in the review documents. Although the GRR/SEIS states that RSLR will be considered during the feasibility level design, the Panel believes that it should be fully evaluated during the current stage to assess how RSLR and sedimentation may affect ship draft and project dredging costs. In addition, the Panel is concerned that the GRR/SEIS uses existing maintenance dredging records to predict future dredging quantities in certain sections of the river, rather than using the results of the HEC-6T one-dimensional (1D) sediment model. The Panel believes that this approach may result in the underestimation of future maintenance dredging costs and suggests that USACE run the HEC-6T 1D sediment model using the historic hydrologic record as the upstream input and the three RSLR scenarios as downstream boundary conditions. Another concern of the Panel is the lack of 1D and three-dimensional (3D) modeling of the potential change in salt wedge location due to dredging and RSLR, and the resulting implications for project costs if the sedimentation rates and saline impacts on water intakes are not properly evaluated. The Panel also noted that two-dimensional (2D) modeling was not conducted at the river crossings to accurately estimate future sedimentation and future annual dredging needs. From a geotechnical standpoint, the Panel agrees that not enough information is presented in the GRR/SEIS on subsurface conditions, particularly the stability of the dredged slopes. Since the instability of these slopes may lead to higher maintenance costs, the Panel suggests that USACE add a description of subsurface conditions and stability analyses of the configuration of the dredge slopes to the GRR/SEIS.

Of lesser concern, the Panel observed that the dredged material could be evaluated further for different beneficial uses, including as a source of construction material, and that the upward trend in ship draft depth presented in the GRR/SEIS is supported by only three years of data, when more recent data are available.

Environmental: The Panel noted that the use of connector vessels has not been evaluated as a potential alternative to deepening the MRSC, and this omission may increase the risk of a legal challenge based on compliance with the National Environmental Policy Act (NEPA). The Panel recommends considering this alternative and describing whether the alternative is feasible in the GRR/SEIS. The Panel also observed that no monitoring program or adaptive management plan is presented for the intertidal coastal wetland habitat beneficial use sites, and suggests that USACE develop a plan to strengthen project documentation and potentially reduce future project costs. Finally, the Panel recommends that a statement in the Executive Summary about the environmental consequences not being fully assessed yet be qualified with additional information on what environmental assessments will be conducted in the future.

4.2 Final Panel Comments

This section presents the full text of the Final Panel Comments prepared by the IEPR panel members.

Final Panel Comment 1

The effects of the three relative sea level rise (RSLR) scenarios and resulting dredging costs are not provided.

Basis for Comment

Engineer Regulation 1100-2-8162 (USACE 2013, p. 1) provides guidance for incorporating sea level rise in USACE coastal projects, noting, "Potential relative sea level change must be considered in every USACE coastal activity as far inland as the extent of estimated tidal influence," in this case in the vicinity of New Orleans, Louisiana. Engineer Technical Letter (ETL) 1100-2-1 (USACE, 2014, p. 3-1) states: "Decisions made in USACE CW [civil works] missions rely on technical assessments and models evaluating complex physical processes such as erosion, sediment transport, waves, saltwater intrusion, and storm surge. Sea level change must be incorporated into these assessments and models."

Although the GRR/SEIS discusses RSLR scenarios, it does not provide existing and projected average annual dredging quantities under the three required RSLR scenarios: (1) the historic trend line of 1.7 mm/year, which yields 0.14 m rise by 2100; (2) National Resource Council (NRC) 1 curve, which yields 0.5 m rise by 2100; and (3) NRC 3 curve, which yields 1.5 m rise by 2100.

Since the range in potential RSLR by year 2100 is the same order of magnitude (4.5 feet) as the increase in draft of 5 feet, it seems that the differences in sedimentation could be significant among the three RSLR scenarios, which could affect project benefit to cost ratio (BCR) and net average annual benefits. While the GRR/SEIS states (p. 2-27) that RSLR "will be considered during feasibility level design of the [tentatively selected plan] TSP," without fully evaluating the three scenarios during the feasibility phase, the interconnected effects of RSLR and sedimentation on ship draft and project dredging costs cannot be fully understood.

Significance – Medium/High

Deferring the consideration of the effects of RSLR scenarios to the feasibility phase has implications for project benefits and costs.

Recommendation for Resolution

1. Perform the analyses for the three RSLR conditions to obtain sedimentation conditions at various years over the 50-year project life.
2. Calculate dredging costs to maintain 50-foot draft at various years over the 50-year project life.
3. Reassess the project economics based on the updated dredging costs.

Literature Cited:

USACE (2013). Incorporating Sea Level Change in Civil Works Programs. Engineer Regulation (ER) 1100-2-8162. Department of the Army. U.S. Army Corps of Engineers, Washington, DC. December 31.

USACE (2014). Procedures to Evaluate Sea Level Change: Impacts, Responses, and Adaptation. Engineer Technical Letter (ETL) 1100-2-1. Department of the Army. U.S. Army Corps of Engineers, Washington, DC. June 30.

Final Panel Comment 2

The justification for using existing maintenance dredging records while disregarding the sediment modeling results to predict future dredging quantities is unclear, since omitting the one-dimensional (1D) sediment model lowers project cost estimates.

Basis for Comment

The Engineer Research and Development Center's (ERDC) HEC-6T 1D sediment model is used to predict existing and future condition average annual sediment removal quantities in river reaches downstream of Mile Post (MP) 11 Above Head of Passes (AHP), and provides a reasonable means to make an assessment and comparison of the future dredging costs under the required three RSLR scenarios. The model predicted that future average annual quantities of sediment removal would be well above existing quantities and would result in higher long term dredging maintenance costs. However, the results of the HEC-6T 1D sediment modeling have not been used to estimate future drainage costs for reaches downstream of MP 11 AHP; rather the assessment of future dredging costs for that stretch of the river have been based on an agreement between ERDC and the District to use existing maintenance dredging quantities as a predictor of future quantities under varying RSLR scenarios (p. C-41). Since the difference in the year 2100 between the low and high estimates of RSLR are significant (approximately 5 feet), basing future dredging quantities on existing maintenance records may not be a realistic approach to determining future dredging costs.

Significance – Medium/High

Future maintenance dredging costs could be underestimated by not using the HEC-6T 1D model results to predict future dredging quantities downstream of MP 11 AHP.

Recommendation for Resolution

1. Establish a period in historic time where a significant, continuous length (50 years) of hydrologic and hydraulic record (e.g., gaging station) at the upstream boundary of the model could be used.
2. Develop the downstream boundary conditions over future years using the three RSLR rates.
3. Run the HEC-6T 1D sediment model with the historic hydrologic and hydraulic record as the upstream input and the three varying RSLR conditions as downstream boundary conditions.

Final Panel Comment 3

Modeling has not been conducted to show how dredging and sea level rise will change the salt water wedge location, which may affect sedimentation rates and water intakes.

Basis for Comment

The GRR/SEIS states (pp. 2-21 – 2-22) that deeper dredging will cause the saltwater wedge to move upstream, threatening freshwater intakes and causing sedimentation to occur further upstream. The shifting of the saltwater wedge further upstream is most prominent during times of low flow in the river. This condition will be further exacerbated by the proposed channel deepening and relative sea level rise (RSLR), causing several river water intakes to draw water with an increased salinity content, resulting in the need for salinity mitigation measures. Appendix C includes several salinity mitigation measures (p. C-49) and the costs of these measures appear to have been included in the project cost estimate as "Relocations" at a cost of $11.6M (p. C-67).

However, neither the estimated costs of the salinity mitigation measures nor the changes in sedimentation caused by channel deepening or RSLR are supported by hydraulic modeling. Appendix C states (p. C-8): "It should be noted that the 1D model does not address the extent or frequency of salinity intrusion or relative sea level rise." Appendix C also states (p. C-14) that a three-dimensional (3D) model will be used during the feasibility phase to fine tune the salinity mitigation measures and sedimentation estimates. Since both these effects of the saltwater wedge affect project costs, even a limited amount of water quality modeling would identify the magnitude of the shift in the saltwater wedge and better inform the project costs.

Significance – Medium

The magnitude of change in location of the saltwater wedge has not been hydraulically modeled which has implications for project costs.

Recommendation for Resolution

1. Use an available 1D water quality model (MIKE11, QUAL, or HEC-RAS) to compare the limit of the existing saltwater wedge to the with-project saltwater wedge and include consideration of RSLR.
2. Using the results of hydraulic modeling, adjust the extents and costs of the salinity mitigation measures, and the effects on the costs of dredging.
3. Perform 3D salinity and sedimentation modeling during the feasibility phase.

Final Panel Comment 4

The use of connector vessels has not been considered or discussed as a potential alternative to deepening the MRSC.

Basis for Comment

The Purpose and Need for the project, as currently written, leaves open the evaluation of alternatives other than deepening the MRSC. One of the public comments requested that USACE evaluate the use of connector vessels to move goods throughout the region in lieu of deepening the river channel. To comply with the National Environmental Policy Act (NEPA), this potential alternative should be considered, and if appropriate, dismissed from the array of alternatives. Failure to address this alternative increases the risk of legal challenge on the basis of NEPA compliance.

Significance – Medium

The project schedule could be significantly affected if there were to be a legal challenge based on NEPA compliance.

Recommendation for Resolution

1. Consider the alternative of using connector vessels to move goods throughout the region versus deepening the MRSC.
2. Include a succinct description of this alternative in the GRR/SEIS.
3. Describe whether this alternative is feasible and why it was eliminated from the array of alternatives considered.

Final Panel Comment 5

Two-dimensional hydrodynamic modeling has not been conducted at the crossings, which affect the crossings' sedimentation estimates.

Basis for Comment

Crossings are locations in the river where the channel (deepest portion of the cross section) crosses from one side of the river to the other between bendways, and are most frequently dredged. The flow regime is also more two-dimensional (2D) in character than 1D. The estimates of future annual dredging costs for the crossings at Rich Bend, Belmont, and Fairview developed in the 1D model are presented in Table 5-1 of the GRR/SEIS (p. 5-7) and indicate that, because of the proposed 5 foot increase in dredging depth, an increase of 3.1 million cubic yards of annual dredging is anticipated at these three crossings. Given the significance of the dredging quantity, associated maintenance costs, and the character of the flow regime, a 2D hydrodynamic model (e.g., MIKE 21 or RAS-2D) coupled with a sediment transport capability would better represent existing and future conditions, and likely provide a more reliable estimate of the increase in average annual dredging costs for the three required RSLR scenarios.

Significance – Medium

Project costs may change if the results of a 2D hydrodynamic model are used to model future annual dredging needs.

Recommendation for Resolution

1. Develop a depth-averaged 2D hydrodynamic model coupled with sediment transport capability to assess the changes in sedimentation in the Rich Bend, Belmont, and Fairview crossings for existing and proposed dredging to provide 50-foot draft for the three required RSLR scenarios.

Final Panel Comment 6

The effects of traffic growth and efficiency gains on the population and employment sectors as a result of the project are not addressed in the socioeconomic discussion.

Basis for Comment

The socioeconomic section presents excellent detail on population and employment in the project area. However, it does not address the interaction and implications of the traffic growth and expected efficiency gains on these sectors that may result from channel deepening. No information is provided on the causal relationship between project benefits, jobs, and population, which would contribute to understanding the project impacts.

Significance – Medium/Low

By adding information on how the project may affect population and employment, the project benefits would be clearer and the GRR/SEIS would be more complete.

Recommendation for Resolution

1. Analyze by location and income status (gainers and losers) how the population and employment sectors of the economy would be affected by the improved transportation.
2. Incorporate these analyses into the GRR/SEIS.

Final Panel Comment 7

The underlying basis for the assumptions on ship operations in the channel and the sources of the information presented in the shipping operations discussion in Appendix D are not identified.

Basis for Comment

Appendix D, Section D-2.6, contains only very general information on the measures of ship operations in the channel, which could have implications for future benefits realized from the channel deepening. Typically, a section like this would include data and other detailed information on the sources and documentation on the identified assumptions. It is unclear how this relatively vague information benefits the report and what important information it is conveying.

Significance – Medium/Low

Without specific data and detailed information, it is difficult to determine how significant shipping operations are to the models, analyses, and results.

Recommendation for Resolution

1. Add the specific sources used to develop Section D-2.6.
2. Identify which operations are based on assumptions and more clearly discuss the background and rationale for these assumptions.
3. Discuss the importance of shipping operations, such as river pilot experience, underkeel clearance, etc. to the models used and the assumptions made.

Final Panel Comment 8

The report does not provide sufficient geotechnical subsurface information or analyses, particularly on the stability of the dredged slopes, even though the channel slope configuration is presented in Appendix C.

Basis for Comment

The Panel understands that the SMART Planning process has precluded completion of basic site characterization activities and subsequent analyses of the geotechnical engineering aspects of the project. Appendix C, Section C-3.0, presents general geotechnical aspects of the project, including a general description of the character of the subsurface deposits along the proposed project alignment. However, there is no subsurface information or analyses to define the character of the dredged material or allow an assessment of the stability of the dredged slopes.

There are some dredged cross sections where the depth of the channel approaches 25 feet or more; however, the GRR/SEIS does not provide any analysis that provides confidence in the stability of the dredged slopes. Appendix C, Section C-4.1.1, includes the only reference to slope stability, stating (p. C-36) that the channel slopes in the river crossing areas would be sloped at 1V to 5H since that appears to be what the normal dredging slope has been. There was no explanation why the channel slopes in the Southwest Pass area were sloped at 1V to 3H rather than 1V to 5H. The channel slope configuration appears to be based on engineering judgement rather than analysis.

Significance – Medium/Low

Although flattening of the slopes will not impact the overall feasibility of the project, instability of the slopes potentially could increase maintenance costs.

Recommendation for Resolution

1. Provide a description of the subsurface conditions and appropriate stability analyses of the configuration of the dredge slopes, or provide other justification for the channel slopes.

Final Panel Comment 9

Appendix C and the GRR/SEIS appear to contradict each other regarding the description of one of the RSLR scenarios.

Basis for Comment

The lowest of the three RSLR scenarios seems to be described differently in Appendix C than in the GRR/SEIS. Appendix C states (p. C-5): “Simulations for each channel depth were conducted for no eustatic sea level rise and for the rates proposed by the National Research Council (NRC) 1 [0.5 m by 2100] and NRC 3 [1.5 m by 2100] curves. The GRR/SEIS states (p. 2-28) that RSLR was developed based on NRC curves 1 and 3, and projection of the current trend line (0.14 m by 2100). It is unclear from the descriptions provided whether “no eustatic sea level rise” and “projection of the current trend line to year 2100” are the same rate of RSLR.

Significance – Medium/Low

This apparent contradiction is unlikely to affect the recommendation or justification of the project, but affects the technical quality of the document.

Recommendation for Resolution

1. Clarify the apparent contradiction between Appendix C, which states that a no eustatic sea level rise condition be analyzed, and the GRR/SEIS, which states that the current RSLR trend line be extended out to year 2100.

Final Panel Comment 10

A monitoring schedule and a methodology for assessing the success of the beneficial use sites have not been presented in the GRR/SEIS.

Basis for Comment

As described in the GRR/SEIS (p. 3-39), dredged material from RM 13.4 AHP to 22 BHP will be used beneficially to create intertidal coastal wetland habitat. However, no follow-up monitoring program or adaptive management plan has been proposed to evaluate the success of these beneficial use sites and to make adjustments if necessary. Although the Panel recognizes that it is not a required element of navigation projects, developing and following an adaptive management plan would increase the likelihood of the beneficial use sites developing into successful habitat, which has implications for future project costs and future proposed dredging activities.

Significance – Medium/Low

Creating a monitoring and adaptive management plan for the beneficial use sites would strengthen the project documentation and potentially reduce future project costs.

Recommendation for Resolution

1. Prepare a monitoring schedule and methodology for determining the success of the beneficial uses sites and include this plan in the GRR/SEIS. Coordinate the monitoring schedule and methodology for the beneficial use sites with the U.S. Fish and Wildlife Service.

Final Panel Comment 11

The beneficial use of the material dredged from the river crossings has not been given sufficient consideration.

Basis for Comment

As stated in the GRR/SEIS (p. 4-7), there will be an ongoing source of dredged material available from the initial construction and the maintenance of the three crossings included in the TSP:

> "It is anticipated that three crossings would be constructed beginning at Fairview crossing, continue upriver, and cease at Rich Bend crossing. Construction of the crossings to 50 ft (LWRP) would require 8,588,600 cy over a 1-2 year period (Table 4-1). Once constructed, average annual maintenance of crossings would increase from existing practice by approximately 35,307,502 cy in these crossings. Dredged material would remain in the Mississippi River system and would be disposed of in deeper portions of the river immediately downstream."

The study does not evaluate whether some of this material dredged from the crossings could be used beneficially, perhaps stockpiled in adjacent areas and used by contractors, municipalities, and others as a source of granular fill. By removing the sediment from the river entirely, the local community might realize benefits and USACE could avoid the eventual need to re-dredge sediment redeposited in downstream locations.

Significance – Medium/Low

While this would not affect the overall feasibility of the project, the completeness of the report would be improved by considering the beneficial use of dredged sediment.

Recommendation for Resolution

1. Evaluate the potential use of dredge material from the initial construction and ongoing maintenance as a source of construction material.

Final Panel Comment 12

A report assessing essential fish habitat (EFH) is not presented in the GRR/SEIS.

Basis for Comment

The National Marine Fisheries Services (NMFS) has a standard protocol for assessing potential environmental impacts on EFH. A report demonstrating that the NMFS protocol was followed should be part of the GRR/SEIS, but it is not found in the documentation.

Significance – Medium/Low

Omitting the required EFH report affects the completeness and technical quality of the documentation.

Recommendation for Resolution

1. Prepare an EFH report that adheres to the National Marine Fisheries protocol and include it in the documentation.

Final Panel Comment 13

Even though more recent data are available, only three years' worth of data are used to support the upward trend in ship drafting greater than 45 feet.

Basis for Comment

The GRR/SEIS states that ships with drafts exceeding the current authorized depth of 45 feet are already calling on the ports of Plaquemines, New Orleans, South Louisiana, and Baton Rouge, and postulates that this is only due to high water events and over-dredging (p. 1-15). The GRR/SEIS recommends that increased dredging be performed to support deeper draft shipping vessels in the Mississippi River. However, only three years of data (2012, 2013, and 2014) are presented in Table 1-2, Number of Ships Drafting >45 feet, to support this recommendation.

Breaking down the available data, while the overall increase among the three years of provided data shows a 20% increase, the increase between 2012 and 2013 indicates a 17% increase, while the increase between 2013 and 2014 is only 3%. Additional years of data both prior to 2012 and 2015 and 2016 are available and would provide a more complete picture of when the vessels drafting greater than 45 feet first appeared, and what the more recent (2015 and 2016) years show in terms of trends.

Significance – Low

Although the increase in number of New or Post Panamax vessels drafting greater than 45 feet is clear from the three years of provided data, a greater understanding of the importance and need for the project could be substantiated by providing the data from other years.

Recommendation for Resolution

1. Compile and present similar shipping draft data for 2015 and 2016 and data for years prior to 2012 in Table 1-2.

Final Panel Comment 14

The GRR/SEIS does not specify which commodities will benefit from the deepening of the Mississippi River channel and the magnitude of the benefits by commodity.

Basis for Comment

The GRR/SEIS summarizes the benefiting commodities well, with good historical data and reasonable projections. However, the source of individual commodity benefits is based on “interviews and historical data,” with no detail as to which individual commodities will benefit and the magnitude of the benefits.

Specific information on benefits by commodity would provide the ability to project potential changes in benefits, as assumptions are varied in the future. These data must have been produced during the development of the value of those benefits so should be available for reporting.

Significance – Low

Detailed identification of benefits, by commodity, would improve the confidence in the benefit-cost estimates, which would improve the technical quality of the GRR/SEIS.

Recommendation for Resolution

1. Include information in Appendix D on which commodities will benefit from the improved channel and the magnitude of those benefits.

Final Panel Comment 15

The Executive Summary states that the environmental consequences of the project have not been fully assessed, but provides no information on existing data gaps and ongoing or future assessments.

Basis for Comment

The Executive Summary states (p. xiii) that the environmental consequences of the project have not been fully assessed, but does not give any information on which environmental consequences have not been assessed. Appendix A of the report provides significant information on environmental analyses, and the GRR/SEIS describes and discusses the environmental effects for each alternative, including the TSP. Given the statement in the Executive Summary, it is not clear whether information on additional environmental consequences is missing or incomplete and when that information might be provided.

Significance – Low

The clarity of the report would be improved if the statement about incomplete environmental consequences was either corrected or elaborated on.

Recommendation for Resolution

1. Define the areas of further environmental assessment, if any, that will be performed and provide a schedule showing when those assessments will be complete and available for review.
2. Explain whether and how any additional assessments that are incomplete may affect the selection of the Tentatively Selected Plan (TSP).
3. If assessments are complete, revise the Executive Summary to remove the statement that environmental consequences have not been fully assessed.

5. REFERENCES

OMB (2004). Final Information Quality Bulletin for Peer Review. Executive Office of the President, Office of Management and Budget, Washington, D.C. Memorandum M-05-03. December 16.

The National Academies (2003). Policy on Committee Composition and Balance and Conflicts of Interest for Committees Used in the Development of Reports. The National Academies (National Academy of Science, National Academy of Engineering, Institute of Medicine, National Research Council). May 12.

USACE (2014). Procedures to Evaluate Sea Level Change: Impacts, Responses, and Adaptation. Engineer Technical Letter (ETL) 1100-2-1. Department of the Army. U.S. Army Corps of Engineers, Washington, DC. June 30.

USACE (2013). Incorporating Sea Level Change in Civil Works Programs. Engineer Regulation (ER) 1100-2-8162. Department of the Army. U.S. Army Corps of Engineers, Washington, DC. December 31.

USACE (2012). Water Resources Policies and Authorities: Civil Works Review. Engineer Circular (EC) 1165-2-214. Department of the Army, U.S. Army Corps of Engineers, Washington, D.C. December 15.

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APPENDIX A

IEPR Process for the MRSC Project

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A.1 Planning and Conduct of the Independent External Peer Review (IEPR)

Table A-1 presents the schedule followed in executing the Mississippi River Ship Channel (MRSC) Gulf to Baton Rouge, Louisiana, General Reevaluation Report (GRR) Independent External Peer Review (hereinafter: MRSC IEPR). Due dates for milestones and deliverables are based on the award/effective date listed in Table A-1. The review documents were provided by U.S. Army Corps of Engineers (USACE) on March 17, 2017. Note that the actions listed under Task 6 occur after the submission of this report and are described in more detail at the end of this Appendix.

Table A-1. MRSC Complete IEPR Schedule

Task	Action	Due Date
1	Award/Effective Date	3/8/2017
	Review documents available	3/17/2017
	Public comments received from USACE	3/17/2017
	Battelle submits draft Work Plan[a]	3/17/2017
	USACE provides comments on draft Work Plan	3/24/2017
	Battelle submits final Work Plan[a]	3/29/2017
2	Battelle requests input from USACE on the conflict of interest (COI) questionnaire	3/10/2017
	USACE provides comments on COI questionnaire	3/13/2017
	Battelle submits list of selected panel members[a]	3/17/2017
	USACE confirms the panel members have no COI	3/22/2017
	Battelle completes subcontracts for panel members	3/28/2017
3	Battelle convenes kick-off meeting with USACE	3/15/2017
	Battelle sends review documents to panel members	3/30/2017
	Battelle convenes kick-off meeting with panel members	3/30/2017
	Battelle convenes kick-off meeting with USACE and panel members	3/30/2017
	Battelle convenes Mid-Review Teleconference for panel members to ask clarifying questions of USACE	Not held
4	Panel members complete their individual reviews	4/13/2017
	Battelle provides talking points for Panel Review Teleconference to panel members	4/14/2017
	Battelle convenes Panel Review Teleconference	4/17/2017
	Battelle provides Final Panel Comment templates and instructions to panel members	4/17/2017
	Panel members provide draft Final Panel Comments to Battelle	4/24/2017
	Battelle provides feedback to panel members on draft Final Panel Comments; panel members revise Final Panel Comments	4/25/2017-4/27/2017
	Panel finalizes Final Panel Comments	4/28/2017
	Battelle sends public comments to Panel	4/11/2017

Table A-1. MRSC Complete IEPR Schedule (continued)

Task	Action	Due Date
	Panel members complete their review of the public comments	4/13/2017
	Battelle and Panel review Panel's responses to public comments	4/14/2017
	Panel drafts Final Panel Comment, if necessary	4/26/2017
	Panel finalizes Final Panel Comment regarding public comments	4/28/2017
5	Battelle provides Final IEPR Report to panel members for review	5/1/2017
	Panel members provide comments on Final IEPR Report	5/2/2017
	Battelle submits Final IEPR Report to USACE[a]	5/4/2017
	USACE Planning Center of Expertise (PCX) provides decision on Final IEPR Report acceptance	5/11/2017
6[b]	Battelle inputs Final Panel Comments to DrChecks and provides Final Panel Comment response template to USACE	5/11/2017
	Battelle convenes teleconference with USACE to review the Comment Response process	5/11/2017
	Battelle convenes teleconference with Panel to review the Comment Response process	5/11/2017
	USACE provides draft Project Delivery Team (PDT) Evaluator Responses to Battelle	6/6/2017
	Battelle provides draft PDT Evaluator Responses to panel members	6/8/2017
	Panel members provide draft BackCheck Responses to Battelle	6/13/2017
	Battelle convenes teleconference with panel members to discuss draft BackCheck Responses	6/14/2017
	Battelle convenes Comment Response Teleconference with panel members and USACE	6/15/2017 (estimated)
	USACE inputs final PDT Evaluator Responses to DrChecks	6/22/2017
	Battelle provides final PDT Evaluator Responses to panel members	6/26/2017
	Panel members provide final BackCheck Responses to Battelle	6/29/2017
	Battelle inputs the Panel's final BackCheck Responses in DrChecks	6/29/2017
	Battelle submits pdf printout of DrChecks project file[a]	6/30/2017
	Agency Decision Milestone (ADM) meeting[c]	5/23/2017
	Contract End/Delivery Date	3/7/2018

[a] *Deliverable.*

[b] *Task 6 occurs after the submission of this report*

[c] *The ADM meeting was listed in the Performance Work Statement under Task 3 but was relocated in this schedule to reflect the chronological order of activities.*

At the beginning of the Period of Performance for the MRSC IEPR, Battelle held a kick-off meeting with USACE to review the preliminary/suggested schedule, discuss the IEPR process, and address any questions regarding the scope (e.g., terminology to use, access to DrChecks, etc.). Any revisions to the schedule were submitted as part of the final Work Plan. The final charge consisted of 20 charge questions provided by USACE, two overview questions and one public comment question added by Battelle (all questions were included in the draft and final Work Plans), and general guidance for the Panel on the conduct of the peer review (provided in Appendix C of this final report).

Prior to beginning their review and after their subcontracts were finalized, all the members of the Panel attended a kick-off meeting via teleconference planned and facilitated by Battelle in order to review the IEPR process, the schedule, communication procedures, and other pertinent information for the Panel. Battelle planned and facilitated a second kick-off meeting via teleconference during which USACE presented project details to the Panel. Before the meetings, the IEPR Panel received an electronic version of the final charge, as well as the review documents and any reference/supplemental materials listed in Table A-2 below.

Table A-2. Documents to Be Reviewed and Provided as Reference/Supplemental Information

Review Documents	No. of Review Pages
Integrated General Reevaluation Report/SEIS	254
Appendices A-D	522
Public Comments*	92
Total Number of Pages to be Reviewed	**868**
Appendices F-H**	152
Economic Report from NFS** (estimated page count)	100
Risk Register** (estimated page count)	15
Total Number of Supporting Documents	**267**

[a] *USACE will submit public comments to Battelle upon their availability according to the schedule in Table A-1, who will in turn submit the comments to the IEPR Panel for review.*

In addition to the materials provided in Table A-2, the panel members were provided the following USACE guidance documents.

- USACE guidance, *Civil Works Review* (EC 1165-2-214), December 15, 2012
- Office of Management and Budget, *Final Information Quality Bulletin for Peer Review,* December 16, 2004.

The Panel did not have any clarifying questions for USACE during the course of their review. Therefore, Battelle and the PCX determined that a mid-review teleconference was not necessary with USACE.

In addition, throughout the review period, USACE provided documents at the request of panel members. These documents were provided to Battelle and then sent to the Panel as additional information only and

were not part of the official review. A list of these additional documents requested by the Panel is provided below.

- Geotechnical stability analyses at the river crossings
- The Economic Impact of Deepening the Mississippi River to 50 Feet, August 2013.

A.2 Review of Individual Comments

The Panel was instructed to address the charge questions/discussion points within a charge question response form provided by Battelle. At the end of the review period, the Panel produced individual comments in response to the charge questions/discussion points. Battelle reviewed the comments to identify overall recurring themes, areas of potential conflict, and other overall impressions. At the end of the review, Battelle summarized the individual comments into a preliminary list of overall comments and discussion points. Each panel member's individual comments were shared with the full Panel.

A.3 IEPR Panel Teleconference

Battelle facilitated a teleconference with the Panel so that the panel members could exchange technical information. The main goal of the teleconference was to identify which issues should be carried forward as Final Panel Comments in the Final IEPR Report and decide which panel member should serve as the lead author for the development of each Final Panel Comment. This information exchange ensured that the Final IEPR Report would accurately represent the Panel's assessment of the project, including any conflicting opinions. The Panel engaged in a thorough discussion of the overall positive and negative comments, added any missing issues of significant importance to the findings, and merged any related individual comments. At the conclusion of the teleconference, Battelle reviewed each Final Panel Comment with the Panel, including the associated level of significance, and confirmed the lead author for each comment.

A.4 Preparation of Final Panel Comments

Following the teleconference, Battelle distributed a summary memorandum for the Panel documenting each Final Panel Comment (organized by level of significance). The memorandum provided the following detailed guidance on the approach and format to be used to develop the Final Panel Comments for the MRSC IEPR:

- Lead Responsibility: For each Final Panel Comment, one Panel member was identified as the lead author responsible for coordinating the development of the Final Panel Comment and submitting it to Battelle. Battelle modified lead assignments at the direction of the Panel. To assist each lead in the development of the Final Panel Comments, Battelle distributed a summary email detailing each draft final comment statement, an example Final Panel Comment following the four-part structure described below, and templates for the preparation of each Final Panel Comment.

- Directive to the Lead: Each lead was encouraged to communicate directly with the other panel member as needed and to contribute to a particular Final Panel Comment. If a significant comment was identified that was not covered by one of the original Final Panel Comments, the appropriate lead was instructed to draft a new Final Panel Comment.

- Format for Final Panel Comments: Each Final Panel Comment was presented as part of a four-part structure:
  1. Comment Statement (succinct summary statement of concern)
  2. Basis for Comment (details regarding the concern)
  3. Significance (high, medium/high, medium, medium/low, and low; see description below)
  4. Recommendation(s) for Resolution (see description below).
- Criteria for Significance: The following were used as criteria for assigning a significance level to each Final Panel Comment:
  1. **High:** Describes a fundamental issue with the project that affects the current recommendation or justification of the project, and which will affect its future success, if the project moves forward without the issue being addressed. Comments rated as high indicate that the Panel determined that the current methods, models, and/or analyses contain a "showstopper" issue.
  2. **Medium/High:** Describes a potential fundamental issue with the project, which has not been evaluated at a level appropriate to this stage in the SMART Planning process. Comments rated as medium/high indicate that the Panel analyzed or assessed the methods, models, and/or analyses available at this stage in the SMART Planning process and has determined that if the issue is not addressed, it could lead to a "showstopper" issue.
  3. **Medium:** Describes an issue with the project, which does not align with the currently assessed level of risk assigned at this stage in the SMART Planning process. Comments rated as medium indicate that, based on the information provided, the Panel identified an issue that would raise the risk level if the issue is not appropriately addressed.
  4. **Medium/Low:** Affects the completeness of the report at this time in describing the project, but will not affect the recommendation or justification of the project. Comments rated as medium/low indicate that the Panel does not currently have sufficient information to analyze or assess the methods, models, or analyses.
  5. **Low:** Affects the understanding or accuracy of the project as described in the report, but will not affect the recommendation or justification of the project. Comments rated as low indicate that the Panel identified information that was mislabeled or incorrect or that certain data or report section(s) were not clearly described or presented.
- Guidelines for Developing Recommendations: The recommendation section was to include specific actions that USACE should consider to resolve the Final Panel Comment (e.g., suggestions on how and where to incorporate data into the analysis, how and where to address insufficiencies, areas where additional documentation is needed).

Battelle reviewed and edited the Final Panel Comments for clarity, consistency with the comment statement, and adherence to guidance on the Panel's overall charge, which included ensuring that there were no comments regarding either the appropriateness of the selected alternative or USACE policy. At the end of this process, 15 Final Panel Comments were prepared and assembled. There was no direct

communication between the Panel and USACE during the preparation of the Final Panel Comments. The full text of the Final Panel Comments is presented in Section 4.2 of the main report.

A.5 Conduct of the Public Comment Review

Following the schedule in Table A-1, Battelle received two PDF files containing 91 pages of public comments on the MRSC project (one public meeting transcript and twelve written comments) from USACE. Battelle then sent the public comments to the panel members in addition to the following charge question:

1. **Do the public comments raise any additional discipline-specific technical concerns with regard to the overall report?**

The Panel produced individual comments in response to the charge question. Each panel member's individual comments for the public comment review were shared with the full Panel. Battelle reviewed the comments to identify any new technical concerns that had not been previously identified during the initial IEPR. The panel members confirmed that one new Final Panel Comments would be developed to summarize the additional issues raised by the IEPR Panel. One panel member was identified by Battelle as the lead author responsible for coordinating the development of the Final Panel Comment and submitting it to the other panel members and Battelle. The Final Panel Comment was developed as part of a four-part structure following guidance previously described in Section A.4.

Battelle reviewed and edited the Final Panel Comment for clarity, consistency with the comment statement, and adherence to guidance on the Panel's overall charge, which included ensuring that the comment did not make any observations regarding either the appropriateness of the selected alternative or USACE policy. There was no direct communication between the Panel and USACE during the preparation of the Final Panel Comment.

A.6 Final IEPR Report

After concluding the review and preparation of the Final Panel Comments, Battelle prepared a final IEPR report (this document) on the overall IEPR process and the IEPR panel members' findings (this document). Each panel member and Battelle technical and editorial reviewers reviewed the IEPR report prior to submission to USACE for acceptance.

A.7 Comment Response Process

As part of Task 6, Battelle will enter the 15 Final Panel Comments developed by the Panel into USACE's Design Review and Checking System (DrChecks), a Web-based software system for documenting and sharing comments on reports and design documents, so that USACE can review and respond to them. USACE will provide responses (Evaluator Responses) to the Final Panel Comments, and the Panel will respond (BackCheck Responses) to the Evaluator Responses. All USACE and Panel responses will be documented by Battelle. Battelle will provide USACE and the Panel a pdf printout of all DrChecks entries, through comment closeout, as a final deliverable and record of the IEPR results.

APPENDIX B

Identification and Selection of IEPR Panel Members for the MRSC Project

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B.1 Panel Identification

The candidates for the Mississippi River Ship Channel (MRSC) Gulf to Baton Rouge, Louisiana, General Reevaluation Report (GRR) (hereinafter: MRSC IEPR) Panel were evaluated based on their technical expertise in the following key areas: Civil Works planning, economics, biological resources and environmental law, hydrology/hydraulics engineering, and geotechnical/civil engineering. These areas correspond to the technical content of the review documents and overall scope of the MRSC project.

For each Louisiana Water Resources Council (LWRC), as defined in the Water Resources Development Act [WRDA] 2007, Section 7009) IEPR, Battelle chooses panel members from its list of LWRC Primary Panel members or, in the event that a Primary Panel member does not have the expertise or cannot meet schedule requirements, from the LWRC Backup Pool. Battelle endeavored to select only LWRC Primary Panel or Backup Pool members for the MRSC IEPR.

Of the five expertise descriptions in the MRSC GRR IEPR PWS, four of them (Civil Works planning, economics, biological resources and environmental law, and hydrology/hydraulics engineering) are technical areas of expertise previously identified for the LWRC Primary Panel. Battelle consulted with the appropriate LWRC Primary Panel members for these expertise areas to evaluate their expertise and schedule commitments against the requirements of the PWS. The LWRC Primary Panel economics panel member did not meet the PWS expertise requirements. As the LWRC Primary Panel Civil Works planning panel member is a transportation economist with several decades of experience, he served as the economics panel member for this IEPR, in addition to serving as the Civil Works planning panel member. The LWRC Primary Panel hydrology/hydraulic engineering panel member did not meet the requirements for the hydrology/hydraulics engineering position on the Panel. Battelle identified a member of the LWRC Backup Pool with the required expertise in hydrology/hydraulics engineering. The final expertise area described in the MRSC GRR IEPR PWS (geotechnical/civil engineering) is not an expertise area on the LWRC Primary Panel. Battelle identified a member of the LWRC Backup Pool with the required expertise in geotechnical/civil engineering.

Candidates were screened for the following potential exclusion criteria or conflicts of interest (COIs). These COI questions were intended to serve as a means of disclosure in order to better characterize a candidate's employment history and background. Battelle evaluated whether scientists in universities and consulting firms that are receiving USACE-funding have sufficient independence from USACE to be appropriate peer reviewers. Guidance in OMB (2004, p. 18) states,

> "…when a scientist is awarded a government research grant through an investigator-initiated, peer-reviewed competition, there generally should be no question as to that scientist's ability to offer independent scientific advice to the agency on other projects. This contrasts, for example, to a situation in which a scientist has a consulting or contractual arrangement with the agency or office sponsoring a peer review. Likewise, when the agency and a researcher work together (e.g., through a cooperative agreement) to design or implement a study, there is less independence from the agency. Furthermore, if a scientist has repeatedly served as a reviewer for the same agency, some may question whether that scientist is sufficiently independent from the agency to be employed as a peer reviewer on agency-sponsored projects."

Panel Conflict of Interest (COI) Screening Statements for the IEPR of the Mississippi River Ship Channel (MRSC) Gulf to Baton Rouge, Louisiana, General Reevaluation Report (GRR)
1. Previous and/or current involvement by you or your firm on the Mississippi River Ship Channel (MRSC), Gulf to Baton Rouge, Louisiana, Draft Integrated General Reevaluation Report (GRR) and Supplemental Environmental Impact Statement (SEIS) and related projects.
2. Previous and/or current involvement by you or your firm in navigation (dredging) projects in coastal Louisiana or Mississippi.
3. Previous and/or current involvement by you or your firm in the conceptual or actual design, construction, or operation and maintenance (O&M) of the MRSC, Gulf to Baton Rouge, Louisiana, Draft Integrated GRR/SEIS or related projects.
4. Current employment by the U.S. Army Corps of Engineers (USACE).
5. Previous and/or current involvement with paid or unpaid expert testimony related to the MRSC, Gulf to Baton Rouge, Louisiana, Draft Integrated GRR/SEIS.
6. Previous and/or current employment or affiliation with members of the cooperating agencies or local sponsors OR the non-Federal sponsors or any of the following cooperating Federal, State, County, local and regional agencies, environmental organizations, and interested groups *(for pay or pro bono):* for this IEPR it is the Louisiana Department of Transportation and Development (LaDOTD).
7. Past, current, or future interests or involvements (financial or otherwise) by you, your spouse, or your children related to projects in coastal Louisiana or Mississippi.
8. Current personal involvement with other USACE projects, including whether involvement was to author any manuals or guidance documents for USACE. If yes, provide titles of documents or description of project, dates, and location (USACE district, division, Headquarters, ERDC, etc.), and position/role. Please highlight and discuss in greater detail any projects that are specifically with the Mississippi Valley Division – New Orleans District.
9. Previous or current involvement with the development or testing of models that will be used for, or in support of the MRSC, Gulf to Baton Rouge, Louisiana, Draft Integrated GRR/SEIS project. These models include the Harbor Simulation Model (HarborSym), the Wetland Value Assessment (WVA), HEC-RAS 6T (River Analysis System), ADH (Adaptive Hydraulics Modeling), and the Delft 3D model.
10. Current firm involvement with other USACE projects, specifically those projects/contracts that are with the Mississippi Valley Division – New Orleans District. If yes, provide title/description, dates, and location (USACE district, division, Headquarters, ERDC, etc.), and position/role. Please also clearly delineate the percentage of work you personally are currently conducting for the Mississippi Valley Division – New Orleans District. Please explain.
11. Any previous employment by USACE as a direct employee, notably if employment was with the Mississippi Valley Division – New Orleans District. If yes, provide title/description, dates

Panel Conflict of Interest (COI) Screening Statements for the IEPR of the Mississippi River Ship Channel (MRSC) Gulf to Baton Rouge, Louisiana, General Reevaluation Report (GRR)
employed, and place of employment (district, division, Headquarters, ERDC, etc.), and position/role.
12. Any previous employment by USACE as a contractor (either as an individual or through your firm) within the last 10 years, notably if those projects/contracts are with the Mississippi Valley Division – New Orleans District. If yes, provide title/description, dates employed, and place of employment (district, division, Headquarters, ERDC, etc.), and position/role.
13. Previous experience conducting technical peer reviews. If yes, please highlight and discuss any technical reviews concerning navigation in coastal Louisiana or Mississippi, and include the client/agency and duration of review (approximate dates).
14. Pending, current, or future financial interests in the MRSC, Gulf to Baton Rouge, Louisiana, Draft Integrated GRR/SEIS related contracts/awards from USACE.
15. Significant portion of your personal or office's revenues within the last three years came from USACE contracts or LaDOTD contracts.
16. Any publicly documented statement (including, for example, advocating for or discouraging against) related to the MRSC, Gulf to Baton Rouge, Louisiana, Draft Integrated GRR/SEIS.
17. Participation in relevant prior and/or current Federal studies relevant to this project and/or the MRSC, Gulf to Baton Rouge, Louisiana, Draft Integrated GRR/SEIS, including the 1981 feasibility study and environmental impact statement entitled "Deep-Draft Access to the Ports of New Orleans and Baton Rouge, Louisiana" prepared for the MRSC, Gulf to Baton Rouge, Louisiana, dated July 1981.
18. Previous and/or current participation in prior non-Federal studies relevant to this project and/or the MRSC, Gulf to Baton Rouge, Louisiana, Draft Integrated GRR/SEIS.
19. Has your research or analysis been evaluated as part of the MRSC, Gulf to Baton Rouge, Louisiana, Draft Integrated GRR/SEIS. If so, please describe.
20. Is there any past, present, or future activity, relationship, or interest (financial or otherwise) that could make it appear that you would be unable to provide unbiased services on this project? If so, please describe.

Providing a positive response to a COI screening question did not automatically preclude a candidate from serving on the Panel. For example, participation in previous USACE technical peer review committees and other technical review panel experience was included as a COI screening question. A positive response to this question could be considered a benefit.

B.2 Panel Selection

In selecting the final members of the Panel, Battelle chose experts who best fit the expertise areas and had no COIs. Table B-1 provides information on each panel member's affiliation, location, education, and overall years of experience. Battelle identified one candidate who was able to serve in a dual role as both the economics and the Civil Works planning expert. Battelle established subcontracts with the panel members when they indicated their willingness to participate and confirmed the absence of COIs through a signed COI form. USACE was given the list of candidate panel members, but Battelle selected the final Panel.

Table B-1. MRSC IEPR Panel: Summary of Panel Members

Name	Louisiana Water Resources Council (LWRC) Membership	Affiliation	Location	Education	P.E.	Exp. (yrs)
Civil Works Planning/Economics (Dual Role)						
Kenneth Casavant	Primary Panel	Independent consultant	Pullman, WA	Ph.D., Agricultural Economics	No	47
Biological Resources and Environmental Law						
Kay Crouch	Primary Panel	Crouch Environmental Services, Inc.	Houston, TX	M.S., Biology and Aquatic Ecology	No	38
Hydrology/Hydraulics (H&H) Engineering						
Kenneth Avery	Backup Pool	Bergmann Associates, Inc.	Rochester, NY	M.S., Water Resources Engineering	Yes	40
Geotechnical/Civil Engineering						
Douglas Spaulding	Backup Pool	Spaulding Consultants, Inc.	Golden Valley, MN	M.S., Civil Engineering	Yes	40+

Table B-2 presents an overview of the credentials of the final four members of the Panel and their qualifications in relation to the technical evaluation criteria. More detailed biographical information regarding each panel member and his or her area of technical expertise is given in Section B.3.

Table B-2. MRSC IEPR Panel: Technical Criteria and Areas of Expertise

Technical Criterion	Casavant	Crouch	Avery	Spaulding
Civil Works Planning/Economics (Dual Role)				
Minimum of 15 years demonstrated experience as a senior water resources planner on navigation (dredging) projects in a coastal inland waterway system	X			
Familiar with USACE plan formulation processes, procedures, and standards	X			
Familiar with evaluation of alternative plans for navigation/dredging projects	X			
Experience related to evaluating traditional Civil Works plan benefits associated with navigation/dredging projects, to include experience in USACE methodologies for performing cost effectiveness/incremental cost analysis (CE/ICA), and experience in determining the cost effectiveness of alternatives evaluations	X			
Minimum of 15 years of demonstrated experience or combined equivalent of education and experience in economics	X			
M.S. degree or higher in economics	X			
Recognized expert in applied economics related to transportation economics including experience with financing transportation infrastructure and national and international logistics and transportation requirements	X			
Experience working with risk informed approaches to decision making, risk models and disaster scenarios with regard to economic impact and familiarity with the USACE tool for CE/ICA called Institute for Water Resources (IWR) Planning Suite	X			
Biological Resources and Environmental Law				
Minimum of 15 years of demonstrated experience working with the National Environmental Policy Act (NEPA) impact assessments of public works projects		X		
Minimum M.S. degree or higher in an appropriate field of study		X		
Ability to determine the scope and appropriate methodologies for environmental impact analyses for projects and programs with high public and interagency interests which have project impacts on nearby sensitive habitats along the Mississippi River or similar systems		X		
Knowledge of NEPA, the Endangered Species Act with regional knowledge of south Louisiana specific regulatory requirements, and Federal services regulations		X		
Active participation in related professional societies		X		

Table B-2, continued. MRSC IEPR Panel: Technical Criteria and Areas of Expertise

Technical Criterion	Casavant	Crouch	Avery	Spaulding
Hydrology/Hydraulics (H&H) Engineering				
Minimum of 15 years of demonstrated experience or combined equivalent of education and experience assessing navigation (dredging) projects in an inland waterway system			X	
Registered professional engineer with an M.S. degree in civil engineering or H&H engineering			X	
Direct H&H design or construction management experience centered on navigation design and construction along a coastal inland waterway system			X	
Familiar with standard USACE H&H computer models, with 5-10 years of experience working with numerical modeling applications for navigation projects			X	
Familiar with USACE applications of risk and uncertainty analysis in navigation transportation projects			X	
Active participation in related professional societies			X	
Geotechnical/Civil Engineering				
Minimum of 15 years of demonstrated engineering experience or combined equivalent of education and experience in soils engineering or related field				X
Registered professional engineer with an M.S. or higher degree				X
Lock and dam design and construction experience				X
Several years of direct experience with regard to navigation as either a designer or construction project engineer				X
Skillful with the USACE risk-informed approach to navigation transportation and flood risk reduction projects				X
Capable of addressing the USACE Safety Assurance Review (SAR) for this project				X
Active participation in related professional societies				X

B.3 Panel Member Qualifications

Detailed biographical information on each panel members' credentials and qualifications and areas of technical expertise are summarized in the following paragraphs.

Name	*Role (Combined Role)*	*Affiliation*
Dr. Ken Casavant	Civil Works Planning/Economics	Independent consultant

Dr. Casavant is a professor and economist at the School of Economic Sciences at Washington State University, Director of the Freight Policy Transportation Institute (FPTI), and adjunct professor at North Dakota State's Upper Great Plains Transportation Institute. He earned his Ph.D. in agricultural economics from Washington State University in 1971. Dr. Casavant has nearly 50 years of experience as an economist, with expertise in transportation economics and planning, particularly the evaluation and comparison of alternative plans for numerous navigation studies. He has served as an economic consultant detailing the tradeoffs necessary on several public works projects, most recently on studies of the deep draft national and international maritime industry. In this capacity, he has become a recognized expert in applied economics related to transportation economics, with specific experience with financing transportation infrastructure and national and international logistics and transportation requirements. For example, he has aided in the design of a physical distribution system for limestone in Portugal, the wheat transportation system in Mali and Bolivia, among other domestic and international assignments.
Dr. Casavant is familiar with USACE plan formulation processes, procedures, and standards. He has more than 15 years of experience in plan formulation, evaluation and comparison of alternative plans for numerous navigation studies (dredging), ecosystem restoration projects, and feasibility studies, including his technical reviews of the Lower Columbia River Channel Deepening Project, the Upper Mississippi and Illinois Navigation Study, the Barataria Basin Barrier Shoreline (BBBS) Restoration Study, and the Mississippi River Gulf Outlet Ecosystem Restoration Plan.

Dr. Casavant has worked with USACE methodologies for cost effectiveness/incremental cost analysis (CE/ICA) and has a detailed knowledge of USACE standards and procedures including the IWR Planning Suite. As an economist or a combined Civil Works planner/economist for USACE IEPRs, he has studied and evaluated alternative plans for navigation/dredging projects, such as the Savannah Harbor Expansion Project GRR. Over the last 10 years, he has worked on 13 USACE projects where he has had to apply USACE standards and procedures, including the IWR Planning Suite methodologies, with a focus on effective and efficient ecological and natural sustained output per dollar of relevant expenditure for alternative project formulations. He has applied the USACE six-step planning process, which is governed by ER 1105-2-100, Planning Guidance Notebook, during his work as a technical reviewer and peer reviewer on more than 20 projects, such as the Port of Iberia Channel Deepening Project in 2006 for USACE, the External Independent Economic Opinion on Identifying and Measuring National Economic Development (NED) Benefits: Navigation Shipping USACE, 2007, and the Morganza to the Gulf IEPR study, a hurricane protection and storm damage risk project.

Dr. Casavant has experience identifying, reviewing, and evaluating impacts on environmental resources from structural flood risk and impacts related to hurricane and coastal storm damage risk reduction projects. From risk assessment in Monte Carlo evaluations to traditional risk models in the IWR Planning Suite, he has broad and applied experience working with risk-informed approaches to decision making. The six most recent projects he has contributed to had critical components concerning the impacts of environmental resources from flood risk and coastal storm damage. He has also been a plan formulator

expert on LWRC IEPRs; several of the projects under review had a specific objective to evaluate the damage reduction and the risk associated with achieving benefits from flood risk management and one project focused specifically on the impact on shorelines.

Dr. Casavant has published more than 70 journal articles and has contributed to hundreds of written documents including chapters in books, books, abstracts, proceedings, professional materials, conference papers, and research bulletins, circulars, and reports. He is a member of numerous professional associations, such as the Transportation Research Board - National Research Council, the International Agricultural Economics Association, and the Logistics and Physical Distribution Association.

Name	***Role***	***Affiliation***
Ms. Kay Crouch	Biological Resources and Environmental Law	Crouch Environmental Services, Inc.

Ms. Crouch is Board Chair of Crouch Environmental Services, Inc., a company specializing in National Environmental Policy Act (NEPA) analysis, environmental site assessment, permitting, and mitigation for projects with high public and interagency interests. She earned her M.S. in biology/ecology in 1978 from Steven F. Austin State University, and has received additional academic training in the NEPA process from the Duke University Nicholas School of Environmental and Earth Sciences (2004-05). Ms. Crouch has more than 38 years of nationwide experience in conducting environmental site assessments and NEPA impact assessments for complex multi-objective public works projects with competing trade-offs. She has performed numerous environmental evaluations throughout the coastal ecosystems of Louisiana and Texas in support of Federal Energy Regulatory Commission (FERC) filings and NEPA documentation. For the first 10 years of her consulting career, Ms. Crouch worked predominately in Louisiana performing NEPA analyses for oil and gas pipelines crossing the Louisiana Coastal Zone and has prepared over 100 NEPA documents since 1978.

Ms. Crouch has experience working with NEPA impact assessment in marsh and urban areas and related ecosystem species and habitats. She has done extensive work in the coastal marsh habitats that span the Gulf Coast. She has experience in high and low tidal marsh restoration and evaluation, as well as inland wetlands. Additionally, she has worked on projects in Louisiana involving evaluation of chenieres and inland swamps. In the mid-1990s, Crouch Environmental Services Inc. designed and constructed the Baytown Nature Center, Texas, a large coastal marsh creation project for which the company received the 1998 Award of Excellence from the National Association of Landscape Architects.

Ms. Crouch is familiar with USACE calculations of environmental benefits and routinely performs cumulative effects analyses on high visibility public works projects as part of her extensive NEPA practice. This type of modeling has been required on every flood damage reduction and ecosystem restoration project she has worked on relating to USACE, including the Clear Creek Flood Damage Reduction Project and the Addicks and Barker Dams and Reservoirs system in Harris County, Texas. Other NEPA projects have consisted of flood damage reduction projects, dams, ports, parks, offshore activities, linear transportation corridors, and power plants and other types of projects involving Federal funding.

Ms. Crouch has 38 years of experience with endangered species. She has completed several projects that involve compliance with the Endangered Species Act, specifically with the listed species found in Southern Louisiana, including state-listed species, through her work in the Louisiana coastal zone. The evaluation of the presence or absence of listed species is required for almost every project she is

involved in. These include USACE 404 permit applications requiring field investigations for listed species in numerous states; she also has completed the Section 7 consultation process for several species.

She also has demonstrated experience with cultural resource surveys. Almost every project Ms. Crouch works on requires an investigation and evaluation of cultural resource issues. She is intimately familiar with the record search step as well as field survey techniques for cultural resources. Her experience is supervisory, and relates to USACE 404 permits and NEPA documentation. She also has experience with Section 106 for the analysis of historical issues. She has demonstrated knowledge of conducting biological assessments, including wetlands delineation, compilation of Biological Assessments for Section 404 permitting, and NEPA documentation. She has dealt with numerous types of habitats in numerous locations nationwide.

Ms. Crouch is familiar with USACE calculation and application of environmental impacts and benefits. She routinely performs cumulative effects analyses on high-visibility public works projects as part of her extensive NEPA practice. She is well versed in various modeling types and in the performance of incremental cost analysis for mitigation evaluation for dam repair and restoration. She has experience reviewing the application of Wetland Value Assessment (WVA) methodology and has calculated the environmental losses and benefits of USACE projects using the hydrogeomorphic approach (HGM), habitat evaluation procedures (HEP), and WVA, as well as other models. Most recently, she performed WVA analysis for the Addicks and Barker Dams environmental assessment in Harris County, Texas, for the Galveston District. Additionally, she has experience serving as an environmental expert in previous IEPRs of USACE LWRC projects. Ms. Crouch is a member of the Society of Wetland Scientists.

Name	***Role***	***Affiliation***
Kenneth Avery, P.E, CFM, D. WRE	H&H Engineering	Bergmann Associates, Inc.

Mr. Avery is a senior hydrologic and hydraulic engineer with Bergmann Associates, Inc. in Rochester, NY. He earned his M.S. in water resources engineering from Clarkson University in 1977 and is a registered professional engineer in Michigan, New York, Florida, and Montana. Mr. Avery has 40 years of experience in water resources, environmental, and civil engineering, including projects focused on navigation (dredging) in coastal inland waterway systems. His H&H engineering experience spans state transportation agencies to the Federal government. Mr. Avery served on IEPRs for the Navigation and Ecosystem Sustainability Program (NESP) Project P2 Lock & Dam 22 Fish Passage Improvement Project; Protection of the Harvey-Algiers Canal; and Louisiana Coastal Area Convey Atchafalaya River Water to Northern Terrebonne Marshes and Multipurpose Operation of Houma Navigation Lock, Integrated Feasibility Study and Environmental Impact Statement.

Mr. Avery has direct H&H management experience centered on navigation design and construction along a coastal inland waterway system. For example, he served as the on-site environmental compliance monitor for the New NY Bridge. This was design-build project to replace the aging and deficient Tappan Zee Bridge carrying I-87/I-287 over the Hudson River. As part of that project, approximately 1.8 MCY of material was dredged out of the Hudson River and sent for land disposal. The purpose of the dredging was for the navigation channel and to enable deeper-draft vessels to navigate the bridge. He provided a weekly independent assessment of compliance with permit conditions and reviewed construction submittals. He also developed and guided auditing of environmental state and Federal agency compliance in dredging; armoring; in-river water quality; construction noise and vibration; dust and air

quality; spill prevention, control and countermeasures; stormwater management (SWPPP); pile driving; and concrete placement.

He is familiar with standard USACE H&H computer models and has experience working with numerical modeling applications for navigation and flood risk reduction projects. For the Fargo-Moorhead Flood Damage Reduction Project for the USACE St. Paul District, he worked with a team of hydraulic modelers responsible for developing two-dimensional numerical and physical hydraulic models of alternative configurations for channel realignments and aqueduct designs to carry the Maple River over the Red River diversion channel. For the Devils Lake City Embankments project for the USACE St. Paul District, he led the HEC-RAS hydraulic modeling of the interior drainage areas that included: conveyance channels; ponding areas; and pumping stations and piping systems to achieve a 1% annual chance flood elevation on the protected side of the embankment that is at or below FEMAs Special Flood Hazard Area.

Mr. Avery is familiar with USACE applications of risk and uncertainty analysis in navigation transportation projects. As part of several lock and dam rehabilitation projects, he developed a method for determining the seasonally adjusted hydrologic risk of flooding during cofferdam construction for the Utica Harbor Dam, Lock & Dam E-26. As consultant manager for the New York State Canal Corporation's (NYSCC) Dam Safety Program that includes 80 dams, Mr. Avery led a Dam Risk Prioritization study for 13 high- and intermediate-hazard dams in the portfolio using FEMA's *Risk Prioritization Tool for Dams*. The risk prioritization process involves identifying potential failure modes, then compiling the overall risk onto Risk Plots of annual probability vs. life loss potential and comparing the results to ANCOLD tolerability limits. For construction of improvements to dams in NYSCC's portfolio, Mr. Avery participates on Potential Failure Mode Analysis (PFMA) teams that evaluate risk of failure during construction of improvements.

He also served as a senior hydraulic engineer on the New Inglis Lock project for the Florida Department of Environmental Protection, the Charleroi Locks and Dam project for the USACE Pittsburgh District, and the Lagrange Lock Alignment project for the USACE Rock Island District. For the New Inglis Lock project, he developed the lower pool frequency vs. elevation relationship using published reports and record data for use by contractors to assess construction risk. For the Charleroi Locks and Dam project, he determined hydraulic forces acting on the side and end walls of the river chamber and land chamber outlet structure. For the Lagrange Lock Alignment project, he provided recommendations concerning the hydraulic engineering methodologies, physical modeling, and numerical modeling that should be performed to establish 1D and 2D velocities, depths, sediment transport, and lock culvert filling and emptying systems.

In the field of water resources, his experience encompasses planning, engineering, and design. His principal disciplines of concentration are surface water hydrology, open and closed channel hydraulics, revetment, bridge and channel scour, and sediment transport. Mr. Avery has used steady and unsteady flow hydraulic models such as the HEC and NWS software, ADH, and DYNLET. His design experience covers hydraulic structures, dams, sewers, highway and bridge hydraulics, penstocks, natural channels, and riprap revetment. Mr. Avery's relevant experience includes being the project manager and lead hydrologist for the Chase-Hibbard Dam Fish Ladder and Portage Study in Elmira, New York. The fish ladder project involved hydrologic analysis of discharges to determine operational hydraulic requirements for the fish ladder during the migration season, high flow conditions, and low flow conditions; determination of target fish species; review of a previous fish ladder design; cost estimating; and conceptual design.

As a channel design expert, Mr. Avery served as project manager for the engineering and design of a 2000-foot-long section of Minisceongo Creek. The creek had experienced severe channel erosion,

including failure of gabion sections, slope failures, and collapse of drainage outfall pipes. Mr. Avery developed a repair strategy, prepared plans, specifications, permits and cost estimates to repair the primary damage area. He has conducted physical hydraulic modeling (including for Control Structure 46 for the Monroe County Department of Engineering in Rochester, New York) and has done extensive work with dams, navigation channels, locks, spillways, and outlet works.

In addition, Mr. Avery is capable of addressing USACE Safety Assurance Review (SAR) as applied to this IEPR. He has served as a panel member for Type I and Type II IEPRs on other USACE projects where those projects posed a significant threat to human life and public safety and the review charge included elements of SAR review. Mr. Avery is a member of the American Society of Civil Engineers, the Society of American Military Engineers, the American Water Resource Association, the New York State Floodplain and Stormwater Managers Association. He is a diplomate of the American Association of Water Resources Engineers and is a Certified Floodplain Manager (CFM).

Name	***Role***	***Affiliation***
Douglas Spaulding, P.E.	Geotechnical/Civil Engineering	Spaulding Consultants, Inc.

Mr. Spaulding is a Principal and geotechnical engineer with Spaulding Consultants, LLC, responsible for dam, levee, and floodwall design and inspection. He earned his M.S. in geotechnical engineering from Purdue University, and is a registered professional engineer in Wisconsin, Minnesota, and Michigan. He has almost 50 years of experience in the design, evaluation, and inspection of water-retaining structures. During his long career, he has provided geotechnical design and evaluation services for flood control levees, embankments, and hydroelectric projects in a 23-state area, including Louisiana. His experience includes 10 years with USACE, where he served as Chief of the Levee and Channel Design Section for the St. Paul District. In that capacity, he managed the development of the Pembina levee project in North Dakota and provided geotechnical design services for over $200 million worth of local flood protection projects in Minnesota and North Dakota. The Pembina project and the Mankato and Winona flood control projects in Minnesota all included extensive sections of floodwall (both I-wall and T-wall configurations). In addition, for the Winona project, Mr. Spaulding supervised the evaluation of underseepage. He is also the former Program Manager for the National Dam Safety Program in Wisconsin and Minnesota. He has experience with lock structures in Minnesota and Michigan and served on the design team for the rehabilitation of Lock and Dams No.1 and No.2 on the Mississippi River and managed the design of several hydroelectric projects at navigation dams on the Mississippi and Red Rivers.

Mr. Spaulding's geotechnical background includes evaluating the stability of levee sections founded on soft clay foundations. His experience also encompasses geotechnical design of cellular sheet pile structures, sheet pile tieback walls, conventional gravity walls, and pump stations founded on sand and soft clay deposits. He has provided design services for embankments using preload fills to strengthen underlying foundation deposits. He recently served as a consultant to evaluate the instability caused by a sanitary landfill founded on over 100 feet of soft lacustrine clay. All of the local flood control projects for which Mr. Spaulding has provided design services have involved at least several gatewells to accommodate gravity drainage.

As part of his experience, he applied USACE risk-informed approaches to the evaluation of safety issues at USACE navigation, flood control, and hydroelectric projects. Mr. Spaulding also provided dam safety training for USACE operations personnel at navigation and flood control projects from 1988 to 2010. Over

the last 10 years, Mr. Spaulding has participated in more than 75 PFMA evaluations of USACE flood control dams and hydroelectric projects. As a facilitator of PFMA evaluations authorized by FERC, Mr. Spaulding has directed more than 50 evaluations for embankment dams, concrete gravity structures, and arch dam structures.

Mr. Spaulding has served on IEPR review panels dealing with local flood protection projects, dam remediation, dam replacement, and seepage control system upgrades. This experience has provided extensive background in USACE's Safety Assurance Review (SAR) requirements. Mr. Spaulding has provided peer review services on two reaches of hurricane protection projects in the New Orleans area. In 2008, he peer-reviewed the geotechnical design of the New Orleans Group 1 to Group 3 pump stations. In 2010, Mr. Spaulding also served on the IEPR team reviewing the Olmsted Lock and Dam structure on the Ohio River. In 2014 he served on the IEPR evaluation team for the Pine Creek dam remediation in Oklahoma, assessing proposed methods to control internal embankment seepage around an existing conduit that had created large internal voids in the 50-year-old dam. In addition, Mr. Spaulding currently serves on two FERC-appointed Boards of Consultants reviewing the design of two major hydroelectric projects and was appointed to the Department of Energy (DOE) Peer Review panel to evaluate ongoing DOE-sponsored research related to dams and hydroelectric generation. Mr. Spaulding is a lifetime member of the American Society of Civil Engineers. He also is a member of the Minnesota Geotechnical Society, the National Hydropower Association, and the Construction Panel for the Minneapolis section of the American Arbitration Association.

APPENDIX C

Final Charge for the MRSC IEPR

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Charge Questions and Guidance to the Panel Members for the Independent External Peer Review (IEPR) of the Mississippi River Ship Channel (MRSC) Gulf to Baton Rouge, Louisiana, General Reevaluation Report (GRR)

This is the final Charge to the Panel for the MRSC IEPR. This final Charge was submitted to USACE as part of the final Work Plan, originally submitted on March 29, 2017.

BACKGROUND

Construction of the MRSC, Gulf to Baton Rouge, LA project was planned for construction in 3 phases. Construction of Phase I was completed in December of 1987 and provided a depth of 45 ft. from Donaldsonville, LA (River Mile 181.0) to the Gulf of Mexico. Construction of Phase II was completed in December 1994 and involved deepening of the MRSC to a depth of 45 ft. between Donaldsonville, LA (River Mile 181.0) to Baton Rouge and included dredging eight river crossings to an equivalent depth. Prior to proceeding with construction of Phase III, a general reevaluation study and an accompanying GRR, and supplemental environmental impact statement (SEIS) is required due to potential changed conditions and assumptions related to the MRSC depth, economic development, and environmental assessments since the 1981 Feasibility Report. The general reevaluation study will examine whether navigation improvements to deepen the existing Federal project for the MRSC are warranted and in the Federal interest. This will be accomplished by assessing existing and future conditions; evaluating related problems and opportunities; developing potential alternatives and evaluating/comparing the costs, benefits, and feasibility of those alternatives; writing a supplemental environmental impact statement; and identifying a recommended plan.

The scope of the study includes evaluation of alternatives to deepen the MRSC between depths of 45 ft. and 50 ft. for the next phase of construction. The evaluation of alternatives was limited to a depth of 50 ft. at the request of the non-Federal Sponsor. Currently, the crossings in the Mississippi River are at depths of 45 ft., based on a depth below the Low Water Reference Plane (LWRP), and the lower Mississippi River is at a depth of 48.5 ft. Mean Lower Low Water (MLLW). The general reevaluation study will identify the depth that creates the greatest net benefits, up to a depth of 50 ft. MLLW. At initiation, the study recognized there was a need to reevaluate the construction phasing of the project. Within the general reevaluation study, the alternative depths are limited to a depth not to exceed 50 ft. Therefore, future construction phases beyond the 3 phases originally planned are required to fully implement the authorized project.

OBJECTIVES

The objective of this work is to conduct an independent external peer review (IEPR) of the Mississippi River Ship Channel (MRSC) Gulf to Baton Rouge, Louisiana, General Reevaluation Report (GRR) (hereinafter: MRSC GRR IEPR) in accordance with the Department of the Army, U.S. Army Corps of Engineers (USACE), Water Resources Policies and Authorities' *Civil Works Review* (Engineer Circular [EC] 1165-2-214, dated December 15, 2012), and the Office of Management and Budget's *Final Information Quality Bulletin for Peer Review* (December 16, 2004). Peer review is one of the important procedures used to ensure that the quality of published information meets the standards of the scientific and technical community. Peer review typically evaluates the clarity of hypotheses, validity of the research design, quality of data collection procedures, robustness of the methods employed,

appropriateness of the methods for the hypotheses being tested, extent to which the conclusions follow from the analysis, and strengths and limitations of the overall product.

The purpose of the IEPR is to assess the "adequacy and acceptability of the economic, engineering, and environmental methods, models, and analyses used" (EC 1165-2-214; p. D-4) for the decision documents. The IEPR will be limited to technical review and will not involve policy review. The IEPR will be conducted by subject matter experts (i.e., IEPR panel members) who meet the technical criteria and areas of expertise required for and relevant to the project.

The Panel will be "charged" with responding to specific technical questions as well as providing a broad technical evaluation of the overall project. Per EC 1165-2-214, Appendix D, review panels should identify, explain, and comment upon assumptions that underlie all the analyses, as well as evaluate the soundness of models, surveys, investigations, and methods. Review panels should be able to evaluate whether the interpretations of analysis and the conclusions based on analysis are reasonable. Reviews should focus on assumptions, data, methods, and models. The panel members may offer their opinions as to whether there are sufficient analyses upon which to base a recommendation.

DOCUMENTS PROVIDED

The following is a list of documents, supporting information, and reference materials that will be provided for the review.

Documents for Review

The following is a list of documents, supporting information, and reference materials that will be provided for the review.

Review Documents	Subject Matter Experts				
	No. of Review Pages	Civil Works Planning/ Economics [dual panel member]	Biological Resources and Environ-mental Law	Hydrology/ Hydraulics Engineering	Geotechnical/ Civil Engineering
Integrated General Reevaluation Report/SEIS	254	254	254	254	254
Appendices A-D	522	98	225	199	199
Public Comments*	92	92	92	92	92
Total Number of Pages to be Reviewed	**868**	**444**	**571**	**545**	**545**
Appendices F-H**	152	129	37	152	152
Economic Report from NFS** (estimated page count))	100	100	100	100	100
Risk Register** (estimated page count)	15	15	15	15	15
Total Number of Supporting Documents	**267**	**244**	**152**	**267**	**267**

* USACE will submit public comments to Battelle, who will in turn submit the comments to the IEPR Panel.

** Supporting documentation only. These documents are not for Panel review and should be used as information sources only. They are not included in the total review document page count.

Documents for Reference

- USACE guidance *Civil Works Review,* (EC 1165-2-214, December 15, 2012)
- Office of Management and Budget's *Final Information Quality Bulletin for Peer Review* (December 16, 2004)
- Foundations of SMART Planning
- SMART Planning Bulletin (PB 2013-03)
- SMART – Planning Overview
- Planning Modernization Fact Sheet.

SCHEDULE

This schedule is based on the receipt of the final review documents. Note that dates presented in the schedule below also could change due to panel member and USACE availability.

Task	Action	Due Date Working Days
Attend Meetings and Conduct Peer Review	Subcontractors complete mandatory Operations Security (OPSEC) training	4/27/2017
	Battelle sends review documents to panel members	3/30/2017
	Battelle convenes kick-off meeting with panel members	3/30/2017
	Battelle convenes kick-off meeting with USACE and panel members	3/30/2017
	Battelle convenes mid-review teleconference for panel members to ask clarifying questions of USACE	4/6/2017
	Panel members complete their review of the documents	4/13/2017
Prepare Final Panel Comments and Final IEPR Report	Battelle provides talking points to panel members for Panel Review Teleconference	4/14/2017
	Battelle convenes Panel Review Teleconference	4/17/2017
	Battelle provides Final Panel Comment templates and instructions to panel members	4/17/2017
	Panel members provide draft Final Panel Comments to Battelle	4/24/2017
	Battelle provides feedback to panel members on draft Final Panel Comments; panel members revise Final Panel Comments	4/25/2017 - 4/27/2017
	Panel finalizes Final Panel Comments	4/28/2017
	Battelle receives public comments from USACE	3/17/2017
	Battelle sends public comments to Panel	4/14/2017
	Panel members complete their review of the public comments	4/18/2017

	Battelle and Panel review Panel's responses to public comments	4/19/2017
	Panel drafts Final Panel Comment on public comments, if necessary	4/26/2017
	Panel finalizes Final Panel Comment regarding public comments, if necessary	4/28/2017
	Battelle provides Final IEPR Report to panel members for review	5/1/2017
	Panel members provide comments on Final IEPR Report	5/2/2017
	Battelle submits Final IEPR Report to USACE*	5/4/2017
	USACE Planning Center of Expertise (PCX) provides decision on Final IEPR Report acceptance	5/11/2017
Comment/ Response Process	Battelle inputs Final Panel Comments to Design Review and Checking System (DrChecks) and provides Final Panel Comment response template to USACE	5/15/2017
	Battelle convenes teleconference with Panel to review Comment Response process	5/15/2017
	USACE Project Delivery Team (PDT) provides draft Evaluator Responses to USACE PCX for review	6/1/2017
	USACE PCX reviews draft Evaluator Responses and works with USACE PDT regarding clarifications to responses, if needed	6/7/2017
	USACE PCX provides draft PDT Evaluator Responses to Battelle	6/8/2017
	Battelle provides draft PDT Evaluator Responses to panel members	6/12/2017
	Panel members provide draft BackCheck Responses to Battelle	6/15/2017
	Battelle convenes teleconference with panel members to discuss draft BackCheck Responses	6/16/2017
	Battelle convenes Comment Response Teleconference with panel members and USACE	6/19/2017
	USACE inputs final PDT Evaluator Responses to DrChecks	6/26/2017
	Battelle provides final PDT Evaluator Responses to panel members	6/28/2017
	Panel members provide final BackCheck Responses to Battelle	7/3/2017
	Battelle inputs the panel members' final BackCheck Responses to DrChecks	7/3/2017
	Battelle submits pdf printout of DrChecks project file*	7/5/2017

* Deliverables
** There is no Civil Works Review Board (CWRB) for this project.

CHARGE FOR PEER REVIEW

Members of this IEPR Panel are asked to determine whether the technical approach and scientific rationale presented in the decision documents are credible and whether the conclusions are valid. The Panel is asked to determine whether the technical work is adequate, competently performed, and properly documented; satisfies established quality requirements; and yields scientifically credible conclusions. The Panel is being asked to provide feedback on the economic, engineering, environmental

resources, and plan formulation. The panel members are not being asked whether they would have conducted the work in a similar manner.

Specific questions for the Panel (by report section or appendix) are included in the general charge guidance, which is provided below.

General Charge Guidance

Please answer the scientific and technical questions listed below and conduct a broad overview of the decision documents. Please focus your review on the review materials assigned to your discipline/area of expertise and technical knowledge. Even though there are some sections with no questions associated with them, that does not mean that you cannot comment on them. Please feel free to make any relevant and appropriate comment on any of the sections and appendices you were asked to review. In addition, please note that the Panel will be asked to provide an overall statement related to 2 and 3 below per USACE guidance (EC 1165-2-214; Appendix D).

1. Your response to the charge questions should not be limited to a “yes” or “no.” Please provide complete answers to fully explain your response.
2. Assess the adequacy and acceptability of the economic and environmental assumptions and projections, project evaluation data, and any biological opinions of the project study.
3. Assess the adequacy and acceptability of the economic analyses, environmental analyses, engineering analyses, formulation of alternative plans, methods for integrating risk and uncertainty, and models used in evaluating economic or environmental impacts of the proposed project.
4. If appropriate, offer opinions as to whether there are sufficient analyses upon which to base a recommendation.
5. Identify, explain, and comment upon assumptions that underlie all the analyses, as well as evaluate the soundness of models, surveys, investigations, and methods.
6. Evaluate whether the interpretations of analysis and the conclusions based on analysis are reasonable.
7. Please focus the review on assumptions, data, methods, and models.

Please **do not** make recommendations on whether a particular alternative should be implemented, or whether you would have conducted the work in a similar manner. Also please **do not** comment on or make recommendations on policy issues and decision making. Comments should be provided based on your professional judgment, **not** the legality of the document.

1. If desired, panel members can contact one another. However, panel members **should not** contact anyone who is or was involved in the project, prepared the subject documents, or was part of the USACE Agency Technical Review (ATR).

2. Please contact the Battelle Project Manager (Project Manager; wisneskic@battelle.org) or Program Manager (Rachel Sell; sellr@battelle.org) for requests or additional information.

3. In case of media contact, notify the Battelle Program Manager, Rachel Sell (sellr@battelle.org) immediately.

4. Your name will appear as one of the panel members in the peer review. Your comments will be included in the Final IEPR Report, but will remain anonymous.

Please submit your comments in electronic form to the Project Manager, wisneskic@battelle.org no later than 10 pm ET by the date listed in the schedule above.

Independent External Peer Review of the Mississippi River Ship Channel (MRSC) Gulf to Baton Rouge, Louisiana, General Reevaluation Report (GRR)

Charge Questions and Relevant Sections as Supplied by USACE

Broad Evaluation Charge Questions

1. Is the need for and intent of the decision document clearly stated?
2. Does the decision document adequately address the stated need and intent relative to scientific and technical information?

Given the need for and intent of the decision document, assess the adequacy and acceptability of the following:

3. Project evaluation data used in the study analyses,
4. Economic, environmental, and engineering assumptions that underlie the study analyses ,
5. Economic, environmental, and engineering methodologies, analyses, and projections,
6. Models used in the evaluation of existing and future without-project conditions and of economic or environmental impacts of alternatives,
7. Methods for integrating risk and uncertainty,
8. Formulation of alternative plans and the range of alternative plans considered,
9. Quality and quantity of the surveys, investigations, and engineering sufficient for conceptual design of alternative plans, and
10. Overall assessment of significant environmental impacts and any biological analyses.

Further,

11. Evaluate whether the interpretations of analysis and the conclusions based on analysis are reasonable, and
12. Assess the considered and tentatively selected alternatives from the perspective of systems, including systemic aspects being considered from a temporal perspective, including the potential effects of climate change.
13. Regarding the formulation of alternative plans, were current and new technologies used adequately to formulate the most cost-effective designs

For the tentatively selected plan, assess whether:

14. The models used to assess life safety hazards are appropriate,
15. The assumptions made for the life safety hazards are appropriate,
16. The quality and quantity of the surveys, investigations, and engineering are sufficient for a concept design considering the life safety hazards and to support the models and assumptions made for determining the hazards, and
17. The analysis adequately address the uncertainty and residual risk given the consequences associated with the potential for loss of life for this type of project.

Specific Charge Questions

18. Does this report include an in-depth analysis of Operations and Maintenance (O&M) costs for maintaining the 50ft depth through Baton Rouge?
19. Does the report adequately consider the appropriate national and regional benefits in the evaluation of alternatives and selection of the TSP?
20. Does the Economic portion of the report adequately address the national benefit figures upriver from other states?

Battelle Summary Charge Questions to the Panel Members[1]

Summary Questions

21. Please identify the most critical concerns (up to five) you have with the project and/or review documents. These concerns can be (but do not need to be) new ideas or issues that have not been raised previously.

22. Please provide positive feedback on the project and/or review documents.

Public Comment Questions

23. Do the public comments raise any additional discipline-specific technical concerns with regard to the overall report?

[1] Questions 21 through 23 are Battelle supplied questions and should not be construed or considered part of the list of USACE-supplied questions. These questions were delineated in a separate appendix in the final Work Plan submitted to USACE.

APPENDIX D

Conflict of Interest Form

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Conflicts of Interest Questionnaire

Independent External Peer Review

Mississippi River Ship Channel Gulf to Baton Rouge, Louisiana, General Reevaluation Report

The purpose of this document is to help the U.S. Army Corps of Engineers identify potential organizational conflicts of interest on a task order basis as early in the acquisition process as possible. Complete the questionnaire with background information and fully disclose relevant potential conflicts of interest. Substantial details are not necessary; USACE will examine additional information if appropriate. Affirmative answers will not disqualify your firm from this or future procurements.

NAME OF FIRM: **Battelle Memorial Institute**
REPRESENTATIVE'S NAME: **Courtney M. Brooks**
TELEPHONE: **614-424-5623**
ADDRESS: **505 King Avenue, Columbus, OH 43201**
EMAIL ADDRESS: **brooksc1@battelle.org**

I. INDEPENDENCE FROM WORK PRODUCT. Has your firm been involved in any aspect of the preparation of the subject study report and associated analyses (field studies, report writing, supporting research etc.) **No** Yes (if yes, briefly describe):

II. INTEREST IN STUDY AREA OR OUTCOME. Does your firm have any interests or holdings in the study area, or any stake in the outcome or recommendations of the study, or any affiliation with the local sponsor? **No** Yes (if yes, briefly describe):

III. REVIEWERS. Do you anticipate that all expert reviewers on this task order will be selected from outside your firm? No **Yes** (if no, briefly describe the difficulty in identifying outside reviewers):

IV. AFFILIATION WITH PARTIES THAT MAY BE INVOLVED WITH PROJECT IMPLEMENTATION. Do you anticipate that your firm will have any association with parties that may be involved with or benefit from future activities associated with this study, such as project construction? **No** Yes (if yes, briefly describe):

V. ADDITIONAL INFORMATION. Report relevant aspects of your firm's background or present circumstances not addressed above that might reasonably be construed by others as affecting your firm's judgment. Please include any information that may reasonably: impair your firm's objectivity; skew the competition in favor of your firm; or allow your firm unequal access to nonpublic information.
No additional information to report.

Courtney M. Brooks

Courtney M. Brooks — February 28, 2017

BATTELLE

It can be done