Final Independent External Peer Review Report -

Independent External Peer Review of West Bank and Vicinity, LA (WBV) Project Description Document (PDD) and Individual Environmental Report (IER) for Providing 100-Year Level of Risk Reduction to the Harvey-Algiers Canal

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Prepared for
Department of the Army
U.S. Army Corps of Engineers
Coastal Storm Damage Reduction Planning Center of Expertise
Baltimore District

Contract No. W911NF-07-D-0001
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SHORT TERM ANALYSIS SERVICE (STAS)

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on

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Final Independent External Peer Review Report

for

Independent External Peer Review of West Bank and Vicinity, LA (WBV) Project Description Document (PDD) and Individual Environmental Review (IER) for Providing 100-Year Level of Risk Reduction to the Harvey-Algiers Canal

EXECUTIVE SUMMARY

The U.S. Army Corps of Engineers (USACE) is currently designing and constructing the Greater New Orleans Hurricane and Storm Damage Risk Reduction System (HSDRRS). A vital component of this system is the portion along the Harvey and Algiers Canals on the West Bank of the Mississippi River in New Orleans.

Much of the West Bank lies below sea-level and is protected from hurricane storm surge by a continuous string of earthen levee and floodwall reaches running from South Kenner to the mouth of the Hero Canal at the Mississippi River. Pump stations are distributed along the levee system to remove storm water runoff caused by rainfall in the protected areas. Levee elevations relative to National Geodetic Vertical Datum of 1988 (NAVD88) vary, but are less than the elevations necessary to provide a 100-year level of risk reduction to the area. The Gulf Intracoastal Water Way (GIWW), Algiers, and Harvey Canals are heavily developed industrial waterways that provide access from the Mississippi River to the Gulf of Mexico. There are approximately 27 miles of earthen levee that extend from the vertex of the V-Line Levee to the western terminus of the Hero Canal. These levees provide parallel risk reduction along the navigation route. Mississippi Valley New Orleans (MVN) is presently authorized to raise the existing parallel risk reduction levees to an elevation of 10 feet above NAVD88. The alternatives being considered in this evaluation process would provide risk reduction over and above these construction projects. The project is in a conceptual-planning and evaluation phase.

Because of the importance of this project, an Independent External Peer Review (IEPR) of the Harvey Algiers Individual Environmental Report (IER) #12 and Project Description Document (PDD) #9 were conducted. Independent, objective peer review is regarded as a critical element in ensuring the reliability of scientific analyses.

Battelle Memorial Institute (hereafter Battelle), as a non-profit science and technology organization with experience in establishing and administering peer review panels, was engaged to coordinate the IEPR of the Harvey-Algiers project. The IEPR followed the procedures described in the Department of the Army, USACE guidance *Peer Review of Decision Documents* (EC 1105-2-410) dated August 22, 2008; CECW-CP Memorandum dated March 30, 2007; *Engineering and Design, Quality Management* (ER 1110-1-12) dated July 21, 2006; and *Engineering and Design, DrChecks* (ER 1110-1-8159) dated May 10, 2001.

This final IEPR report (this report) describes the IEPR process followed by the external panel of experts, summarizes final comments of that IEPR panel, and describes the panel members and their selection.

Battelle initially screened 10 potential peer reviewers for their technical expertise, absence of potential conflicts of interests, and their availability. Five peer reviewers were selected: a geotechnical/civil engineer, structural engineer, hydraulic engineer, mechanical/operations and maintenance engineer, and an environmental scientist.

IER #12

The IEPR panel members were provided with hard and electronic copies of the Harvey-Algiers IER #12 and supporting documentation, along with a charge that contained guidance and specific questions to answer. Starting their IER #12 review on January 7, 2009, the IEPR panel members produced 76 individual written comments. Within the comments, the IEPR panel members recommended the following additional detail/clarifications be added to improve the document:

- Construction staging as it relates to barge traffic, temporary structures, and water control measures including costs associated with those items/measures.
- Fulfill borrow needs including determining the suitability of borrow material.
- Hydraulic modeling pertaining to the storm water detention pond as it relates to pond performance for the design storm events.
- Information supporting the cost estimates.
- Calculation of the acreage of impacts avoided by providing the innovative T-wall in lieu of a levee adjacent to the 404(c) area.
- Clarification of the USACE Project Delivery Team (PDT) commitments to long term adaptive management.
- Purpose of dredging the Algiers Canal, the estimate of dredging frequency, and importance of the dredging to the GIWW West Closure Complex pump station sizing.
- Alternatives development, decision factors and evaluation process to better support the decision making process.
- Measures that would be taken to reduce noise impacts during construction.
- Creation of a checklist of Environmental Commitments/Requirements to help assure that the commitments are fulfilled and are not lost or overlooked as project implementation proceeds and Operation and Maintenance, Repair, Replacement and Rehabilitation (OMRR&R) activities are accomplished.
- Creation of a Memorandum of Agreement or Understanding developed to capture understandings with other agencies and commitments to other agencies.

The remaining comments focused on offering recommendations to clarify the document and ensure interagency approval.

The USACE PDT evaluated and responded to all 76 comments: concurring with 38 comments; agreed to provide additional information in support of 14 comments; stating they needed to check and resolve issues raised on 12 comments; and non-concurring with 12 comments, for which an explanation was provided with each. Upon review of the USACE PDT responses, the IEPR panel members determined that some comments needed further discussion because the comments were inadequately addressed. Therefore, an IEPR teleconference was conducted on February 4, 2009 for the IEPR panel and USACE PDT to discuss those comments that were identified by the panel as being inadequately addressed. Upon completion of the IEPR

teleconference and subsequent evaluations by the USACE PDT, the IEPR panel members considered all comments adequately addressed and closed all of the comments under review.

In general, the IEPR panel members agreed that the alternatives considered, the evaluation criteria, the evaluation process conducted, and the alternative proposed for implementation in the IER #12 were reasonable and appropriate for the project. The selection of the GIWW West Closure Complex as the proposed action was determined to be well-reasoned and credible.

PDD #9

After concluding the review of the IER #12 the IEPR panel members were then provided with hard and electronic copies of the Harvey-Algiers Project Description Document (PDD) #9 and supporting documentation, along with a charge that contained guidance and specific questions to answer. Starting their PDD #9 review on February 24, 2009, the IEPR panel members produced 68 individual written comments. Within the comments, the IEPR panel members recommended the following additional detail/clarifications be added to improve the document:

- Hydraulic modeling as it relates to the detention system maximum stage for the design storm event.
- Effects of pile installation on existing structures near the proposed WBV-38.2 T-walls.
- Likelihood of change to the current designs due to changes in the location and size of the GIWW-WCC structure and gates.
- Location, elevation, explanation and illustration of the line of risk reduction of the various components of the system exposed to hurricane surge to make them consistent, correct, or clearly explained.
- Purpose and need for the project and the process and conclusions conducted as a part of IER #12.
- Pumping station fronting risk reduction (and backflow prevention), flood gates, and line of risk reduction for the detention basin area.
- Depiction, design, and preliminary layout of the proposed 404(c) flood wall, access road and rock revetment throughout the GIWW Closure Complex.
- Safety guidelines to be used in design.
- Discussion of the coordination with the project sponsor/operator on right-of-way, site access, and maintenance/patrol roads.
- Clarify that environmental commitments made in response to comments received on Draft IER #12 and those contained in pending documents be added to the environmental commitment sheet as they occur.

The USACE PDT evaluated and responded to all 68 comments: concurring with 57 comments; providing additional information in response to one (1) comment; and non-concurring with 10 comments, for which an explanation was provided with each. Upon review of the USACE PDT responses, the IEPR panel members determined that some comments needed further discussion because the comments were inadequately addressed. A face-to-face IEPR Conference was conducted on March 12, 2009 at the USACE New Orleans District for the IEPR panel and USACE PDT to discuss those comments that were identified by the panel as being inadequately addressed. Upon completion of the IEPR Conference and subsequent evaluation by the USACE PDT, all comments were considered adequately addressed.

In general, the IEPR panel members agreed that the PDD #9 was technically adequate, properly documented, and the document satisfied established quality requirements.

Based upon the discussions on the IEPR teleconference, IEPR Conference, and subsequent explanations in DrChecks™ (Design Review and CHECKing System, the USACE's web-based document review software tool), the IEPR panel members and USACE PDT are in general agreement on the contents and findings of the IER #12 and the PDD #9.

1. INTRODUCTION

1.1 Background of Reports Reviewed

The U.S. Army Corps of Engineers (USACE) is currently designing and constructing the Greater New Orleans Hurricane and Storm Damage Risk Reduction System (HSDRRS). A vital component of this system is the portion along the Harvey and Algiers Canals on the West Bank of the Mississippi River in New Orleans.

Much of the West Bank lies below sea-level and is protected from hurricane storm surge by a continuous string of earthen levee and floodwall reaches running from South Kenner to the mouth of the Hero Canal at the Mississippi River. Pump stations are distributed along the levee system to remove storm water runoff caused by rainfall in the protected areas. Levee elevations relative to National Geodetic Vertical Datum of 1988 (NAVD88) vary, but are less than the elevations necessary to provide a 100-year level of risk reduction to the area. The Gulf Intracoastal Water Way (GIWW), Algiers, and Harvey Canals are heavily developed industrial waterways that provide access from the Mississippi River to the Gulf of Mexico. There are approximately 27 miles of earthen levee that extend from the vertex of the V-Line Levee to the western terminus of the Hero Canal. These levees provide parallel risk reduction along the navigation route. Mississippi Valley New Orleans (MVN) is presently authorized to raise the existing parallel risk reduction levees to an elevation of 10 feet above NAVD88. The alternatives being considered in this evaluation process would provide risk reduction over and above these construction projects. The project is in a conceptual-planning and evaluation phase.

When originally scoped, this project was to review the Harvey Algiers Alternative Evaluation Process (AEP) and Project Description Document (PDD). Upon initial coordination of the AEP review, it was determined by USACE that a review of the entire AEP would not be conducted due to the number of documents involved (over 700). Instead, a review of one portion of the AEP, the Individual Environmental Report (IER) #12, was conducted (See Figure 1).

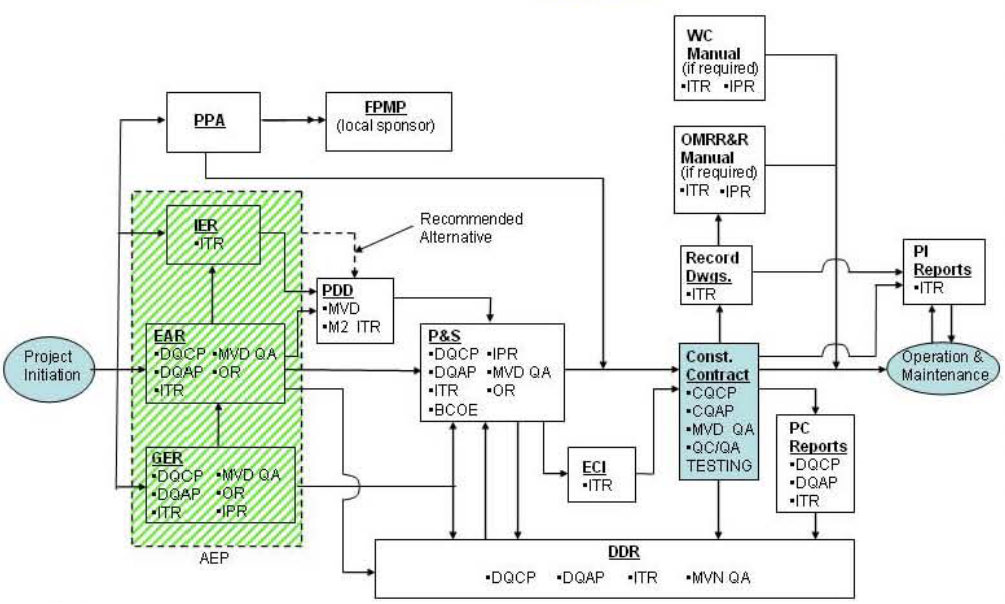

Figure 1. Documents Created During the AEP Process (see green striped box, acronym definitions included in Appendix A)

Because of the importance of this project, an Independent External Peer Review (IEPR) of the Harvey Algiers IER #12 and PDD #9 were conducted. Independent, objective peer review is regarded as a critical element in ensuring the reliability of scientific analyses.

Battelle Memorial Institute (hereafter Battelle), as a non-profit science and technology organization with experience in establishing and administering peer review panels, was engaged to coordinate the IEPR of the Harvey-Algiers project. The IEPR followed the procedures described in the Department of the Army, USACE guidance *Peer Review of Decision Documents* (EC 1105-2-410) dated August 22, 2008; CECW-CP Memorandum dated March 30, 2007; *Engineering and Design, Quality Management* (ER 1110-1-12) dated July 21, 2006; and *Engineering and Design, DrChecks* (ER 1110-1-8159) dated May 10, 2001.

This final IEPR report describes the IEPR process by an external panel of experts, summarizes final comments of that IEPR panel, and describes the panel members and their selection.

1.2 Project and Documents Reviewed

The West Bank and Vicinity, LA Project (WBV) is located in St. Charles, Jefferson, Orleans, and Plaquemines parishes on the west bank of the Mississippi River in the vicinity of New Orleans, Louisiana. The WBV project area generally extends from the vicinity of the Jefferson Parish - St. Charles Parish line in the west to the community of Oakville in Plaquemines Parish in the east and is bounded by the Mississippi River on the north and east and Davis Pond, Lakes Cataouatche and Salvador and the Gulf Intracoastal Waterway (GIWW) on the south and west.

This IEPR review covers a specific area of the WBV project that includes those reaches identified as WBV-90, WBV-14g.2, WBV-33, and WBV-14e.2. These reaches are in the Gulf Intracoastal Waterway West Closure Complex (GIWW-WCC), and include Harvey and Algiers Canals levees and fronting risk reduction. The levee reaches for the 100-year level of risk

reduction are located in Jefferson and Plaquemines parishes, while the supporting reaches are located in Jefferson, Orleans, and Plaquemines parishes. These projects provide risk reduction for the residents of Orleans, Jefferson, and Plaquemines parishes in the Harvey and Algiers area.

IER #12, Draft January 2009 Version. The IER # 12 evaluates the potential impacts associated with the proposed construction and upgrades of levees, floodwalls, floodgates, and pumping station(s) to achieve the authorized 100-year level of risk reduction for the Harvey and Algiers Canals of the WBV HSDRRS. IER # 12 has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969 and the Council on Environmental Quality's Regulations (40 CFR §1500-1508), as reflected in the USACE Engineering Regulation, ER 200-2-2. The NEPA compliance was accomplished under Alternative Arrangements, dated 13 March 2007, under the provisions of the CEQ Regulations for Implementing the NEPA (40CFR§1506.11). This process was implemented in order to expeditiously complete environmental analysis for any changes to the authorized systems.

PDD #9, February 2009 Version. The purpose of the PDD is to describe the alternatives evaluated and provide a recommended plan to reduce risk to the Harvey-Algiers portion of the WBV Project. This document describes the various features and alternatives considered, the environmental impacts of those plans, economic and real estate requirements, and a recommended plan for providing the required level of risk reduction to achieve the certification required for participation in the National Flood Insurance Program (NFIP). This PDD covers a specific area of the project and includes those reaches identified as WBV-90, WBV-14g.2, WBV-33, and WBV-14e.2. In addition, areas behind the WCC are partially described due to their inter-connected relationship in this portion of the HSDRRS.

1.3 Purpose of the Independent External Peer Review

The purpose of an IEPR is to strengthen the quality and credibility of the USACE's decision documents in support of its Civil Works program. Independent, objective peer review is regarded as a critical element in ensuring the reliability of scientific and engineering analyses.

To help ensure that USACE documents are supported by the best scientific and technical information, a peer review process has been implemented by USACE that utilizes an IEPR to complement the agency technical review, as described in the Department of the Army, USACE guidance *Peer Review of Decision Documents* (EC 1105-2-410) dated August 22, 2008, and CECW-CP Memorandum dated March 30, 2007. In this case, the IEPR of the Harvey-Algiers IER #12 and PDD #9 was conducted and managed using contract support from an independent 501(c)(3) organization, Battelle, to ensure independent objectivity, along with a high degree of flexibility and responsiveness, which was essential for USACE to meet deadlines.

2. REPORT REVIEW PROCESS

This section describes the methodology followed in selecting external peer reviewers, and in planning and conducting the IEPR. The IEPR followed the process described in the Work Plan, which Battelle develop specifically for this project, and was conducted following procedures described in USACE's guidance cited above (Section 1.1) and in accordance with the Office of Management and Budget's *Final Information Quality Bulletin for Peer Review*, released December 16, 2004. In addition, supplemental guidance on the evaluation of conflicts of interest from the National Academies' *Policy on Committee Composition and Balance and Conflicts of Interest for Committees Used in the Development of Reports*, dated May 12, 2003 was also followed.

2.1 Planning and Schedule

Table 1 defines the schedule followed by Battelle in executing the IEPR.

Table 1. Schedule

Task	Action	Completed By Date
	Pre-award Recruitment Funding Notice to Proceed (NTP)	29 Aug – 15 Sep 08 18 Sep 08
1	Submit Draft Work Plan Submit Final work Plan	29 Oct 08 5 Nov 08
2	Submit list of Final IPR Panel Peer reviewers under contract	26 Sep 08 8 Oct 08
3	USACE provides the Briefing Materials USACE provides Orientation Briefing Peer Reviewers attend Orientation Briefing	6-10 Oct 08 17 Oct 08 17 Oct 08
4	USACE provides Individual Environmental Report (IER) #12 Conduct Peer Review of IER #12 Peer Reviewers' Comments provided in DrChecks™ USACE Project Delivery Team (PDT) Review Peer Reviewers' Comments and Respond in DrChecks Peer Reviewers' Backcheck USACE PDT Responses in DrChecks Teleconference feedback on IER #12 Review	06 Jan 09 7 Jan – 21 Jan 09 7 Jan – 21 Jan 09 22 Jan – 11 Feb 09 29 Jan – 18 Feb 09 4 Feb 09
5	USACE provides PDD #9 Conduct Peer Review of PDD #9 Peer Reviewers' Comments provided in DrChecks USACE PDT Review Peer Reviewers' Comments and Respond in DrChecks Peer Reviewers' Backcheck USACE PDT Responses in DrChecks	23 Feb 09 24 Feb – 6 Mar 09 24 Feb – 6 Mar 09 4 Mar – 16 Mar 09 7 Mar – 17 Mar 09
6	Peer Review Final Briefing Conference Peer Reviewers present findings at Peer Review Conference	12 Mar 09 12 Mar 09
7	Closeout all comments in DrChecks Submit Closeout Report (Final Report) Project Closeout	17 Mar 09 17 Apr 09 1 Jul 09

2.2 Identification and Selection of Independent External Peer Reviewers

Battelle initially identified ten potential peer reviewers, confirmed their availability, evaluated their technical expertise, and inquired about potential conflicts of interest. Of those initially contacted, five external peer review candidates confirmed their interest and availability, and five candidates declined due to the schedule, anticipated level of effort, or because of disclosed conflicts of interest.

The five reviewers selected for the final IEPR panel were independent engineering consultants. Corresponding to the technical content of the Harvey-Algiers documents, the areas of technical expertise of the selected peer reviewers included: geotechnical/civil engineering, structural engineering, hydraulic engineering, mechanical/operations and maintenance engineering, and environmental science.

The credentials of the peer reviewers were evaluated according to the overall scope of the Harvey-Algiers documents, focusing on the key areas listed above. Participation in previous USACE technical review committees and other technical review panel experience was also considered.

The peer reviewers were screened for the following *potential* exclusion criteria or conflicts of interest:

- Involvement in producing the Harvey-Algiers documents (including related technical reports and supporting appendices);
- Involvement in any USACE projects in the New Orleans, Louisiana area;
- Current USACE, federal, or state government employee;
- Other USACE affiliation [Scientist employed by the USACE (except as described in National Academy of Sciences (NAS) criteria, see EC 1105-2-408 section 9d)];[a]
- A significant portion of personal or company revenues within the last 3 years came from USACE contracts;
- Current or future financial interests in HSDRRS contracts/awards from USACE;
- Any publicly documented statement made by the reviewer or reviewer's firm advocating for or against the subject project;

[a] Note: Battelle evaluated whether scientists in universities and consulting firms that are receiving USACE funding have sufficient independence from USACE to be appropriate peer reviewers. See the OMB memo p. 18, "….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."

- Financial or litigation association with USACE, "The State" (defined as the State of Louisiana and Local governing entities including Southeast Louisiana Flood Protection Authority), their engineering teams or subcontractors;
- Paid or unpaid participation in litigation related to the work of the USACE;
- Personal relationships with USACE staff in Mississippi Valley Division Headquarters, Task Force Hope, New Orleans District (Protection Restoration Office), Hurricane Protection Office, or officials from the State of Louisiana and Local governing entities including Southeast Louisiana Flood Protection Authority;
- Participation in the Interagency Performance Evaluation Task (IPET) Force, American Society of Civil Engineers External Review of IPET, the Louisiana Coastal Protection and Restoration Study, and/or National Research Council Committee on New Orleans Regional Hurricane Protection Projects; and
- Other possible perceived conflicts of interest for consideration, e.g.,
  - Former USACE New Orleans employee

In selecting final peer reviewers from the list of potential peer review candidates, an effort was also made to select experts who best fit the criteria and factors described above. Based on these considerations, five peer reviewers were selected from the potential list (see Section 3 for names and biographical information on the selected peer reviewers). Battelle established subcontracts with the peer reviewers who had indicated their willingness to participate and confirmed the absence of conflicts of interest (through a signed conflict of interest form).

2.3 Orientation Visit

On October 17, 2008, Battelle staff and the IEPR panel members gathered for an Orientation Meeting on the Harvey-Algiers project at USACE's New Orleans District in New Orleans, Louisiana. During the Orientation Meeting, the USACE Project Delivery Team (PDT) briefed Battelle and the IEPR panel members on the entire HSDRRS program and provided an overview of the Harvey Canal and Algiers Canal projects. Following the briefing, members of the USACE PDT, Battelle staff, and IEPR panel members boarded a vessel on the Mississippi and travelled down the Harvey Canal, up the Algiers Canal, returning after to their original destination. Throughout the entire trip, the USACE PDT members pointed out the various locations of the Harvey-Algiers project features and answered questions posed by the IEPR panel members.

2.4 Preparation of the Charge and Conduct of the Peer Review

A charge to the IEPR panel members, which contained specific questions regarding the IER #12 or PDD #9, was developed for each document peer reviewed to assist the IEPR panel. The draft charge was prepared by Battelle with input from USACE and guidance provided in USACE's guidance *Peer Review of Decision Documents* (EC 1105-2-410) and the Office of Management and Budget's *Final Information Quality Bulletin for Peer Review*, released December 16, 2004. The charge was finalized based on the USACE PDT's suggested changes to the draft charge questions.

The IER #12 charge consisted of five questions applicable to the entire document. The PDD #9 charge consisted of three questions applicable to the entire document.

Battelle developed a Microsoft PowerPoint training session to instruct the panel members on using the USACE software system for document and sharing comments on reports - DrChecks™ (Design Review and Checking System). The IEPR panel was instructed to respond to the charge questions for each specific review using DrChecks. The final IER #12 charge for the peer review is shown in Appendix B of this final IEPR report and the final PDD #9 charge for the peer review is shown in Appendix C.

The IER #12 IEPR started on January 7, 2009 when Battelle provided the IEPR panel members with hard and electronic copies of the final charge, IER #12, and supporting documentation. At that time the IEPR panel members were instructed by Battelle to submit their initial responses to the charge questions via DrChecks no later than January 21, 2009.

The PDD #9 review was a slightly more compressed review period than originally scheduled due to Battelle receiving the document on February 23, 2009 and the need of the USACE PDT to have all comments addressed by March 17, 2009. The PDD #9 IEPR started on February 24, 2009 when Battelle provided the IEPR panel members with hard and electronic copies of the final charge, PDD #9, and supporting documentation. Unlike other HSDRRS IEPR reviews that provided two full weeks for review of the document, this compressed review allowed only one week for the IEPR panel members to review the document and post their initial comments via DrChecks. Three additional days were provided for the provision of any remaining comments that might have been forthcoming (comment period closed on March 6, 2009). In addition, unlike other HSDRRS IEPR reviews, the USACE PDT were provided access to the peer review comments on March 4, 2009 (prior to the peer review comment period ending on March 6, 2009) so they could begin reviewing and addressing the comments to meet the March 17, 2009 deadline.

To maintain independence and control, the IEPR panel was not permitted to have e-mail or phone contact with the USACE for either the IER #12 or PPD #9 reviews. All interaction either occurred during the orientation, during an IEPR teleconference, through the DrChecks interface, or during a face-to-face IEPR Conference.

2.5 IER # 12 Review

Using the charge guidance as the basis for their review, the IEPR panel members collectively developed 76 individual comments for the IER #12, which were entered directly into DrChecks by IEPR panel members. Comments were made on several sections and appendices of the IER #12 document and covered a variety of topics. Of the 76 comments provided, the IEPR panel members initially identified 12 comments as critical. Critical comments are defined as being associated with issues that address public safety, health, and welfare. Critical comments focused on the following general topics:

- Tracking environmental commitments/requirements;
- Mitigation, augmentation, monitoring and adaptive management measures for the Section 404(c) area;

- Detention pond characteristics;
- Alternatives evaluation;
- Borrow material analysis/dredging;
- Flow control and pumping station structure operations\cost benefits; and
- Noise impacts.

The USACE PDT evaluated and responded to all 76 comments: concurring with 38 comments; agreed to provide additional information in support of 14 comments; stating they needed to check and resolve issues raised on 12 comments; and non-concurring with 12 comments, for which an explanation was provided with each. Upon review of the USACE PDT responses, the IEPR panel members determined that some comments needed further discussion because the comments were inadequately addressed. Battelle compiled information from the comments left open by the IEPR panel members in DrChecks into a Microsoft PowerPoint presentation and led an IEPR Live Meeting and teleconference on February 4, 2009 to allow the IEPR panel members and USACE PDT to discuss the open comments (see Appendix D and Section 2.6).

The following figure is one example of a critical comment which was entered into DrChecks by the IEPR panel, evaluated by the USACE PDT prior to the IEPR teleconference, responded to (i.e., Backchecked by the panel member), discussed further on the IEPR teleconference, and subsequently agreed upon and closed out after the IEPR teleconference.

Figure 2. Example of a Critical Comment from the IER #12 Review

2262066	Hydraulics	Environmental Impact Statement	n/a'	n/a	n/a
(Document Reference: 3.2, page 91) **Coordinating Discipline(s)**: Environmental The only noise impacts that should be of concern are temporary noise impacts from construction activities. The analyses does not include any provisions regarding how construction noise will be addressed. Do local or state zoning or other regulations specify maximum Leq, DNL or maximum noise levels for various times of day and night? Per table 11 one pile driving unit at 100' produces 85 dBA. How many residential areas could be impacted by pile driving activities? What restrictions on pile driving will be implemented? Will there be monitoring of construction noise and will there be procedures for advance notification of residents and for addressing of complaints? Pile driving is not the only operation capable of producing undesireable noise levels. This is particularly true along the Algiers Canal, which has many residents adjacent to it. Submitted By: [redacted]. Submitted On: 20-Jan-09					
1-0	Evaluation **Concurred** We expect to receive complaints about the operation since 24 hour activities will be needed to meet the goal of 2011. Jefferson parish just passed a resolution allowing 24 hour construction and eleminating the restrictions on noise generation at certain hours. Submitted By: [redacted] Submitted On: 30-Jan-09				
1-1	Backcheck Recommendation **Open Comment** Coordination with local officials that USACE has conducted to obtain the resolution with Jefferson parish is a great first step. Are similar resolutions (if needed) being pursued with other parishes? Include a statement regarding the Jefferson and other parish resolutions. Recommend that another statement be added saying that the contract documents will contain preventative and response provisions for addressing noise complaints that may				

	arise during construction of the project. Submitted By: [redacted] Submitted On: 31-Jan-09
2-0	Evaluation **Non-concurred** Additional efforts are being coordinated with Plaquemines Parish Government. All noise complaints will be addressed in accordance with the provisions of that resolution. Submitted By: [redacted] Submitted On: 02-Mar-09
2-1	Backcheck Recommendation **Close Comment** Temporary noise impacts are being addressed with the parishes. Comment is closed. Submitted By: [redacted] Submitted On: 05-Mar-09
	Current Comment Status: **Comment Closed**

2.6 PDD # 9 Review

Using the charge as the basis for their review, the IEPR panel members collectively developed 68 individual comments for the PDD #9, which were entered directly into DrChecks by IEPR panel members. Comments were made on several sections and appendices of each document and covered a variety of topics. Of the 68 comments provided, the IEPR panel members initially identified 8 comments as critical. Critical comments are defined as being associated with issues that address public safety, health, and welfare. Critical comments focused on the following general topics:

- Levee and structure elevations;
- Environmental compliance\commitments;
- Purpose and need for the project;
- Alternatives;
- Canal freeboard; and
- Available structural engineering data.

The USACE PDT evaluated and responded to all 68 comments: concurring with 57 comments; providing additional information in response to one (1) comment; and non-concurring with 10 comments, for which an explanation was provided with each. Upon review of the USACE PDT responses, the IEPR panel members determined that some comments needed further discussion because the comments were inadequately addressed. Battelle compiled information from the comments left open by the IEPR panel members in DrChecks into a Microsoft PowerPoint presentation and led an IEPR Conference on March 12, 2009 to allow the IEPR panel members and USACE PDT to discuss the open comments (see Appendix E and Section 2.7).

The following figure is one example of a critical comment which was entered into DrChecks by the IEPR panel, evaluated by the USACE PDT prior to the IEPR Conference, responded to (i.e., Backchecked by the panel member), discussed further at the IEPR Conference, and subsequently agreed upon and closed out after the IEPR Conference.

Figure 3. Example of a Critical Comment from the PDD #9 Review

2350646	Structural	Project Information Reports	n/a'	n/a	n/a
Coordinating Discipline(s): Structural The PDD #9 document provided for review, excluded appendices for the supporting documents limiting the amount of structural engineering data available for review. The fact that the Sector Gate South study is of critical importance to the selected alternative, that document including appendicies should be provided for review. Submitted By: [redacted]. Submitted On: 03-Mar-09					
1-0	Evaluation **Non-concurred** There will be a technical peer review of all designed features as they are designed. Submitted By: [redacted] Submitted On: 11-Mar-09				
1-1	Backcheck Recommendation **Open Comment** This should be discussed at the review conference. Submitted By: [redacted] Submitted On: 11-Mar-09				
2-0	Evaluation **Concurred** As discussed in meeting of 12 March 2009, supplemental information was unavailable for review by panel members. Supplemental information in the form of volumes 2,3, and 4 of the final EAR as well as the ROD as signed by commander MVN is in the process of being provided. It is understood that the PDD is meant to be a consise document and not a feasibility study and that full technical review of the detailed design documents will be undertaken under the design peer review. Submitted By: [redacted] Submitted On: 13-Mar-09				
2-1	Backcheck Recommendation **Close Comment** Based on the additional information provided following the review conference of 12 March 2009, this reviewer finds that the level of engineering analysis is sufficient to support the recommended alternative. Submitted By: [redacted] Submitted On: 14-Mar-09				
	Current Comment Status: **Comment Closed**				

2.7 IEPR Teleconference for IER #12

Battelle led an IEPR teleconference between the USACE PDT who responded to the DrChecks comments and the IEPR panel members on February 4, 2009, via Live Meeting (presentation) and teleconference. Members of the State and local stakeholders were invited to attend. The purpose of the IEPR teleconference was to provide a forum for a discussion of those comments that the IEPR panel members considered inadequately addressed regarding the IER #12.

The February 4 teleconference provided an opportunity for the IEPR panel members to understand some of the responses from the USACE PDT to clarify some of the comments made by the IEPR panel members for the USACE PDT. Overall the teleconference was successful in

clarifying and resolving the issues, and at the conclusion of the teleconference all comments were considered adequately addressed by the IEPR panel members.

2.8 IEPR Conference for IER #12 and PPD #9

Battelle led a face-to-face IEPR Conference between the USACE PDT who responded to the DrChecks comments and the IEPR panel members on March 12, 2009, at the New Orleans District in New Orleans, Louisiana. Members of the State and local stakeholders were invited to attend. The purpose of the IEPR Conference was to provide a forum for a face-to-face discussion of those comments that the IEPR panel members considered inadequately addressed regarding the PDD and two comments that remained open (but had been resolved on the February 4, 2009 teleconference) on the IER #12.

The peer review conference provided an opportunity for the IEPR panel members to understand some of the responses from the USACE PDT to clarify some of the comments made by the IEPR panel members for the USACE PDT. Overall the conference was successful in clarifying and resolving the open issues, and at the conclusion of the IEPR Conference all comments were considered adequately addressed by the IEPR panel members.

2.9 IEPR Final Report

After concluding the review of the PDD #9, Battelle prepared a final report (this report) on the overall IEPR process and the IEPR panel member's findings. The report was reviewed and commented on by each IEPR panel member and Battelle technical and editorial experts prior to submission of the report to the USACE.

3. BIOGRAPHICAL INFORMATION ON EXTERNAL PEER REVIEWERS

Potential peer review candidates were identified through Battelle's IEPR Database of experts, trade organizations, engineering societies, targeted internet searches using key words (e.g., terms focusing on technical area and geographic region), search of websites of universities or other compiled expert sites, and through referrals.

All IEPR panel members met the following minimum requirements:

- If engineers, registered professional (or equivalent in home country);
- Masters degree (preferable); and
- 10 years of experience and responsible charge of engineering work.

Panel members in each discipline also were required to have specific technical experience in the areas summarized in Table 2 below.

Table 2. Required Technical Experience for Harvey-Algiers IEPR Panel Members

Discipline (# of Reviewers)	Required Experience			General Experience
Geotechnical Engineer (1)	Very soft Louisiana-type clay soil foundations	Large diameter pile design	Axial and lateral load testing for piles	Civil Works Planning, Project and Program management experience with specific experience in plan formulation and storm damage reduction and have led projects that have lasted several years and are complex in nature (2 Reviewers Needed)
	T-wall and L-wall design	Subsurface investigations in very soft soil	Seepage design	
	Wave impact/armoring	Slope stability analyses for very soft soils	Levees design	
	Large hydraulic structures	Erosion Control	Timber guide and risk reduction walls	
Structural Engineer (1)	Sector gates, lift gates, and/or barge gates subject to high wind and wave loading		T-wall and L-wall floodwall design	
Hydraulic Engineer (1)	Hurricane surge and wave generation		Navigational hydraulics	
Mechanical/Operational Maintenance Engineer (1)	Gate machinery	Hydraulic systems	O&M of major civil work hydraulic structures including navigation gates	
Environmental Scientist (1)	National Environmental Policy Act	EPA Regulations [especially sections 404(b) and 404(c)	Environmental Impact Statements	

A draft list of potential reviewers that were screened for availability, technical background, and conflict of interest was prepared by Battelle and provided to the USACE. The final list of IEPR panel members was determined by Battelle (Table 3) based on their specific experience in the areas of expertise specified in the scope of work (Table 4).

Table 3. Final List of IEPR Panel Members

Discipline/Name	Affiliation	Location	Education	P.E.	Years of Experience
Geotechnical/Civil Engineer					
A. Mahendra Rodrigo	GC Engineering, Inc.	Pearland, TX	BSCE, MS (Civil & Env Eng)	Yes	24
Structural Engineer					
Tom Burkhart	Carlton Engineering	Shingle Springs, CA	BSCE	Yes	23
Hydraulic Engineer					
Kenneth Avery	Bergmann Associates, Inc. PC	Rochester, NY	BS (Civil and Env Eng); MS Water Res Eng	Yes	31
Mechanical/Operation & Maintenance					
Peter Fischer	Short Elliot Hendrickson, Inc.	St. Paul, MN	BSCE, MSCE	Yes	53
Environmental Science					
Nathaniel "Skeeter" McClure	Volkert & Associates	Mobile, AL	BSCE, MS	Yes	47

Table 4. Specific Experience of IEPR Panel Members Requested in the Scope of Work

Expertise	Total	A. Mahendra Rodrigo	Tom Burkhart	Kenneth Avery	Peter Fischer	Nathaniel D. "Skeeter" McClure
Civil Works Planning, Project, and Program Management						
Plan Formulation	**4**	X		X	X	X
Storm Damage Reduction	**3**	X			X	X
Led projects that have lasted several years and are complex in nature	**4**	X		X	X	X
Geotechnical/Civil Engineer						
Very soft Louisiana-type clay soil foundations	**1**	X				
Large diameter pile design	**1**	X				
Axial and lateral load testing for piles	**1**	X				
T-wall and L-wall design	**1**	X				
Subsurface investigations in very soft soil	**1**	X				
Seepage design	**1**	X				
Wave impact/armoring	**1**	X				
Slope stability analyses for very soft soils	**1**	X				
Levees design	**3**	X		X	X	
Large hydraulic structures	**4**	X	X	X	X	
Erosion control	**3**	X		X	X	
Timber guide and risk reduction walls	**2**	X			X	
Structural Engineer						
Sector gates, lift gates, and/or barge gates subject to high wind and wave loading	**1**		X			
T-wall and L-wall floodwall design	**1**		X			
Hydraulic Engineer						
Hurricane surge and wave generation	**2**		X		X	
Navigational hydraulics	**3**	X		X	X	
Mechanical/Operation & Maintenance						
Gate machinery	**1**				X	
Hydraulic systems	**0**					
O&M of major civil work hydraulic structures including navigation gates	**1**				X	
Environmental Scientist						
National Environmental Policy Act	**3**			X	X	X
EPA Regulations [especially sections 404(b) and 404(c)	**3**			X	X	X
Environmental Impact Statements	**3**			X	X	X

A summary of the credentials of the five reviewers selected for the IEPR panel and their qualifications in relation to the technical evaluation criteria is presented below. A resume including more detailed biographical information for each reviewer and his technical areas of expertise is presented in Appendix F.

Kenneth Avery, P.E., CFM, D.WRE, Role: Hydraulic Engineer, has 31 years of experience in water resources, environmental, and civil engineering. In the field of water resources, his experience encompasses planning, engineering, and design, especially surface water hydrology, open and closed channel hydraulics, revetment, bridge and channel scour, and sediment transport. Mr. Avery has utilized steady and unsteady flow hydraulic models. His design experience covers hydraulic structures, dams, sewers, highway and bridge hydraulics, penstocks, natural rivers and riprap revetment. He has worked on major watershed, hydrologic and hydraulic studies for clients that include the USACE, National Park Service, and State Transportation Agencies. In his work with State Transportation Agencies, he participated in the alternatives analyses and preparation of NEPA EIS documents for several $50+ M transportation projects. Mr. Avery served as the Project Engineer for the first major renovation of the Hornell, NY local flood protection works since the 1930s. He has also served as Sr. Hydraulic Engineer on projects that include: Braddock Dam, Emsworth Main Channel Dam, Waterbury Dam, and Wyoming Valley. For the Ohio and Erie Canal Waterway Study in Cuyahoga Valley National Park, OH, Mr. Avery served as the Project Manager for hydrologic and hydraulic study of a 6-mile re-watered section of the Ohio and Erie Canal between the Brecksville Dam and Rockside Road.

Tom Burkhart, P.E., S.E., Role: Structural Engineer, is the Principal Structural Engineer at Carlton Engineering as well as the Structural Department Manager. He has 23 years of experience in the field of Structural Engineering including considerable structural engineering experience in water conveyance and energy facilities construction. Mr. Burkhart has worked on a variety of water district facilities and was the engineer responsible for the structural engineering portion of the 22-mile FERC Project 184 Flume Evaluation conducted in 2001. In addition to his traditional structural engineering roles, Mr. Burkhart manages many of the company's more significant projects. As Principal Structural Engineer, he contributes to the design team by developing structural design concepts, directing structural analysis and design methods, production of working drawings and specifications, and overseeing construction administration and quality control inspections. Mr. Burkhart was the Structural Project Engineer for a study of approximately 4000 feet of the City of Sacramento's flood protection wall, as well as Project Engineer responsible for structural evaluation for various storm water pumping plants in the Sacramento area. He was also the Senior Structural Engineer responsible for forensic evaluation of existing water intake and control gates within an existing water diversion structure for the El Dorado Irrigation District, El Dorado County, CA.

Peter A. Fischer, P.E., Role: Mechanical Engineer/Operations and Maintenance, has been practicing in the fields of civil and water resources engineering for 50 years, over 31 years of which was with the U.S. Army Corps of Engineers, St. Paul District. Assignments included engineering management, project management, technical supervision, hydraulic design, and hydrologic engineering of a wide variety of projects in flood control, navigation, and water resources development. For the past 12 years, Mr. Fischer has been participating in the hands-on

design of water resources projects as a member of the Water Resources Division at Short, Elliot, and Hendrickson (SEH). During the 25 years that Mr. Fischer worked on and managed hydraulic design, he was involved with projects that required the design of wing dams, rock dikes, riprap bank protection, diversion dikes, channel closure structures, groins, gated diversion structures, weirs and low overflow spillways. Mr. Fischer recently led the Independent Technical Review (ITR) of the Grand Forks, ND and East Grand Forks, MN Operation Maintenance Manual. He also led the rehabilitation of 10 Mississippi River Locks and Dams. Projects included repair and replacement of unsatisfactory concrete and masonry, new central control stations, motorization of the operation of the Tainter gates, repair of miter gates, replacement of miter gate machinery, and replacement of gates on lock filling tunnels.

N. D. "Skeeter" McClure, IV, P.E., D. WRE, Role: Environmental Scientist, retired from the USACE Mobile District in 1997 after 37 years of service. He is a Professional Engineer and in 2005 was inducted by ASCE/AAWRE as Diplomate, Water Resource Engineer. His experience and expertise as includes service as Chief of the Planning and Environmental Division, the Environmental and Resources Branch, the Environmental and Water Quality Sections, and Tennessee-Tombigbee Litigation Unit (NEPA Litigation) over his career with USACE. Mr. McClure began his NEPA experience in the preparation of EIS for the Tenn-Tom Waterway (TTW) in 1970. Since that time, Mr. McClure has participated in the preparation and/or review of over 100 NEPA documents including over 30 EISs. Mr. McClure joined Volkert & Associates, Inc. in 1997 as a Consultant and Environmental Manager. He has served as an Independent Technical Review Panel member for Environmental, Water Quality and NEPA Documents for the proposed Duck River Water Supply Reservoir. Mr. McClure also served as the environmental manager for the preparation of an award-winning EIS for the Choctaw Point Terminal Container Port in Mobile.

A. Mahendra Rodrigo, P.E., Role: Geotechnical/Civil Engineer, is a Principal with GC Engineering, Inc. (GCE) with over 24 years of experience in managing projects related to civil and geotechnical engineering, program management, environmental restoration, transportation, and water resources. He has extensive project management experience in civil and environmental services on multi-disciplinary projects for Federal, State, and Local governmental agencies as well as for private industry. Mr. Rodrigo served as Program Manager for the analysis of hydraulic and geotechnical stability of an approximately 1,200 feet section along Green Brook for USACE New York District. He also served as Program manager for the NJDOT – I-287 Stream Bank Repair Design of Ramapo River at a Constructed Wetland Site. For the Port of Houston Authority, Mr. Rodrigo served as the Project Manager responsible for the design and preparation of construction documents for the reconstruction of an approximately 2-acre pavement, erosion control measures along the ship channel adjacent to the project site at Wharves 47-48 in Houston.

4. RESULTS – SUMMARY OF IER #12 REVIEW

The IEPR panel members followed the processes described in Sections 2.4, 2.5, 2.7, and 2.8 to conduct their review of the IER #12, execute the IEPR teleconference and Conference, and to finalize remaining comments in DrChecks. These processes were in accordance with the Work Plan and all the USACE guidance documents (described previously). Listed below are summaries of how the peer review experts in each discipline approached their reviews,

conclusions that the panel members reached, and the status of any open issues including critical items.

4.1 Review Approach

As noted in Section 2.4, Battelle developed a charge to direct the IEPR panel members in conducting their review. As part of that charge, Battelle asked the IEPR panel members to answer five specific questions and to conduct a broad overview of the document focusing on their particular area of expertise and technical knowledge.

The panel members were encouraged to work individually according to their assigned expertise and to also contribute to the reviews being conducted by the reviewers in the other disciplines, as appropriate based upon their experience as shown in Table 4. Panel members were able to discuss their reviews with other panel members if it was beneficial.

Appendix B provides the IER #12 charge prepared by Battelle with the five specific questions the IEPR panel members were asked to answer. The sections below describe how the peer review experts approached their broad overview of the IER #12 document based on their particular area of expertise and technical knowledge.

Geotechnical/Civil Engineering Review Approach

The IEPR panel member with geotechnical and civil engineering expertise focused on the following items during his review:

- General conformance of the design to Hurricane and Storm Damage Risk Reduction System (HSDRRS) Design Guidelines and applicable USACE Engineering Manuals.
- Overall civil engineering plan and schedule.
- Boring and sampling requirements.
- Dredging, dredged material characteristics, and disposal.
- Environmental issues and their impacts.
- Slope stability and seepage analysis, and relative design issues such as hydraulic design, and load considerations.
- Design rationale, design computations, report and drawings consistency, accuracy, as well as load applications including loading case combinations.
- Critical issues that could result in failure.

Structural Engineering Review Approach

The review performed by the IEPR panel member with structural engineering expertise began with a general review of the project documents to gain a broad understanding of the scope of the project and the disciplines involved. This was followed by a more detailed review.

The IER #12 was mainly focused on providing general information on the purpose and need, alternatives analysis, and environmental impacts. Neither the IER #12 nor the supporting information supplied contained calculations, designs, or other structural engineering technical documentation. Therefore, a normal structural design review could not be conducted. The

resulting review was more administrative in nature and documented the lack of structural information for review.

Hydraulic Engineering Review Approach

The IEPR panel member with hydraulic engineering expertise conducted the IER#12 document review in a similar manner to previous reviews conducted for other federal Environmental Impact Statements and Environmental Assessments, and in accordance with the charge to the peer review team. Rather than limiting the review to his discipline, he performed an overall review of the document, which was intended to be a record of the decision-making process that was followed in the development, evaluation, and selection of alternatives for the Harvey – Algiers portion of the HSDRRS. The reviewer developed an additional series of questions that included:

- Was the purpose and need for the project clearly and succinctly explained?
- Were a wide enough range of alternatives evaluated, and was sufficient explanation and documentation provided as to why some alternatives were considered but dismissed from a more in-depth evaluation?
- Was the evaluation of the most feasible alternatives conducted using an objective, and rational criteria, consistent with the purpose and need for the project, and was sufficient explanation and documentation of the decision making process that led to selection of the preferred alternative provided?
- Were the environmental effects (including avoidance, minimization, and mitigation) associated with the feasible alternatives clearly and consistently documented?
- Did the document clearly explain the environmental commitments associated with the preferred alternative, and how they would be implemented going forward?
- Was the technical approach and scientific rationale credible, and were the conclusions valid?
- Was the work technically adequate and properly documented, and did it satisfy established quality requirements and yield scientifically credible results?

Mechanical/Operation and Maintenance Engineering Review Approach

The IEPR panel member with mechanical/operation and maintenance engineering expertise concentrated the review on the operation, maintenance, and mechanical features of the project specifically relating to discussion of and impacts of mechanical features, operational access, maintenance, and safety, all of which may create operation and maintenance issues after completion of construction and turn-over to the operating agency. The focus was to insure all mechanical, operation, and maintenance features were clearly described and impacts accurately evaluated.

Environmental Science Review Approach

The IEPR panel member with environmental science expertise focused the review on ensuring that the document, including appendices, accomplished the following:

- Conformance with NEPA/CEQ approved emergency alternative arrangements as well as other environmental laws and Executive Orders.
- Accurate description of the proposed action, alternatives, affected environments (social and natural attributes), environmental consequences, cumulative impacts, selection rationale, coordination and consultation, mitigation and monitoring and compliance with environmental laws and regulations.

He also reviewed the comments of other IEPR panel members to discern potential environmental issues and to avoid duplication or conflicts of views. Lastly, common issues, especially hydraulics, disposal of dredge material and water quality, were discussed with other panel members.

4.2 Summary of IEPR Panel Comments

In general, the IEPR panel members agreed that the alternatives considered, the evaluation criteria, the evaluation process conducted, and the alternative proposed for implementation in the IER #12 were reasonable and appropriate for the project. The selection of the GIWW West Closure Complex as the proposed action was determined to be well-reasoned and credible.

The panel concluded that the IER #12 prepared for the Harvey-Algiers project does not contain any significant technical errors, but recommended that the document be revised to improve clarity of some issues and to address the issues identified during the IEPR process. Based upon the discussions during the IEPR teleconference, at the IEPR Conference, and subsequent close-out of DrChecks comments, the USACE PDT is in general agreement with the panel members concerns.

The following sections provide conclusions drawn by each reviewer that were in addition to those noted above by the IEPR panel as a whole.

Geotechnical/Civil Engineering Comments

The Geotechnical and Civil Engineering IEPR panel member provided 10 DrChecks comments that identified several concerns, made a few suggestions, and provided some general thoughts on the IER #12. The concerns included a lack of detail regarding construction staging as it relates to barge traffic, temporary structures, and water control measures including costs associated with those items/measures. The reviewer indicated that additional information was needed to fulfill borrow needs, including determining the suitability of borrow material. Lastly, the Geotechnical and Civil Engineering IEPR panel member was concerned about the hydraulic modeling pertaining to the storm water detention pond as it relates to pond performance for the design storm events.

The Geotechnical and Civil Engineering IEPR panel member suggested evaluating dredged material reuse options depending on the nature and level of contamination in order to minimize costs and other impacts associated with hauling and disposal. He also suggested providing the available disposal capacity at Geocrib Site in JLNHPP as well as disposal capacity and suitable borrow availability at Walker Road Borrow Site.

Structural Engineering Comments

The Structural Engineering IEPR panel member's review of the IER #12 document revealed a lack of information relative to the structural engineering discipline. This issue was raised in DrChecks.

Because of the lack of structural engineering data made available for review, the remaining observations and resulting comments produced were administrative in nature. Overall, six (6) comments were entered into DrChecks by the Structural Engineering IEPR panel member. Specific items included the observation of inconsistencies in the report related to the uses of names and acronyms of the various supporting studies, comments regarding data gaps, comments related to the lack of information supporting the cost estimates, and a comment related to the lack of quantitative data in general.

Hydraulic Engineering Comments

In general, the Hydraulic Engineering IEPR panel member found the alternatives development and evaluation and the IER #12 analyses well-written, credible, and thorough. Some of his comments cited issues that were meant to further improve the overall presentation by adding available information that did not make it into the document or that could have been referenced. Many of the comments requested further explanation of the engineering of the various features of the project, which were explained in the responses and later discussed in more detail as a part of the PDD #9 review. Overall, 33 comments were entered by the Hydraulic Engineering IEPR panel member. Specific comments, concerns, recommendations and critical items noted in DrChecks are summarized below:

- One comment requested a calculation of the acreage of impacts avoided by providing the innovative T-wall in lieu of a levee adjacent to the 404(c) area.
- One comment requested clarification of the USACE PDT commitments to long-term adaptive management.
- Several comments identified that the purpose of dredging the Algiers Canal was not well defined, and the estimate of dredging frequency and importance of the dredging to the GIWW West Closure Complex pump station sizing was not explained.
- Three comments recommended improving the visibility of the alternatives development, evaluation factors and evaluation process to better support the decision making process that was actually followed.
- One comment requested additional explanation of measures that would be taken to reduce noise impacts during construction.
- One comment, which pertained to the USACE's Engineer Research and Development Center qualitative risk and reliability study conducted for a range of alternatives, asked if additional studies involving the use of fragility curves would be conducted for the proposed action. The USACE PDT said that those studies would be undertaken for the proposed action.

Mechanical/Operation and Maintenance Engineering Comments

The Mechanical/Operation and Maintenance Engineering IEPR panel member found, with minor exceptions, the decisions in the IER #12 to be technically adequate, properly documented, and determined that it satisfies established quality requirements. He also believed the IER #12 yields scientifically credible findings that are appropriate to answer the principal study questions. Specific comments, concerns, recommendations and critical items noted in DrChecks are summarized below:

- Comments relating to impacts of operation, maintenance, and dredging activities on cost, time, staffing, noise, air and water quality were resolved when the evaluator indicated these items would be discussed in the PDD #9 and engineering alternatives report documents, and will be discussed in detail in a future "Comprehensive Environmental Document."
- Comments regarding the inclusion of impacts on evacuation of the area in the IER #12 were resolved with a clarification by the evaluator that the IER includes only federal actions and evacuation is non-federal.

Discussions between the evaluators and the Mechanical/Operation and Maintenance Engineering IEPR panel member clarified issues and developed a good understanding leading to resolution. Upon completion of the review, all 10 of his comments were resolved and closed.

Environmental Science Comments

The Environmental Science IEPR panel member considered 2 of his 17 comments to be critical:

- One comment noted that a number of environmental commitments were made in the document, including commitments to address certain issues in future documents such as Mitigation IERs and a Comprehensive Environmental Document. Additional decisions and commitments were also pending. A recommendation was made, and an example provided, that a checklist of Environmental Commitments/Requirements be prepared to help assure that the commitments were fulfilled and were not lost or overlooked as project implementation proceeded and OMRR&R activities were accomplished. Commitments regarding the Section 404(c) area are especially important because of it designation as an important resource deserving special protection.
- Another Comment recommended that a mechanism such as a Memorandum of Agreement or Understanding be developed to capture understandings with other agencies and commitments to other agencies. This comment was an extension of the recommendation made under a previous comment. Again it was considered to be particularly relevant for the Section 404(c) area and for the fulfillment of agreements with EPA and other federal and state agencies.

The remaining comments focused on offering recommendations to clarify the document and ensure interagency approval. USACE PDT concurred with most of these comments or marked them for future review and consideration.

The Environmental Science IEPR panel member indicated that it remains essential that all of the environmental commitments are captured and fulfilled as the project goes forward. By

concurring with the critical comments, USACE PDT assured the Environmental Science IEPR panel member that these commitments will be met. Therefore, the Environmental Science IEPR panel member concluded that all of his comments in DrChecks were satisfactorily addressed by the USACE PDT upon which he subsequently closed them.

4.3 Critical Comments and any other Open Issues that Remain to be Resolved

As a result of the IEPR teleconference, IEPR Conference, and resolution of all issues included in DrChecks, there were no remaining open issues or critical comments at the conclusion of the IEPR of the IER #12. The IEPR teleconference provided an effective voice medium, with Internet televised presentation (i.e., Live Meeting), to communicate and discuss peer review comments on the IER #12 with the USACE PDT. In addition, the IEPR Conference provided an effective face-to-face format to communicate and discuss the IEPR panel's understanding of the technical details of the entire project. The teleconference and face-to-face meeting were critical components of the independent peer review process, especially since there was no e-mail or additional telephone contact between the USACE PDT and the IEPR panel members.

5. RESULTS – SUMMARY OF PDD #9 REVIEW

The IEPR panel members followed the processes described in Sections 2.4, 2.6, and 2.8 to conduct their review of the PDD #9 document, execute the IEPR Conference, and to finalize remaining comments in DrChecks. These processes were in accordance with the Work Plan and all the USACE guidance documents (described previously). Listed below are summaries of how the peer review experts in the different disciplines approached their reviews, conclusions that the panel members reached, and the status of any open issues including critical items.

5.1 Review Approach

As noted in Section 2.4, Battelle developed a charge to direct the IEPR panel members in conducting their review. As part of that charge, Battelle asked the IEPR panel members to answer three specific questions and to conduct a broad overview of the document focusing on their particular area of expertise and technical knowledge.

The panel members were encouraged to work individually according to their assigned expertise and to also contribute to the reviews being conducted by the reviewers in the other disciplines, as appropriate based upon their experience as shown in Table 4. Panel members were able to discuss their reviews with other panel members if it was beneficial.

Appendix C provides the PDD #9 charge prepared by Battelle with the three specific questions the IEPR panel members were asked to answer. The sections below describe how the peer review experts approached their broad overview of the PDD #9 document based on their particular area of expertise and technical knowledge.

Geotechnical/Civil Engineering Review Approach

The Geotechnical and Civil Engineering IEPR panel member followed the same review approach for reviewing the PDD #9 document as was used for the IER #12 (see Section 4.1).

Structural Engineering Review Approach

The Structural Engineering IEPR panel member followed a similar review approach when reviewing the PDD #9 document to that used for the IER #12 (see Section 4.1).

The PDD #9 review was mainly focused on providing general information on the purpose and need, alternatives analysis, and recommended alternative. It did not contain calculations, designs, or other structural engineering supporting information. Therefore, a normal structural engineering review could not be conducted on the PDD #9. This issue was raised at the IEPR Conference. Upon discussion of this concern, the USACE PDT realized that the appendices of the Sector Gate South report which contained the structural engineering information was not provided at the onset of the review. These appendices were provided after the review had begun and the Structural Engineering IEPR panel member reviewed the information before closing his comments. The appendices included information on the structural calculations, which are the basis for the structural design.

Hydraulic Engineering Review Approach

The Hydraulic Engineering IEPR panel member conducted his review of the PDD #9 document primarily from a discipline-specific perspective, focusing on technical issues related to hydraulics and the associated risk/reliability of this portion of the HSDRRS. The reviewer aimed to answer a series of questions that included:

- How was location and elevation line of risk reduction established for the project features exposed to Gulf of Mexico hurricane storm surge? Was the rationale used to develop it logical and consistent, and was it clearly documented?
- How was the location and elevation of the line of risk reduction established for the project features in the detention basin exposed to interior flooding? Was the rationale used to develop it logical and consistent, and was it clearly documented?
- Was the technical approach and scientific rationale credible, and were the conclusions valid?
- Was the work technically adequate, properly documented, satisfies established quality requirements, and yields scientifically credible results?
- As the hydraulic and overall design effort progresses, are there any technical issues that need to be examined in greater detail to fine-tune the design?

Mechanical/Operation and Maintenance Engineering Review Approach

The Mechanical/Operation and Maintenance Engineering IEPR panel member concentrated his review of the PDD Report on operation, maintenance, and mechanical features of the project specifically relating to description of features and design. Of specific concern, at this early stage in design (25–35%), were features relating to mechanical design concepts, operational access,

maintenance, and safety, all of which may create operation and maintenance issues after completion of construction and turn-over to the operating agency. His focus was to ensure that all mechanical, operation, and maintenance features were clearly described and designs were appropriate for this stage of project development.

Environmental Science Review Approach

The Environmental Science IEPR panel member followed a similar review approach when reviewing the PDD #9 document to that used for the IER #12. The primary difference in the review was that the information available from the IER #12 document and its peer review process were utilized as a baseline for the review of PDD #9.

5.2 Summary of IEPR Panel Comments

In general, the IEPR panel agreed that the PDD #9 was technically adequate, properly documented, and the document satisfied established quality requirements.

The panel concluded that the Harvey-Algiers project does not contain any significant technical errors, but recommend that the project documents be revised to improve clarity of some issues and address the issues identified during the IEPR process. Based upon the discussions during the IEPR Conference, and subsequent close-out of DrChecks comments, the USACE PDT is in general agreement with the panel members concerns.

The following sections provide conclusions drawn by each reviewer that were in addition to those noted above by the IEPR panel as a whole.

Geotechnical/Civil Engineering Comments

The Geotechnical/Civil Engineering IEPR panel member generally found the decisions documented in the PDD #9 to be valid based on the HSDRRS design guidelines. In his DrChecks comments, he requested that hydrologic and hydraulic models be provided related to the pump station, detention system, and water stages in the detention pond for the design storm event and the 100 year event, and that the effects of pile installation on existing structures near the proposed WBV-38.2 T-walls be evaluated. The Geotechnical/Civil Engineering IEPR panel member also was concerned with the likelihood of change to the current designs due to changes in the location and size of the GIWW-WCC structure and gates.

To ensure the project meets the June 2011 schedule, the Geotechnical/Civil Engineering IEPR panel member suggested that a design and construction schedule be included. He also suggested clarifications in levee and structure elevations. Lastly, he was concerned about how the IEPR comments will be incorporated into the design.

Structural Engineering Comments

Review of the PDD #9 document by the Structural Engineering IEPR panel member revealed a lack of information relative to the structural engineering discipline. This finding was documented in five DrChecks comments. A lack of cost data, information on construction

phasing, and information on how navigation during construction will be maintained was also noted and documented in DrChecks. The Structural Engineering IEPR panel member communicated concerns over the ability to answer the charge questions due to lack of structural engineering information, and requested the information be provided for review. At the review conference, discussions regarding the amount of information provided for review were held, at the conclusion of which it was agreed that in order to document an appropriate level of due diligence, additional information would be provided. The requested information was provided, reviewed, and it was confirmed that an appropriate level of engineering analysis in support of the selected alternative had been produced.

Hydraulic Engineering Comments

Specific comments, concerns, recommendations and critical items noted by the Hydraulic Engineering IEPR panel member in his 40 DrChecks comments are summarized below:

- Several comments noted that the location, elevation, explanation and illustration of the line of risk reduction of the various components of the system exposed to hurricane surge were not always consistent, correct, or clearly explained. This led to a significant number of comments, some of which were indicated as "critical." The USACE PDT thoroughly explained the many factors involved with establishing the top of the line of risk reduction at the March 12, 2009 IEPR Conference (authorized level of risk reduction, structural superiority and risk reduction to the 2057 elevation). The technical approach and scientific rationale for setting the top of the line of risk reduction were found to be credible, based on the explanations provided. The remaining comments identified incorrect depictions of elevations, which the USACE PDT stated will be revised.
- Two comments requested improvement of the clarity and correctness of Figure 2, which was intended to illustrate all the project features.
- Two comments noted that the discussion in Section 5 of the document failed to explain the purpose and need for the project and adequately summarize the process and conclusions conducted as a part of IER #12.
- More discussion and/or clarification of the pumping station fronting risk reduction (and backflow prevention), flood gates, and line of risk reduction for the detention basin area were requested.
- Comments were made regarding the depiction, design, and preliminary layout of the proposed 404(c) flood wall, access road, and rock revetment throughout the GIWW Closure Complex. These comments were discussed and resolved at the March 12, 2009 IEPR Conference. The USACE PDT explained that several of these features are still under design development and are being hydraulically modeled.
- Two comments were made regarding the GIWW Closure Complex, and specifically the pump station. These comments were discussed and resolved at the March 12, 2009 IEPR Conference. The USACE PDT explained that these features are still under design development and are being hydraulically modeled. Most importantly, the USACE PDT explained that the need for backflow prevention on the discharge side of the pump station will be addressed by constructing a sill at +16 that the proposed flower pot pumps will be required to raise the water above.

- One comment questioned several aspects of the Harvey and Algiers Canals, which were either addressed by the USACE PDT, or are under further hydraulic study which will be subjected to a subsequent independent peer review.

Overall, the USACE PDT either sufficiently addressed all of the issues raised in the comments, or stated that additional hydraulic analyses were being performed to answer the issues raised in the comments.

Mechanical/Operation and Maintenance Engineering Comments

The Mechanical/Operation and Maintenance Engineering IEPR panel member stated that the PDD #9 yields scientifically credible findings that are appropriate to answer the principal study questions. Specific comments, concerns, recommendations and critical items noted in DrChecks are summarized below:

- During the review a number of minor comments relating primarily to completeness and clarity of the PDD #9 were offered and accepted without further discussion. These included adding a number of important and critical references to Appendix B; adding a description of safety guidelines to be used in design; and including a discussion of the coordination with the project sponsor/operator on right-of-way, site access, and maintenance/patrol roads.

Discussions between the evaluators and the Mechanical/Operation and Maintenance Engineering IEPR panel member clarified issues and led to a good understanding and resolution. Upon completion of the review, all seven of his comments were resolved and closed.

Environmental Science Comments

Overall, the Environmental Science IEPR panel member considered two of his three comments to be critical:

- One comment identified a number of pending items that had not achieved resolution and/or full environmental compliance. The three most prominent unresolved issues were:

  1. EPA approval to use the Section 404(c) area to construct the special floodwall.
  2. A decision on the disposal measures for the material to be dredged from the Algiers Canal and the completion of the associated Section 404(b)(1) evaluation.
  3. The forthcoming Mitigation IER's and Comprehensive Environmental document.

  The Environmental Science IEPR panel member recommended that resolution of these issues be included along with other environmental commitments in the Checklist that the USACE PDT agreed to prepare and utilized in their concurrence with a previous comment on IER #12. This comment was closed after discussion with the USACE PDT on March 12, 2009 where they agreed to provide the Record of Decision (ROD) for IER #12. The ROD was provided on March 16, 2009. The DrChecks comment period was closed so no additional comments were provided.
- One comment recommended that any additional environmental commitments made in the ROD for IER #12 or in response to public or agency comments be added to the environmental commitment checklist. The final IER #12 provided on March 16, 2009,

did not include the Appendices. Therefore, Appendices that contained public and agency comments on the draft IER #12 were not available for review.

The Environmental Science IEPR panel member's third comment focused on clarifying the non-Federal sponsors responsibilities.

It is the Environmental Science IEPR panel member's understanding that the urgency to complete the proposed project in order to meet Congressional mandates and to provide specified storm risk reduction and access of the National Flood Insurance Program to the public necessitated a compressed schedule to accomplish the environmental studies, agency coordination, and preparation of environmental documents. In his opinion, this expedited approach affected the peer review process. For example, a number of decisions related to design, environmental protection, mitigation, and project operation and maintenance, repair, replacement and rehabilitation are still pending. However, he recognized that the compressed schedule was necessary and noted that it was obvious that the USACE PDT was making every effort to execute the project and to be responsive to the peer review panel. Nevertheless, he indicated it remains essential that all of the environmental commitments are captured and fulfilled as the project goes forward. By concurring with the critical comments, the USACE PDT assured the IEPR environmental reviewer that these commitments will be met. Therefore, the Environmental Science IEPR panel member concluded that all of his comments in DrChecks were satisfactorily addressed by the USACE PDT upon which he subsequently closed them.

5.3 Critical Comments and any other Open Issues that Remain to be Resolved

As a result of the IEPR teleconference, IEPR Conference, and resolution of all issues included in DrChecks, there were no remaining open issues or critical comments at the conclusion of the IEPR of the IER #12 or the PDD #9. The IEPR teleconference provided an effective voice medium, with Internet televised presentation (i.e., Live Meeting), to communicate and discuss peer review comments on the IER #12 with the USACE PDT. In addition, the IEPR Conference provided an effective face-to-face format to communicate and discuss peer review comments with the USACE PDT on the PDD #9, and greatly helped the IEPR panel's understanding of the technical details of the entire project. The teleconference and face-to-face meeting were critical components of the independent external peer review process, especially since there was no e-mail or additional telephone contact between the USACE PDT and the IEPR panel members.

6. CONCLUSIONS

The selection of the five panel members using pre-defined technical and Conflict of Interest standards, as well as the IEPR process itself, were conducted in strict compliance with USACE peer review guidance documents (described previously), and the Work Plan.

6.1 IER #12

The IEPR panel members were provided with hard and electronic copies of the Harvey-Algiers IER #12 and supporting documentation, along with a charge that contained guidance and specific questions to answer. Starting their IER #12 review on January 7, 2009, the IEPR panel members

produced 76 individual written comments. Within the comments, the IEPR panel members recommended the following additional detail/clarifications be added to improve the document:

- Construction staging as it relates to barge traffic, temporary structures, and water control measures including costs associated with those items/measures.
- Fulfill borrow needs including determining the suitability of borrow material.
- Hydraulic modeling pertaining to the storm water detention pond as it relates to pond performance for the design storm events.
- Information supporting the cost estimates.
- Calculation of the acreage of impacts avoided by providing the innovative T-wall in lieu of a levee adjacent to the 404(c) area.
- Clarification of the USACE Project Delivery Team (PDT) commitments to long term adaptive management.
- Purpose of dredging the Algiers Canal, the estimate of dredging frequency, and importance of the dredging to the GIWW West Closure Complex pump station sizing.
- Alternatives development, decision factors and evaluation process to better support the decision making process.
- Measures that would be taken to reduce noise impacts during construction.
- Creation of a checklist of Environmental Commitments/Requirements to help assure that the commitments are fulfilled and are not lost or overlooked as project implementation proceeds and Operation and Maintenance, Repair, Replacement and Rehabilitation (OMRR&R) activities are accomplished.
- Creation of a Memorandum of Agreement or Understanding developed to capture understandings with other agencies and commitments to other agencies.

The remaining comments focused on offering recommendations to clarify the document and ensure interagency approval.

The USACE PDT evaluated and responded to all 76 comments: concurring with 38 comments; agreed to provide additional information in support of 14 comments; stating they needed to check and resolve issues raised on 12 comments; and non-concurring with 12 comments, for which an explanation was provided with each. Upon review of the USACE PDT responses, the IEPR panel members determined that some comments needed further discussion because the comments were inadequately addressed. Therefore, an IEPR teleconference was conducted on February 4, 2009 for the IEPR panel and USACE PDT to discuss those comments that were identified by the panel as being inadequately addressed. Upon completion of the IEPR teleconference and subsequent evaluations by the USACE PDT, the IEPR panel members considered all comments adequately addressed and closed all of the comments under review.

In general, the IEPR panel members agreed that the alternatives considered, the evaluation criteria, the evaluation process conducted, and the alternative proposed for implementation in the IER #12 were reasonable and appropriate for the project. The selection of the GIWW West Closure Complex as the proposed action was determined to be well-reasoned and credible.

6.2 PDD #9

After concluding the review of the IER #12 the IEPR panel members were then provided with hard and electronic copies of the Harvey-Algiers Project Description Document (PDD) #9 and supporting documentation, along with a charge that contained guidance and specific questions to answer. Starting their PDD #9 review on February 24, 2009, the IEPR panel members produced 68 individual written comments. Within the comments, the IEPR panel members recommended the following additional detail/clarifications be added to improve the document:

- Hydraulic modeling as it relates to the detention system maximum stage for the design storm event.
- Effects of pile installation on existing structures near the proposed WBV-38.2 T-walls.
- Likelihood of change to the current designs due to changes in the location and size of the GIWW-WCC structure and gates.
- Location, elevation, explanation and illustration of the line of risk reduction of the various components of the system exposed to hurricane surge to make them consistent, correct, or clearly explained.
- Purpose and need for the project and the process and conclusions conducted as a part of IER #12.
- Pumping station fronting risk reduction (and backflow prevention), flood gates, and line of risk reduction for the detention basin area.
- Depiction, design, and preliminary layout of the proposed 404(c) flood wall, access road and rock revetment throughout the GIWW Closure Complex.
- Safety guidelines to be used in design.
- Discussion of the coordination with the project sponsor/operator on right-of-way, site access, and maintenance/patrol roads.
- Clarify that environmental commitments made in response to comments received on Draft IER #12 and those contained in pending documents be added to the environmental commitment sheet as they occur.

The USACE PDT evaluated and responded to all 68 comments: concurring with 57 comments; providing additional information in response to one (1) comment; and non-concurring with 10 comments, for which an explanation was provided with each. Upon review of the USACE PDT responses, the IEPR panel members determined that some comments needed further discussion because the comments were inadequately addressed. A face-to-face IEPR Conference was conducted on March 12, 2009 at the USACE New Orleans District for the IEPR panel and USACE PDT to discuss those comments that were identified by the panel as being inadequately addressed. Upon completion of the IEPR Conference and subsequent evaluation by the USACE PDT, all comments were considered adequately addressed.

In general, the IEPR panel members agreed that the PDD #9 was technically adequate, properly documented, and the document satisfied established quality requirements.

Based upon the discussions on the IEPR teleconference, IEPR Conference, and subsequent explanations in DrChecks, the IEPR panel members and USACE PDT are in general agreement on the contents and findings of the IER #12 and the PDD #9.

Appendix A

Figure 1 Acronyms

Figure 1-Acronyms

BCOE	Biddability, Constructibility, Operability and Environmental Review
CQAP	Contract Quality Assurance Plan
CQCP	Contractor Quality Control Plan
DDR	Design Documentation Report
DQAP	Design Quality Assurance Plan
DQCP	Design Quality Control Plan
EAR	Engineering Alternatives Report
ECI	Engineering Considerations and Instructions
FPMP	Flood Plain Management Plan
GER	Geotechnical Engineering Report
IER	Individual Environmental Report
IPR	Independent Peer Review
ITR	Independent Technical Review
M2 ITR	Independent Technical Review of the cost estimate
MVD	Mississippi Valley Division
MVN	Mississippi Valley Division New Orleans District
OMRR&R	Operation, Maintenance, Repair, Replacement, and Rehabilitation
OR[b]	Owners Review
PI	Periodic Inspection
P&S	Plans and Specifications
PC	Post-Construction
PDD	Project Description Document
PPA	Project Partnership Agreement
QA	Quality Assurance
QC	Quality Control
WC	Water Control

[b] OR's have been replaced with System Consistency Reviews (SCR) that are done by a team consisting of individuals from within MVD (Division-wide).

Appendix B

Charge to the Harvey-Algiers IEPR Panel for the IER # 12

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FINAL CHARGE TO THE PEER REVIEWERS

OF THE

INDEPENDENT EXTERNAL PEER REVIEW (IEPR) OF WEST BANK AND VICINITY, LA (WBV) INDIVIDUAL ENVIRONMENTAL REPORT (IER) FOR PROVIDING 100-YEAR LEVEL OF RISK REDUCTION TO THE HARVEY-ALGIERS CANAL

Individual Environmental Report #12

by

Battelle
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Columbus, Ohio 43201

for

U.S. Army Corps of Engineers
Coastal Storm Damage Reduction Center of Expertise
Baltimore District
Julia Fritz, P.E.
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January 6, 2009

Contract No. W911NF-07-D-0001
TCN 08321
Scientific Services Program

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of the
INDEPENDENT EXTERNAL PEER REVIEW (IEPR) OF WEST BANK AND VICINITY, LA (WBV) INDIVIDUAL ENVIRONMENTAL REPORT (IER) FOR PROVIDING 100-YEAR LEVEL OF RISK REDUCTION TO THE HARVEY-ALGIERS CANAL

INDIVIDUAL ENVIRONMENTAL REPORT #12

1.0 BACKGROUND

The U.S. Army Corps of Engineers is currently designing and constructing the HSDRRS program. A vital component of this system is the portion along the Harvey and Algiers Canals on the West Bank of the Mississippi River in New Orleans.

Much of the West Bank lies below sea-level. A continuous string of earthen levee and floodwall reaches running from South Kenner to the mouth of the Hero Canal at the Mississippi River provide a reduction in the risk of flooding for this area from hurricane storm surge. Pump stations are also distributed along the levee system to remove storm water runoff caused by rainfall in these areas. Levee elevations relative to NAVD88 vary, but are less than the elevations necessary to provide a 100-year level of risk reduction to the area. The Gulf Intracoastal Water Way (GIWW), Algiers, and Harvey Canals are heavily developed industrial waterways that provide access from the Mississippi River to the Gulf of Mexico. There are approximately 27 miles of earthen levee that extend from the vertex of the V-Line Levee to the western terminus of the Hero Canal. These levees provide parallel risk reduction along the navigation route. Mississippi Valley New Orleans (MVN) is presently authorized to raise the existing parallel risk reduction levees to an elevation of 10 feet above NAVD88. The alternatives being considered in this evaluation process would provide risk reduction over and above these construction projects. The project is in a conceptual-planning and evaluation phase. Because of the importance of this project, an independent objective peer review is regarded as a critical element in ensuring the reliability of the scientific analyses used for the project.

The project will be conducted in partnership with the State of Louisiana. The term "State" refers to both the State of Louisiana and Local governing entities including Southeast Louisiana Flood Protection Authority and levee districts under them.

2.0 DOCUMENTS PROVIDED

The following documents will be provided by the USACE for review:

Report Topic (file folder name)	Report Title	Date of Report
IER 12	Individual Environmental Report #12	December 27, 2008

The following documents will be provided by the USACE as support/background documents only, they will not be reviewed:

Report Topic (file folder name)	Report Title	Date of Report
Sector Gate South EAR - To Be Revised For Larger Gate and PS	Sector Gate South Detailed Alternative Study Report, Mod 001 95% Submittal	March 25, 2008
Sector Gate South Innovation Study	Sector Gate South Innovation Study	July 2008
Reliability Report	ERDC Relative Reliability Report	30Apr08
Alternative Evaluation Process briefings	Alternative Evaluation Process briefings	June-July 2008
EPA Visit and Briefing	Briefings, Itinerary during EPA visit and tour at MVN	30Jun08

In addition:

- USACE Orientation Briefing Documents, date October 14, 2008
- HSDRRS Quality Management Plan, 10 October 2008

The following references to the USACE regulations shall be followed in conducting the IEPR. These documents are available at http://www.usace.army.mil/publications/eng-regs.

- EC 1105-2-410, Peer Review of Decision Documents, 22 August 2008
- ER 1110-1-8159, Engineering and Design, DrChecks, 10 May 2001

The Battelle Peer Review Quality Control Plan (PRQCP) for the Harvey-Algiers IEPR will also be followed.

3.0 PEER REVIEW PANEL

The peer review panel consists of a Geotechnical/Civil Engineer, Hydraulic Engineer, Structural Engineer, Mechanical/Operation and Maintenance (O&M) Engineer, and Environmental Scientist.

Task	Deliverable (D)/ Milestone (M)	Action	Suggested Date
		Pre-award Recruitment Funding Notice to Proceed (NTP)	29 Aug – 15 Sep 08 18 Sep 08
1	D D	Draft Work Plan Final work Plan	8 Oct 08 24 Oct 08
2	D M	Submit list of Final IEPR Panel Peer reviewers under contract	26 Sep 08 8 Oct 08
3	M M D	USACE provides the Briefing Materials USACE provides Orientation Briefing Peer Reviewers attend Orientation Briefing	14 Oct 08 17 Oct 08 17 Oct 08
4	M M D M M D	USACE provides Individual Environmental Report (IER) #12 Conduct Peer Review of IER #12 Comments provided in DrChecks USACE Evaluator Comment Review and Response Peer Review Backchecks Comments Conference call feedback on IER Review	6 Jan 09 7 Jan – 21 Jan 09 7 Jan – 21 Jan 09 22 Jan – 11 Feb 09 29 Jan – 18 Feb 09 4 Feb 09

4.0 CHARGE FOR PEER REVIEW

Members of this peer review are asked to determine if all reasonable alternatives were evaluated and was the best alternative selected, relative to risk and reliability (since the existing proposed pumps would be operating in series), cost, environmental, schedule, operations and maintenance, constructability, and other pertinent criteria. Members of this peer review are also asked to determine whether the technical approach and scientific rationale presented in the IER #12 for the HSDRRS Harvey-Algiers project are credible and whether the conclusions are valid. The reviewers are asked to determine whether the technical work is technically adequate, properly documented, satisfies established quality requirements, and yields scientifically credible conclusions. In addition, the reviewers are asked to determine whether the findings are appropriate to help answer the principal study questions that the USACE will consider in its decision-making process for the project.

The document to be reviewed as well as reference documents will be forward to the expert panel. Once the document review starts, the expert panel will enter their comments into DrChecks. Once USACE starts providing their evaluator comments, the panel members will provide Backcheck comments to closeout each original comment. The expert panel will participate in a conference call to discuss any outstanding unresolved issues with the USACE. It is expected that most of the comments will be closed out prior to the review conference call. The review conference call will allow discussions between the expert panel and the USACE evaluators. Following the conference call, USACE will have one week to close out their evaluator comments. Following that, the expert panel will have an additional week to provide final Backcheck comments. The "State" will be invited to both the orientation visit and the review conference.

Specific questions for the peer reviewers, by report section, are included following the general charge guidance, which is provided below.

4.1 GENERAL CHARGE GUIDANCE

- Please answer the scientific and technical questions listed below and conduct a broad overview of the IER #12 document for the HSDRRS Harvey-Algiers project. Please focus on your area of expertise and technical knowledge.
- Please focus the review on scientific information, including factual inputs, data, the use and soundness of models, analyses, assumptions, and other scientific and engineering matters that inform decision makers.
- Preparation of review comments for all of the tasks in DrChecks will contain the following information: 1) Specific reference to the document; 2) a clear statement of the concern; 3) the basis for the concern; 4) the significance of the concern (the importance of the concern with regard to the project); 5) comment cross-referencing (if necessary); and 6) recommendations.
- Please **do not** make recommendations on whether you would have presented the work in a similar manner. Also please **do not** comment on or make recommendations on policy issues and decision making.
- If desired, IEPR panel members can contact each other and will have access to other comments in DrChecks. Other than the peer review conference call, IEPR panel members should not contact anyone else other that the Battelle Project Manager and/or Deputy Project Manager.
- Please contact the Battelle project manager (Thomas Kuchar, kuchart@battelle.org) or the Deputy Project Manager (Lynn McLeod, mcleod@battelle.org) for requests or additional information.
- In case of media contact, notify the Battelle project manager immediately.
- Your name will appear as one of the panelists in the peer review. Your comments will be included in the Final EPR Report.

APPENDIX A

IEPR OF HSDRRS HARVEY- ALGIERS
FINAL CHARGE QUESTIONS FOR IER # 12

OVERALL

Are there any significant gaps in the information included in the draft individual environmental report #12 that could impact the design of the proposed alternative? If so, what and how would it impact the alternative?

Was the level of engineering input and data gathering sufficient to make an evaluation and decision, given the project constraints? Are there pieces of information that need to be clarified for the documentation?

During your review, did you identify any significant risks or uncertainty of the selected plan that were not considered by USACE? If so, what and how would it impact the alternative?

During your review, did you identify any significant safety issues that were not considered by USACE but would impact the selected plan? If so, what and how would it impact the alternative?

Were all reasonable alternatives evaluated and was the best alternative selected, relative to risk and reliability, cost, environmental, schedule, operations and maintenance, constructability, and other pertinent criteria? If you believe other reasonable alternatives exist, please provide information on what should have been considered. If you disagree with the recommended alternative, please provide the rational behind your reason for disagreement.

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Appendix C

Charge to the Harvey-Algiers IEPR Panel for the PDD # 9

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CHARGE TO THE PEER REVIEWERS

OF THE

INDEPENDENT EXTERNAL PEER REVIEW (IEPR) OF WEST BANK AND VICINITY, LA (WBV) PROJECT DESCRIPTION DOCUMENT (PDD) FOR 100-YEAR ALTERNATIVES FOR THE HARVEY-ALGIERS CANAL

by

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for

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February 24, 2009

Contract No. W911NF-07-D-0001
TCN 08321
Scientific Services Program

HSDRRS Harvey Algiers
PDD Charge

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1.0 BACKGROUND

The U.S. Army Corps of Engineers is currently designing and constructing the Hurricane and Storm Damage Risk Reduction (HSDRRS) program. A vital component of this system is the portion along the Harvey and Algiers Canals on the West Bank of the Mississippi River in New Orleans.

Much of the West Bank lies below sea-level. A continuous string of earthen levee and floodwall reaches running from South Kenner to the mouth of the Hero Canal at the Mississippi River provide a reduction in the risk of flooding for this area from hurricane storm surge. Pump stations are also distributed along the levee system to remove storm water runoff caused by rainfall in these areas. Levee elevations relative to NAVD88 vary, but are less than the elevations necessary to provide a 100-year level of risk reduction to the area. The Gulf Intracoastal Water Way (GIWW), Algiers, and Harvey Canals are heavily developed industrial waterways that provide access from the Mississippi River to the Gulf of Mexico. There are approximately 27 miles of earthen levee that extend from the vertex of the V-Line Levee to the western terminus of the Hero Canal. These levees provide parallel risk reduction along the navigation route. Mississippi Valley New Orleans (MVN) is presently authorized to raise the existing parallel risk reduction levees to an elevation of 10 feet above NAVD88. The alternatives being considered in this evaluation process would provide risk reduction over and above these construction projects. This project is in a conceptual-planning and evaluation phase. Because of the importance of this project, an independent objective peer review is regarded as a critical element in ensuring the reliability of the scientific analyses used for the project.
The project will be conducted in partnership with the State of Louisiana. The term “State” refers to both the State of Louisiana and Local governing entities including Southeast Louisiana Flood Protection Authority and levee districts under them.

2.0 DOCUMENTS PROVIDED

The following documents will be provided by the USACE for review:

Report Topic (file folder name)	Report Title	Date of Report
PDD #9	Project Description Document (Draft)	February 2009

The following documents will be provided by the USACE as support/background documents only, they will not be reviewed:

Report Topic (file name)	Report Title	Date of Report
Sector Gate South Innovation Study	Sector Gate South Innovation Study 100 Percent Submittal Volume 1	September 2008
WBV-14a.2 100PCT EAR	Engineering Alternatives Report, WBV-14a.2, Harvey Canal West Bank Levees – Phase 2	May 2008
WBV-14a.2 100 PCT EAR DRWGS	Engineering Alternatives Report, WBV-14a.2, Harvey Canal West Bank Levees – Phase 2, New Estelle Pump Station to Lapalco Drawings	May 2008
WBV 14e.2 100 PCT EAR GEOTECH RPT	100% Submittal, Appendix A Geotechnical Report, West Bank and Vicinity Hurricane Protection Project Westwego to Harvey Canal, WBV-14e.2 Hurricane Protection for 1% Storm	December 2008
WBV 14a.2 100PCT EAR GEOTECH RPT	100% Submittal, Appendix A Geotechnical Report, West Bank and Vicinity Hurricane Protection Project Westwego to Harvey Canal, WBV-14e.2 Hurricane Protection for 1% Storm, New Estelle Pump Station to Lapalco Boulevard	May 2008
WBV 14e.2 100PCT EAR	Westwego to Harvey Canal, Louisiana Hurricane Protection Project Culvert Sizing Study	April 2008
WBV 14e.2 100PCT EAR DRWGS	Engineering Alternatives Report, WBV-14e.2, V- Line Levee East of Vertex	December 2008
West Bank Risk and Reliability Report 043008 Letter Report	A Deliberative Assessment of the Relative Reliability of Three 100-Year Hurricane Protection System Design Alternatives In the West Bank of New Orleans	April 2008
WBV 07 08 10 11 and 13 100 PCT EAR	Fronting Protection Engineering Alternative Report (EAR) Belle Chasse #1, Belle Chasse #2, Planters, S&WB No. 11, and S&WB No. 13 Pumping Stations Jefferson, Orleans, and Plaquemines Parish – West Bank	Not Available
WBV 90 100 PCT EAR Final Report	Sector Gate South Detailed Alternatives Study Report Final Submittal	Not Available
WBV 90 100 PCT EAR App B	Sector Gate South Detailed Alternatives Study Report Final Submittal Appendix B- Geotechnical Report Supplement Appendix A Eliminated Alternatives	Not Available

In addition:

- USACE Orientation Briefing Documents, October 14, 2008
- HSDRRS Quality Management Plan with change 1, 10 October 2008

The following references to the USACE regulations shall be followed in conducting the IEPR. These documents are available at http://www.usace.army.mil/publications/eng-regs.

- EC 1105-2-410, Peer Review of Decision Documents, 22 August 2008
- ER 1110-1-8159, Engineering and Design, DrChecks, 10 May 2001

The Battelle Peer Review Quality Control Plan (PRQCP) for the Harvey-Algiers IEPR will also be followed.

3.0 PEER REVIEW PANEL

The peer review panel consists of a Geotechnical/Civil Engineer, Hydraulic Engineer, Structural Engineer, Mechanical/Operation and Maintenance (O&M) Engineer, and an Environmental Scientist.

This following is the schedule for this peer review:

Task	Deliverable (D)/ Milestone (M)	Action	Suggested Date
4	M	USACE provides Project Description Document (PDD)	20 Feb 09
	M	Conduct Peer Review of PDD	24 Feb – 6 Mar 09
	D	Comments provided in DrChecks	24 Feb – 6 Mar 09
	M	USACE Evaluator Comment Review and Response	7 Mar – 16 Mar 09
	M	Peer Review Backchecks Comments	7 Mar – 17 Mar 09
6	M	Peer Review Final Briefing Conference	12 Mar 09
	D	Peer Reviewers present findings at Peer Review Conference	12 Mar 09
7	D	Closeout all comments in DrChecks	17 Mar 09
	D	Submittal of Closeout Report (Final Report)	28 Apr 09
	M	Project Closeout	1 Jul 09

Dates in Red are tentative.

4.0 CHARGE FOR PEER REVIEW

Members of this peer review are asked to determine whether the technical approach and scientific rationale presented in PDD #9 for the HSDRRS Harvey-Algiers project are credible and whether the conclusions are valid. The reviewers are asked to determine whether the technical work is technically adequate, properly documented, satisfies established quality requirements, and yields scientifically credible conclusions. In addition, the reviewers are asked to determine whether the findings are appropriate to help answer the principal study questions that the USACE will consider in its decision-making process for the project.

The PDD will be forwarded to the expert panel in hard and electronic format. Supporting reference documents will be forwarded to the expert panel in electronic format only. Once the document review starts, the expert panel will enter their comments into DrChecks. Upon closure of the comment period, USACE will provide their evaluator comments and the panel members will provide Backcheck comments to closeout each original comment. The expert panel will

participate in a review conference to discuss any outstanding unresolved issues with the USACE on March 12, 2009. The "State" will be invited to the review conference. It is expected that most of the comments will be closed out prior to the review conference. The review conference will allow discussions between the expert panel and the USACE evaluators. Immediately after the review conference, USACE will have two days to close out their evaluator comments. Following that, the expert panel will have two days to provide final Backcheck comments.

Specific questions for the peer reviewers are included following the general charge guidance, which is provided below.

4.1 GENERAL CHARGE GUIDANCE

- Please answer the scientific and technical questions listed below and conduct a broad overview of the PDD document for the HSDRRS Harvey-Algiers project. Please focus on your area of expertise and technical knowledge.
- Please focus the review on scientific information, including factual inputs, data, the use and soundness of models, analyses, assumptions, and other scientific and engineering matters that inform decision makers.
- Preparation of review comments for all of the tasks in DrChecks will contain the following information: 1) Specific reference to the document; 2) a clear statement of the concern; 3) the basis for the concern; 4) the significance of the concern (the importance of the concern with regard to the project); 5) comment cross-referencing (if necessary); and 6) recommendations.
- Please **do not** make recommendations on whether you would have presented the work in a similar manner. Also please **do not** comment on or make recommendations on policy issues and decision making.
- If desired, IEPR panel members can contact each other and will have access to other comments in DrChecks. Other than the peer review conference call, IEPR panel members should not contact anyone else other that the Battelle Project Manager and/or Deputy Project Manager.
- Please contact the Battelle project manager (Thomas Kuchar, kuchart@battelle.org) or the Deputy Project Manager (Lynn McLeod, mcleod@battelle.org) for requests or additional information.
- In case of media contact, notify the Battelle project manager immediately.

APPENDIX A

IEPR OF HSDRRS HARVEY- ALGIERS
CHARGE QUESTIONS FOR PDD

OVERALL

Were the decisions documented in the PDD valid?

Was the process used to select the recommended alternative rational and was the process implemented in a reasonable manner given the project constraints?

Was the level of engineering input and data gathered sufficient to make an evaluation and decision, given the project constraints? Are there pieces of information that needs to be clarified for the documentation?

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Appendix D

Final Presentation from the Peer Review Conference Call Held February 4, 2009

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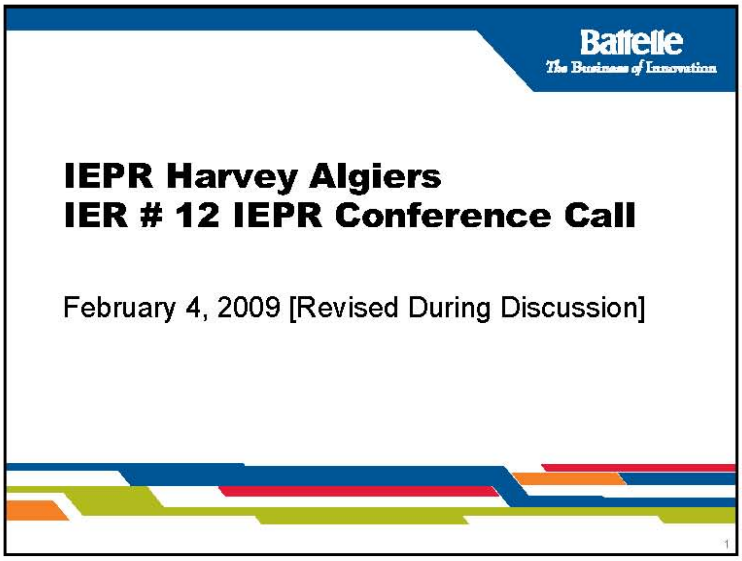
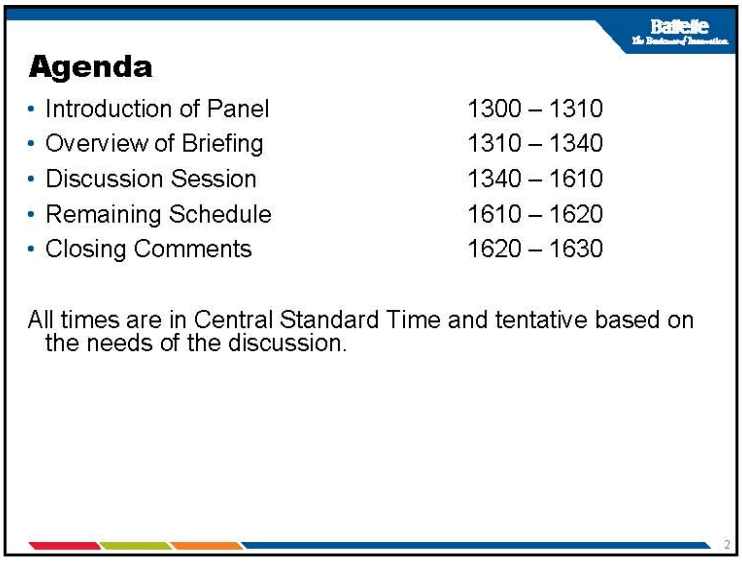

Battelle
The Business of Innovation
IEPR Harvey Algiers
IER # 12 IEPR Conference Call
February 4, 2009 [Revised During Discussion]
1


Battelle
Agenda
• Introduction of Panel 1300 – 1310
• Overview of Briefing 1310 – 1340
• Discussion Session 1340 – 1610
• Remaining Schedule 1610 – 1620
• Closing Comments 1620 – 1630
All times are in Central Standard Time and tentative based on the needs of the discussion.
2

Purpose

- Discuss Harvey Algiers IER#12 Peer Review
- Discuss Critical Issues Noted in DrChecks
- Identify Path Forward

IPR Expert Panel

Name	Firm	IPR Discipline
A. Mahendra Rodrigo	GC Engineering, Inc.	Geotechnical\Civil Engineer
Kenneth R. Avery	Bergmann Associates, Inc. PC	Hydraulic Engineer
Tom Burkhart	Carlton Engineering	Structural Engineer
Peter A Fischer	Short Elliot Hendrickson, Inc.	Mechanical\ Operation and Maintenance Engineer
Nathaniel "Skeeter" McClure	Volkert & Associates	Environmental Scientist

Project Schedule of Deliverables/Milestones

Task	Deliverable (D)/ Milestone (M)	Action	Suggested Date
		Pre-award Recruitment Funding Notice to Proceed (NTP)	29 Aug – 15 Sep 08 18 Sep 08
1	D D	Draft Work Plan Final work Plan	29 Oct 08 5 Nov 08
2	D M	Submit list of Final IPR Panel Peer reviewers under contract	26 Sep 08 8 Oct 08
3	M M D	USACE provides the Briefing Materials USACE provides Orientation Briefing Peer Reviewers attend Orientation Briefing	6-10 Oct 08 17 Oct 08 17 Oct 08
4	M M D M M D	USACE provides Individual Environmental Report (IER) #12 Conduct Peer Review of IER #12 Comments provided in DrChecks USACE Evaluator Comment Review and Response Peer Review Backchecks Comments Conference call feedback on IER Review	06 Jan 09 7 Jan – 21 Jan 09 7 Jan – 21 Jan 09 22 Jan – 11 Feb 09 29 Jan – 18 Feb 09 4 Feb 09
5	M M D M M	USACE provides PDD 9 Conduct Peer Review of Project Description Document (PDD) Comments provided in DrChecks USACE Evaluator Comment Review and Response Peer Review Backchecks Comments	17 Mar 09 19 Mar – 11 Apr 09 19 Mar – 11 Apr 09 13 Apr – 10 May 09 23 Apr – 17 May 09
6	M D	Peer Review Final Briefing Conference Peer Reviewers present findings at Peer Review Conference	6 May 09 6 May 09
7	D D M	Closeout all comments in DrChecks Submittal of Closeout Report (Final Report) Project Closeout	17 May 09 26 May 09 1 Jul 09

Overall Charge

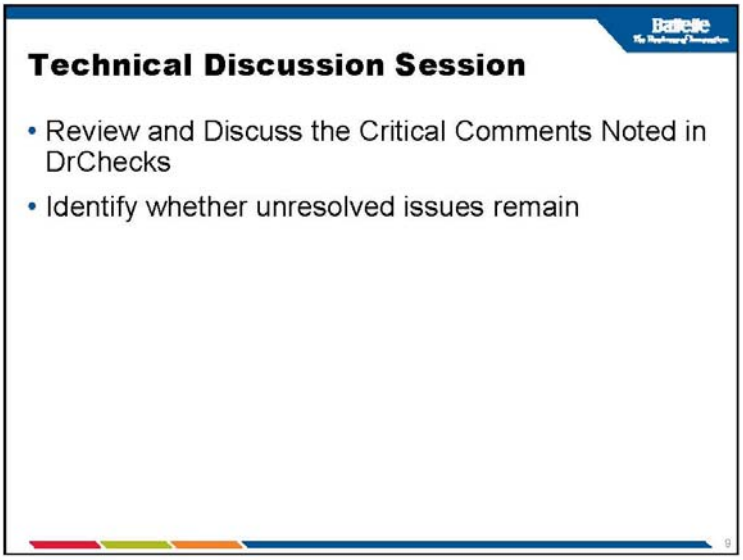
- Are there any significant gaps in the information included in the draft individual environmental report #12 that could impact the design of the proposed alternative? If so, what and how would it impact the alternative?
- Was the level of engineering input and data gathering sufficient to make an evaluation and decision, given the project constraints? Are there pieces of information that need to be clarified for the documentation?
- During your review, did you identify any significant risks or uncertainty of the selected plan that were not considered by USACE? If so, what and how would it impact the alternative?
- During your review, did you identify any significant safety issues that were not considered by USACE but would impact the selected plan? If so, what and how would it impact the alternative?
- Were all reasonable alternatives evaluated and was the best alternative selected, relative to risk and reliability, cost, environmental, schedule, operations and maintenance, constructability, and other pertinent criteria? If you believe other reasonable alternatives exist, please provide information on what should have been considered. If you disagree with the recommended alternative, please provide the rational behind your reason for disagreement.

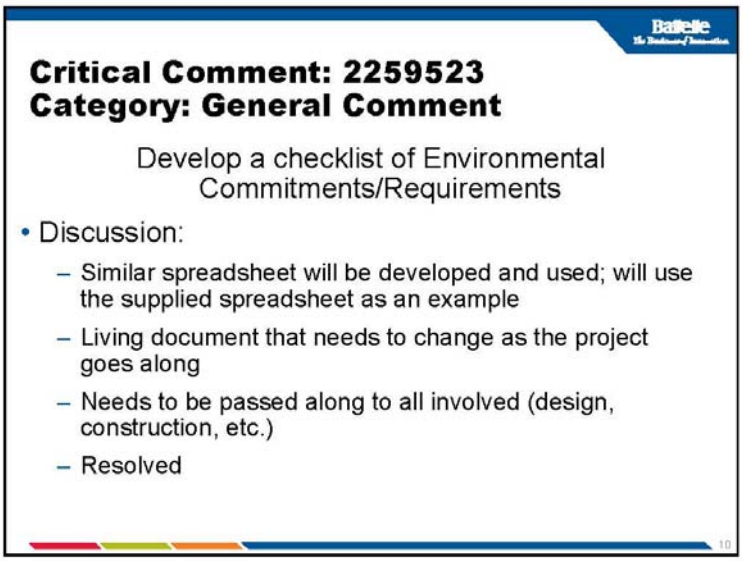
Types of Comments

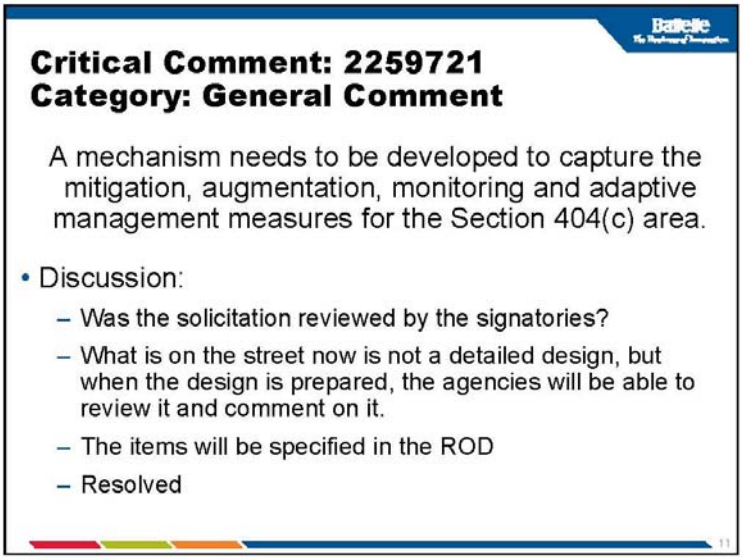
Currently labeled critical (Total 12 comments)
Potential critical (different definitions) or reassessed
Questions which could lead to critical comments
Nice suggestion which is critical
Recommendation
Charge (broad comment)
Intent of the document

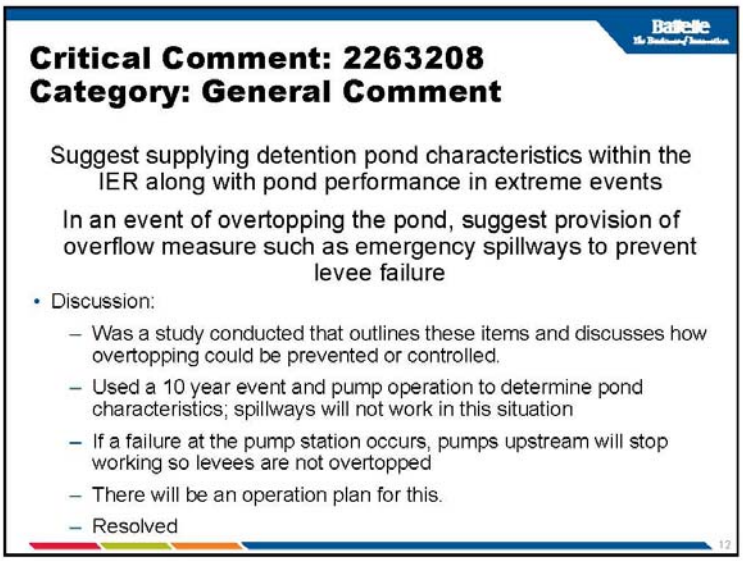
Harvey Algiers IER#12 Review Summary (as of February 3, 2009 AM)

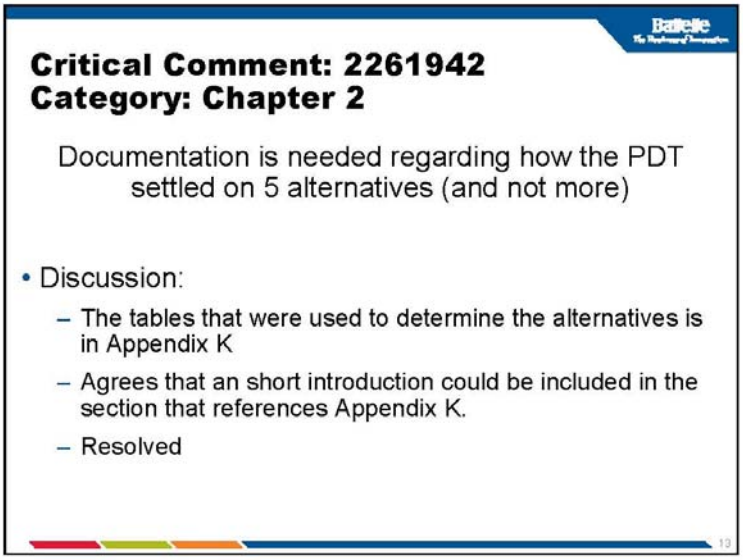
76 Comments (12 Critical)					
Chapter #	Title	Panel Comments (Total/Critical)	Evaluated (Total/ Critical)	Back Checked (Total/ Critical)	Open (Total/ Critical)
1.0	Introduction	2	1	0	1
2.0	Alternatives	30/6	15/5	6/1	25/6
3.0	Affected Environment and Environmental Consequences	9	4	4	7
4.0	Cumulative Impacts	1	0	0	1
5.0	Selection Rationale	4	3	2	3
6.0	Coordination and Consultation	8	1	1	7
7.0	Mitigation and Monitoring	1	1	1	1
8.0	Compliance with Environmental Laws and Regulations	2	0	0	2
9.0	Conclusions	1/1	1/1	1/1	1/1
N/A	Overall/Other	13/3	8/1	4	9/3
	Appendices	5/2	4	2	5/2

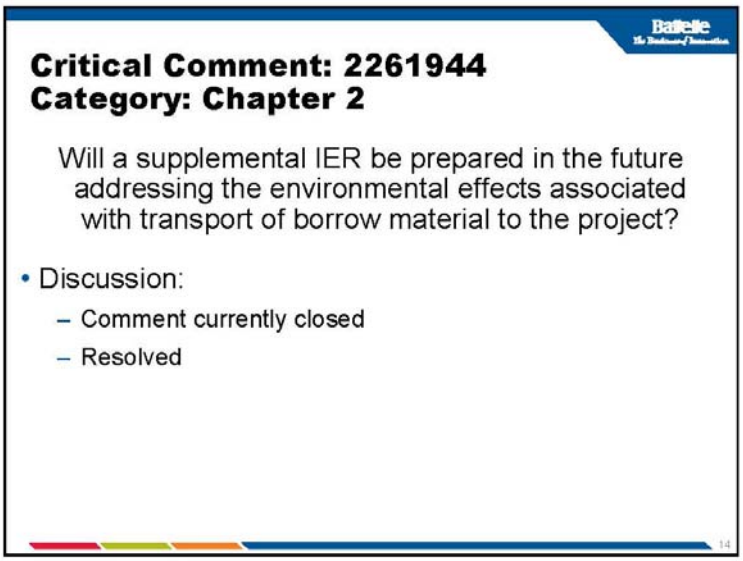

Battelle
Technical Discussion Session
• Review and Discuss the Critical Comments Noted in DrChecks
• Identify whether unresolved issues remain
9


Battelle
Critical Comment: 2259523
Category: General Comment
Develop a checklist of Environmental Commitments/Requirements
• Discussion:
– Similar spreadsheet will be developed and used; will use the supplied spreadsheet as an example
– Living document that needs to change as the project goes along
– Needs to be passed along to all involved (design, construction, etc.)
– Resolved
10


Battelle
Critical Comment: 2259721
Category: General Comment
A mechanism needs to be developed to capture the mitigation, augmentation, monitoring and adaptive management measures for the Section 404(c) area.
• Discussion:
– Was the solicitation reviewed by the signatories?
– What is on the street now is not a detailed design, but when the design is prepared, the agencies will be able to review it and comment on it.
– The items will be specified in the ROD
– Resolved
11


Battelle
Critical Comment: 2263208
Category: General Comment
Suggest supplying detention pond characteristics within the IER along with pond performance in extreme events
In an event of overtopping the pond, suggest provision of overflow measure such as emergency spillways to prevent levee failure
• Discussion:
– Was a study conducted that outlines these items and discusses how overtopping could be prevented or controlled.
– Used a 10 year event and pump operation to determine pond characteristics; spillways will not work in this situation
– If a failure at the pump station occurs, pumps upstream will stop working so levees are not overtopped
– There will be an operation plan for this.
– Resolved
12


Battelle
Critical Comment: 2261942
Category: Chapter 2
Documentation is needed regarding how the PDT settled on 5 alternatives (and not more)
• Discussion:
– The tables that were used to determine the alternatives is in Appendix K
– Agrees that an short introduction could be included in the section that references Appendix K.
– Resolved
13


Battelle
Critical Comment: 2261944
Category: Chapter 2
Will a supplemental IER be prepared in the future addressing the environmental effects associated with transport of borrow material to the project?
• Discussion:
– Comment currently closed
– Resolved
14

Critical Comment: 2261963
Category: Chapter 2

Regarding the flow control structure at the end of Old Estelle Pump Station Outfall Canal

- Cost of the structure
- What impact does it help mitigate/measureable benefits does it provide?
- Where does the discharged water end up (GIWW or Section 404(c) area?
- Is this part of the purpose and need?
- Is this mitigation for Section 404(c) impacts?

- Discussion:
  - They need this anyway, but it can also be used for beneficial purposes; only additional costs might be in gapping the bank
  - Resolved

15

Critical Comment: 2261983
Category: Chapter 2

What are the hydraulic effects of operating a 20,000 cfs pump station on the upstream and discharge side of the station and how were they analyzed?

- Discussion:
  - Modeling will be conducted
  - Resolved

16

Critical Comment: 2261993
Category: Chapter 2

What are the costs and benefits of the flow control structure?

How will its necessity be determined relative to its potential environmental benefits?

- Discussion:
  - Necessary structure based on design that could also provide environmental benefits.
  - Resolved

17

Critical Comments: 2262034, 2262085, 2262095, and 2262097
Category: Chapter 2 and Appendix L

Why is the Algiers Canal being dredged?

- Provide material for wetlands mitigation or some benefit within the detention area?
- What sedimentation studies were performed or records used to determine the dredging period exceeding 25 years
- Appendix L does not seem to provide reasons or calculations to support the dredging

- Discussion:
  - Dredging came up solely for conveyance of water downstream;
  - They tried adding more/larger pumps, but it did not work; They did not want to dredge
  - Improved slope is about 2 feet
  - Has not been dredged since it was built; there really isn't a source of sediment into the area
  - Resolved

18

Critical Comment: 2262092
Category: Chapter 9

What are the costs and benefits of the closure structure?

- Discussion:
  - Resolved under 2261993

19

Inclusion of Evacuation in the No Action Alternative

- Evacuation is a state decision, it is not a Corps decision
- Even after the structure is completed, evacuations will still be needed in certain situations
- O&M – the facility is meant to be manned during the worst storms
- Suggest including a statement that this project will not lessen the need for evacuation
- Resolved

20

Operation and Maintenance Impacts

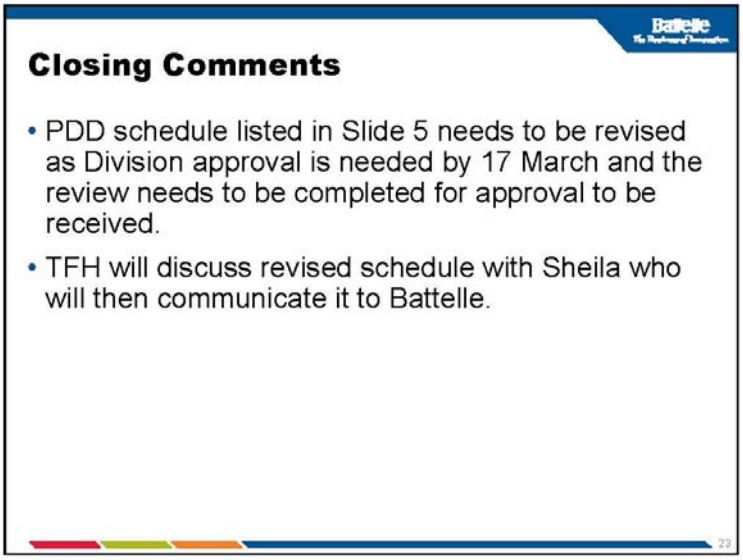
- Pumping station will be located in an industrialized area where noise is ongoing
- Impacts are short-term and not very significant; suggest adding one or two statements covering this
- Pumps will only be run when the storm is occurring; they will also be run periodically to exercise the pumps; these pumps will create a similar noise level to pumps used on marine vessels
- Resolved

21

Remaining Actions

- USACE to evaluate all remaining DrChecks Comments
- Peer Reviewers BackCheck DrChecks Comments and Close, if resolved
- Any remaining unresolved comments will be addressed at the Peer Review Conference held in person after review of the PDD
- USACE will supply the PDD for review

22


Battelle
Closing Comments
• PDD schedule listed in Slide 5 needs to be revised as Division approval is needed by 17 March and the review needs to be completed for approval to be received.
• TFH will discuss revised schedule with Sheila who will then communicate it to Battelle.
23

Appendix E

Final Presentation from the Peer Review Conference Held March 12, 2009

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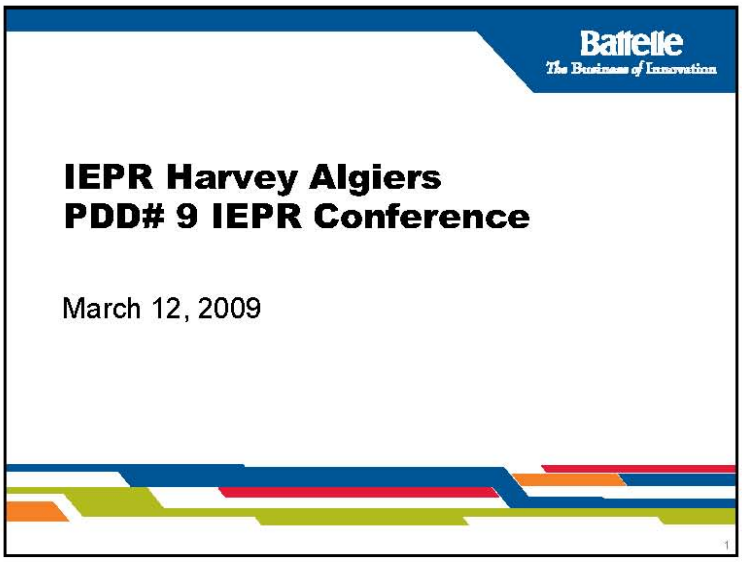
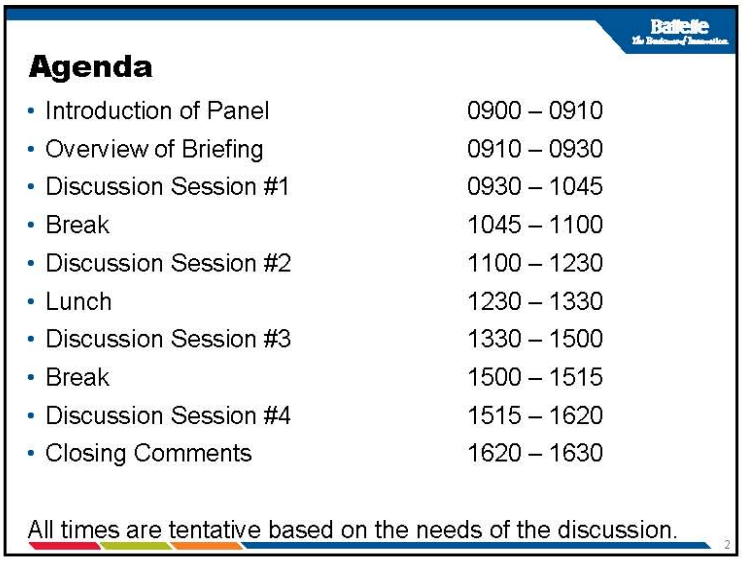
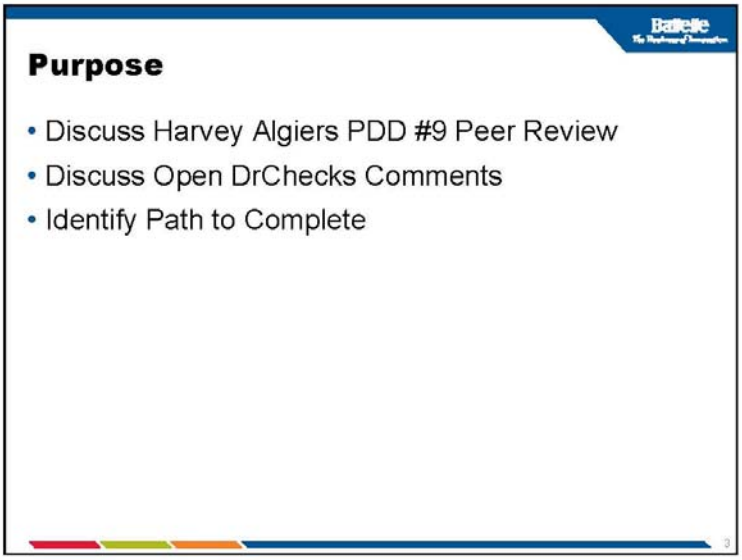

Battelle
The Business of Innovation
IEPR Harvey Algiers
PDD# 9 IEPR Conference
March 12, 2009
1


Battelle
Agenda
• Introduction of Panel 0900 – 0910
• Overview of Briefing 0910 – 0930
• Discussion Session #1 0930 – 1045
• Break 1045 – 1100
• Discussion Session #2 1100 – 1230
• Lunch 1230 – 1330
• Discussion Session #3 1330 – 1500
• Break 1500 – 1515
• Discussion Session #4 1515 – 1620
• Closing Comments 1620 – 1630
All times are tentative based on the needs of the discussion.
2



IPR Expert Panel

Name	Firm	IPR Discipline
A. Mahendra Rodrigo	GC Engineering, Inc.	Geotechnical\Civil Engineer
Kenneth R. Avery	Bergmann Associates, Inc. PC	Hydraulic Engineer
Tom Burkhart	Carlton Engineering	Structural Engineer
Peter A Fischer	Short Elliot Hendrickson, Inc.	Mechanical\ Operation and Maintenance Engineer
Nathaniel "Skeeter" McClure	Volkert & Associates	Environmental Scientist

Project Schedule of Deliverables/Milestones

Task	Deliverable (D) Milestone (M)	Action	Suggested Date
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1	D D	Draft Work Plan Final work Plan	29 Oct 08 5 Nov 08
2	D M	Submit list of Final IPR Panel Peer reviewers under contract	26 Sep 08 8 Oct 08
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5	M M D M M	USACE provides PDD 9 Conduct Peer Review of Project Description Document (PDD) Comments provided in DrChecks USACE Evaluator Comment Review and Response Peer Review Backchecks Comments	23 Feb 09 24 Feb – 6 Mar 09 24 Feb – 6 Mar 09 4 Mar – 16 Mar 09 7 Mar – 17 Mar 09
6	M D	Peer Review Final Briefing Conference Peer Reviewers present findings at Peer Review Conference	12 Mar 09 12 Mar 09
7	D D M	Closeout all comments in DrChecks Submittal of Closeout Report (Final Report) Project Closeout	17 Mar 09 28 Apr 09 1 Jul 09

5

Overall PDD Charge

- Were the decisions documented in the PDD valid?
- Was the process used to select the recommended alternative rational and was the process implemented in a reasonable manner given the project constraints?
- Was the level of engineering input and data gathered sufficient to make an evaluation and decision, given the project constraints? Are there pieces of information that needs to be clarified for the documentation?

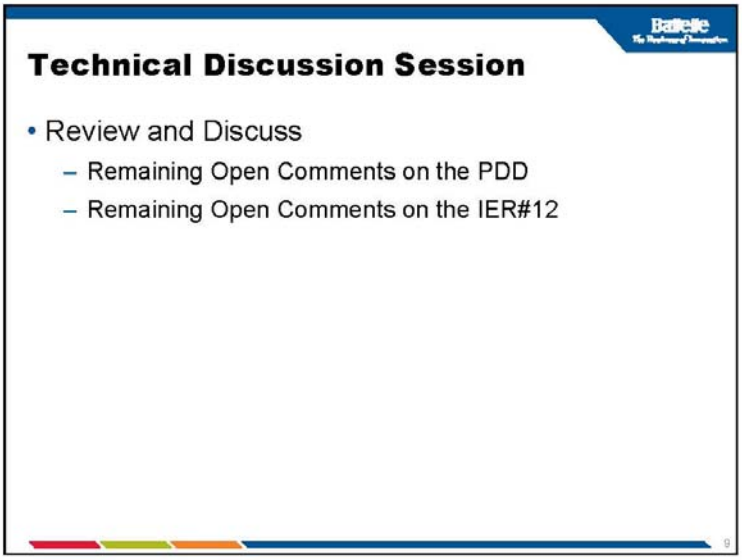
6

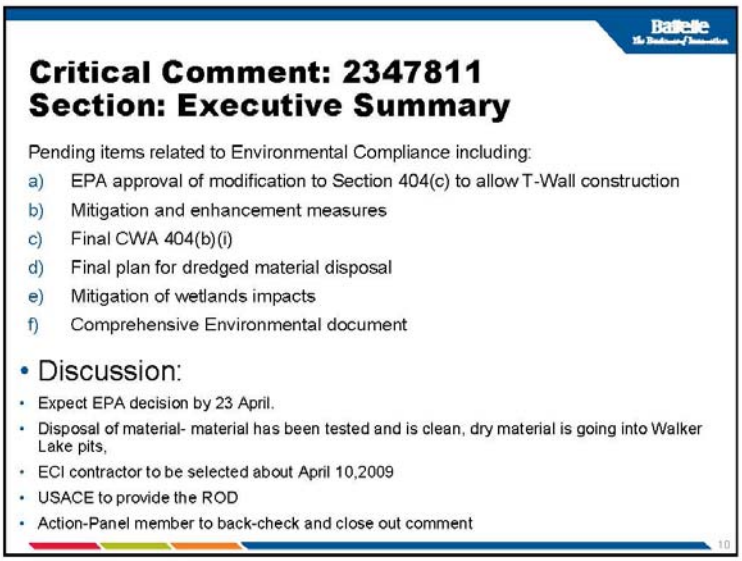
Types of Comments

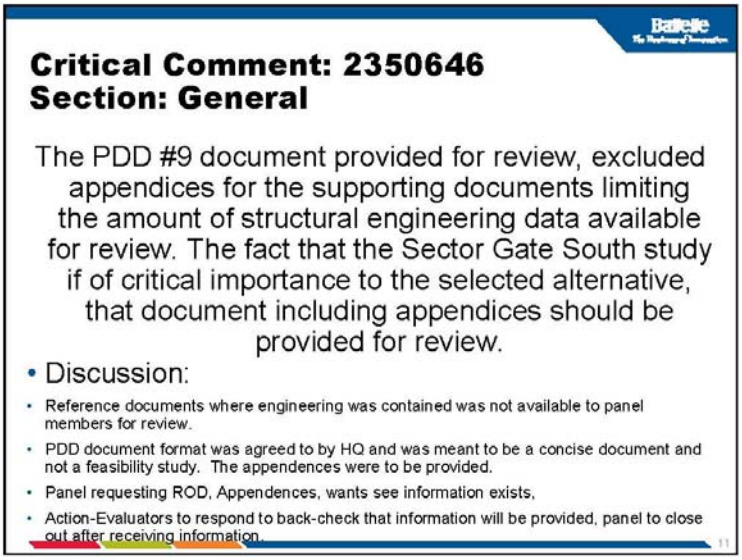
Currently labeled critical
Potential critical (different definitions) or reassessed
Questions which could lead to critical comments
Nice suggestion which is critical
Recommendation
Charge (broad comment)
Intent of the document

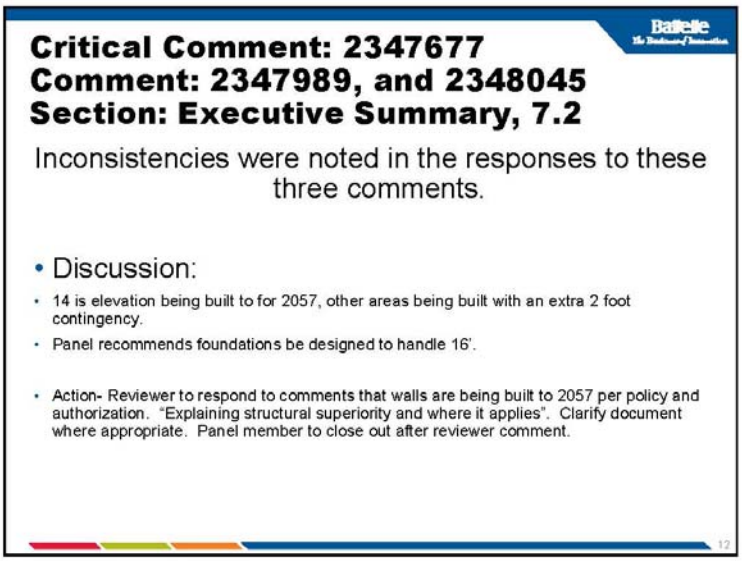
Harvey Algiers PDD#9 Review Summary (as of March 10, 2009 1630)

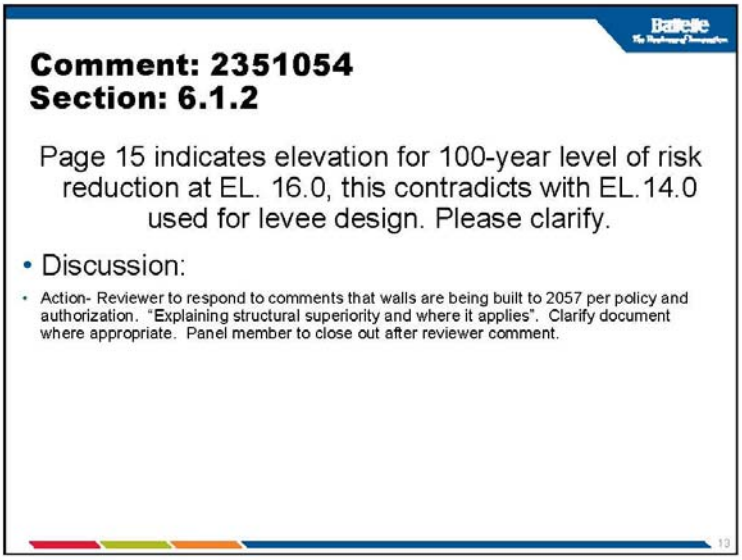
68 Comments (8 Critical)					
Chapter #	Title	Panel Comments (Total/Critical)	Evaluated (Total/ Critical)	Back Checked (Total/ Critical)	Open (Total/ Critical)
	Executive Summary	8/1	8/1	8/1	2/1
1.0	Name and Location of Project	NA	NA	NA	NA
2.0	Project Description	NA	NA	NA	NA
3.0	Project Authority	NA	NA	NA	NA
4.0	Non-Federal Sponsor	NA	NA	NA	NA
5.0	Project Purpose and Need	2/2	2	2	0
6.0	Alternatives Considered	6	6	6	1
7.0	Recommended Alternatives	24/1	23	23	4
8.0	Pertinent Project Data	6/1	6	6	2
9.0	Implementation Guidance for Supplemental Appropriations	NA	NA	NA	NA
10.0	Items of Cooperation	1	1	1	0
11.0	Project Summary	NA	NA	NA	NA
N/A	Overall/Other	17/2	17	17	3/1
	Appendices	4/1	4	4	0

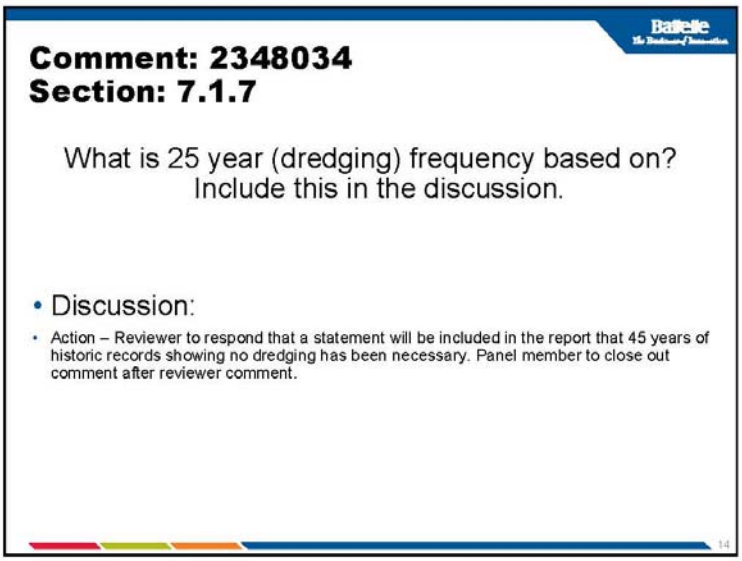

Battelle
Technical Discussion Session
• Review and Discuss
– Remaining Open Comments on the PDD
– Remaining Open Comments on the IER#12
9


Battelle
Critical Comment: 2347811
Section: Executive Summary
Pending items related to Environmental Compliance including:
a) EPA approval of modification to Section 404(c) to allow T-Wall construction
b) Mitigation and enhancement measures
c) Final CWA 404(b)(i)
d) Final plan for dredged material disposal
e) Mitigation of wetlands impacts
f) Comprehensive Environmental document
• Discussion:
• Expect EPA decision by 23 April.
• Disposal of material- material has been tested and is clean, dry material is going into Walker Lake pits,
• ECI contractor to be selected about April 10,2009
• USACE to provide the ROD
• Action-Panel member to back-check and close out comment
10


Battelle
Critical Comment: 2350646
Section: General
The PDD #9 document provided for review, excluded appendices for the supporting documents limiting the amount of structural engineering data available for review. The fact that the Sector Gate South study if of critical importance to the selected alternative, that document including appendices should be provided for review.
• Discussion:
• Reference documents where engineering was contained was not available to panel members for review.
• PDD document format was agreed to by HQ and was meant to be a concise document and not a feasibility study. The appendences were to be provided.
• Panel requesting ROD, Appendences, wants see information exists,
• Action-Evaluators to respond to back-check that information will be provided, panel to close out after receiving information.
11


Battelle
Critical Comment: 2347677
Comment: 2347989, and 2348045
Section: Executive Summary, 7.2
Inconsistencies were noted in the responses to these three comments.
• Discussion:
• 14 is elevation being built to for 2057, other areas being built with an extra 2 foot contingency.
• Panel recommends foundations be designed to handle 16'.
• Action- Reviewer to respond to comments that walls are being built to 2057 per policy and authorization. "Explaining structural superiority and where it applies". Clarify document where appropriate. Panel member to close out after reviewer comment.
12


Battelle
Comment: 2351054
Section: 6.1.2
Page 15 indicates elevation for 100-year level of risk reduction at EL. 16.0, this contradicts with EL.14.0 used for levee design. Please clarify.
• Discussion:
• Action- Reviewer to respond to comments that walls are being built to 2057 per policy and authorization. "Explaining structural superiority and where it applies". Clarify document where appropriate. Panel member to close out after reviewer comment.
13


Battelle
Comment: 2348034
Section: 7.1.7
What is 25 year (dredging) frequency based on? Include this in the discussion.
• Discussion:
• Action – Reviewer to respond that a statement will be included in the report that 45 years of historic records showing no dredging has been necessary. Panel member to close out comment after reviewer comment.
14

Comment: 2348141
Section: 7.4.1

Recommended pump stations in the Sector Gate South Study (Bell mouth, with discharge invert at +12; formed suction, with discharge invert at +12; and Bell mouth, with discharge invert at +16) – Which of these is now being recommended and why?

- Discussion:
  - Pumps will lift water above 16'
  - Action – Reviewer to add that pumps will lift water above 16. Panel member to close out comment after reviewer comment.

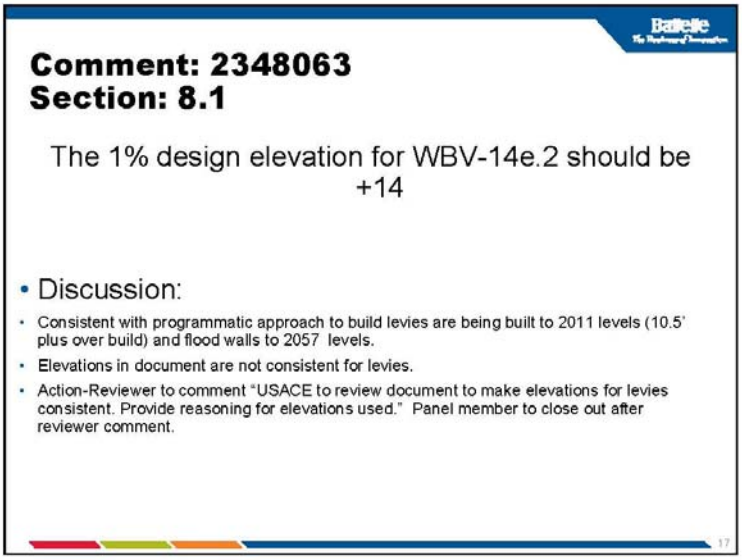
15

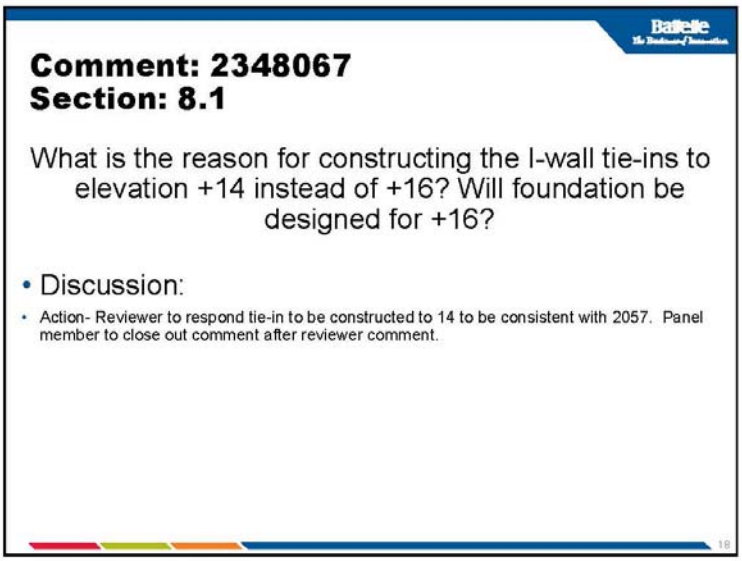
Comment: 2348057
Section: 7.5.3

Why are WBV-38.2 flood walls being constructed to 10.5 and not 9.5?

- Discussion:
  - Action- Reviewer to respond "Report will be clarified with note stating that 10.5 will be used in this location because of existing all ready constructed walls in close prox that are constructed to 10.5." after response panel member to close out comment.

16


Battelle
Comment: 2348063
Section: 8.1
The 1% design elevation for WBV-14e.2 should be +14
• Discussion:
• Consistent with programmatic approach to build levies are being built to 2011 levels (10.5' plus over build) and flood walls to 2057 levels.
• Elevations in document are not consistent for levies.
• Action-Reviewer to comment "USACE to review document to make elevations for levies consistent. Provide reasoning for elevations used." Panel member to close out after reviewer comment.
17


Battelle
Comment: 2348067
Section: 8.1
What is the reason for constructing the I-wall tie-ins to elevation +14 instead of +16? Will foundation be designed for +16?
• Discussion:
• Action- Reviewer to respond tie-in to be constructed to 14 to be consistent with 2057. Panel member to close out comment after reviewer comment.
18

Comment: 2351062
Section: IER

A significant borrow need (~3.1 M yd3) for the new levee and floodwall was identified. In addition an excavation volume of ~4 M yd3 of material from eastern floodwall, closure complex, levee, and road realignment was proposed. Possibility of utilizing this material for fulfilling borrow needs above was also identified, however, an evaluation was not available. Suggest prioritizing geotechnical explorations and borrow analysis as this could have a considerable impact on costs and constructability.

- Discussion:
  - Action-Evaluators to respond to back-check that information will be provided, panel to close out after receiving information.

19

Critical Comment: 2261969
Section: IER

What is the mitigation provided by the innovative T-wall? What is the difference between the innovative T-wall and a levee or conventional flood wall in terms of 404(c) impacts?

- Discussion:
- Action Reviewer to respond "Information being supplied to EPA and resource agencies in support of decision to construct the T wall in the 100' corridor" Panel member to close out comment after reviewer input.

20

Critical Comment: 2262054
Section: IER

How have the hydrologic effects of 2000 feet of permanent, impermeable sheet piling been assessed? Are measures available to allow sheeting to have greater permeability then it inherently has, and would this be of benefit to improving or maintaining wetlands hydrology?

- Discussion:
- ROD has been signed and USACE is committed to mitigating for any adverse effects in the 404c
- Action – Reviewer concurs with recommendation. Panel member to close comment after reviewer concurs.

21

Closing Comments

- Due to the need for all comments to be closed by next Tuesday, and peer reviewer travel schedules, the Peer Reviewers would appreciate responses on these final items tomorrow (Friday)
- Final report will be prepared by April 28th.

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Appendix F

Peer Review Member Resumes

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Kenneth R. Avery, P.E., CFM, D.WRE
Hydraulic Engineer

Experience
30+ years

Expertise
Civil engineering
Environmental engineering
Water resources engineering
- Surface water hydrology
- Open and closed channel hydraulics
- Revetment
- Bridge and channel scour
- Sediment transport

Education
M.S., Water Resources Engineering, Clarkson University, 1977
B.S., Civil and Environmental Engineering, Clarkson University, 1976
Short Courses
- HEC-1, DAMBRK, DWOPER, Penn State University
- "Coastal Engineering for the Great Lakes," U. of Wisconsin

Registration
Registered Professional Engineer
- Florida
- Michigan
- Minnesota
- New Jersey
- New York
- Wisconsin

ASPPM Certified Floodplain Manager

Special Skills
Steady and Unsteady Flow Models:
- HEC-RAS
- HEC-HMS
- SWMM
- DYNLET

Professional Affiliations
American Society of Civil Engineers
Society of American Military Engineers
American Water Resources Association
Association of State Flood Plain Managers

Presentations
More than a dozen presentations on water resources management, made at conferences, symposia, workshops, and short courses.

Summary of Experience
Mr. Kenneth R. Avery is Business Segment Leader of Urban Water Resources and Senior Hydraulic and Hydrologic Engineer with Bergmann Associates. Mr. Avery is experienced in the use of steady and unsteady flow hydraulic models, HEC-18 and HEC-23 bridge scour guidelines, and stream stability and river mechanics. His design experience covers hydraulic structures, dams, sewers, highway and bridge hydraulics, penstocks, natural rivers, and riprap revetment. He has worked on major watershed, hydrologic and hydraulic studies for both small and larger clients including the USACE, National Park Service, and state transportation agencies.

Relevant Projects
- **Renovation of the Hornell, NY, Local Flood Protection Works.** On this first major renovation since the 1930s, served as the Project Engineer. He performed hydraulic, debris, and sedimentation analyses in connection with the design of replacement check dams and a sheetpile stabilization sill; inspected, evaluated, and designed replacement sluice and flap gates, and drainage structures within the project area; evaluated and designed improvements for 7,000 ft of existing earthen levee; designed the details and prepared specifications for grout-filled mattresses to be placed on the land side of the levee; and developed details and specifications for filling holes using a low density concrete mix.
- **NYSDOT Corning Bypass Project.** Directed the hydraulic evaluations for Cutler and Post Creeks to determine the impacts of the proposed construction and the extent of mitigating features required to maintain current levels of flood protection within these Federal flood control projects.
- **Ohio & Erie Canal Waterway Study in Cuyahoga Valley National Park, OH**. Served as Project Manager for the hydrologic and hydraulic study of a 6-mi re-watered section of the Ohio and Erie Canal between the Brecksville Dam and Rockside Road. The study was undertaken to define the hydraulic and hydrologic inputs and outputs so that waste/weir structure and bypass spillway crest elevations could be adjusted, and so that a temporary bypass for the Tinkers Creek Aqueduct could be sized.
- **USACE, Philadelphia District**. Served as the Senior Project Engineer for the design of new riprap revetment to protect 1,400 ft of historic masonry wall along the Delaware River and Poquessing Creek. The project included the hydraulic analysis of wind- and ship-generated waves on the Delaware River in accordance with the USACE's Shore Protection Manuals and published research on ship-generated waves, and checking of riprap stability for floods on Poquessing Creek.
- **USACE, Baltimore District, Wyoming Valley Flood Protection Levee Raising Project, Wyoming Valley, PA**. Project Manager and Senior Hydraulic Engineer, performed detailed hydraulic and hydrologic investigations of flooding from interior drainage systems behind the levees, within the communities of Kingston and Plymouth. The evaluation included the modification of HEC-1 and INTDRA models developed by the USACE to include dam overtopping and breaching analyses of the Toby Creek Impounding Basin (Kingston) and the Brown's Creek Impounding Basin (Plymouth) for the Standard Project Flood event. The analyses required routing of overtopping and breaching flows through downstream developed areas to relief culverts located at various spots behind the

levees. As part of this work, the elevation vs. discharge relationships for the impounding basins and the relief culverts were reevaluated. The results were used by others to prepare a risk analysis that examined the risks and costs associated with eliminating all or some of the relief culverts versus adding a second line of protection to the existing relief culverts, which currently have a single line of protection consisting of automatic drainage gates.

- **NYS Canal Corporation, Rehabilitation of Dam E-26 on the Clyde River, Clyde, NY.** Senior Hydraulic Engineer in charge of dam safety analysis, spillway capacity evaluation, cofferdam impact analysis, and "sunny day" failure analysis. All work was performed in accordance with NYSCDEC's Guidelines for Design of Dams. Used FHWA publication HEC-17, "Design of Encroachments on Flood Plains Using Risk Analysis" to assess the additional seasonal adjusted risk of flooding during construction due to cofferdam construction.
- **USACE, New York District, Sauquoit Creek LFP, Whitesboro, NY.** Project Manager for $5 M Section 205 flood control project that incorporated a low-flow channel designed in accordance with fluvial geomorphologic principles and used a combination of conventional rip rap and bioengineering (brush layering and sprigged coir logs and coir mat) techniques. This project included channel improvements and realignment to reduce damages from riverine flooding and ice jams on this tributary to the Mohawk River. Flood control features included 4,500 ft of riprap-lined 60-ft bottom-width trapezoidal channel, and 3,000 ft of unlined diversion channel. Bergmann's flood control features also included modifications to four existing bridges and two culverts to accommodate the lowered channel profile as well as sheet pile crest weir and interior drainage modifications. Also incorporated into the project were wetlands restoration details designed by the District.

Tom Burkhart, P.E., S.E.
Structural Engineer

Experience
23 years

Expertise
Structural engineering
Water conveyance
Energy facilities construction

Education
B. S., Civil Engineering, CSU, Sacramento, 1986

Registrations
Structural Engineer
California
Nevada

Professional Engineer
California
New Mexico

OES-Post Disaster Safety Assessment Inspector
California

Summary of Experience

Mr. Burkhart is the Principal Structural Engineer, as well as the Structural Department Manager, at Carlton Engineering in Shingle Springs, CA. In addition to his traditional structural engineering roles, Mr. Burkhart has also developed Carlton's Special Inspection capabilities, and manages many of the company's more significant projects. As a Senior Structural Engineer, he contributes to the design team by developing structural design concepts, directing structural analysis and design methods, production of working drawings and specifications, and overseeing construction administration and quality control inspections.

Relevant Projects

- **Riverwall Stability Evaluation, Sacramento, CA.** Structural project engineer for a study of approximately 4000 ft of the City of Sacramento's flood protection wall, a critical feature constructed in the early 1900s. The project included performance of field investigations to document existing conditions, review of historic plans for construction of the wall, interaction with land survey, civil, and geotechnical team members to develop a complete understanding of topography, and scouring of potential and geotechnical conditions. Based on these findings, a structural stability analysis for individual "blocks" as well as for global stability was performed. Produced recommendations and a preliminary design for strengthening of the wall and the installation of post-tensioned, grouted soil anchors to achieve required factors of safety. All findings from the study were incorporated into a report that has been used by the City to guide development along its riverfront.
- **Storm Water Pumping Plants and Emergency Generator Facilities, Sacramento, CA.** Project Engineer, responsible for structural evaluation including analysis, design, and preparation of construction documents for various storm water pumping plants in the Sacramento area. Projects included expansion of facilities to increase capacity, evaluation of scour protection and design of outfall structures, modifications to accommodate new automated mechanical trash racks, and design of new emergency power generation facilities.
- **EID Slide Gate Repair, El Dorado County, CA.** Senior engineer responsible for forensic evaluation of existing water intake and control gates within an existing water diversion structure after two large intake gates malfunctioned, with one gate experiencing structural failure. The evaluation covered 10 gates, of which six were found to be marginal or defective. The findings resulted in a project to replace the gates and guarantee proper operation of the diversion structure, which is part of FERC Project 184, and a critical component for water supply and power generation in the community.
- **EID Diversion Dam & Fish Screen Repair, Kyburz, CA.** Structural Project Manager and Department Manager, responsible for structural evaluation of a failure of the fish screen and catwalk support structure within the intake structure. Provided rapid response, close coordination with district efforts, and quick decision making. Structural services included evaluation of failure mechanisms, consultation with district staff and management, preparation of a forensic evaluation report with recommendations, design of repairs, buoyancy evaluation and mitigation

measures so that the facility could be safely dewatered, plus structural observation during construction. The facility was placed back in service in less than two weeks.

- **EID El Dorado Powerhouse, El Dorado, CA.** Structural Project Manager and Department Manager, responsible for evaluating the existing facility for flood-proofing measures. Work included testing and evaluation of the existing flood walls, consultation on structural remedies to flood proof the building, and design of structural modifications for the powerhouse.
- **SRC PG&E Wise Tunnel No. 9 Repair, Auburn, CA.** Principal In Charge and Project Manager for the repair of an existing water conveyance tunnel. Developed a program to install appropriate shoring and grout the voids behind the lining, performed structural analysis of the existing tunnel lining, and developed optimal shoring requirements to support anticipated grout pressures.
- **EID Hazel Creek Tunnel Repair, El Dorado County, CA.** Structural Project Manager, responsible for providing oversight and quality assurance review during the design, construction document, and construction phases of this project to repair the landslide-damaged water conveyance. Structural work included 160-ft extension of the outlet portal of the tunnel using a reinforced concrete box section.
- **EID EchoTunnel: Slipline Feasibility, Echo Lake, CA.** Technical support for structural aspects, including evaluation of the original timber tunnel lining, and analysis and design of shotcrete linings and anchoring systems.
- **Bear River Tunnel No. 4, Auburn, CA.** Project Manager and Department Manager, responsible for providing structural consultation on means and methods, as well as construction documents for repair of the tunnel lining. Work included finite-element analysis of the existing lining to determine stability during the grouting of voids behind the lining, design of grouting methods and procedures, design of shoring methods, and construction support services.
- **Utica Power Authority Flume 14 Repair, Angels Camp, CA.** Structural Project Manager, responsible for design, construction plans and support services to replace approximately 1 mi of flume destroyed by forest fire. Plans included foundations pinned to rock, rock bolting, and rock slope netting protection.
- **EID Flume Conditions Assessment for FERC 184, El Dorado County, CA**. Structural Project Manager, responsible for structural evaluation of all elevated and at-grade flume structures along the 22-mi water conveyance project. Duties included client consultation, programming, conducting site visits for evaluation of structures, supervision of project engineers performing field studies, structural analysis, report preparation, and quality assurance review of the completed work product.
- **EID Hydroelectric FERC Project 184, Placerville, CA.** Project Engineer, responsible for design engineering support for structures, pipelines, flumes, canals, and tunnel features. Also responsible for collaborating with the geotechnical team with the goal of uncovering an eloquent yet cost effective solution to each complex problem.

Peter A. Fischer, P.E.
Operations & Maintenance Engineer

Experience
53 years

Expertise
Civil engineering
Water resources engineering

Education
M.S., Civil Engineering, Structures (Minor Math), 1955
B.S., Civil Engineering, 1954
B.S., Physical Science, 1954

Registration
Professional Engineer
Minnesota
Wisconsin
North Dakota
Iowa

Professional Affiliations
American Society of Civil Engineers
U.S. Committee on Large Dams
U.S. Committee on Irrigation, Drainage and Flood Control

Summary of Experience

Mr. Fischer, Senior Professional Engineer with Short, Elliott, Hendrickson (SEH) in St. Paul, MN, has been practicing in the fields of civil and water resources engineering for more than 50 years, of which more than 31 were with the US Army Corps of Engineers, St. Paul District (retired in 1987). Assignments included engineering management, project management, technical supervision, hydraulic design, and hydrologic engineering of a wide variety of projects in flood control, navigation, and water resources development. For the past 12 years, he has been participating in the hands-on design of water resources projects as a member of SEH's Water Resources Division. Work includes preparing concept and preliminary designs, hydraulic and hydrologic engineering advice to project designers, peer and quality review (QA/QC) of hydrology and hydraulic modeling, designs and design reports, and preparing and coordinating preparation of design and environmental reports.

Relevant Projects

- **USACE, St. Paul District**. Directly developed or supervised hydraulic design and hydrologic engineering investigations for more than 60 St. Paul District water resource projects. Phases of development included feasibility studies, preliminary concept design, final design and associated reports, construction plans and specifications, engineering during construction, development of operating and maintenance manuals, period surveillance during operation, and water control operational functions. Sites included harbors, locks, dams, spillways, channels, and rivers. Engineering addressed hydraulic structures, levees, flood walls, pumping plants, and interior drainage works. Projects included storm water management and floodplain delineation, channel modification flood control, levee and urban flood control, harbor development, dam safety, various dam and reservoir projects, river engineering, river training structures, bank protection, probable maximum flood studies, as well as locks, dams, and navigation projects.
- **Independent Technical Review (ITR), Grand Forks, ND, and East Grand Forks, MN, Operation Maintenance Manual.** Led the ITR effort to review the structural, geotechnical, hydraulic, civil, mechanical, and electrical elements of the O&M Manual that was prepared by the USACE St. Paul District.
- **USACE, St. Paul District, Flood Control Project, Stage 2, Mississippi River**. Provided overall quality review of design of interior drainage facilities and modifications to levees, floodwalls, closure structures, one pumping station, and utility relocations.

N.D. 'Skeeter' McClure, IV, P.E., D.WRE
Environmental Scientist

Experience
47 years

Expertise
Water resources
Transportation
Environmental compliance

Education
M.S., Engineering, University of Alabama, 1967
B.C.E., Civil Engineering, Auburn University, 1961
FHWA Indirect and Cumulative Impact Analysis Class, April 4-5, 2006 (16-hours)

Registration
Registered Professional Engineer Alabama, 1967

Professional Affiliations
National Society of Professional Engineers
American Society of Civil Engineers, Fellow, President of Mobile Branch (1979-81); Secretary and Newsletter Editor of State Section
Society of American Military Engineers, Fellow; President, Mobile Post (1996-97); Director (2003)
American Water Resources Association, Alabama Section, Advisory Board (1988-90)
Alabama Environmental Planning Council, Water Quality Committee (1986-87)
Governor of Alabama's Drought Task Force, Advisor (1988)
Leadership Mobile, Charter Class (1974)
University of South Alabama, College of Engineering Industrial Advisory Board (1994–1997)
Tennessee-Tombigbee Development Council

Honors/Awards
Diplomate, American Academy of Water Resources Engineers (2005)
Life Member and Fellow, American Society of Civil Engineers (2002)
Fellow, Society of American Military Engineers (2004)

Summary of Experience

As Environmental Scientist and Project Manager with Volkert Environmental Group, Inc., based in Mobile, AL, Mr. McClure provides project management, environmental consultation, and quality assurance on numerous projects. He is an expert on the National Environmental Policy Act (NEPA), having participated in the preparation, review, and approval of more than 100 NEPA documents, including over 30 Environmental Impact Statements (EIS). Mr. McClure is also an expert in comprehensive water resource planning and interstate water issues, EIS's, and team leadership of interdisciplinary planning and environmental teams. He has extensive experience in public involvement, moderating public workshops and meetings, interagency coordination, and conflict/issue resolution. He has served as an expert witness in federal court on NEPA litigation.

Mr. McClure spent 38 years with the U.S. Army Corps of Engineers (USACE). For eight years, he was chief of the Planning and Environmental Division. His duties included supervising a multidisciplinary staff that was responsible for water resources planning, flood plain management, and environmental compliance for the Mobile (AL) District. His involvement included NEPA documents and other environmental compliance activities for the Tennessee-Tombigbee Waterway, Mobile Harbor dredging, as well as operations and maintenance activities for the Black Warrior-Tombigbee Waterway, Coosa-Alabama Waterway, and other Mobile District projects. Mr. McClure provided oversight to planning and environmental support activities for military customers including the Army BRAC Environmental Program. He was also principal advisor to the District Engineer on planning and environmental matters.

Relevant Projects

- **Environmental Impact Statement (EIS) at Choctaw Point in Mobile, AL, for the Alabama State Port Authority (ASPA)**. As the prime consultant, managed and participated in the collection and evaluation of environmental data related to the proposed site development scenarios on approximately 370 acres of land in the Choctaw Point and Monroe Park areas. Led an interdisciplinary team in evaluating environmental impacts to uplands, wetlands, and coastal shallow water bottoms considered by federal and state regulatory agencies to contain valuable resources. Investigations resulted in providing the agencies with a complete understanding of the resources being impacted and allowed negotiation of mitigation requirements with the governing agencies. The environmental analysis and proposed mitigation and enhancement measures resulted in the ASPA realizing a savings in mitigation area and assured agency cooperation. The environmental analyses and proposed mitigation and enhancement measures were incorporated into an EIS. Responsible for writing, overseeing, and coordinating the EIS; for managing all aspects of the environmental study; participated in extensive agency coordination to obtain a favorable Record of Decision (ROD) for the project; and responsible for environmental monitoring for the construction of the dredging, land reclamations, and site stabilization construction contract for the proposed.
- **Technical Review of Environmental Documentation for the Cullman**

Inducted into the Gallery of Distinguished Retired Employees of the Mobile District, U.S. Army Corps of Engineers (2000)

Department of the Army, Meritorious Civilian Awards (1996,1985, 1983)
Alabama Society of Professional Engineers, Engineer of the Year (1995)
Mobile Area Council of Engineers, Engineer of the Year (1994)
Department of the Army, Commander's Award for Civilian Service (1992)
Silver Bullet, Mobile District, for Participatory Leadership Accomplishments (1990)
Department of the Army, Superior Civilian Service Award (1988)
Customer Care Achiever of the Year, Mobile District (1986)
Outstanding Planning Achievement Award, South Atlantic Division (1974)
Community Leadership Recognition, United Way of America (1974)

Publications

More than 20 presentations and several publications.

Dam in Cullman, AL for Amon Associates, Inc., and the Cullman-Morgan Water Supply District. As environmental advisor, reviewed technical documents, provided comments on completeness and scientific adequacy, reviewed and provided recommendations related to the adequacy of NEPA documentations including appropriate level of documentation (EIS) or Major Environmental Analysis (MEA), and participated as a member of an Independent Technical Review Board (ITRB). The NEPA documentation was provided to the USACE as a component of their decision-making process related to a permit application under Section 404 of the Clean Water Act (33USC1344). Environmental support activities involved the entire spectrum of environmental analyses and agency coordination, including wetland delineation and mitigation, threatened and endangered species, water quality, noise, air, hazardous materials, and environmental justice issues. Responsible for providing quality control, agency coordination, and overview of all required environmental documentation. The project was challenged in federal court. The court identified components of the EA that required additional documentations.

A. Mahendra Rodrigo, P.E.
Geotechnical/Civil Engineer

Experience
24 years

Expertise
Civil and geotechnical engineering
Environmental restoration
Transportation
Water resources

Education
M.S., Civil and Environmental Engineering, New Jersey Institute of Technology, 1988
B.S., Civil Engineering, University of Moratuwa, Sri-Lanka (First Class Honors), 1984
Current OSHA Approved Hazardous Waste Operations Health and Safety Training (40 Hrs and 8 Hr Annual Refreshers)

Registration
Registered Professional Engineer, New Jersey
Texas

Professional Affiliations
American Society of Civil Engineers
International Society for Soil Mechanics and Foundation Engineers

Presentations
More than a dozen presentations on wetlands mitigation and groundwater hydrology.

Summary of Experience

Mr. Rodrigo is a Principal with GC Engineering, Inc. (GCE), Pearland, TX. His expertise spans civil and geotechnical engineering, environmental restoration, transportation, and water resources. He has extensive project management experience in civil and environmental services on multidisciplinary projects for Federal, state, and local governmental agencies as well as for private industry.

Relevant Projects

- **USACE, New York District, Green Brook Flood Control Project, Program Manager.** Work consisted of the analysis of hydraulic and geotechnical stability of an approximately 1200 ft section along Green Brook. Hydraulic analysis included an erosion and deposition study using HEC-6 software for various flood recurrence intervals to determine the erosion characteristics of the stream banks and the proposed levee adjacent to the bank. The geotechnical study was composed of slope stability analysis for the proposed levee, approximately 10 ft high, subject to sudden drawdown condition as a result of the receding 150-yr design flood. Other work included stream bank stabilization and a study on the use bioengineering techniques for the stream bank.
- **NJDOT, I-287 Stream Bank Repair Design of Ramapo River at a Constructed Wetland Site, Mahwah Township, NJ.** Program Manager, responsible for the survey of the damaged area due to floods, hydraulic and hydrologic analysis including Ramapo River flood frequency and overtopping analysis, damage repair design including the use vegetated gabions, cable-concrete and riprap (joint plantings), and bio-degradable erosion control mattings for erosion protection and restoration of large scour holes created by the Ramapo River, restoration of impacted wetland area, preparation of plans, specifications and cost estimates, and design reports. Also provided construction support services.
- **Port of Houston Authority, Pavement Repairs at Wharves 47-48, Houston, TX.** Project Manager, responsible for the design and preparation of construction documents for the reconstruction of an approximately 2-acre pavement, and erosion control measures along the ship channel adjacent to the project site at Wharves 47-48. Work included geotechnical investigations for the project area, survey, environmental sampling and analysis of soils, design and preparation of plans, specifications and cost estimate, and construction support services for the project. Due to the presence of soft silty clay and silt deposits, a foundation system consisting of deep soil mixing was designed for the area of 2-acre industrial pavement.
- **Harris County Flood Control District, North Fork of Greens Bayou Flood Delineation, Harris County, TX.** Project Director, responsible for managing Letter of Map Revision (LOMR) request submittal to FEMA. Work included HEC-2 studies, stream survey, evaluation of the changes to the watershed and modification of the HEC-1 model for the watershed to account for development activities.

- **USACE, Baltimore District, Michie Stadium Stormwater Flood Control, West Point, NY.** Quality Assurance/Quality Control. Project Director, responsible for multiple hydrologic and hydraulic projects for the USMA campus, including an overall hydrologic study for stormwater improvement projects. Work required intensive hydrologic analysis of the West Point campus using HYDRAFLOW software by Intelisolve, hydraulic analysis of open channel (HECRAS) and piping networks, flume design for steep slope watercourse conveyance, temporary watercourse diversion, report preparation, and preparation of several USACE construction documents (plans, SPECSINTACT contract specifications, MCASES construction cost estimate).
- **City of Newark, Piersons Creek Stream Restoration, NJ.** Project Manager of restoration work, which consisted of improvement/ optimization of channel conveyance, correcting local flooding problems, improving the maintainability of the channel, and preparation of the permits. The goal was to restore the Piersons Creek from chronic flooding due to various hydraulic restrictions and undersized drainage systems along the length of the creek. Work also consisted of modifications to the creek including a combination of stream cleaning and concrete stream lining, design of twin culverts, each approximately 5 ft x 10 ft in size and 1,800 ft long, dredging/characterization and disposal of dredged sediments, and rehabilitation of a tide gate structure.