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Final Independent External Peer Review Report for the Engineering, Economic, and Environmental Evaluation of the Geotechnical, Hydrological, Hydraulic, and Economic Aspects of Flood Risk Reduction Report, Marlinton, West Virginia

Prepared by
Battelle Memorial Institute

Prepared for
Department of the Army
U.S. Army Corps of Engineers
Flood Risk Management Planning Center of Expertise
Huntington District

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Task Control Number: 10239
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November 16, 2010

SHORT-TERM ANALYSIS SERVICE (STAS)

on

Final Independent External Peer Review Report
for the
Engineering, Economic, and Environmental Evaluation of the Geotechnical, Hydrological, Hydraulic, and Economic Aspects of Flood Risk Reduction Report, Marlinton, West Virginia

by

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Scientific Services Program

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FINAL
INDEPENDENT EXTERNAL PEER REVIEW REPORT
for the

Engineering, Economic, and Environmental Evaluation of the Geotechnical, Hydrological, Hydraulic, and Economic Aspects of Flood Risk Reduction Report, Marlinton, West Virginia

EXECUTIVE SUMMARY

The Town of Marlinton, West Virginia (WV), and the Greenbrier Valley have a long history of flooding, with the largest recorded floods of recent occurrence. The flood of record occurred in November 1985 and inundated almost the entire Town of Marlinton. This flood event had an estimated frequency of 350 years, causing over $100 million (October 2001 price level) in damages basin-wide and resulting in five deaths. Another major flood occurred in January 1996, with basin-wide damages again estimated to be nearly $100 million (October 2001 price level). During those floods, the damages in Marlinton alone were estimated at $25 million to $30 million (October 2001 price level).

In response to this latest major flooding, under the 1996 Water Resources Development Act (WRDA), Congress authorized the U.S. Army Corps of Engineers (USACE) to investigate flood damage reduction at several named communities in the basin, including the major damage centers of Marlinton, Ronceverte, and Alderson. The least costly alternative was identified for each community and documented in the 1997 Greenbrier Limited Evaluation Report. Congress appropriated funds in Fiscal Year 1999 to initiate preparation of a Detailed Project Report (DPR) for a flood control project to protect the Town of Marlinton.

USACE is conducting an Independent External Peer Review (IEPR) of the Engineering, Economic, and Environmental Evaluation of the Geotechnical, Hydrological, Hydraulic, and Economic Aspects of Flood Risk Reduction Report, Marlinton, West Virginia, and Feasibility Report – Marlinton, WV Detailed Project Report and Environmental Impact Statement with all pertinent appendices (September 2008 version) (hereinafter the Marlinton DPR/EIS). Battelle, as a 501(c)(3) non-profit science and technology organization with experience in establishing and administering peer review panels for USACE, was engaged to coordinate the IEPR of the Marlinton DPR/EIS. Independent, objective peer review is regarded as a critical element in ensuring the reliability of scientific analyses. The IEPR was external to the agency and conducted following USACE and Office of Management and Budget (OMB) guidance described in USACE (2010), USACE (2007), and OMB (2004). This final report describes the IEPR process, describes the panel members and their selection, and summarizes the Final Panel Comments of the IEPR Panel (the Panel).

Five panel members were selected for the IEPR from more than 20 identified candidates. Based on the technical content of the Marlinton DPR/EIS and the overall scope of the project, the final panel members were selected for their technical expertise in the following key areas:

geotechnical engineering, hydraulic engineering, economics, plan formulation, and National Environmental Policy Act (NEPA) impact assessment/environmental ecology. Although the Panel was disclosed to USACE, Battelle made the final decision on selecting the Panel.

The Panel received electronic versions of the Marlinton DPR/EIS documents (approximately 900 pages), along with a charge that solicited comments on specific sections of the documents to be reviewed. The charge was prepared by Battelle to assist the USACE in the development of the charge questions that was to guide the peer review, according to guidance provided in USACE (2010) and OMB (2004). USACE was given the opportunity to provide comments and revisions, and subsequently approved the final charge questions.

The USACE Project Delivery Team briefed the Panel and Battelle during an onsite kick-off meeting to discuss the Marlinton DPR/EIS project. The meeting was held at the Marlinton Town Hall on September 14 and15, 2010, prior to the start of the review. Other than during this meeting, there was no direct communication between the Panel and USACE during the peer review process. The Panel produced more than 300 individual comments in response to the 70 charge questions.

IEPR panel members reviewed the Marlinton DPR/EIS documents individually. The panel members then met via teleconference with Battelle to review key technical comments, discuss charge questions for which there were conflicting responses, and reach agreement on the Final Panel Comments to be provided to USACE. Each Final Panel Comment was documented using a four-part format consisting of: (1) a comment statement; (2) the basis for the comment; (3) the significance of the comment (high, medium, or low); and (4) recommendations on how to resolve the comment. Overall, 14 Final Panel Comments were identified and documented. Of these, 2 were identified as having high significance, 11 had medium significance, and 1 had low significance.

Table ES-1 summarizes the Final Panel Comments by level of significance. Detailed information on each comment is contained in Appendix A of this report.

Table ES-1. Overview of 14 Final Panel Comments Identified by the Marlinton DPR/EIS IEPR Panel

Significance – High	
1	The alternatives identified focus solely on the elimination of flood damages, rather than a reduction in flood damages relative to those in the 1985 event. This appears to be in conflict with the guidance of ER 1105-2-101, Section 7d.
2	The Recommended Plan appears to conflict with several objectives noted during the plan formulation process, including maintains social and cultural resources, minimizes social disruptions, and is socially acceptable given the effects on aesthetics and scenic resources.
Significance – Medium	
3	The damages and benefits for the "without project" and "with project" conditions have not been provided in sufficient detail to justify the selection of the Recommended Plan.

4	Assumptions related to vegetation management, visual impacts, and mitigation may have been partially invalidated by recent changes to USACE vegetation management standards and should be reassessed and clarified.
5	The operation and maintenanceof the project features by the Town of Marlinton may not be achievable as proposed.
6	Additional information describing how scour potential was accounted for in the design of the floodwalls and levees of the Recommended Plan is needed.
7	The Economic Appendix analyzes other damage categories (ODCs); however, there is no information demonstrating how these ODCs were developed, calculated, and used in the overall damages and benefits analysis.
8	The effectiveness of the Recommended Plan could not be ascertained due to a lack of details regarding the implementation of the Emergency Action Plan (EAP).
9	Additional information is required regarding the preliminary evaluation of levee and floodwall stability, under-seepage, through-seepage, and slope stability to provide context for the engineering design issues presented.
10	Inconsistencies due to changes in the Recommended Plan and project features over time should be corrected to represent the current proposed project, and some environmental impacts associated with these changes have not been addressed.
11	Inconsistencies in the intermediate screening process resulted in non-structural alternatives being removed from further consideration.
12	The Federal Emergency Management Agency (FEMA) accreditation, which includes the Recommended Plan's effects on future floodplain management, floodplain redevelopment, and flood insurance requirements in the project area, is not addressed.
13	The Draft Section 404(b)(1) Evaluation provided in Appendix F does not address all the proposed discharges, and potential impacts, of fill material into "Waters of the United States."
Significance – Low	
14	Some of the socioeconomic data described and used in the analysis include inconsistencies and are outdated.

The Panel agreed on its "assessment of the adequacy and acceptability of the economic, engineering, and environmental methods, models, and analyses used" (USACE, 2010; p. D-4) in the Marlinton DPR/EIS. The Panel agreed that the DPR/EIS did a good job of describing the history of flooding and the resulting adverse impacts to the Town of Marlinton, as well as as well as the need for improved flood risk management. The Alternatives formulated for initial, intermediate, and final screening were well described and covered a broad range of flood protection measures for the town.

The Panel agreed that while the project is the lowest cost alternative that eliminates flooding to the 1985 level, the project is not "economically justified" in the traditional sense (does not produce net economic benefits). While the WRDA 1996 authorization language has been cited as the basis for proceeding despite the project economics, the Panel was also in agreement that additional discussion was required within the report with respect to interpretation of the WRDA

mandate to eliminate, rather than reduce, flood losses relative to the 1985 event. Furthermore, The Panel also found that some segments of the report include outdated or inconsistent information.

The following statements summarize the Panel's findings, which are described in more detail in the Final Panel Comments (see Appendix A).

Plan Formulation Rationale:
During the intermediate planning phase, non-structural alternatives were dropped; the reasons for this should be clarified. Given the Recommended Plan's effects on aesthetics and scenic resources, as well as the Town's economic dependence on these resources, the project has not clearly demonstrated that the Recommend Plan maintains social and cultural resources, minimizes social disruptions, and is socially acceptable.

Economics:
Overall, the socioeconomic data used in the analysis and description are very dated and need to be updated. The report would benefit from tables that show Single Occurrence Damages, Expected Annual Damages (EAD), and Average Annual Equivalent (AAE) Damages. The report would also benefit from the addition of further clarification that the Project is not economically justified following the usual USACE guidelines, but was moved forward following the directive from WRDA 1996.

Engineering:
Detailed engineering data, including geotechnical and geological data, seepage analyses, scour potential, and hydrologic data, were not included in the report and would aid in understanding project feasibility and constraints. The evaluation of the Recommended Plan vs. the "no-action" alternative should include a description of the emergency action plan including an estimate of the frequency of (1) damaging flood events, and (2) hydrologic events that would require gate closures as it has a direct bearing on the personnel required to operate the system, as well as the sociological aspect of the disruption of traffic during gate closures.

Environmental:
Changes in the project over time do not appear to have been consistently incorporated into the report, resulting in inconsistencies and contradictions (e.g., some sections say there are no impacts, whereas others say 2,100 feet of the river bank are impacted). In particular, the changes related to USACE vegetation management standards may alter some of the mitigation requirements for the project.

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LIST OF ACRONYMS

AAE	Average Annual Equivalent
ATR	Agency Technical Review
COI	Conflict of Interest
DrChecks	Design Review and Checking System
DPR	Detailed Project Report
EAB	Expected Annual Benefits
EAD	Expected Annual Damages
EAP	Emergency Action Plan
EGM	Economic Guidance Memorandum
EIS	Environmental Impact Statement
EM	Engineering Manual
ERDC	Engineering Research and Development Center
ETL	Engineering Technical Letter
FEMA	Federal Emergency Management Agency
HEC-FDA	Hydrologic Engineering Center – Flood Damage Reduction Analysis
HEC-HMS	Hydrologic Engineering Center – Hydrologic Modeling System
HEC-RAS	Hydrologic Engineering Center – River Analysis System
IEPR	Independent External Peer Review
LPP	Local Protection Project
NED	National Economic Development
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NTP	Notice to Proceed
ODC	Other Damage Categories
OMB	Office of Management and Budget
USACE	United States Army Corps of Engineers
WRDA	Water Resources Development Act
WV	West Virginia

1. INTRODUCTION

The Town of Marlinton is located entirely within the State of West Virginia (WV) on the Greenbrier River, 109 miles upstream from its confluence with the New River. Marlinton and the Greenbrier Valley have a long history of flooding, with the largest recorded floods of recent occurrence. The flood of record occurred in November 1985 and inundated almost the entire Town of Marlinton. This flood event had an estimated frequency of 350 years, causing over $100 million (October 2001 price level) in damages basin-wide and resulting in five deaths. Another major flood occurred in January 1996, with basin-wide damages again estimated to be nearly $100 million (October 2001 price level). During those floods, the damages in Marlinton alone were estimated at $25 million to $30 million (October 2001 price level).

The project area includes approximately 4 miles of the Greenbrier River, the lower mile of Knapps Creek, and an area along Stony Creek downstream of the community of Campbelltown. Marlinton is served by WV Route 39 and US Route 219. The tributaries, Stony Creek (23-square-mile drainage area) and Knapps Creek (134-square-mile drainage area) both enter the Greenbrier River within the project area. The drainage area for the Greenbrier River at Marlinton is approximately 518 square miles.

Feasibility studies of the Greenbrier River Basin, including the Town of Marlinton, originated in the mid-1960s as a part of the Kanawha River Basin Comprehensive Study. A feasibility study conducted by the U.S. Army Corps of Engineers (USACE) and documented in a draft Detailed Project Report (DPR) (September 1985) concluded that a low level of protection from channel modification of the Greenbrier River was the most feasible alternative to provide flood protection for the Town of Marlinton. However, after the 1985 flood, emphasis shifted back to basin-wide measures such as multipurpose reservoirs and tributary impoundments. A draft Evaluation Report dated July 1994 indicated that only a dry dam on the mainstem Greenbrier River was economically feasible. A river corridor management plan completed in 1996 evaluated a number of nonstructural measures, but only a flood warning system was determined to be economically feasible. Prior to completion of a basin-wide feasibility report, two major floods occurred in the Greenbrier Basin in 1996. In response to this latest major flooding, Congress authorized USACE (under the 1996 Water Resources Development Act [WRDA]) to investigate flood damage reduction at several named communities in the basin, including the major damage centers of Marlinton, Ronceverte, and Alderson. The least costly alternative was identified for each community and documented in the 1997 Greenbrier Limited Evaluation Report. Congress appropriated funds in fiscal year 1999 to initiate preparation of a DPR for a flood control project to protect the Town of Marlinton.

The objective of the work described here was to conduct an Independent External Peer Review (IEPR) of the Engineering, Economic, and Environmental Evaluation of the Geotechnical, Hydrological, Hydraulic, and Economic Aspects of Flood Risk Reduction Report, Marlinton, West Virginia and Feasibility Report – Marlinton, WV Detailed Project Report and Environmental Impact Statement with all pertinent appendices (September 2008 version) (hereinafter the Marlinton DPR/EIS) in accordance with procedures described in the Department of the Army, USACE Engineer Circular *Civil Works Review Policy* (EC No. 1165-2-209)

(USACE, 2010), USACE CECW-CP memorandum *Peer Review Process* (USACE, 2007), and Office of Management and Budget (OMB) bulletin *Final Information Quality Bulletin for Peer Review* (OMB, 2004). Battelle, as a 501(c)(3) non-profit science and technology organization with experience in establishing and administering peer review panels, was engaged to coordinate the IEPR of the Marlinton DPR/EIS. Independent, objective peer review is regarded as a critical element in ensuring the reliability of scientific analyses.

This final report details the IEPR process, describes the IEPR panel members and their selection, and summarizes the Final Panel Comments of the IEPR Panel on the existing environmental, economic, plan formulation, and engineering analyses contained in the Marlinton DPR/EIS. Detailed information on the Final Panel Comments is provided in Appendix A.

2. PURPOSE OF THE IEPR

To ensure that USACE documents are supported by the best scientific and technical information, USACE has implemented a peer review process that uses IEPR to complement the Agency Technical Review (ATR), as described in USACE (2010) and USACE (2007).

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

In this case, the IEPR of the Marlinton DPR/EIS was conducted and managed using contract support from Battelle, which is an Outside Eligible Organization under Section 501(c)(3) of the U.S. Internal Revenue Code with experience conducting IEPRs for USACE.

3. METHODS

This section describes the method followed in selecting the members for the IEPR Panel (the Panel) and in planning and conducting the IEPR. The IEPR was conducted following procedures described by USACE (2010) and in accordance with USACE (2007) and OMB (2004) guidance. Supplemental guidance on evaluation for conflicts of interest (COI) was obtained from the *Policy on Committee Composition and Balance and Conflicts of Interest for Committees Used in the Development of Reports* (The National Academies, 2003).

3.1 Planning and Schedule

After receiving the notice to proceed (NTP), Battelle held a kick-off meeting with USACE to review the preliminary/suggested schedule, discuss the IEPR process, and address any questions regarding the scope (e.g., clarify expertise areas needed for panel members). Any revisions to the schedule were submitted as part of the final Work Plan.

Table 1 defines the schedule followed in executing the IEPR. Due dates for milestones and deliverables are based on the NTP date of July 15, 2010. Note that the work items listed in Task 7 occur after the submission of this report. Battelle will enter the 14 Final Panel Comments developed by the Panel into USACE's Design Review and Checking System (DrChecks), a Web-based software system for documenting and sharing comments on reports and design documents, so that USACE can review and respond to them. USACE will provide responses (Evaluator Responses) to the Final Panel Comments, and the Panel will respond (BackCheck Responses) to the Evaluator Responses. All USACE and Panel responses will be documented by Battelle.

Table 1. Marlinton DPR/EIS IEPR Schedule

TASK	ACTION	DUE DATE
	Notice to Proceed (NTP)	7/15/2010
	Review documents available	8/12/2010
1	Battelle submits draft Work Plan[a]	8/26/2010
	USACE provides comments on draft Work Plan	9/2/2010
	Teleconference (if necessary)	9/2/2010
	Battelle submits final Work Plan[a]	9/8/2010
	Battelle requests input from USACE on COI questionnaire	7/22/2010
	USACE provides comments on COI questionnaire	7/22/2010
2	Battelle submits list of selected panel members[a]	8/16/2010
	USACE provides comments on selected panel members	8/19/2010
	Battelle completes subcontracts for panel members	9/8/2010
	Battelle submits draft charge (combined with draft Work Plan – Task 1)[a]	8/26/2010
3	USACE provides comments on draft charge	9/2/2010
	Battelle submits final charge (combined with final Work Plan – Task 1)[a]	9/8/2010
	USACE approves final charge	9/9/2010
	USACE/Battelle kick-off meeting	9/7-10/2010
	Battelle sends review documents to Panel	9/9/2010
4	USACE/Battelle/Panel kick-off meeting	Week of 9/13/2010
	Panel members complete their reviews	10/8/2010
5	Convene panel review teleconference	10/18/2010
	Panel provides draft Final Panel Comments to Battelle	10/26/2010
6	**Battelle submits Final IEPR Report to USACE**[a]	11/16/2010
7	Battelle inputs Final Panel Comments to DrChecks; Battelle provides Final Panel Comment response template to USACE	11/18/2010
	USACE provides draft Evaluator Responses and clarifying questions	12/2/2010

TASK	ACTION	DUE DATE
	Teleconference between Battelle, Panel, and USACE to discuss Final Panel Comments, draft Evaluator Responses, and clarifying questions	12/13/2010
	USACE inputs final Evaluator Responses in DrChecks	12/28/2010
	Battelle inputs the Panel's BackCheck Responses in DrChecks	1/12/2011
	Battelle submits pdf printout of DrChecks project file and closes out DrChecks[b]	1/13/2011
	Project Closeout: includes time to close out subcontracts with panel members. A no-cost extension may be required to accommodate project closeout activities	3/26/2011

[a] Deliverable

[b] Task occurs after the submission of this report.

3.2 Identification and Selection of IEPR Panel Members

The candidates for the Panel were evaluated based on their technical expertise in the following key areas: geotechnical engineering, hydraulic engineering, economics, plan formulation, and National Environmental Policy Act (NEPA) impact assessment/environmental ecology. These areas correspond to the technical content of the Marlinton DPR/EIS and overall scope of the project.

To identify candidate panel members, Battelle reviewed experts in Battelle's Peer Reviewer Database, sought recommendations from colleagues, contacted former panel members, and conducted targeted Internet searches. Battelle initially identified more than 20 candidates for the Panel, evaluated their technical expertise, and inquired about potential COI. Of these, Battelle chose nine of the most qualified candidates and confirmed their interest and availability. Of the nine candidates, five were proposed for the final Panel and four were proposed as backup reviewers. Information about the candidate panel members, including brief biographical information, highest level of education attained, and years of experience, was provided to USACE for feedback. Battelle made the final selection of panel members according to the selection criteria described in the Work Plan.

The five proposed primary reviewers constituted the final Panel. The remaining candidates were not proposed for a variety of reasons, including lack of availability, disclosed COI, or lack of the precise technical expertise required.

The candidates were screened for the following potential exclusion criteria or COI.[1] These COI questions were intended to serve as a means of disclosure, and to better characterize a potential

[1] 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 OMB (2004, 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

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

- Involvement by you or your firm[2] in any part of the Feasibility Report for Marlinton, West Virginia, Detailed Project Report (DPR) and Environmental Impact Statement (EIS), including all appendices.
- Involvement by you or your firm[2] in any work related to the Marlinton, West Virginia flood risk reduction project.
- Involvement by you or your firm[2] in any other flood risk reduction activities within the Greenbrier River Basin.
- Involvement by you or your firm[2] in any work in the Town of Marlinton, West Virginia or on the Greenbrier River Basin.
- Current employment by the U.S. Army Corps of Engineers (USACE).
- Involvement with paid or unpaid expert testimony related to the flood risk reduction in Marlinton, West Virginia.
- Current or previous employment or affiliation, with members of the Marlinton, West Virginia flood risk reduction team and currently working on Marlinton flood risk reduction projects (for pay or pro bono).
- Past, current or future interests or involvements (financial or otherwise) of you, your spouse or your children related to the Marlinton, West Virginia flood risk reduction project.
- Current personal involvement with other USACE projects, including whether involvement was to author any manuals or guidance documents for USACE. If yes, provide titles of documents or description of project, dates, and location (USACE district, division, Headquarters, Engineering Research and Development Center (ERDC), etc.), and position/role. Please highlight and discuss in greater detail any projects that are specifically with the Huntington District.
- Current firm[2] involvement with other USACE projects, specifically those projects/contracts that are with the Huntington District. If yes, provide title/description, dates, and location (USACE district, division, Headquarters, ERDC, etc.), and position/role.
- Any previous employment by the USACE as a direct employee or contractor (either as an individual or through your firm[2]) within the last 10 years, notably if those projects/contracts are with the Huntington District. If yes, provide title/description, dates employed, and place of employment (district, division, Headquarters, ERDC, etc.), and position/role.

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agency, some may question whether that scientist is sufficiently independent from the agency to be employed as a peer reviewer on agency-sponsored projects."

[2] Includes any joint ventures in which your firm is involved.

- Previous experience conducting technical peer reviews. If yes, please highlight and discuss any technical reviews concerning flood risk reduction and include the client/agency and duration of review (approximate dates).
- Pending, current or future financial interests in the Marlinton, West Virginia flood risk reduction project related contracts/awards from USACE.
- A significant portion (i.e., greater than 50%) of personal or firm[1] revenues within the last 3 years came from USACE contracts.
- Any publicly documented statement (including, for example, advocating for or discouraging against) related to the Marlinton, West Virginia flood risk reduction project.
- Participation in relevant prior Federal studies relevant to this project:
    a. Feasibility studies of the Greenbrier River Basin, which originated in the mid 1960s as a part of the Kanawha River Basin Comprehensive Study
    b. Draft Evaluation Report, July 1994
    c. A River Corridor Management Plan, 1996
    d. Greenbrier Limited Evaluation Report, 1997
    e. Detailed Project Report and Environmental Impact Statement (DPR/EIS), March 2002
    f. DPR/EIS, April 2003
    g. DPR/EIS, September 2005
    h. DPR/EIS with a Cost and Schedule Risk Analysis, September 2008
    i. Other Greenbrier River flood risk reduction reports or studies.
- Participation in prior non-Federal studies relevant to this project and/or Marlinton, West Virginia and vicinity.
- Is there any past, present or future activity, relationship or interest (financial or otherwise) that could make it appear that you would be unable to provide unbiased services on this project? If so, please describe.

In selecting the final members of the Panel from the list of candidates, Battelle chose experts who best fit the expertise areas and had no COI. The five final reviewers were affiliated with consulting companies. Battelle established subcontracts with the panel members when they indicated their willingness to participate and confirmed the absence of COI through a signed COI form. Although the Panel was disclosed to USACE, Battelle made the final decision on selecting the Panel. Section 4 of this report provides names and biographical information on the panel members.

Prior to beginning their review and within one day of their subcontracts being finalized, all members of the Panel attended a kick-off meeting via teleconference planned and facilitated by Battelle in order to review the IEPR process, the schedule, communication, and other pertinent information for the Panel.

3.3 Preparation of the Charge and Conduct of the IEPR

Battelle drafted a preliminary charge document, including specific charge questions and discussion points. The charge was prepared by Battelle to assist USACE in the development of

the charge questions that will guide the peer review, according to guidance provided in USACE (2010) and OMB (2004). The draft charge was submitted to USACE for evaluation as part of the draft Work Plan. USACE provided comments and revisions to the draft charge, which were used to produce the final charge. The final charge was submitted to USACE for approval. In addition to a list of 70 charge questions/discussion points, the final charge included general guidance for the Panel on the conduct of the peer review (provided in Appendix B of this final report).

The USACE Project Delivery Team briefed the Panel and Battelle during an onsite kick-off meeting to discuss the Marlinton DPR/EIS project. The meeting was held at the Marlinton Town Hall on September 14 and 15, 2010, prior to the start of the review. Before the meeting, the IEPR Panel received an electronic version of the Marlinton DPR/EIS documents (approximately 900 pages) and the final charge.

A full list of the documents reviewed by the Panel is provided in Appendix B of this report. The Panel was instructed to address the charge questions/discussion points within a comment-response form provided by Battelle.

3.4 Review of Individual Comments

At the end of the review period, the Panel produced approximately 300 individual comments in response to the charge questions/discussion points. Battelle reviewed the comments to identify overall recurring themes, areas of potential conflict, and other overall impressions. As a result of the review, Battelle was able to summarize the 300 comments into a preliminary list of 18 overall comments and discussion points. Each panel member's individual comments were shared with the full Panel in a merged individual comments table.

3.5 IEPR Panel Teleconference

Battelle facilitated a 4-hour teleconference with the Panel so that the panel experts, many of whom are from diverse scientific backgrounds, could exchange technical information. The main goal of the teleconference was to identify which issues should be carried forward as Final Panel Comments in the IEPR report and decide which panel member would serve as the lead author for the development of each Final Panel Comment. This information exchange ensured that the final IEPR report would accurately represent the Panel's assessment of the project, including any conflicting opinions. The Panel engaged in a thorough discussion of the overall positive and negative comments, added any missing issues of high-level importance to the findings, and merged any related individual comments. In addition, Battelle confirmed each Final Panel Comment's level of significance to the Panel.

The Panel also discussed responses to four specific charge questions where there appeared to be disagreement among panel members. The conflicting comments were resolved based on the professional judgment of the Panel, and all sets of comments were determined not to be conflicting. Each comment was either incorporated into a Final Panel Comment, determined to be consistent with other Final Panel Comments already developed, or determined to be a non-significant issue.

At the end of these discussions, the Panel identified 16 comments and discussion points that should be brought forward as Final Panel Comments. However, subsequent review of the Final

Panel Comments after the teleconference, including clarification of one issue from USACE, determined that one comment was policy related and another comment was editorially related. Since neither was consistent with the IEPR Type I guidance according to EC 1165-2-209, both comments were dropped, leaving 14 Final Panel Comments.

3.6 Preparation of Final Panel Comments

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

- Lead Responsibility: For each Final Panel Comment, one panel member was identified as the lead author responsible for coordinating the development of the Final Panel Comment and submitting it to Battelle. Battelle modified lead assignments at the direction of the Panel. To assist each lead in the development of the Final Panel Comments, Battelle distributed the merged individual comments table, a summary detailing each draft final comment statement, an example Final Panel Comment following the four-part structure described below, and templates for the preparation of each Final Panel Comment.
- Directive to the Lead: Each lead was encouraged to communicate directly with other IEPR panel members as needed and to contribute to a particular Final Panel Comment. If a significant comment was identified that was not covered by one of the original Final Panel Comments, the appropriate lead was instructed to draft a new Final Panel Comment.
- Format for Final Comments: Each Final Panel Comment was presented as part of a four-part structure:
  1. Comment Statement (succinct summary statement of concern)
  2. Basis for Comment (details regarding the concern)
  3. Significance (high, medium, low; see description below)
  4. Recommendation(s) for Resolution (see description below).
- Criteria for Significance: The following were used as criteria for assigning a significance level to each Final Panel Comment:
  1. High: Describes a fundamental problem with the project that could affect the recommendation or justification of the project (e.g., a "showstopper")
  2. Medium: Affects the completeness or understanding of the reports/project
  3. Low: Affects the technical quality of the reports but will not affect the recommendation of the project.
- Guidance for Developing the Recommendation: The recommendation was to include specific actions that the USACE should consider to resolve the Final Panel Comment (e.g., suggestions on how and where to incorporate data into the analysis, how and where to address insufficiencies, areas where additional documentation is needed).

At the end of this process, 14 Final Panel Comments were prepared and assembled. Battelle reviewed and edited the Final Panel Comments for clarity, consistency with the comment

statement, and adherence to guidance on the Panel's overall charge, which included ensuring that there were no comments regarding either the appropriateness of the selected alternative or USACE policy. There was no direct communication between the Panel and USACE during the preparation of the Final Panel Comments. The Final Panel Comments are presented in Appendix A of this report.

4. PANEL DESCRIPTION

Candidates for the Panel were identified using Battelle's Peer Reviewer Database, targeted Internet searches using key words (e.g., technical area, geographic region), searches of websites of universities or other compiled expert sites, and referrals. Battelle prepared a draft list of primary and backup candidate panel members (who were screened for availability, technical background, and COI), and provided it to USACE for feedback. Battelle made the final selection of panel members.

An overview of the credentials of the final five primary members of the Panel and their qualifications in relation to the technical evaluation criteria is presented in Table 2. More detailed biographical information regarding each panel member and his or her area of technical expertise is presented in the text that follows the table.

Table 2. Marlinton DPR/EIS: IEPR Panel: Technical Criteria and Areas of Expertise

	Mack	Halverson	Kelsoe	Denlinger	Malec
Geotechnical Engineer	X				
Minimum 10 years of experience in geotechnical engineering	X				
Experience with the design of flood control works, including:	X				
Slope stability	X				
Through-seepage	X				
Under-seepage	X				
Riverbank stability	X				
Settlement	X				
Bearing capacity evaluations	X				
Registered Professional Engineer	X				
Hydraulic Engineer		X			
Minimum 10 years of experience in hydraulic engineering with an emphasis on local protection projects (LPPs)		X			
Extensive background in hydraulic theory and practice		X			
Familiar with USACE application of risk and uncertainty analysis of flood damage reduction studies (structural and non-structural), specifically related to overtopping of earthen levees and floodwalls		X			
Modeling experience with XP-SWMM		X			
Active participation in related professional societies		X			
M.S. degree or higher in hydraulic engineering		X			
Modeling experience with standard USACE hydrologic and hydraulic computer models, including but not limited to:		X			
HEC-RAS (steady and unsteady)		X			
HEC-HMS		X			
Registered Professional Engineer		X			

	Mack	Halverson	Kelsoe	Denlinger	Malec
Economics			X		
Minimum 10 years of experience in economics			X		
Experience directly related to water resource economic evaluation and review			X		
Experience working for or with USACE			X		
Several years experience directly dealing with HEC-FDA software and analysis (required)			X		
Experience with National Economic Development (NED) analysis procedures related to flood risk management projects			X		
Degree(s) in economics or related field			X		
Plan Formulation				X	
Extensive experience and knowledge in the plan formulation process, particularly with the USACE six-step planning process				X	
Familiar with evaluation of alternative plans for flood risk management projects				X	
Active participation in related professional societies				X	
M.S. degree or higher in planning or related field					
Minimum 10 years of experience in plan formulation				X	
NEPA Impact Assessment/Environmental Ecology					X
Minimum 10 years of experience in evaluating and conducting NEPA impact assessments					X
Experience determining the scope and appropriate methodologies for impact assessment and analyses for projects with high public and interagency interests					X
Experience in describing and evaluating the complex relationships and dynamics of ecosystems					X
Able to assess the consequences of altering environmental conditions					X
Experience in cumulative effects analyses for complex multi-objective public works projects with competing trade-offs					X

	Mack	Halverson	Kelsoe	Denlinger	Malec
Experience determining the scope and appropriate methodologies for impact assessment and analyses for projects having impacts on the human environment					X
Active participation in related professional societies					X
M.S. degree or higher in an appropriate field of study with emphasis on public policy					X

Darren Mack, P.E., G.E.

Role: This panel member was chosen primarily for his geotechnical engineering experience and expertise.
Affiliation: Sanders & Associates Geostructural Engineering, Inc

Darren Mack is an associate engineer at Sanders & Associates Geostructural Engineering, Inc. He earned a M.S. in Civil (Geotechnical) Engineering from the University of California Berkley in 1997, has 13 years of experience, and is a licensed Professional Engineer and Geotechnical Engineer in California. He has managed over 200 geotechnical projects, including water resources and levee projects. He is experienced in the evaluation of slope stability for various types of projects, including both soil and rock slopes. Mr. Mack has performed levee evaluation and design for new setback levees, including through-seepage analysis in accordance with USACE EM 1110-2-1913, *Design and Construction of Levees* (USACE, 2000a) and under-seepage analysis using SEEP/W software. He is currently performing levee design and under-seepage analysis during preliminary engineering for a proposed setback levee in West Sacramento, California; analysis included under-seepage analysis with and without an 80-foot-deep cutoff wall. Mr. Mack has evaluated riverbank stability, including stability of an existing flood wall, as part of the Docks Riverfront promenade project in Sacramento, California. He also performed rock slope protection design to protect portions of the riverbank subject to scour. Mr. Mack has performed numerous settlement studies, including building settlement in sands and clays; consolidation settlement in deep, soft marine deposits; dry sand seismic settlement; and post-liquefaction settlement of buildings and embankments. He has performed numerous bearing capacity evaluations for flood walls, canals, hydraulic structures, pump houses, buildings, and bridge abutments. Mr. Mack has been an Associate Member of the American Society of Civil Engineers since 1996.

Bruce Halverson, P.E. Certified Floodplain Manager

Role: This panel member was chosen primarily for his hydraulic engineering experience and expertise.
Affiliation: Door Creek Associates

Bruce Halverson is the principal and water resources engineer for Door Creek Associates with 28 years of experience in the areas of water resources and civil engineering. Mr. Halverson earned a M.S. in Civil Engineering from Louisiana State University in 1988. He served as a hydraulics engineer for the USACE Chicago District Hydrologic and Hydraulic Branch from 1988 to 1992 focusing on flood damage risk reduction. Mr. Halverson's expertise includes analysis of extreme hydrologic events and the quantification of their effects, risk analysis, and the development of hydrologic and hydraulic designs. His project experience includes Hurricane Katrina Hydrologic and Hydrodynamic Modeling, New Orleans, Louisiana; Section 205 Flood Damage Reduction Study, St. Joseph, Missouri; Drainage Improvements and Floodplain Determination Study, Ebner Coulee, La Crosse, Wisconsin; and the Flood Damage Mitigation Study, Des Plaines River, Chicago, Illinois. The post-Katrina hydrologic and hydrodynamic modeling included a Hydrologic Engineering Center-River Analysis System (HEC-RAS) unsteady-state model that was developed with variations ranging from inoperative to fully operational pump modes. He performs distributed-parameter hydrologic modeling, sediment delivery and transport studies, floodplain determinations, reservoir flood routing, and

hydropower studies; conducts hydrologic alteration analyses using statistical methods; and designs and analyzes hydraulic structures and physical model studies. Among his accomplishments is the development of a new version of the Hydrometeorological Report 52 (HMR52) computer program to produce probable maximum storm hyetographs. Mr. Halverson's modeling experience includes the use of modeling systems developed by USACE, the Danish Hydraulic Institute, the National Weather Service, and the Natural Resources Conservation Service, as well as integrated geographic information system-based model development systems, such as HEC-Geospatial RAS, HEC-Geospatial Hydrologic Modeling Extension, and Watershed Management System. He has been using steady and unsteady models for 20 years, including HEC-2, and developed HEC-RAS and HEC-Hydrologic Modeling System (HMS) models for large watersheds and river systems for design, historic events, and probable maximum flood. He is familiar with the USACE application of risk and uncertainty analysis for flood damage reduction, has experience with HEC-Flood Damage Reduction Analysis (FDA), and was a member of the modeling team for Interagency Performance Evaluation Team study of New Orleans post-Katrina. Mr. Halverson is a member of the Association of State Floodplain Managers and the Society of American Military Engineers.

Darrell Kelsoe

Role: This panel member was chosen primarily for his economics experience and expertise.
Affiliation: Brown and Gay Engineers, Inc

Darrell Kelsoe is an Economics Manager for Brown & Gay Engineers, Inc. and has 25 years of experience in economics, financial, and flood damage reduction projects. He received his B.S. in Agricultural Economics (Agri-Business Option) from Texas A&M University in 1983 and has worked extensively with USACE Galveston, Fort Worth, New Orleans, and Sacramento Districts on feasibility and general re-evaluation studies. His technical expertise includes risk-based analysis using the HEC-FDA modeling program, financial analysis, real estate appraisals, land use analysis, and social impacts. He has specific experience related to water resource economic evaluation and review. Under Section 211f of the WRDA, he has computed inundation, location, and recreation benefits for urban flood damage reduction projects and performed the structure inventory data sets for Analysis on Brays Bayou, White Oak Bayou, Hunting Bayou and Halls Bayou, including "without project" conditions, component evaluation, alternative analysis, and National Economic Development (NED) plan formulation. Each of these projects included dealing directly with HEC-FDA software. Recently, Mr. Kelsoe served as the Lead Economist for the Halls Bayou Flood Risk Management Study for the Harris County Flood Control District and USACE, Galveston, for which he prepared the inventory for more than 24,000 structures within the 80-square-mile watershed; appraised more than 300 structures using Marshall & Swift to validate the County's property data; estimated future conditions using population and structure inventory forecasting; and performed the risk-based analysis using HEC-FDA (which included Monte Carlo simulations). For the Hunting Bayou (Texas) project, Mr. Kelsoe was the Lead Economist for an economic re-evaluation in accordance with the NED objective for flood risk management studies. He performed a depth-damage analysis based on current Economic Guidance Memorandum (EGM) 09-04 (USACE, 2009a) along with a price level update based on a random sample of over 50 properties and current replacement cost of new less depreciation. This study also estimated "future conditions" population, socioeconomic analysis, and structure

inventory forecasting, all of which was incorporated into the HEC-FDA model. Mr. Kelsoe has extensive knowledge of the USACE planning process relative to the Principles and Guidelines, the USACE Planning Guidance Notebook (USACE, 2000b), and the federal objective related to water resource projects.

John Denlinger, P.E., Certified Floodplain Manager

Role: This panel member was chosen primarily for his plan formulation experience and expertise.
Affiliation: HDR Engineering, Inc.

John Denlinger is a project manager, planner, and engineer at HDR Engineering, Inc. He has a B.S. from Lehigh University in Civil Engineering, 20 years of experience focused on water resources planning and engineering, and over 10 years of USACE plan formulation experience. He is a certified Professional Engineer in Nebraska, Missouri, Kansas, and Wisconsin. He is a Certified Floodplain Manager and has served on a wide variety of water resources and civil works projects. He has completed plan formulation activities, hydraulics and hydrology studies, floodplain models, Federal Emergency Management Agency (FEMA) map revisions, feasibility studies, flood mitigation, ecosystem restoration, risk assessments, and watershed studies. He has prepared engineering and economic evaluations, cost-benefit analyses, cost-effectiveness analyses, incremental analyses, construction cost estimates, plans, specifications, bid documents, and construction phase services. Mr. Denlinger offers specialized experience in a wide variety of computer modeling applications, including HEC packages and other water resources tools. His experience in the plan formulation process includes the USACE six-step planning process and Planning Guidance Notebook (USACE, 2000b), and he has completed associated task orders for the USACE Kansas City, Omaha, St. Louis, St. Paul, and New York Districts. Mr. Denlinger has focused expertise on alternatives evaluation for flood risk management, with current USACE projects including Brush Creek Basin Feasibility Study in Kansas City, Missouri; Ecorse Creek Basin General Reevaluation Report in Wayne County, Michigan; and Blind Brook Watershed Plan in West Chester County, New York. His current activities are focused on plan formulation for flood risk management and ecosystem restoration in strategic watershed locations, complete with cost-effectiveness and incremental analysis to screen alternatives. For the Brush Creek Basin Flood Control and Ecosystem Restoration Project, Mr. Denlinger has led several planning-phase efforts, including the 905(b) Reconnaissance Study in 2005. He is currently completing the Brush Creek Basin Feasibility Study and Watershed Management Plan. He is an active member in the Association of State Floodplain Managers and the Society of American Military Engineers.

Henry Malec, P.E.

Role: This panel member was chosen primarily for his NEPA impact assessment/environmental ecology experience and expertise.
Affiliation: Volkert, Inc

Henry Malec is an Environmental Project Manager with Volkert, Inc. He earned a M.S. in Environmental Engineering at the University of Florida in 1975, has 40 years of experience preparing and reviewing NEPA impact assessments for public and private agencies, and is a licensed Professional Engineer in Alabama. Prior to joining Volkert, Mr. Malec worked 28 years

for the USACE and 6 years for the U.S. Air Force. He has extensive NEPA experience in determining the scope and appropriate methodologies for impact assessment and analysis for projects with high public and interagency interests; describing and evaluating the complex relationships and dynamics of ecosystems; assessing the consequences of altering environmental conditions; performing cumulative effects analyses for complex multi-objective public works projects; and determining the scope and appropriate methodologies for impact assessment and analyses for projects having impacts on the human environment. Mr. Malec helped prepare one of the first EISs after the passage of NEPA in 1969 and has worked on NEPA projects throughout his career. He has extensive experience preparing NEPA documents, reviewing NEPA documents prepared by others, and preparing Section 10/404 permit applications and Section 404 (b)(1) evaluations for filling waters and wetlands associated with both development and restoration projects. Mr. Malec was an Environmental Project Engineer for the completion of an EIS for the Alabama State Port Authority's Choctaw Point Terminal project to develop 370 acres in Choctaw Point and Garrows Bend and fill 47.4 acres of water bottoms and 24.3 acres of wetlands. The third-party EIS was prepared to support the USACE Mobile District permit decision for the Choctaw Point Terminal Project. Mr. Malec led an interdisciplinary team to evaluate environmental impacts and develop a mitigation plan. The environmental analyses and proposed mitigation and enhancement measures were incorporated into the draft and final EISs. The project required working closely with the 10 cooperating agencies and a proactive public outreach program.

5. SUMMARY OF FINAL PANEL COMMENTS

The Panel agreed on its "assessment of the adequacy and acceptability of the economic, engineering, and environmental methods, models, and analyses used" (USACE, 2010; p. D-4) in the Marlinton DPR/EIS. The Panel agreed that the DPR/EIS did a good job of describing the history of flooding and the resulting adverse impacts to the Town of Marlinton, as well as as well as the need for improved flood risk management. The Alternatives formulated for initial, intermediate, and final screening were well described and covered a broad range of flood protection measures for the town.

The Panel agreed that while the project is the lowest cost alternative that eliminates flooding to the 1985 level, the project is not "economically justified" in the traditional sense (does not produce net economic benefits). While the WRDA 1996 authorization language has been cited as the basis for proceeding despite the project economics, the Panel was also in agreement that additional discussion was required within the report with respect to interpretation of the WRDA mandate to eliminate, rather than reduce, flood losses relative to the 1985 event. Furthermore, The Panel also found that some segments of the report include outdated or inconsistent information.

The following statements summarize the Panel's findings, which are described in more detail in the Final Panel Comments (see Appendix A).

Plan Formulation Rationale:
During the intermediate planning phase, non-structural alternatives were dropped; the reasons for this should be clarified. Given the Recommended Plan's effects on aesthetics and scenic resources, as well as the Town's economic dependence on these resources, the project has not clearly demonstrated that the Recommend Plan maintains social and cultural resources, minimizes social disruptions, and is socially acceptable.

Economics:
Overall, the socioeconomic data used in the analysis and description are very dated and need to be updated. The report would benefit from tables that show Single Occurrence Damages, Expected Annual Damages (EAD), and Average Annual Equivalent (AAE) Damages. The report would also benefit from the addition of further clarification that the Project is not economically justified following the usual USACE guidelines, but was moved forward following the directive from WRDA 1996.

Engineering:
Detailed engineering data, including geotechnical and geological data, seepage analyses, scour potential, and hydrologic data, were not included in the report and would aid in understanding project feasibility and constraints. The evaluation of the Recommended Plan vs. the "no-action" alternative should include a description of the emergency action plan including an estimate of the frequency of (1) damaging flood events, and (2) hydrologic events that would require gate closures as it has a direct bearing on the personnel required to operate the system, as well as the sociological aspect of the disruption of traffic during gate closures.

Environmental:
Changes in the project over time do not appear to have been consistently incorporated into the report, resulting in inconsistencies and contradictions (e.g., some sections say there are no impacts, whereas others say 2,100 feet of the river bank are impacted). In particular, the changes related to USACE vegetation management standards may alter some of the mitigation requirements for the project.

Table 3 lists the 14 Final Panel Comment statements by level of significance.

Table 3. Overview of 14 Final Panel Comments Identified by Marlinton DPR/EIS IEPR Panel

Significance – High	
1	The alternatives identified focus solely on the elimination of flood damages, rather than a reduction in flood damages relative to those in the 1985 event. This appears to be in conflict with the guidance of ER 1105-2-101, Section 7d.
2	The Recommended Plan appears to conflict with several objectives noted during the plan formulation process, including maintains social and cultural resources, minimizes social disruptions, and is socially acceptable given the effects on aesthetics and scenic resources.
Significance – Medium	
3	The damages and benefits for the "without project" and "with project" conditions have not been provided in sufficient detail to justify the selection of the Recommended Plan.
4	Assumptions related to vegetation management, visual impacts, and mitigation may have been partially invalidated by recent changes to USACE vegetation management standards and should be reassessed and clarified.
5	The operation and maintenance of the project features by the Town of Marlinton may not be achievable as proposed.
6	Additional information describing how scour potential was accounted for in the design of the floodwalls and levees of the Recommended Plan is needed.
7	The Economic Appendix analyzes other damage categories (ODCs); however, there is no information demonstrating how these ODCs were developed, calculated, and used in the overall damages and benefits analysis.
8	The effectiveness of the Recommended Plan could not be ascertained due to a lack of details regarding the implementation of the Emergency Action Plan (EAP).
9	Additional information is required regarding the preliminary evaluation of levee and floodwall stability, under-seepage, through-seepage, and slope stability to provide context for the engineering design issues presented.
10	Inconsistencies due to changes in the Recommended Plan and project features over time should be corrected to represent the current proposed project, and some environmental impacts associated with these changes have not been addressed.
11	Inconsistencies in the intermediate screening process resulted in non-structural alternatives being removed from further consideration.
12	The Federal Emergency Management Agency (FEMA) accreditation, which includes the Recommended Plan's effects on future floodplain management, floodplain redevelopment, and flood insurance requirements in the project area, is not addressed.
13	The Draft Section 404(b)(1) Evaluation provided in Appendix F does not address all the proposed discharges, and potential impacts, of fill material into "Waters of the United States."
Significance – Low	
14	Some of the socioeconomic data described and used in the analysis include inconsistencies and are outdated.

6. REFERENCES

40 CFR Part 230. Title 40, Protection of Environment, Part 230 - Section 404(b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material. U.S. Environmental Protection Agency.

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

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

USACE (1989). Retaining and Flood Walls. Department of the Army, U.S. Army Corps of Engineers, Washington, D.C. Engineering Manual No. EM 1110-2-2502. September 29.

USACE (2000a). Design and Construction of Levees. Department of the Army, U.S. Army Corps of Engineers, Washington, D.C. Engineering Manual No. EM 1110-2-1913. April 30.

USACE (2000b). Planning Guidance Notebook. Department of the Army, U.S. Army Corps of Engineers, Washington, D.C. Engineer Regulation (ER) No. 1105-2-100. April 22.

USACE (2006). Risk Analysis for Flood Damage Reduction Studies. Department of the Army, U.S. Army Corps of Engineers, Washington, D.C. Engineer Regulation (ER) No. 1105-2-101. January 3.

USACE (2007). Peer Review Process. Department of the Army, US Army Corps of Engineers, Washington, DC. CECW-CP Memorandum. March 30.

USACE (2009a). Generic Depth-Damage Relationships for Vehicles. Department of the Army, U.S. Army Corps of Engineers, Washington, D.C. Economic Guidance Memorandum (EGM) No.09-04. June 22.

USACE (2009b). Guidelines For Landscape Planting and Vegetation Management at Levees, Floodwalls, Embankment Dams, and Appurtenant Structures. Department of the Army, U.S. Army Corps of Engineers, Washington, D.C. Engineering Technical Letter (ETL) No. 1110-2-571, April 10.

USACE (2010). Water Resources Policies and Authorities: Civil Works Review Policy. Department of the Army, US Army Corps of Engineers, Washington, DC. Engineer Circular (EC) No. 1165-2-209. January 31.

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APPENDIX A

Final Panel Comments

on the

Marlinton DPR/EIS

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Final Panel Comment 1:

The alternatives identified focus solely on the elimination of flood damages, rather than a reduction in flood damages relative to those in the 1985 event. This appears to be in conflict with the guidance of ER 1105-2-101, Section 7d.

Basis for Comment:

ER 1105-2-101, Section 7d, states that "The National Economic Development (NED) plan will be the scale of the flood damage reduction alternative that reasonably maximizes expected net benefits" (USACE, 2006).

The planning objectives were targeted toward providing flood protection to the 1985 flood level, and this appears to have been implemented with the intention of essentially eliminating flood damages from this specified flood event. The project authorization language (Water Resources Development Act (WRDA) of 1996, Section 579) does not provide a directive to "eliminate future losses" but rather to "reduce future losses." The project authorization language states that "The Secretary may design and implement a flood damage reduction program for the Greenbrier River Basin, West Virginia, in the vicinity of Durbin, Cass, Marlinton, Renick, Ronceverte, and Alderson as generally presented in the District Engineer draft Greenbrier River Basin Study Evaluation Report, dated July 1994, to the extent provided under subsection (b) to afford such communities a level of protection against flooding sufficient to reduce future losses to such communities from the likelihood of flooding such as occurred in November 1985, January 1996, and May 1996."

Section 5.2 (page 75) of the report lists the various planning objectives that were established for the study. The first objective listed is "develop the most cost-effective, implementable plan to provide flood protection for the Town of Marlinton to the level of the 1985 flood as specified in the WRDA and all other applicable laws and regulations." This objective is focused on flood protection to the 1985 flood level, essentially eliminating future flood losses from such an event, and not specifically reducing (as stated in the authorization language) future losses. ER 1105-2-101 requires that a range of flood protection measures be evaluated such that the NED plan can be identified. It appears that the plan formulation process is focused on eliminating future flood losses from a single flood event and does not clearly demonstrate that this plan maximizes expected net benefits.

U.S. Army Corps of Engineers (USACE) principles and guidelines refer to incremental analysis and different scales of alternatives. For this project, it appears that a single increment/scale was used in plan formulation. Incremental analysis and various scales of alternatives are necessary to identify cost-effective plans and the best buy alternative.

It is possible that other alternatives could have been determined to be more "cost effective" if carried forward in the planning process. For example, Table 5-1 states that alternatives with low and moderate flood reduction effectiveness were dropped from further consideration (in some cases, other considerations were included in the decision to drop as well). Because these were dropped from consideration before a benefit-cost ratio was computed, it is not clear if the lower level of effectiveness would have met the intention of the WRDA in a more "cost effective" manner.

Similarly, at the intermediate screening level, all of the non-structural alternatives were eliminated from further consideration. Several reasons are given for eliminating these alternatives, including cost and socioeconomic impacts. However, the ability to obtain the same level of flood protection as the flood wall/levees was also a significant consideration in eliminating these alternatives.

Finally, one of the unavoidable environmental impacts is aesthetics due to the required height of the floodwalls and levees. However, it does not appear that any consideration was given to lower, less obstructive, less costly flood protection structures. These structures may have had higher benefit-cost ratios and/or reduced visual impact, depending on the level of flood reduction obtained. This is the area in which the most notable difference may have been seen had incremental analysis with different scales of alternatives been performed.

Significance – High:

The interpretation of the authorization language has directly affected the plan formulation process, establishment of objectives, development of alternatives, and identification of a Recommended Plan that appears not to be in compliance with USACE guidance.

Recommendation(s) for Resolution:

1. Clarify and explain the interpretation of the authorization language and establishment of planning objectives.
2. Discuss any variations from the USACE principles and guidelines as a result of the authorization language or interpretation thereof.
3. Provide documentation regarding plan formulation and alternatives that considered lesser scales of flood damage reduction and incremental analysis.
4. Display cost-effectiveness analysis and incremental analysis graphs for a range of flood damage reduction alternatives.

Literature Cited:

USACE (2006). Risk Analysis for Flood Damage Reduction Studies. Department of the Army, U.S. Army Corps of Engineers, Washington, D.C. Engineer Regulation (ER) No. 1105-2-101. January 3.

Final Panel Comment 2:

The Recommended Plan appears to conflict with several objectives noted during the plan formulation process, including maintains social and cultural resources, minimizes social disruptions, and is socially acceptable given the effects on aesthetics and scenic resources.

Basis for Comment:

The levee and floodwall system will alter the social and economic environment, aesthetics, scenic resources, community cohesion, tourism, and related concerns. Given the recreational draw of the Town of Marlinton and Pocahontas County area, the effects of the Recommended Plan on tourism and outdoor recreation should be more fully documented and quantified. The methodology for recreational resources indicated that only a qualitative evaluation was done.

The following are examples where statements are conflicting or need additional information:

- On page 133 (Section 5.5.9), the various socioeconomic impacts of the Recommended Plan are presented. The text indicates that the "levee/floodwall…may attract new businesses to locate within the flood protected area". The text also indicates that "no economic impacts would occur as a direct effect of the project once the construction was completed". These two statements are contradictions. From the reviewer's perspective, it may be possible that the levee/floodwall could be viewed as obtrusive and produce a negative effect on community cohesion and other factors, resulting in a loss of population base.

- On page 134 (Section 5.5.9), the effects of the Recommended Plan on community cohesion are documented. Residents have expressed intentions of relocating outside of Marlinton should the Recommended Plan proceed, citing such issues as impacts on scenic resources, aesthetics, and community isolation. Given these stated effects on community cohesion, the report should more clearly address how the objectives are achieved by the Recommended Plan.

- On page 141 (Section 5.5.11), it is noted that the visual impacts from the floodwall/levee and other substantial project features cannot be mitigated. If the visual impacts cannot be mitigated, the report should more clearly address how the objectives are achieved by the Recommended Plan.

- In Table 5-11, the resource category "Socio-economic" does not mention any effects on the local or regional tourism industry.

- In Table 5-11, the resource category "Aesthetics" notes major impacts to landscape features. This appears to conflict with Appendix D, page 7, which states that the project activity should not attract attention.

- In Table 5-11, the resource category "Recreation" notes minor impacts expected during construction but does not discuss the long-term impacts of this project on local and regional recreation.

Significance – High:
The Recommended Plan appears to conflict with the stated objectives.
Recommendation(s) for Resolution:
1. Address the apparent conflicts between the Recommended Plan and the stated objectives. Specifically, address conflicts regarding community cohesion, scenic resources, and aesthetics. 2. Since social acceptability is a stated objective, provide further documentation on public outreach to demonstrate public understanding of the various impacts and gauge the long-term effects of the Recommended Plan on community cohesion. 3. Since social acceptability is a stated objective, provide further documentation to demonstrate a clear public understanding, local support, and social acceptance of the Recommended Plan. 4. Provide a more detailed and quantitative evaluation of the effects on tourism and outdoor recreation, including specific effects on the Town of Marlinton. 5. Provide the long-term impacts of the Recommended Plan on local and regional recreation in Table 5-11. 6. Given the stated effects on community cohesion, explain more clearly how the objectives are achieved by the Recommended Plan. 7. If the visual impacts cannot be mitigated, explain more clearly how the objectives are achieved by the Recommended Plan.

Final Panel Comment 3:

The damages and benefits for the "without project" and "with project" conditions have not been provided in sufficient detail to justify the selection of the Recommended Plan.

Basis for Comment:

To provide appropriate justification for the Recommended Plan, the report needs additional discussion of the damages that will occur under the "without project" conditions and the benefits associated with the "with project" conditions (i.e., alternatives).

Information such as the following should be included to help evaluate the analysis upon which the Recommended Plan is based:

- **Single Occurrence Damages and Benefits** – The Detailed Project Report/Environmental Impact Statement (DPR/EIS) does not provide any analysis or presentation of the Single Occurrence Damages and Benefits. These values represent damages expected for individual events under the "without" and "with" project hydrologic conditions and include structure and content values.
- **Expected Annual Damages (EAD) and Benefits (EAB)** – The DPR/EIS does not provide any analysis or presentation of the EAD or EAB for the "without" and "with" project conditions. Tables 23, 24, 25, 27 and 28 in the Economic Appendix (pages 29, 32, 33 and 34) provide a good summary of the EAD for the "without project" conditions, residual EAD and EAB for each alternative, and a final EAD reduced table. This information should be incorporated into the DPR/EIS.
- **Annual Equivalent Damages and Benefits** - The report does not show any Average Annual Equivalent (AAE) damages or benefits. The Panel understands that the base year and future year conditions are the same for the "without project" and "with project" conditions; however, the damages and benefits in AAE values should be provided.

Significance – Medium:

The damages and benefits details are required to understand the process used to identify the Recommended Plan

Recommendation(s) for Resolution:

1. Incorporate single occurrence, EAD, and AAE information to the DPR/EIS in the form of a narrative and table showing each of the damages for the "without project" conditions, for each of the alternatives, and for the final NED plan.

Final Panel Comment 4:

Assumptions related to vegetation management, visual impacts, and mitigation may have been partially invalidated by recent changes to USACE vegetation management standards and should be reassessed and clarified.

Basis for Comment:

In 2009, USACE finalized and published new vegetation standards in Engineering Technical Letter (ETL) 1110-2-571 (USACE, 2009b). The purpose of the standards is to provide aesthetic and environmental benefits through the use of vegetation without compromising the reliability of flood protection structures. The document presents minimum standards for the dimensions of the vegetation- and root-free zones to provide the minimum acceptable buffer between vegetation and flood damage reduction structures. Specifically, the standards indicate that a vegetation- and root-free zone (by easement) is required on either side of a floodwall or levee. The easement measures at least 15 feet from each levee toe, 15 feet from each face of the floodwall, and at least 8 feet from the floodwall foundation/subdrain edges. The surface of the levee should also be vegetation- and root-free. The vegetation-free zone should not contain trees or shrubs, and should be planted with maintained native grasses for erosion control.

For existing levees, there has been some debate among resource agencies regarding the implementation of ETL 1110-2-571, as it would appear to require the removal of native vegetation and riparian vegetation. However, for new levees, implementation of these standards would appear to be much more straightforward.

In the case of the Marlinton Local Protection Project (LPP), the implementation of the standards in the ETL may be more complex. Because the proposed levees and floodwalls are new structures, it is likely that the minimum limits of the vegetation- and root-free zones will apply on and landward of the structures. Specific details are not provided in the DPR/EIS regarding the specific nature of landward planting to mitigate visual and aesthetic impacts. However, it is possible that these standards could reduce the amount of tree and shrub screening previously intended for visual impact mitigation. Alternatively, larger easements could potentially be required to provide for such screening within the constraints of the standards.

Riverward of the structures, it is less clear how these standards would be implemented. Details were not provided in the DPR/EIS to allow the Panel to evaluate the distance between existing riparian vegetation that would remain and the new structures. Under the worst case, it would be necessary to clear more vegetation than previously assumed in the DPR/EIS, increasing environmental, habitat, and aesthetic impacts and potentially increasing the amount of mitigation or the number of mitigation measures required. It is also possible that the existing vegetation is outside the limits of the vegetation management zone or that a variance could be obtained to leave this vegetation in place, although there is insufficient information for the Panel to evaluate the likelihood of obtaining a variance.

Significance – Medium:
The Recommended Plan could be potentially impacted by the ETL 1110-2-571 standards, including the extent of environmental and aesthetic impacts and the scale of mitigation efforts required for the selected alternative.
Recommendation(s) for Resolution:
1. Describe the likely impact ETL 1110-2-571 has on the identified impacts for the alternatives evaluated, including vegetative clearing and easement requirements. 2. Describe the specific project features required to comply with the vegetation management standards. 3. Discuss any limitations imposed by the standards on visual impact mitigation. 4. Discuss additional mitigation, if any, required due to vegetation management compliance.

Literature Cited:

USACE (2009b). Guidelines For Landscape Planting and Vegetation Management at Levees, Floodwalls, Embankment Dams, and Appurtenant Structures. Department of the Army, U.S. Army Corps of Engineers, Washington, D.C. Engineering Technical Letter (ETL) No. 1110-2-571, April 10.

Final Panel Comment 5:
The operation and maintenance of the project features by the Town of Marlinton may not be achievable as proposed.
Basis for Comment:
The Recommended Plan includes a levee and floodwall system to protect downtown Marlinton and the Riverside area. Multiple gate openings and closure mechanisms are included, along with various pump stations. The Engineering Appendix mentions structural steel gates, swing-gate closure structures, rolling-gate closure structures, pump stations, gatewells, sluice gates, stop logs, portable pumps, and related project features. One of the overriding assumptions in the design is that the functionality of the system depends on staff from the Town of Marlinton closing the floodgates and operating the temporary sump pumps for interior drainage. Therefore, the system does not function properly in a purely passive mode – it requires active controls to implement full protection. While the presence of the Flood Warning System in the valley suggests there should be adequate time for these tasks to occur, there is no discussion in the DPR and/or Appendix H regarding the risk associated with these human-operated protection structures. In addition to the features noted above, the Recommended Plan also includes levees and floodwalls. All project features will require routine maintenance and periodic testing as needed to support long-term functionality of the project for flood risk management. Section 5.5.9 (page 131) indicates that "All required project operations personnel are assumed to currently work in a municipal capacity within Marlinton or Pocahontas County. Therefore, the project would not require any new staff to operate and maintain the infrastructure added as a result of the Marlinton flood control project." This assumption appears questionable given the sizable operations and maintenance needs of the Recommended Plan in comparison to the limited local resources currently available. It is unclear if the Town is currently set up to adequately fund and/or provide the operations and maintenance needed. No long-term, dedicated funding source was identified at the local level. During the Panel's site visit, the Town Mayor informed us that there is no paid Town staff and that all staffing is provided on a volunteer basis. Furthermore, the Mayor suggested that the current volunteer staff available to operate the flood protection system (gates and temporary pumps) was limited to approximately four individuals. Given the potentially temporary nature of the volunteer staff, it is not clear that the operation and maintenance costs provided on page 176 (Section 6.6.3) include additional costs associated with potentially frequent retraining.
Significance – Medium:
The functionality of the Recommended Plan relies upon the adequate operation and maintenance of all project features.

Recommendation(s) for Resolution:

1. Revise text on page 131 (Section 5.5.9) to be consistent with project needs and local resources.
2. Discuss further the operations and maintenance requirements, including the Town's ability to carry out the expected duties.
3. Discuss risks associated with human-operated flood control structures.
4. Discuss the development of an operation and maintenance plan.
5. Discuss the development of the operation and maintenance costs; no basis has been provided. In particular, it is not clear whether the volunteer nature of the Town staff could result in higher-than-anticipated operation and maintenance costs, including costs for training and retraining.

Final Panel Comment 6:
Additional information describing how scour potential was accounted for in the design of the floodwalls and levees of the Recommended Plan is needed.
Basis for Comment:
Within the DPR/EIS and appendices, there is no clear demonstration that scour potential was accounted for in the preliminary design, which was the basis for the project cost estimate. Several references were made to a sediment investigation by WEST in 2001; however, it is unclear to the Panel whether scour potential was considered or to what level scour potential was considered (e.g., conservative level). Regarding the conclusions of the sediment investigation, one potentially inconsistent observation is that (in Exhibit C, Appendix C) the West Virginia Department of Natural Resources mentions scour depths of 5 to 10 feet for large events in some locations. The DPR includes a statement that "scouring and sedimentation under Alternative 1 would have only minor effects over current conditions." It is possible that one or both of these statements have been taken out of context by the Panel, but the Panel has no basis for drawing this conclusion. Other comments in the DPR/EIS focus on the fact that incremental increases in scour potential relative to the no-action alternative are minor and therefore have no impact on the alternatives.
Significance – Medium:
Scour potential plays a significant role in several design features and mitigation measures, but it is not documented within the report.
Recommendation(s) for Resolution:
1. Discuss the scour potential from the WEST (2001) report for each design component. 2. Include an accompanying discussion of the considerations undertaken to address both total and incremental scour.

Final Panel Comment 7:

The Economic Appendix analyzes other damage categories (ODCs); however, there is no information demonstrating how these ODCs were developed, calculated, and used in the overall damages and benefits analysis.

Basis for Comment:

The Economic Appendix provides ODCs related to automobile damages, National Flood Insurance Program costs, transportation damages, utility damages, and emergency costs. However, it does not provide any information regarding unit values or calculation methodology, nor does it discuss whether risk and uncertainty were used in the process. For example:

- Automobile Damages – The automobile damages suggest that vehicle damages were calculated using depth-damage curves; however, it is unclear whether the damages were calculated using the Hydrologic Engineering Center-Flood Damage Analysis (HEC-FDA) model and whether risk and uncertainty were used in the calculations as required by ER 1105-2-100 (USACE, 2000b). The report mentions that "NADA Blue Book" values were used; however, it does not mention what the value represents - is it an average value applied to all and, if so, what type of vehicle (compact car, sedan, truck, etc.) does the value represent? In addition, it is unclear whether Economic Guidance Memorandum (EGM) 09-04, *Generic Depth-Damage Relationships for Vehicles* (USACE, 2009a), was used in the calculations. The EGM was released to provide guidance for the use of generic vehicle depth-damage curves for USACE flood risk management studies. The Economic Appendix needs to include more information as to how these damages were calculated.
- Transportation Damages – The Economic Appendix does not explain how transportation damages were calculated with risk and uncertainty, and a unit value for the inundated unit cost per road mile or a length of roads inundated is not specified. The Economic Appendix needs to include these calculations.
- Utility Damages – The utility damages do not show the depth damage or explain how the depth-damage curves were developed. The Engineering News-Record's Construction Cost Index was used to update damages to October 2003 price levels. Typically, when updating damages with depth-damage curves, an update is applied to the structure and content values, then the appropriate depth-damage curve provides an updated damage. Using an index is not the correct methodology.
- Emergency Costs – The average emergency costs per unit need better explanation as to how the emergency costs were developed, calculated, and used in the overall damages and benefits calculation. It is not clear if the emergency damages included risk and uncertainty or were calculated within the HEC-FDA.

Typically, transportation, utility, and emergency costs are calculated outside the HEC-FDA and then manually inputted into the HEC-FDA for calculating with risk and uncertainty.

Significance – Medium:

The Economic Appendix needs to clearly explain how all ODCs were developed, calculated, and used in the overall damages and benefits analysis.

Recommendation(s) for Resolution:
1. Explain in the Economic Appendix how the ODCs were calculated and discuss whether they were calculated with risk and uncertainty. 2. Discuss in the Economic Appendix the depth-damage curves used to calculate the automobile damages.

Literature Cited:

USACE (2000b). Planning Guidance Notebook. Department of the Army, U.S. Army Corps of Engineers, Washington, D.C. Engineer Regulation (ER) No. 1105-2-100. April 22.

USACE (2009a). Generic Depth-Damage Relationships for Vehicles. Department of the Army, U.S. Army Corps of Engineers, Washington, D.C. Economic Guidance Memorandum (EGM) No.09-04. June 22.

Final Panel Comment 8:
The effectiveness of the Recommended Plan could not be ascertained due to a lack of details regarding the implementation of the Emergency Action Plan (EAP).
Basis for Comment:
The success of the Recommended Plan is predicated on the ability of the Town of Marlinton to successfully implement the EAP. The Recommended Plan consists of a levee/floodwall combination that would protect the main part of Marlinton and the Riverside section of Marlinton. The levee/floodwall system includes several gate structures and pumping systems that would be manually activated during flood events by Town of Marlinton personnel. The operation of the system as a whole would require a predefined EAP, which would include response actions related to hydrologic and meteorological criteria, including streamflow in conjunction with accumulated and forecasted precipitation. The hydrologic response of the Greenbrier River and Knapps Creek is relatively rapid, and the lead time between the EAP triggering thresholds and the onset of hazardous flood levels would be correspondingly short. One of the consequences of having a short allowable response time is that emergency measures would need to be initiated before the certainty of the flood magnitude is established, and would likely occur significantly more frequently than damaging flood events. The evaluation of the Recommended Plan vs. the "no-action" alternative should include an estimate of the frequency of (1) damaging flood events, and (2) hydrologic events that would require gate closures. The frequency of enacting the EAP has a bearing on the personnel required to operate the system, as well as the sociological aspect of the disruption of traffic during gate closures.
Significance – Medium:
The lack of a description of the expected actions that are required to successfully implement the Recommended Plan and how often the actions are expected to be implemented affects the completeness of the report.
Recommendation(s) for Resolution:
1. Describe, in general terms, the components of the EAP, including the triggering mechanisms and the response action. 2. Describe the expected frequency of triggering events and the frequency of damaging flood events. 3. Provide an estimate of the allowable lead time between triggering the EAP and onset of hazardous flood levels.

Final Panel Comment 9:

Additional information is required regarding the preliminary evaluation of levee and floodwall stability, under-seepage, through-seepage, and slope stability to provide context for the engineering design issues presented.

Basis for Comment:

Flood protection projects such as levees and floodwalls require the evaluation of several potential failure modes related to the structural flood protection features. For example, USACE Engineering Manual (EM) 1110-2-1913, "Design and Construction of Levees" (USACE, 2000a), requires that levees used as flood protection structures be evaluated to determine slope stability under several different flood conditions. In addition, flood protection levees should control under-seepage and through-seepage without the potential for failures related to issues such as piping and sand boils. Similar stability and seepage checks are required for flood walls.

Although a planning level document, the DPR/EIS contains no boring or test pit logs or any other site-specific subsurface data that would be useful for understanding overall project context and potential constraints. Information such as general subsurface stratigraphy, depth to bedrock, bedrock permeability, and rock surface variability, at a minimum, could affect the cost of the system. For example, it is noted that bedrock underlies the site at relatively shallow depths, and that a cut-off wall will be used below the levees to prevent under-seepage. The cut-off would tie into the top of the bedrock. However, if the top of the bedrock surface is very uneven or non-uniform, it may be difficult to reliably control under-seepage with steel sheet piles, as noted in the report, and a slurry wall may be more appropriate. These two construction methods would both accomplish the goal of providing under-seepage protection, although the cost is likely to be significantly different depending on the system used. Similarly, if the bedrock is highly fractured and permeable, it may be possible, although unlikely, for seepage to circumvent the cut-off system and reduce system effectiveness.

The Engineering Appendix (Appendix H) describes the proposed flood control structures in more detail than the DPR/EIS. However, the various system components are described simply as being required – no basis is provided for why the various project elements were selected. For example, the appendix does not explain why the under-seepage cut-off system in Riverside transitions from sheet piles beneath the floodwalls to a slurry cut-off beneath the levee.

Significance – Medium:

Inclusion of more detailed geotechnical data in the report would improve the overall understanding of the project and provide context for the specific geologic and geotechnical constraints that could impact project effectiveness, detailed design, and costing of the final selected alternative.

Recommendation(s) for Resolution:

1. Describe the soil and bedrock types and include cross-sections showing typical subsurface stratigraphy.
2. Include a detailed description of the bedrock underlying the proposed levees and floodwalls, including local variability in top-of-rock elevation, degree of fracturing, permeability, etc.
3. Add a description and/or a figure showing the anticipated total river scour (as opposed

to incremental scour relative to the no-action condition) and whether it could impact the stability of the flood protection structures at the river-side toe.
4. Discuss the engineering controls expected to be required for the flood control structures to comply with the requirements of EM 1110-2-1913, EM 1110-2-2502, "Retaining and Flood Walls" (USACE, 1989), and other applicable USACE guidance.
5. Include typical cross sections in Appendix H showing scaled relationships between the centerline of the river, the natural toe-of-slope, the proposed flood protection structures, and the top of bedrock.

Literature Citation:

USACE (2000a). Design and Construction of Levees. Department of the Army, U.S. Army Corps of Engineers, Washington, D.C. Engineering Manual No. EM 1110-2-1913. April 30.

USACE (1989). Retaining and Flood Walls. Department of the Army, U.S. Army Corps of Engineers, Washington, D.C. Engineering Manual No. EM 1110-2-2502. September 29.

Final Panel Comment 10:

Inconsistencies due to changes in the Recommended Plan and project features over time should be corrected to represent the current proposed project, and some environmental impacts associated with these changes have not been addressed.

Basis for Comment:

Several milestone events over the life of the project have substantially changed the scope and magnitude of the project features, which have a significant bearing on the planning processes. Two examples are the historic floods that have occurred since the original project was conceived and the inclusion of the project into WRDA 1996. The impact of these events on the evolution of the project is vital to understanding the process of selecting the Recommended Plan. Below are specific references to text where there are inconsistencies or where impacts have not been addressed.

- Pages 93 – 99, Sections 5.4.3.1 and 5.4.3.2 reference total project costs (corrected to October 2007) for Alternative 1 and 2. However, the cost for Alternative 1 does not match the estimated project cost in the Cost Estimating Appendix.
- Page 99, Figure 5-5 still shows rolled rock levees even though the final plan formulation in Appendix H notes earthen levees will be used (Table 2).
- Page 105, 2nd paragraph (Section 5.5.2) says windrow revetment avoids direct impacts to the stream. Table 5-12 says "Significant impact to…2100 feet of stream from stone slope protection."
- Page 121, 4th paragraph (Section 5.5.6) says "discharges to navigable waters would occur" and "No significant effects would occur as a result of these discharges." Table 5-12 says "Significant impact to…2100 feet of stream from stone slope protection."
- Page 121, 4th paragraph (Section 5.5.6) says "These actions, described in detail in Appendix F, include the placement of stone slope protection, construction of longitudinal dikes, construction of gate well on Marlin Run, and incidental filling of wetlands from soil borrow areas." Only concrete fill for the gate well is described in detail in Appendix F.
- Page 124, 1st paragraph (Section 5.5.7) – All the activities that could affect aquatic resources such as stone slope protection and longitudinal dikes are not described, based on the Panel's understanding of the proposed project.
- Pages 124, 2nd paragraph (Section 5.5.7) says "Impacts to aquatic species from construction activities would be minor as construction would not take place within the riverbed…" Table 5-12 says "Significant impact to…2100 feet of stream from stone slope protection."
- Page 124, 3rd paragraph (Section 5.5.7) says no impacts to mussel beds would be expected. Stone slope protection and longitudinal dikes may have minor impacts depending on their location, based on the Panel's understanding of the proposed project.
- Page 124, 4th paragraph (Section 5.5.7) says maintenance clearing of stream banks would not be required due to use of windrow revetment. Some clearing will be required based on the Panel's understanding that windrow revetment has been discarded in favor of longitudinal dikes.
- Page 163, Section 6.1 does not address all plan components such as longitudinal dikes and stream bank protection.

- Page 168, 3rd paragraph (Section 6.2.3) says "the use of windrow revetment instead of conventional stone slope protection....will result in no impact to the streams. Therefore, no mussel habitat would be significantly impacted." There could be a minor impact to mussel habitat based on the Panel's understanding of the proposed project.
- In section 6.2.4, page 169, the last line says "the windrow revetment design for erosion protection for the levee/floodwall where possible, eliminates the need for clearing stream banks...." It is the Panel's understanding that windrow revetment has been replaced by longitudinal dikes and stream bank protection, so there will be some clearing.
- Appendix C, Page 4, response to comments 51 and 82 says "....non-structural measures were considered final alternatives." Non-structural measures are not a final alternative.
- Appendix C, Page 14, response to comments 17, 21, 69, 77, and 87 says "The toe of the levee/floodwall would be protected from failure by the windrow revetment." It is the Panel's understanding that windrow revetment has been replaced by longitudinal dikes.
- Appendix C, Page 17, response to comment 80 says "aquatic" impacts were avoided by extensive use of windrow revetment and alignment changes. Table 5-12 says "Significant impact to...2100 feet of stream from stone slope protection."
- Appendix H states that a slurry cut-off wall is proposed beneath the levee in Riverside, but it is not discussed anywhere in the main report.

Significance – Medium:

The correction of inconsistencies will ensure completeness of the report and will aid in understanding the current proposed project and its potential environmental impacts.

Recommendation(s) for Resolution:

1. Conduct a global search and revise the report to delete project components that are no longer a part of the proposed plan such as rolled rock levee, windrow revetment, and stoplog storage building.
2. Revise appropriate sections of the report to evaluate current proposed project components where required.
3. Revise cost for Alternative 1 in Sections 5.4.3.1 and 5.4.3.2 to agree with the updated cost estimate in the Cost Estimating Appendix.
4. Revise Figure 5-5 to show earth fill rather than rolled rock.
5. Revise responses to public comments in Appendix C where required to address the current proposed project.
6. Revise the main report to address the slurry cut-off under the levee in Riverside according to Appendix H.
7. Revise the plan description in Section 6.1 of the report to identify all plan components: Levee/Floodwall, Pumping Stations, Longitudinal Dikes, Stone Slope Protection (stream bank and levee), Windrow Revetment if appropriate, Rock Quarry or other sources of riprap, etc.
8. Add a paragraph showing how the process/plan has changed over time.
9. Add an expanded Study History (Section 2.2), with a tabulation of milestone events in chronological order and their respective impacts on the project alternatives under consideration at that point in time.

Final Panel Comment 11:

Inconsistencies in the intermediate screening process resulted in non-structural alternatives being removed from further consideration.

Basis for Comment:

In Section 5.4.2 (Alternatives Evaluated – Intermediate Screening), the potential impacts due to both structural and non-structural alternatives are discussed. The results of this discussion are summarized in Table 5-2. All of the non-structural alternatives were dropped at the intermediate screening stage due to a combination of high socioeconomic impacts and cost.

The discussions in Section 5.4.2 describe the impacts on community cohesion and other socioeconomic impacts from the non-structural alternatives, and generally state that they are unacceptably high. In contrast, the social impacts of the structural alternatives are listed as "minor." However, there are also moderate to significant environmental impacts and significant aesthetic impacts associated with the two structural alternatives carried forward. For the "town relocation" and "floodproofing/acquisition" non-structural alternatives, there is no discussion as to why the high social impacts have apparently been weighted more heavily than the environmental or aesthetic impacts. Furthermore, although social impacts are listed as "minor" for both structural alternatives at intermediate screening (Table 5-2), they are listed as a "major" environmental consequence during final screening (Table 5-11). Therefore, a consistent treatment of the socioeconomic impacts for the two structural alternatives does not appear to have been applied during consecutive screening phases.

In addition, the discussion for the "Commercial Redevelopment/Floodproofing" alternative states (page 91, section 5.4.2.6):

> "This alternative would not be as permanently disruptive to the local business community as a floodproofing or acquisition program. However social disruption would be significant and the town would expect the loss of residents and businesses during implementation. Furthermore, at a cost of $200 million (October 2007 Price level), the redevelopment alternative was one of the more costly plans considered at this level. Therefore, commercial redevelopment/floodproofing was dropped from further consideration."

While the discussion states this alternative has reduced social impacts relative to the other non-structural alternatives, Table 5-2 notes the social impacts as major and implies it is equivalent to the other two non-structural alternatives. This, in combination with the significantly higher costs of the alternative, was sufficient to drop this alternative from further consideration. However, while the cost of the Commercial Redevelopment/Floodproofing alternative is reported at $200 million (October 2007 price basis) in Table 5-2, the October 2007 price basis for Alternative 1 (Recommended Plan) is reported at various places within the document as:

- $100 million (page 83 and Table 5-2, first cost, Intermediate Screening);
- $137 million (page 94, first cost, section 5.4.3 Final Screening); and
- $164 million (page 174 section 6.3.1 and Cost Appendix, first cost, listed as both 2007 and 2008 price level, Recommended Plan).

No basis is provided for the cost estimating performed at the intermediate or final screening levels; therefore, the Panel cannot evaluate the validity of the assumptions used for intermediate or final screening cost estimates nor the differences between intermediate and final costing for the selected alternative.

Given the variable costs reported for the Recommended Plan, it is not clear to the Panel that the intermediate screening criteria used to drop the Commercial Redevelopment/Floodproofing (moderate to high social impacts, significantly higher costs) are justified given similar order of magnitude costs, moderate environmental impacts, and significant aesthetic impacts for the Recommended Plan.

Significance – Medium:

A clear justification of the decision to drop the non-structural alternatives at the intermediate screening level (especially the "Commercial Redevelopment/Floodproofing" alternative) has not been provided.

Recommendation(s) for Resolution:

1. Provide additional justification regarding the decision to drop the non-structural alternatives prior to final screening, especially the "Commercial Redevelopment/ Floodproofing" alternative. Include justification for apparent higher weighting of socioeconomic impacts relative to environmental and aesthetic (visual) impacts.
2. Discuss the cost-estimating process utilized at the intermediate screening level and explain how it could impact the cost estimates provided.
3. Revise the discussion of the magnitude of social impacts at the intermediate and final screening stages for the levee/floodwall alternative so that the sections are consistent between screening stages.
4. Add a discussion in Section 6.3 and/or the Cost Appendix describing the basis for the cost differences for the various stages of cost estimating.

Final Panel Comment 12:

The Federal Emergency Management Agency (FEMA) accreditation, which includes the Recommended Plan's effects on future floodplain management, floodplain redevelopment, and flood insurance requirements in the project area, is not addressed.

Basis for Comment:

The process by which FEMA accreditation would be obtained under the Recommended Plan warrants discussion, and a statement that flood insurance would no longer be required warrants further explanation. The FEMA accreditation process is not addressed. For example, the report should describe (1) the expected timeframe to achieve FEMA accreditation after project completion, and (2) any components of the plan (e.g., manually operated structures, Town staffing) that could prevent the project from obtaining accreditation. Reduction of flood insurance costs is stated in multiple locations as a benefit, although there is little to no discussion of the process required post-construction to obtain this benefit; rather, the Recommended Plan implies that it is an intrinsic benefit. For example, Table 5-11 states that flood insurance would no longer be required with the project. However, flood insurance will be required until FEMA certifies that the project provides flood protection to the 100-year level and the FEMA Letter of Map Revision is approved. Considering the DPR states that the project provides a 350-year level of protection, this certification could be obtainable, but it is subject to FEMA design criteria, which are not specified in the DPR/EIS. Certification can be a lengthy process, and it seems it would be more accurate to state in Table 5-11 that the alternative meets the planning constraint of being compatible with the provisions of the National Flood Insurance Program.

The report does not discuss how the FEMA accreditation and USACE design criteria have both been considered and accommodated within the engineering design of the levees/floodwalls.

Significance – Medium:

The FEMA accreditation issue affects the completeness of the report, overall understanding of the project functionality, and effects on the local community.

Recommendation(s) for Resolution:

1. Discuss the FEMA accreditation process as it relates to the Recommended Plan.
2. Discuss the design criteria for the levee and floodwall features in relation to the FEMA accreditation process and other application criteria.
3. Discuss the impacts to the local community prior to and after accreditation.

Final Panel Comment 13:

The Draft Section 404(b)(1) Evaluation provided in Appendix F does not address all the proposed discharges, and potential impacts, of fill material into "Waters of the United States."

Basis for Comment:

The Draft Section 404 (b)(1) Evaluation in Appendix F does not address all the proposed discharges of fill material in the current proposed plan and needs to be updated and revised in accordance with ER 1105-2-100 (USACE, 2000b) and the Section 404 (b)(1) guidelines. Some specific examples that need to be addressed are listed below:

- Section B, Description of Proposed Work, discusses rolled rock construction rather than earth fill for the levee. Section B should be updated to address the current proposed project, including components that involve filling "Waters of the United States."
- Section D describes the characteristics and source of the concrete fill material only. It should also describe characteristics and sources of the other fill materials.
- Sections E.1 and E.2 discuss the location and size of the Marlin Run discharge site only. It should discuss the locations and sizes of the other proposed discharge sites.
- Section E.3 describes the type and habitat of the Marlin Run discharge site only. It should describe the type and habitat of the other proposed discharge sites.
- Section E.4 includes outdated timing and duration of the proposed discharges and needs to be updated.
- Section K addresses contamination on the project site only and does not address the 40 CFR 230.11(d) requirement to "Determine the degree to which the material proposed for discharge will introduce, relocate, or increase contaminants."
- Section L.5 B says the "project area is outside a five mile radius of a known hibernaculum;" however, this needs to be revised since there is a hibernaculum within five miles.
- Section L.7 says "....windrow revetment design for erosion protection for the levee/floodwall eliminated the need for clearing of stream banks...." Table 5-12 of the report says there will be "Significant impact to...2100 feet of stream from stone slope protection."

Significance – Medium:

Revising and updating the Draft Section 404 (b)(1) Evaluation has a direct bearing on the completeness and understanding of the impacts of discharging fill material into "Waters of the United States."

Recommendation(s) for Resolution:

1. Update Section B to describe the current proposed plan, including components that involve filling "Waters of the United States."
2. Identify the characteristics and source of all fill materials that will be discharged into "waters of the United States" and revise Section D.
3. Identify the locations and sizes of all proposed discharge sites in "Waters of the United States" and revise Section E.1 and E.2.
4. Revise Section E.3 to describe the types and habitats of the other proposed discharge sites.

5. Revise the timing and duration of the proposed discharges in Section E.4.
6. Determine the potential for contaminants in the fill materials and revise Section K to address the 40 CFR 230.11(d) requirement to "Determine the degree to which the material proposed for discharge will introduce, relocate, or increase contaminants."
7. Revise Sections L.5 and L.7 to address the current proposed project.
8. Add maps and/or a table to describe "Waters of the United States" to be filled.

Literature Cited:

40 CFR Part 230. Title 40, Protection of Environment, Part 230 - Section 404(b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material. U.S. Environmental Protection Agency.

USACE (2000b). Planning Guidance Notebook, Appendix C Environmental Evaluation and Compliance, Section C-6 Water Quality and Related Requirements. Department of the Army, U.S. Army Corps of Engineers, Washington, D.C. Engineer Regulation No. ER 1105-2-100. April 22.

Final Panel Comment 14:

Some of the socioeconomic data described and used in the analysis include inconsistencies and are outdated.

Basis for Comment:

The following are examples of inconsistencies and outdated data within the report and appendices:

- Page 64, 2nd paragraph (Section 4.9.1)– Housing values are based on 1990 Census data. There are significant differences between Section 4.9.1 of the report and Appendix E (i.e., median housing values are $42,000 in the report, $64,000 in the 2005 Economic Appendix, and $71,000 in the 2008 Supplement).
- Page 64, last paragraph (Section 4.9.2)– The most recent unemployment rates are from 1999. Appendix E contains more recent and detailed information.
- Page 65, Section 4.9.3 – Education levels attained are based on 1990 statistics.
- Page 66, last paragraph (Section 4.9.5)– Poverty level data for Pocahontas County are from 1997.

Significance – Low:

Fixing the inconsistencies and updating the socioeconomic data will improve the technical quality of the report.

Recommendation(s) for Resolution:

1. Revise the report to include the most recent available socioeconomic data.

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APPENDIX B

Final Charge to the Independent External Peer Review Panel
as
Submitted to USACE on September 7, 2010

on the

Marlinton DPR/EIS IEPR

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Final Charge Questions and Guidance to the Peer Reviewers for the Engineering, Economic, and Environmental Evaluation of the Geotechnical, Hydrological, Hydraulic and Economic Aspects of Flood Risk Reduction Report, Marlinton, West Virginia – Independent External Peer Review

BACKGROUND

The Town of Marlinton is located entirely within the State of West Virginia on the Greenbrier River, 109 miles upstream from its confluence with the New River. The project area includes approximately 4 miles of the Greenbrier River, the lower mile of Knapps Creek, and along Stony Creek downstream of the community of Campbelltown. Marlinton is served by WV Route 39 and US Route 219. The tributaries, Stony Creek (23 sq. mi. drainage area) and Knapps Creek (134 sq. mi. drainage area) both enter the Greenbrier River within the project area. The drainage area for the Greenbrier River at Marlinton is approximately 518 square miles.

Marlinton and the Greenbrier Valley have a long history of flooding, with the largest recorded floods of recent occurrence. The flood of record occurred in November 1985 and inundated almost the entire Town of Marlinton. This flood event had an estimated frequency of 350 years, causing over $100 million (October 2001 price level) in damages basin-wide and resulting in five deaths. Another major flood occurred in January 1996, with basin-wide damages again estimated to be nearly $100 million (October 2001 price level). During those floods, the damages in Marlinton alone were estimated at $25 to $30 million (October 2001 price level).

Feasibility studies of the Greenbrier River Basin, including the Town of Marlinton, originated in the mid 1960s as a part of the Kanawha River Basin Comprehensive Study. The conclusion from a feasibility study conducted by the U.S. Army Corps of Engineers (USACE) and documented in a Draft Detailed Project Report (September 1985), was that a low-level of protection from channel modification of the Greenbrier River was the most feasible alternative to provide flood protection for the Town of Marlinton. However, after the 1985 flood, emphasis shifted back to basin-wide measures such as multipurpose reservoirs and tributary impoundments. A draft Evaluation Report dated July 1994 indicated that only a dry dam on the mainstem Greenbrier River was economically feasible. A river corridor management plan completed in 1996 included evaluation of a number of nonstructural measures, but only a flood warning system was determined to be economically feasible. Prior to completion of a basin-wide feasibility report, two major floods occurred in the Greenbrier Basin in 1996. In response to this latest major flooding, Congress authorized USACE (1996 Water Resources Development Act) to investigate flood damage reduction at several named communities in the basin including the major damage centers of Marlinton, Ronceverte, and Alderson. The least costly alternative was identified for each community and documented in the 1997 Greenbrier Limited Evaluation Report. Congress appropriated funds in FY 99 to initiate preparation of a Detailed Project Report (DPR) for a flood control project to protect the Town of Marlinton.

The DPR is now complete and in USACE Headquarters waiting approval, pending the conclusion of an independent external peer review. The identified least cost plan is a combination levee/floodwall that provides protection against the flood of record.

OBJECTIVES

The objective of this work is to conduct an independent external peer review (IEPR) of the Marlinton Detailed Project Report and Environmental Impact Statement (DPR/EIS) in accordance with the Department of the Army, U.S. Army Corps of Engineers, Water Resources Policies and Authorities' *Civil Works Review Policy* (EC 1165-2-209) dated January 31, 2010, and the Office of Management and Budget's *Final Information Quality Bulletin for Peer Review* released December 16, 2004.

Peer review is one of the important procedures used to ensure that the quality of published information meets the standards of the scientific and technical community. Peer review typically evaluates the clarity of hypotheses, validity of the research design, quality of data collection procedures, robustness of the methods employed, appropriateness of the methods for the hypotheses being tested, extent to which the conclusions follow from the analysis, and strengths and limitations of the overall product.

This purpose of the IEPR is to assess the "adequacy and acceptability of the economic, engineering, and environmental methods, models, and analyses used" (EC 1165-2-209; p. D-4) for the Marlinton DPR/EIS. The IEPR will be limited to technical review and will not involve policy review. The IEPR will be conducted by subject matter experts (i.e., IEPR panel members) with extensive experience in engineering, economics, and environmental issues relevant to the project. They should also have experience applying their subject matter expertise to flood risk management.

The panel members will be "charged" with responding to specific technical questions as well as providing a broad technical evaluation of the overall project. Per EC 1165-2-209, Appendix D, review panels should identify, explain, and comment upon assumptions that underlie all the analyses, as well as evaluate the soundness of models, surveys, investigations, and methods. Review panels should be able to evaluate whether the interpretations of analysis and the conclusions based on analysis are reasonable. Reviews should focus on assumptions, data, methods, and models. The panel members may offer their opinions as to whether there are sufficient analyses upon which to base a recommendation.

DOCUMENTS PROVIDED

The following is a list of documents and reference materials that will be provided for the review. **The documents and files presented in bold font are to be reviewed**. All other documents are provided for reference.

- **Feasibility Report – Marlinton, WV Detailed Project Report (DPR) and Environmental Impact Statement with all pertinent appendices (September 2008 version).**
    - **Appendix A – Correspondence**
    - **Appendix B – Draft and Final Fish and Wildlife Coordination Act Reports**
    - **Appendix C – Public Participation**
        - **Exhibit A – Comments on Draft DPR/EIS and USACE Response**

        - **Exhibit B – Transcript of Public Hearing of December 6, 2001**
        - **Exhibit C – Public/Agency Comments**
        - **Exhibit D – U.S. Department of Transportation Brochure**
        - **Exhibit E – Public Notices**
    - **Appendix D – Visual Resource Assessment**
    - **Appendix E – Economic Appendix (September 2005 and Supplement September 2008)**
    - **Appendix F – Section 404(b)(1) Evaluation**
    - **Appendix G – Real Estate Plan**
    - **Appendix H – Engineering Appendix**
    - **Appendix I – MII Baseline Cost Estimate**

The following supporting documents will be provided by USACE for information purposes:

- Draft Project Partnership Agreement (PPA)
- Draft Record of Decision (ROD)
- Army Corps of Engineers (USACE) Engineer Circular (EC) No. 1165-2-209, *Civil Works Review Policy*, dated 31 January 2010.
- CECW-CP Memorandum dated March 31, 2007
- Office of Management and Budget's *Final Information Quality Bulletin for Peer Review* released December 16, 2004.

SCHEDULE

TASK	ACTION	DUE DATE
Conduct Peer Review	Battelle sends review documents to panel members	9/9/2010
	Battelle/IEPR Panel kick-off meeting	9/7-10/2010
	USACE/Battelle/IEPR Panel kick-off meeting	Week of 9/13/2010
	Panel members complete their reviews	10/8/2010
Prepare Final Panel Comments and Final IEPR Report	Battelle provides Panel merged individual comments and talking points for panel review teleconference	10/15/2010
	Convene panel review teleconference	10/18/2010
	Battelle provides Final Panel Comments directive to Panel	10/19/2010
	Panel provides draft Final Panel Comments to Battelle	10/26/2010
	Battelle provides feedback to panel members on draft Final Panel Comments; Panel provides revised draft Final Panel Comments per Battelle feedback (iterative process)	Not Applicable
	Final Panel Comments finalized	11/4/2010
	Battelle provides Final IEPR Report to Panel for review	11/8/2010

TASK	ACTION	DUE DATE
	Panel provides comments on Final IEPR Report	11/10/2010
	*Battelle submits Final IEPR Report to USACE	11/16/2010
Comment/ Response Process	Battelle inputs Final Panel Comments to DrChecks; Battelle provides Final Panel Comment response template to USACE	11/18/2010
	USACE provides draft Evaluator Responses and clarifying questions	12/2/2010
	Battelle provides the Panel the draft Evaluator Responses and clarifying questions	12/7/2010
	Panel provides Battelle with draft comments on draft Evaluator Responses (i.e., draft BackCheck Responses)	12/10/2010
	Teleconference with Battelle and Panel to discuss draft BackCheck Responses	12/10/2010
	Teleconference between Battelle, Panel, and USACE to discuss Final Panel Comments, draft Evaluator Responses, and clarifying questions	12/13/2010
	USACE inputs final Evaluator Responses in DrChecks	12/28/2010
	Battelle provides Evaluator Responses to Panel	1/3/2011
	Panel provides Battelle with final BackCheck Responses	1/6/2011
	Battelle inputs the Panel's BackCheck Responses in DrChecks	1/12/2011
	*Battelle submits pdf printout of DrChecks project file and closes out DrChecks	1/13/2011

CHARGE FOR PEER REVIEW

Members of this peer review Panel are asked to determine whether the technical approach and scientific rationale presented in the Marlinton DPR/EIS are credible and whether the conclusions are valid. The panel members are asked to determine whether the technical work is adequate, competently performed, properly documented, satisfies established quality requirements, and yields scientifically credible conclusions. The Panel is being asked to provide feedback on the economic, engineering, environmental resources, and plan formulation. The panel members are not being asked whether they would have conducted the work in a similar manner.

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

General Charge Guidance

Please answer the scientific and technical questions listed below and conduct a broad overview of the Marlinton DPR/EIS. Please focus on your areas of expertise and technical knowledge. Even though there are some sections with no questions associated with them, that does not mean

that you cannot comment on them. Please feel free to make any relevant and appropriate comment on any of the sections and appendices you were asked to review. In addition, please note the following guidance. Note that the Panel will be asked to provide an overall statement related to 2 and 3 below per USACE guidance (EC 1165-2-209; Appendix D).

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

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

1. If desired, panel members can contact one another. However, panel members **should not** contact anyone who is or was involved in the project, prepared the subject documents, or was part of the USACE Independent Technical Review.
2. Please contact the Battelle deputy project manager (Lynn McLeod, mcleod@battelle.org) or project manager (Karen Johnson-Young, johnson-youngk@battelle.org) for requests or additional information.
3. In case of media contact, notify the Battelle project manager immediately.
4. Your name will appear as one of the panel members in the peer review. Your comments will be included in the Final IEPR Report, but will remain anonymous.

Please submit your comments in electronic form to Lynn McLeod, mcleod@battelle.org, no later than October 8, 2010, 10 pm EDT.

Independent External Peer Review
Engineering, Economic, and Environmental Evaluation of the Geotechnical, Hydrological, Hydraulic and Economic Aspects of Flood Risk Reduction Report, Marlinton, West Virginia – Independent External Peer Review

Final Charge Questions

GENERAL QUESTIONS

1. To what extent has it been shown that the project is technically sound, environmentally acceptable, and economically justified?
2. Are the assumptions that underlie the economic, engineering, and environmental analyses sound?
3. Are the economic, engineering, and environmental methods, models, and analyses used adequate and acceptable?
4. In general terms, are the planning methods sound?
5. Are the interpretations of analysis and conclusions based on the analysis reasonable?
6. Based on your understanding of this project, is there any additional information that is imperative to the USACE's final National Environmental Policy Act (NEPA) assessment that has not already been or currently will not be collected or assessed under this project? If so, please describe.

Detailed Project Report and Environmental Impact Statement

1.0 Introduction

No questions

1.1 Authority

No questions

2.0 Introduction

No questions

2.1 Purpose and Need for Agency Action

No questions

2.2 Study History

No questions

2.3 Public Involvement (including Appendix C)

7. Based on your experience with similar projects, has public, stakeholder, and agency involvement been sufficient to determine all issues of interest and to ensure that the

issues have been adequately addressed to the satisfaction of those interested parties? Should additional public outreach and coordination activities be conducted?

2.4 Objectives of the Environmental Impact Statement

No questions

2.5 Connected, Cumulative and Similar Actions

No questions

3.0 Prior Studies and Reports

8. Have all critically important prior studies performed relative to the study area been described? If not, please describe.

4.0 Affected Environment through 4.15 Future Without Conditions

9. Comment on the accuracy, comprehensiveness, and completeness of the information used to describe the physical characteristics of the affected environment.

10. Comment on the accuracy, comprehensiveness, and completeness of the information used to describe the ecological characteristics of the affected environment.

11. Comment on the accuracy, comprehensiveness, and completeness of the information used to describe the anthropogenic characteristics of the affected environment.

12. Have all cultural resources been accurately described and appropriately considered? Please comment.

13. Are the demographic, employment, housing and overall socioeconomics accurately described? Are they in agreement with the conditions used for estimating expected damages for with and without project conditions?

14. Are the recreational and scenic resources for the project area adequately described? Please comment.

5.1 Problems, Needs, and Opportunities

15. Is the project need clearly stated? If not, please describe.

16. Are the problems facing Marlinton accurately described? If not, please describe.

17. Are the study area opportunities accurately described? If not, please describe.

5.2 Planning Objectives

18. Comment on whether the Marlinton Project as proposed will meet the planning objectives.

5.3 Planning Constraints

19. Comment on whether the planning constraints are clearly and comprehensively described

20. Comment on whether the Marlinton Project as proposed will fully consider and account for the planning constraints.

5.4 Alternatives

21. Comment on whether the descriptions of the initial alternatives are complete.

22. Comment on whether the information provided regarding the initial screening process is comprehensive and complete.

23. Comment on whether the descriptions provided for the intermediate alternatives are complete.

24. Comment on whether the information provided regarding the intermediate screening process is comprehensive and complete.

25. Comment on whether the descriptions provided for the final alternatives are complete.

26. Comment on whether the information provided regarding the final screening process is comprehensive and complete.

5.5 Environmental Consequences

27. Comment on the description of the methodology used to analyze Land Use/Land Cover impacts.

28. For each of the alternatives, comment on whether the discussion of the Land Use/Land Cover impact analysis is complete.

29. Comment on the description of the methodology used to analyze impacts to water resources.

30. For each of the alternatives, comment on whether the discussion of the water resources impact analysis is complete.

31. Comment on the description of the methodology used to analyze impacts to ecological resources.

32. For each of the alternatives, comment on whether the discussion of the ecological resources impact analysis is complete.

33. Comment on the description of the methodology used to analyze impacts to socio-economic resources.

34. For each of the alternatives, comment on whether the discussion of the socio-economic impact analysis is complete.

35. Comment on the description of the methodology used to analyze infrastructure impacts.

36. For each of the alternatives, comment on whether the discussion of the infrastructure impact analysis is complete.

37. Is the analysis of the cumulative impacts comprehensive? If not, please describe.

38. Have direct and indirect impacts, including their relationship to national and regional economic accounts, been appropriately defined and accounted for in each of the alternatives? Please discuss.

39. Are the assumptions employed for estimating social impacts realistic and based on sound economic/policy analysis methods? Have all impacts for the alternatives been accounted for? Please discuss.

40. Have all recreational opportunities and potential impacts presented by the alternatives been considered?

5.6 Final Screening Criteria

41. Comment on whether the final screening criteria are comprehensive and complete.

6.0 Recommended Plan through 6.4 Plan Implementation

42. Comment on whether the description of the components of the Recommended Plan is sufficient.

43. Comment on whether the discussion of fulfilling goals and objectives is complete.

44. Comment on whether the design, environmental, and construction considerations outlined for the Recommended Plan are appropriate and adequate.

45. Comment on whether the mitigation plan is appropriate and implementable.

46. Comment on the use of the Modified Habitat Evaluation Procedure (i.e., Modified Missouri Method) to determine impacts from the Marlinton Project.

47. Comment on whether, in your expert opinion, the document has adequately outlined methods to reduce and/or mitigate the temporary and permanent impacts.

48. Is the interest rate used in the analysis appropriate? If not, please explain.

49. Comment on whether or not you are in agreement with how the benefits and costs were derived, including the use of project life and discount rate. Specifically address any element of the analysis that may be inadequate, inappropriate or incorrect. Were all

factors considered? Are the negative net benefit results handled according to sound economic principles?

7.1 Statutes, Regulations, Consultations, and Other Requirements

No questions

7.2 List of Preparers and Reviewers

No questions

7.3 Draft EIS Distribution List

No questions

8.1 Conclusion

No questions

8.2 Recommendation

No questions

Appendix A: Correspondence

No questions

Appendix B: U.S. Fish and Wildlife Service Coordination Letter and Report

No questions

Appendix C: Public Participation

No questions

Appendix D: Visual Resource Assessment

50. Comment on whether the Visual Resource Assessment Process was adequately described.

51. Comment on whether the Visual Resource Assessment Process was adequately applied and accurately described for the Marlinton Project.

Appendix E: Economics Appendix

52. Are the demographic, employment, housing and overall socioeconomics accurately described and in agreement with those presented in the draft EIS?

53. Please comment on the *Other Damage Categories*, sources of information/data, and application to the overall economic analysis.

54. Comment on whether or not you are in agreement with how the benefits and costs were derived, including use of damage categories, project life, and discount rate. Were all factors considered?

55. Does the sensitivity analysis adequately capture the economic uncertainty of the project?

Appendix F: 404(b)(1) Water Quality Report

56. Comment on whether the description of the activity, disturbances, and resulting impacts discussed in the Water Quality Report are sufficiently detailed and comprehensive.

Appendix G: Real Estate Plan

57. Are the real estate factors and analysis adequately addressed and formulated? Do the assumptions used reflect market conditions?

58. Are the component costs adequately described and do they allow for a clear understanding of total alternative costs?

59. Do the property values accurately depict current market conditions?

Appendix H: Engineering Appendix

60. Have the features of the structure been adequately described?

61. Comment on the appropriateness of the phased approach to the project.

62. Are there any additional analyses or information available or obtainable that would affect decisions regarding the alternative?

63. Has anything significant been overlooked in the development of the assessment of this alternative?

64. Have appropriate considerations been made to support the decisions regarding this alternative?

65. For the selected alternative:

    a. Are the quality and quantity of the surveys, investigations, and engineering sufficient for a conceptual design?

    b. Are the assumptions made for the hazards appropriate?

    c. Does the analysis adequately address the uncertainty given the consequences associated with the potential for loss of life for this type of project?

Appendix I: MII Baseline Cost Estimate

66. Is the costing methodology presented rigorous, complete, and based on accepted engineering and costing principles? Please discuss.

67. Does the construction schedule for the three phases of the project seem reasonable?

68. Do the unit prices used in the cost estimate reflect market conditions? Please discuss any concerns.

69. Do the risk levels assigned to the opportunities/events in the Risk Register seem reasonable/realistic? Please discuss.

FINAL OVERVIEW QUESTION

70. What is the most important concern you have with the document or its appendices that was not covered in your answers to the questions above?