DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS
441 G STREET, NW
WASHINGTON, D.C. 20314-1000

CECW-MVD

FEB 3 2015

MEMORANDUM FOR COMMANDER, Mississippi Valley Division (CEMVD-PD-SP)

SUBJECT: Wood River, Illinois, Independent External Peer review (IEPR), Agency Responses for the Design Deficiency Corrections Limited Reevaluations Report (LRR)

1. Reference is made CEMVD-PD-SP memorandum dated 2 October 2014 subject as above.

2. The final written responses to the IEPR are approved. The enclosed document contains the final written responses of the U.S. Army Corps of Engineers to the issues raised and recommendations contained in the IEPR report. The final written responses will be posted on the Internet, as required by EC 1165-2-214.

3. Any questions on this matter should be directed to Mr. John Lucyshyn, Mississippi Valley Division Regional Integration Team, at 202-761-4515.

Encl

STEVEN L. STOCKTON, P.E.
Director of Civil Works

Wood River Drainage and Levee District, Illinois
Design Deficiency Study
Limited Reevaluation Report and Environmental Assessment

USACE Response to Independent External Peer Review
August 2014

Independent External Peer Review (IEPR) was conducted for the subject project in accordance with Section 2034 of the Water Resources Development Act (WRDA) of 2007, U.S. Army Corps of Engineer (USACE) guidance on *Civil Works Review,* EC 1165-2-214 (2012); and the Office of Management and Budget's *Final Information Quality Bulletin for Peer Review* (2004).

This flood risk management design deficiency limited reevaluation study was carried out under the authority of Section 216 of the Flood Control Act of December 31, 1970 (Public Law 91-611) which says "The Secretary of the Army, acting through the Chief of Engineers, is authorized to review the operation of projects the construction of which has been completed and which were constructed by the Corps of Engineers in the interest of navigation, flood control, water supply, and related purposes, when found advisable due to significantly changed physical or economic conditions, and to report thereon to Congress with recommendations on the advisability of modifying the structures or their operations, and for improving the quality of the environment in the overall public interest." The study examined the need for modifications to the Wood River Drainage and Levee District project to correct a design deficiency which has led to uncontrolled under seepage. The study was cost-shared.

Independent External Peer Review (IEPR) for the limited reevaluation study was initiated in July 2011, and the documents to be reviewed were provided to the IEPR panel in July 2011. The Final IEPR Report was completed in August 2011, and the USACE/IEPR panel comment and response process was completed in August 2011. The IEPR panel consisted of four individuals selected by Noblis with technical expertise in National Environmental Policy Act compliance, civil/geotechnical engineering (2 panel members), and economics.

After the study phase, the project moved into Pre-Construction, Engineering, and Design phase (PED) to continue to refine and develop plans and specifications for the project. The project has moved forward with construction.

IEPR on Draft Limited Reevaluation Report

Noblis, a non-profit science and technology organization, issued the final report from the IEPR on August 19, 2011. The final IEPR report contains a total of 20 comments categorized by level of significance: 7 comments are identified as having high significance, 12 are identified as having medium significance, and 1 is identified as having low significance. The comments are presented in the order of high, medium, and low significance.

'High': Describes a potential fundamental problem with the project that could affect the recommendation or justification of the project.
'Medium': Potentially affects the completeness or understanding of the reports/project

'Low': Potentially affects the technical quality of the reports but will not affect the recommendation of the project."

The following outline summarizes USACE actions which addressed each recommendation for each of the comments provided.

The following discussions present the USACE Final Response to the 20 IEPR comments.

High Potential Significance

1. IEPR Comment – There are several issues identified concerning the engineering analysis of the under seepage design.

The panel experts recommended the following actions to resolve this comment:

a. Parametric study to understand the sensitivity of the recommended control measures to the design criterion of a safety factor of 1.6, as well as a lower factor of safety for the temporary condition of a flood stage.

USACE Response: Not Adopted

The Panel's recommendation was not adopted since USACE criteria require a minimum factor of safety of 1.6.

b. Parametric study to understand the sensitivity of the recommended control measures to the design criterion of a maximum hydraulic gradient of 0.5 between relief wells.

USACE Response: Not Adopted

The Panel's recommendation was not adopted since USACE criteria require use of the allowable hydraulic gradient of 0.5 between relief wells when using a clay blanket unit weight of 115 pounds per cubic foot.

c. Parametric study to understand the sensitivity of the recommended control measures to the design criterion of assuming no effect of existing relief wells during the flood event due to reduced efficiency, as well as the 80% efficiency assumption for the new wells.

USACE Response: Not Adopted

The existing relief wells are of the wood stave screen type and are beyond their design life and therefore are not considered to be effective for underseepage controls. The 80% efficiency used in this analysis was determined by previous studies in the Alton to Gail system pertaining to well efficiency over time that included pump testing and cleaning of existing wells. This information is explained in detail in Appendix D – Geotechnical Engineering, on page D-14.

d. Alternatively, specific reference to USACE policy should be cited in the LRR as justification for these key parameters.

USACE Response: Adopted

Action Taken: Section D.7 of Appendix D (Engineering) was updated to reference the applicable guidance.

2. IEPR Comment – There are several issues concerning the construction of the slurry trench cutoff walls that should be considered before proceeding with the design.

The panel experts recommended the following actions to resolve this comment:

The underseepage analysis should provide a more thorough discussion of the consideration of these construction issues and investigate possibly more cost effective alternatives to deep (≥100 ft) cutoff walls such as:

a. Flood side blanket or buried geomembrane

USACE Response: Adopted

Action Taken: Section D.6 of Appendix D (Geotechnical Engineering) was updated to clarify that flood side blankets or buried geomembranes in this area are ineffective alone because of the river's close proximity to the levee, and that the entrance conditions would remain unchanged.

b. Protected side relief wells and/or seepage berms

USACE Response: Adopted

Action Taken: Section D.6 of Appendix D (Geotechnical Engineering) was modified to clarify that both protected side relief wells and seepage berms were considered for this area. Section 5.5.2 of the Main Report was revised to reflect that relief wells are ineffective because of the thin to nonexistent landside blanket causing uneconomically close well spacing. The required berms in this area would be extremely wide and cause significant environmental impacts to wetlands.

3. IEPR Comment – There are several issues concerning the overall design, particularly the slurry trench cutoff walls and relief wells.

The panel experts recommended the following actions to resolve this comment:

a. The underseepage and cost-benefit analyses should consider the design issues discussed above for cutoff walls and relief wells.

USACE Response: Adopted

Action to be Taken: The design issues identified by the panel for the cutoff wall will be addressed during the design phase. Relief wells have already been analyzed for this area and deemed infeasible.

b. In the design phase, procedures should be implemented to ensure that levee/deficiency correction alternative interfaces are appropriately detailed.

USACE Response: Adopted

Action to be Taken: During the design phase, special attention will be given to interfaces between deficiency correction measures, such as overlap areas.

c. The LRR should clearly indicate why seepage through the levee is acceptable, or provide alternative correction measures that would be effective for this case.

USACE Response: Adopted in Part

Action Taken: The "through seepage" discussed by the panel is actually underseepage giving the appearance of through seepage. For this reason, the LRR was not revised to indicate why through seepage was acceptable or identify other measures to address through seepage. However, the Geotechnical appendix (Section D.6) was revised to more thoroughly describe and clarify the situation.

4. IEPR Comment – There is no discussion of the seismic design/performance of the levees or proposed correction measures.

The panel experts recommended the following actions to resolve this comment:

a. The anticipated seismic performance of the levee and mitigation measures should be included in the LRR. If deficiencies are noted in the analysis resulting from strong shaking or liquefaction, then they should be addressed.

USACE Response: Not Adopted.

While USACE concurred that some discussion of seismic performance should be added to the report, it asserted that the earthquake loading is not normally considered in analyzing levee stability. USACE added the following language to the Appendix D, Section D.7: "As stated in EM 1110-2-1913 on page 6-3 "d. Case IV - Earthquake. Earthquake loadings are not normally considered in analyzing the stability of levees because of the low probability of an earthquake coinciding with periods of high water." If and when and earthquake does occur, the levee system will be inspected for damage with remedial measures taken to restore the system back to an acceptable level before the next flood season."

5. IEPR Comment – It is unclear whether the without-project condition should include the improvements planned for the levee system to meet Federal Emergency Management Agency (FEMA)-required 100-year (yr) flood protection levels, as planned for and described by the Southwest Illinois Flood Prevention District Council (SWILFPDC) in their Implementation Plan.

The panel experts recommended the following actions to resolve this comment:

a. Clarify the relationship of the Wood River Levee System portions of the SWILFPDC Plan to the Plan evaluated in the LRR. If the design deficiency correction measures are in addition to those planned by the SWILFPDC, then the without-project condition appears to over-estimate the Probability of Unsatisfactory Performance (PUP) of the without-project condition and the associated flood damage reduction benefits.

If the improvements evaluated in the LRR include the measures planned by the SWILFPDC, then the without-project conditions applied in the LRR (i.e., no levee improvements) and estimated flood reduction benefits are appropriate. If this is the case, then the LRR Cost-Benefit Analysis should evaluate three alternatives: the No Action, the SWILFPDC plan, and the USACE design deficiency correction plan, because in this case the operative federal decision is whether to undertake a project to provide the incremental protection from 100-yr to >500-yr flooding, and a cost-benefit analysis should be available to support this decision.

Besides clarifying and possibly revising the alternatives in the main body of the LRR and the Economic Appendix, statements in the Environmental Assessment (EA) (specifically in Section 1.4, p. A-A-9 and Section 4.1, p. A-A-33) should be verified or revised to be consistent with the clarified determination of what constitutes the various alternatives.

USACE Response: Not Adopted.

USACE did not concur with the panel's suggestion that the Future Without Project may need to take into consideration the non-federal sponsor's intention to improve the levee system in order to meet FEMA criteria for National Flood Insurance Program mapping purposes. The rationale included the following reasons: 1) the non-federal sponsor's funding capabilities were uncertain – USACE's financial analysis of the sponsor's capabilities did not fully support the sponsor's intended improvements with their sales tax; 2) the sponsor had publicly stated that they could not attain the 100-year design improvements without the USACE project because they did not have enough funds; and 3) given the sponsor's funding uncertainty, it would be difficultto predict which features might be constructed by the sponsor and which would not be constructed.

6. IEPR Comment – As presently written, the LRR does not effectively integrate the findings of the EA or Plan Formulation to provide a cogent explanation of how the tentatively selected plan was selected on the basis of effectiveness (safety, viability, reliability), costs, or environmental impacts.

The panel experts recommended the following actions to resolve this comment:

a. Information provided in Appendix B, Plan Formulation should be described and distilled to explain how the tentative proposed plan was developed.

USACE Response: Adopted.

Action Taken: Main Report Section 5.6 (Recommended Plan Formulation) was modified to provide details of the analysis and decision-making process which resulted in the recommended plan identified at the end of that section.

b. The EA in Appendix A should be revised to reflect this discussion as well, from the perspective of environmental impacts.

USACE Response: Adopted.

Action Taken: Section 2.0 of the EA in Appendix A was modified to include a discussion similar to that in Section 5.6 of the main report and Section 3.0 of the EA has a thorough description of the environmental impacts of the recommended plan.

c. Section 5.5.4 should be greatly expanded to include a discussion of the various alternatives considered and their environmental effects. Each alternative considered does not need a full environmental analysis, but rather an initial discussion of how the alternatives were winnowed down on the basis of cost and effectiveness, followed by a discussion of environmental impacts of the major alternatives considered.

USACE Response: Adopted.

Action Taken: Section 5.6 of the Main Report was expanded to qualitatively compare the costs, effectiveness, and environmental and cultural impacts of the various measures. A table was added to Section 7 which demonstrates the environmental impacts (in acres) of each measure.

d. Then the section on Environmental Consequences in the LRR should be revised to summarize the results of both, to allow the reader a transparent understanding of the process.

USACE Response: Adopted.

Action Taken: Main Report Section 7 (Environmental Consequences) was modified to contain a thorough discussion of the analysis of the environmental impacts of each measure and the effect of that analysis on decision-making.

7. IEPR Comment – The EA lacks sufficient detail and analysis of the environmental impacts of the tentatively selected plan, *relative to other potential project alternatives*, to allow clear and sufficient evaluation of project impacts.

The panel experts recommended the following actions to resolve this comment:

a. Revise Project Purpose and Need statement to address the purpose of the project itself and also the need to ensure that not only does the system operate safely and effectively, but to prevent residents and communities from experiencing the fiscal impacts.

b. Include graphics to provide a better visual understanding of existing conditions or project impacts.

c. Provide a description of the screening process used to develop the tentatively selected plan and that describes the reaches that do not have more than one feasible alternative.

d. Append the Conformity Determination to the EA.

e. Revise the EA to be consistent with the Project Purpose of the design life (i.e., 100-yr flood vs. 500-yr flood).

f. Include discussion to indicate whether the jobs created would be temporary construction jobs or permanent ones along with an estimate of the number created.

g. Provide justification for the claim that no climatological changes are expected or eliminate the statement from the EA.

h. Indicate how temporary noise impacts to residents would be mitigated.

i. Provide sufficient description to ascertain whether the species chosen are appropriate indicators of the dominant species or the specific vegetation community present.

j. Identify the individuals who conducted the HSI analyses.

k. Summarize alternatives and impacts evaluated at each individual reach and used as a basis for the Section 404(b)(1) analysis.

l. Consider whether the anticipated habitat conversion would result in significant biological impacts to species such as migratory shorebirds. Given the importance of this habitat within the region, consider mitigation measures including reestablishment of some of the mudflats eliminated.

m. Establish the project planning period encompassed by the EA early in the document as the basis for Future No-Action conditions.

USACE Response: Not Adopted.

Public review of the EA was underway at the time of the panel's review. USACE concurred that the requested information could be added to the EA if the public review comments indicated a need for the same information. The public review comments did not request any of the information requested by the panel and therefore no changes were made as a result of this comment.

Medium Potential Significance

8. IEPR Comment – It is unclear what value was used in the analyses for the horizontal permeability of the pervious foundation.

The panel experts recommended the following actions to resolve this comment:

a. Add the procedure for determining k in the report. Once a borrow source is identified, confirmation should be made that it meets the design requirements.

USACE Response: Adopted.

Action Taken: The procedure and value used in the analysis for the horizontal permeability of the pervious foundation (k) can be found in the calculations area of Appendix D.

9. IEPR Comment – The threat to future levee performance based on prior observations should be better explained.

The panel experts recommended the following actions to resolve this comment:

a. Revise the LRR and/or analyses to properly utilize prior observation during flood events.

USACE Response: Adopted.

Action Taken: The threat to future levee performance based on prior observations is described in section 5.2.1 and 5.3.1 of the Main Report.

10. IEPR Comment – It is unclear from the report what constitutes "failure" of the levee.

The panel experts recommended the following actions to resolve this comment:

a. A short paragraph should be included in the LRR that defines the range of failures USACE is concerned about, and then consistently use those definitions through the report.

USACE Response: Adopted.

Action Taken: Section 5.2.1 of the Main Report was modified to include a description of the range of failures USACE is concerned about.

11. IEPR Comment – The net benefits are to a great degree dependent on the values used for the PUP (Probability of Unsatisfactory Performance), which are point estimates provided by District Engineers using professional judgment.

The panel experts recommended the following actions to resolve this comment:

a. Conduct an analysis of the sensitivity of the expected annual flood reduction benefits to variations in the PUP's within a reasonable range. Clarify the assumptions that were made regarding seismic risk and regarding the performance of existing relief wells in developing the PUPs for the without-project condition.

USACE Response: Adopted.

Action Taken: A description of the uncertainty of the PUPs and the possible impact of this uncertainty was provided in Section 7 of the Appendix J - Economics

12. IEPR Comment – Section 7.0 Environmental Consequences provides a summary of impacts from the tentatively selected plan, as taken from the EA. Again, the summary of impacts does not demonstrate the preferred alternative's impacts relative to the other alternatives, or how the effects will be mitigated.

The panel experts recommended the following actions to resolve this comment:

a. Section 7 should be revised to reflect the issues identified above and in Comment #6 so that the reader can ascertain the project impacts relative to other alternatives considered

USACE Response: Adopted.

Action Taken: Section 7 (Environmental Effects) of the main report was revised to better summarize the impacts from the tentatively selected plan as compared to the other alternatives.

13. IEPR Comment – The Draft EA concludes with an unsigned Finding of No Significant Impact (FONSI), which is not fully justified given missing information on potential Cultural Resources and HTRW impacts.

The panel experts recommended the following actions to resolve this comment:

a. Delete the FONSI until such time as the necessary studies have been completed.

USACE Response: Adopted

Action Taken: A Phase II Environmental Assessment was completed prior to signing of the FONSI and the results were added to the Main Report (Section 4.2.3.4) and Appendix H – Hazardous and Toxic Waste Considerations. Also a Memorandum of Agreement with the Illinois State Historic Preservation Officer on the assessment of cultural resource impacts and the mitigation of possible adverse effects was signed prior to the signing of the FONSI.

14. IEPR Comment – It is not clear from the report that all elevations cited in the report and used for design reference the same vertical datum (e.g., NAVD 88).

The panel experts recommended the following actions to resolve this comment:

a. All elevations noted in the LRR should have the datum used noted. If different data are used, then the elevations must be corrected.

USACE Response: Adopted.

Action Taken: The vertical datum used was NGVD 29 and this was clarified in the report. All elevations noted in the LRR use the NGVD 29 the datum.

15. IEPR Comment – It is unclear how the 52-ft stage at the St. Louis Gage corresponds to the stages along the project site that have river elevations in the 400s.

The panel experts recommended the following actions to resolve this comment:

a. Clearly indicate in the LRR the correlation between the St. Louis Gage and the stages at the project locations.

USACE Response: Adopted.

Action Taken: For clarification in the main report the following foot note was added to Chart 3 in Section 5.2.1: "The project stages corresponding to 52+2 ft at the St Louis Gage are 443.4 for River Mile 201 and 441.8 for River Mile 197."

16. IEPR Comment – The wetland mitigation plan presented in Appendix A-B requires additional detail in order to fully evaluate its effectiveness against the potential for future failure.

The panel experts recommended the following actions to resolve this comment:

a. The District should revisit the likelihood of success of the proposed mitigation site and allow for a margin of error in the calculations to address uncertainties inherent in offsetting impacts. The mitigation plan should be revised to address the comments raised.

USACE Response: Adopted.

Action Taken: The mitigation plan in Appendix A. Sections 9, 10, and 11 was modified to include monitoring requirements, a long-term management plan, and an adaptive management plan to allow for consideration of uncertainties in order to achieve success and fully compensate for project impacts.

17. IEPR Comment – The Section 404(b)(1) analysis reads more like a description of the proposed project impacts to wetlands rather than a process by which wetlands impacts were avoided and minimized through careful consideration of alternatives.

The panel experts recommended the following actions to resolve this comment:

a. The Section 404(b)(1) analysis should be revised to incorporate appropriate discussion that examines wetlands impacts minimization through consideration of alternatives as prescribed by the Section 404(b)(1) guidelines.

USACE Response: Adopted.

Action Taken: Section III of the Section 404(b)(1) (under "Actions Taken to Minimize Impacts" for each category) was revised to incorporate additional discussion that supports wetlands impacts minimization and consideration of alternatives.

18. IEPR Comment – With regard to the estimated berm quantities, it is not clear whether an allowance was made for site preparation (e.g., clearing and grubbing) beneath the scanned Light Detection And Ranging (LIDAR) surface.

The panel experts recommended the following actions to resolve this comment:

a. Modify LRR to either explain why this procedure is appropriate, or increase estimated sand quantities to account for site preparation.

USACE Response: Adopted.

Action Taken: Section 6.6.2 of the LRR was modified to explain that an allowance was made to account for material which is cleared and grubbed below the existing ground surface.

19. IEPR Comment – There is some concern that the pump stations are designed for lower bound condition.

The panel experts recommended the following actions to resolve this comment:

a. Further discuss the size selection of the pumps to ensure that they are sized properly, or briefly explain why excess flow to the pumps would not have an adverse effect on levee performance.

USACE Response: Adopted.

Action Taken: Text was added to Appendix C – Hydraulics (Section C.6) to discuss/support the size selection of the pumps.

Low Potential Significance

20. IEPR Comment – A number of benefit categories are omitted and not mentioned, while other benefit categories are mentioned and various speculative damage estimates are

stated, but they are not included in the HEC-FDA model or the expected annual damage reduction benefits.

The panel experts recommended the following actions to resolve this comment:

a. The various types of damages that would be reduced but could not be estimated in the net benefits analysis should be enumerated, but the report should avoid vague and unsupported but alarming statements about possible damages and should avoid highly speculative estimates of possible damage. To avoid possible misinterpretation, any damage estimates that are given should come with the caveat that the damages are not expressed in comparable terms to the expected annual damages, and therefore cannot be simply added to the expected annual damages.

USACE Response: Adopted.

Action Taken: Section 6.8.1 of the Main Report was revised to qualitatively describe possible damages that were not included in the calculated benefits and why they were not included.