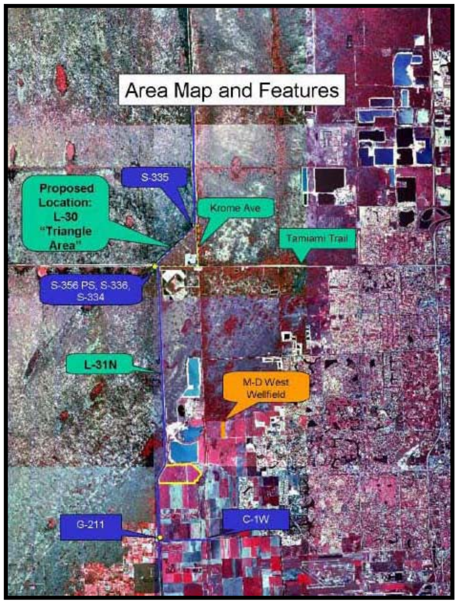
Final Independent External Peer Review Report for L-31N Seepage Management Pilot Project Draft Integrated Pilot Project Design Report/Environmental Assessment

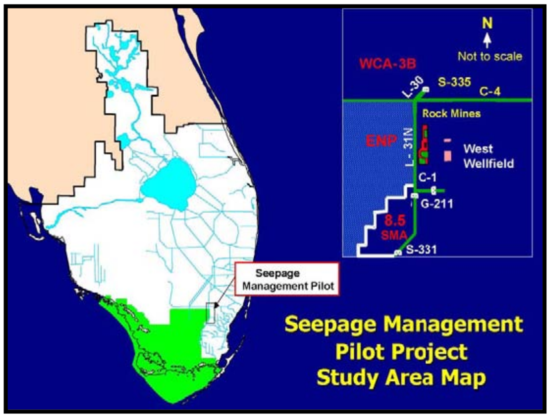
Prepared by
Battelle Memorial Institute

Prepared for
Department of the Army
U.S. Army Corps of Engineers
Ecosystem Restoration
Planning Center of Expertise
Rock Island District

Contract No. W911NF-07-D-0001
Task Control Number: 08228
Delivery Order No. 0463

March 10, 2009





SHORT TERM ANALYSIS SERVICE (STAS)

on

Final Independent External Peer Review Report for
L-31N Seepage Management Pilot Project
Draft Integrated Pilot Project Design Report/Environmental Assessment

by

Battelle
505 King Avenue
Columbus, OH 46201

for

Ms. Diane Karnish
U.S. Army Corps of Engineers
Ecosystem Restoration Planning Center of Expertise
Rock Island District
Attn: CEMVR-PM-F
Clock Tower Building 2nd Floor South
Rock Island, IL 61204-2004

March 10, 2009

Contract No. W911NF-07-D-0001
TCN 08228/D.O. 0463
Scientific Services Program

The views, opinions, and/or findings contained in this report are those of the author and should not be construed as an official Department of the Army position, policy, or decision, unless so designated by other documentation.

FINAL
INDEPENDENT EXTERNAL PEER REVIEW REPORT

of the
L-31N Seepage Management Pilot Project Draft Integrated Pilot Project Design Report/Environmental Assessment

EXECUTIVE SUMMARY

The L-31 North (L-30) Seepage Management Pilot Project Design Report/Environmental Assessment (L-31N SMPP Design Report) was included in the Comprehensive Everglades Restoration Plan (CERP) as a predecessor to the Everglades National Park (ENP) Seepage Management Project. The purpose of the L-31N SMPP Design Report is to investigate seepage management technologies in order to recommend features to control groundwater flow and levee seepage from ENP and Water Conservation Area 3B (WCA-3B). As a predecessor to the full-scale ENP Seepage Management Project, the SMPP identifies the appropriate amount of wet season groundwater flow to return to, or retain within, ENP and WCA-3B, in order to minimize potential impacts to Miami-Dade County's West Wellfield and maintain the existing levels of freshwater flows to Biscayne Bay. Additionally, the project will help determine the constructability of a seepage management barrier to various depths. Lengths within the semi-confining unit of the aquifer may yield results beneficial to the implementation of the full-scale ENP Seepage Management Project.

Some of the identified issues include uncertainty in seepage management due to the unique karst geology of the Biscayne Aquifer; a limited understanding of large-scale seepage management technologies; and seepage from the Everglades. The pilot project is anticipated to yield significant information related to the selected technology's constructability, costs, impacts on local hydrology, and impacts on local water quality. Additionally, the data collected from the pilot project will be used to calibrate a regional model that will improve the understanding of the regional impacts of seepage management used at a larger scale as well as provide a first-step in reducing seepage from the Everglades.

In accordance with the Water Resources Development Act (WRDA) 2007 (Public Law 110-114), Section 2034 dated November 8, 2007, the USACE is conducting an independent external peer review (IEPR) of the L-31N Seepage Management Pilot Project Draft Integrated Pilot Project Design Report/Environmental Assessment ("L-31N SMPP Design Report").[a] 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 L-31N SMPP Design Report. Independent, objective peer review is regarded as a critical element in ensuring the reliability of scientific analyses. The IEPR will be external to the agency and conducted following guidance described in the Department of the Army, USACE, guidance *Peer Review of Decision Documents* (EC 1105-2-410) dated August 22, 2008, CECW-CP Memorandum dated March 30, 2007, and the Office of Management and Budget's *Final Information Quality Bulletin for Peer Review* released December 16, 2004.

[a] Also referred to as the Draft Integrated Pilot Project Design Report (PPDR) and Environmental Assessment (EA).

This final report describes the IEPR process, summarizes final comments of the IEPR panel, and describes the panel members and their selection. The results of this IEPR report will be taken into consideration in preparation of the final L-31N SMPP Design Report.

Three panel members were selected for the IEPR from nearly 20 identified candidates. Corresponding to the technical content of the L-31N SMPP Design Report, the areas of technical expertise of the three selected peer reviewers included: hydrogeology; cost engineering and construction management; and geosystems. It was also emphasized that peer reviewers be familiar with karst geology.

The peer reviewers were provided an electronic version of the L-31N SMPP Design Report documents, along with a charge that solicited their comments on specific sections of the documents that were to be reviewed. More than 270 individual comments were received from the IEPR panel in response to the charge questions. There was no communication between the IEPR panel and the authors of the L-31N SMPP Design Report during the peer review process.

Following the individual reviews of the L-31N SMPP Design Report documents by the IEPR panel members, a panel review teleconference was conducted to review key technical comments, discuss charge questions for which there were conflicting responses, and reach agreement on the final comments to be provided to USACE. The final comments were documented according to a five-part format that included description of: (1) the nature of the comment, (2) the basis for the comment, (3) significance of the comment (high, medium, and low), (4) comment cross-referencing, if related to other comments, and (5) recommendations on how to resolve the comment. Overall, 19 final panel comments were identified and documented. Of the final 19 comments, nine were identified as having high significance, five were identified as having medium significance, and five comments were identified as having a low level of significance. Table ES-1 summarizes the final comments by level of significance. Detailed information on each comment is contained in Appendix A of this report.

The IEPR panel was in agreement about the general strengths and weaknesses of the documents, which were summarized with the following statement: Overall, the panel agreed that the USACE did a good job in developing the L-31N SMPP Design Report which clearly required a significant amount of effort. The panel commented that even though they agreed with the result, there was too much discontinuity in the value engineering process shown in the L-31N SMPP Design Report to effectively evaluate the alternatives and select the final design. In addition to this general assessment, the panel had the following comments L-31N SMPP Design Report:

- The groundwater modeling requires further analysis to quantify or bracket uncertainties in model results.
- The level of hydrologic, hydrogeologic, and geologic data currently available at the L-30 site are sufficient to determine that the project is innovative and well worth pursuing, but precludes detailed engineering of process, cost, and implementation.
- On-going monitoring is needed to calibrate modeling assumptions/project design and to ensure construction success of the pilot project.
- The environmental impacts, such as noise and ecosystems, need to be more accurately described for both the pilot project and the full-scale project.

- The commitments, as described in the report are sufficient to avoid, minimize, or mitigate adverse environmental effects.
- There has been extensive opportunity for affected parties and agencies to provide comment.

Table ES-1. Overview of 19 Final Comments Identified by the L-31N SMPP IEPR Panel.

Significance – High	
1	There are uncertainties in the model and it is unclear how these are carried through in the design elements and costing.
2	It is questionable how sheet pile and slurry wall will be installed given that no pre-blasting will be used in the construction methodology.
3	The window width selected for the pilot project requires further detailed analysis as it was not really configured sufficiently to allow scaling up to a full-scale project.
4	The subsurface geological conditions are important to the many aspects of the design, costing, and construction of the pilot project and need a more detailed discussion.
5	The model is conceptually acceptable; however it is unclear as to how the model was used in the final design, costing, and construction, and how the uncertainties were included in the project planning.
6	Until conditions have stabilized, quarterly monitoring of injection and surface water is an insufficient timeframe to fully evaluate effects on water quality.
7	More site-specific hydraulic and lithologic data are needed to address all seepage conditions expected during the wet and dry seasons.
8	Further clarification is needed on how velocities were determined.
9	The water quality concerns regarding the bentonite mixture percolating through the slurry walls and seeping into the adjacent canals and water bodies requires additional detail to validate that there will be no impact.
Significance – Medium	
10	Geological cross-sections would provide invaluable input and should be included in the report.
11	The hydrology is generally well defined, but limited in scope.
12	The assumption that long-term environmental impacts associated with the pilot project will be similar to those for the full-scale project is not proven, and that long-term impacts of the pilot project were not fully discussed.
13	The plan does not specifically state how seepage will be measured along the slurry and sheet pile walls, and the expected accuracy of the measurement of the total seepage through the pilot project window.
14	The assumptions and specifics used to develop the cost estimates need additional detail
Significance – Low	
15	The form and content of the PPDR seems to suggest that the selected pilot project design and options are those currently favored for the full-scale Everglades Seepage Management Project; however there are statements in the PPDR that the pilot project is not the final design.
16	The impacts are generally well described from the perspective of the project, but not necessarily from the perspective of the affected ecosystems or organisms.
17	Proven technologies such as pre-cast concrete panels and secant walls have not been considered in the available technologies.
18	In the comparison of alternatives, noise was not considered to be a significant criterion.
19	Figures should be revised for clarity and to better support the documentation.

TABLE OF CONTENTS

Page

LIST OF TABLES

1. INTRODUCTION

1.1 Background of Report Reviewed

The L-31 North (L-30) Seepage Management Pilot Project Design Report/Environmental Assessment (L-31N SMPP Design Report) was included in the Comprehensive Everglades Restoration Plan (CERP) as a predecessor to the Everglades National Park (ENP) Seepage Management Project. The purpose of the L-31N SMPP Design Report is to investigate seepage management technologies in order to recommend features to control groundwater flow and levee seepage from ENP and Water Conservation Area 3B (WCA-3B). As a predecessor to the full-scale ENP Seepage Management Project, the SMPP identifies the appropriate amount of wet season groundwater flow to return to, or retain within, ENP and WCA-3B, in order to minimize potential impacts to Miami-Dade County's West Wellfield and maintain the existing levels of freshwater flows to Biscayne Bay. Additionally, the project will help determine the constructability of a seepage management barrier to various depths. Lengths within the semi-confining unit of the aquifer may yield results beneficial to the implementation of the full-scale ENP Seepage Management Project.

Some of the identified issues include uncertainty in seepage management due to the unique karst geology of the Biscayne Aquifer; a limited understanding of large-scale seepage management technologies; and seepage from the Everglades. The pilot project is anticipated to yield significant information related to the selected technology's constructability, costs, impacts on local hydrology, and impacts on local water quality. Additionally, the data collected from the pilot project will be used to calibrate a regional model that will improve the understanding of the regional impacts of seepage management used at a larger scale as well as provide a first-step in reducing seepage from the Everglades.

In accordance with the Water Resources Development Act (WRDA) 2007 (Public Law 110-114), Section 2034 dated November 8, 2007, the USACE is conducting an independent external peer review (IEPR) of the L-31N Seepage Management Pilot Project Draft Integrated Pilot Project Design Report/Environmental Assessment ("L-31N SMPP Design Report").[b] 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 L-31N SMPP Design Report. Independent, objective peer review is regarded as a critical element in ensuring the reliability of scientific analyses. The IEPR will be external to the agency and conducted following guidance described in the Department of the Army, USACE, guidance *Peer Review of Decision Documents* (EC 1105-2-410) dated August 22, 2008, CECW-CP Memorandum dated March 30, 2007, and the Office of Management and Budget's *Final Information Quality Bulletin for Peer Review* released December 16, 2004.

This final report describes the IEPR process, summarizes final comments of the IEPR panel, and describes the panel members and their selection. The results of this IEPR report will be taken into consideration in preparation of the final L-31N SMPP Design Report. Detailed information on the comments is provided in Appendix A.

[b] Also referred to as the Draft Integrated Pilot Project Design Report (PPDR) and Environmental Assessment (EA).

1.2 Purpose of Independent External Peer Review

To help ensure that USACE documents are supported by the best scientific and technical information, a peer review process has been implemented by USACE that utilizes Independent External Peer Review (IEPR) to complement the Agency Technical Review (ATR), as described in the Department of the Army, U.S. Army Corps of Engineers, guidance *Peer Review of Decision Documents* (EC 1105-2-410) dated August 22, 2008; and CECW-CP Memorandum dated March 30, 2007.

The purpose of peer review, in general, is to strengthen the quality and credibility of the USACE decision documents in support of its Civil Works program. Independent external peer review provides an independent assessment of the economic, engineering, and environmental analysis of the project study. In particular, the IEPR addresses the overall adequacy of the scope and structure of the report; the technical soundness of the report's assumptions, methods, analyses, and calculations; and 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 L-31N SMPP Design Report was conducted and managed using contract support from Battelle, which is an Outside Eligible Organization (OEO), eligible under 501(c)(3). Battelle is an independent objective science and technology organization with experience conducting IEPRs which ensured a high degree of flexibility and responsiveness, to meet USACE deadlines.

This final report describes the IEPR process, summarizes final comments of the IEPR panel, and describes the panel members and their selection. The results of this final IEPR report will be taken into consideration in preparation of the final L-31N SMPP Design Report. Detailed information on the final comments of the panel is provided in Appendix A.

2. METHODS

This section describes the methodology followed in selecting independent external peer reviewers, and in planning and conducting the IEPR. The IEPR was conducted following procedures described in USACE's guidance cited above (Section 1.2 of this report) and in accordance with the Office of Management and Budget's *Final Information Quality Bulletin for Peer Review*, released December 16, 2004. Supplemental guidance on evaluation for conflicts of interest used the National Academies' *Policy on Committee Composition and Balance and Conflicts of Interest for Committees Used in the Development of Reports*, dated May 12, 2003.

2.1 Planning and Schedule

Table 1 defines the schedule followed in execution of the IEPR.

Table 1. L-31N SMPP Design Report IEPR Schedule.

Task	Action	Due Date
	NTP	August 1, 2008
	Receipt of Review Documents	December 10, 2008
Task 1	Submit Draft Work Plan	December 19, 2008
	Submit Final Work Plan (including final charge)	January 16, 2009
Task 2	Recruit and collect information on potential peer reviewers; prepare summary information	January 6, 2009
Task 3	Submit Draft Charge	December 19, 2008
	USACE provides comments on Draft Charge and Work Plan	January 13, 2009
	Submit Final Charge (including Final Work Plan)	January 16, 2009
	USACE approves Final Charge and Final Work Plan	January 16, 2009
Task 4	Select 3 external peer reviewers	January 6, 2009
	Submit list of selected peer reviewers	January 6, 2009
	Complete subcontracts for peer reviewers	January 20, 2009
Task 5	Review documents and Final Charge sent to IEPR panel	January 21, 2009
	Battelle Internal and USACE Kick-off Meeting with external peer reviewers	January 21, 2009
	IEPR Panel submits individual technical review comments to Battelle	February 13, 2009
	Battelle identifies strawman key issues list from individual comments and distributes to IEPR Panel	February 19, 2009
	Panel review teleconference to confirm key issues, determine final comments, and assign responsibility for final comments	February 20, 2009
	IEPR Panel prepares final comments on key issues using formatted structure and submits to Battelle	March 5, 2009
	IEPR Panel reviews Final IEPR Report prior to submission to USACE (if time allows)	March 6, 2009
Task 6	Submit Final IEPR report and post Final Panel Comments on DrChecks*	March 10, 2009
Task 7	USACE provides clarifying questions on Final IEPR report	March 24, 2009
	Teleconference with USACE/Battelle/IEPR panel to discuss clarifying questions on Final Panel Comments (if needed)[c]	March 27, 2009
	USACE provides written responses (“Evaluator comments”) to Final Panel Comments in DrChecks	April 8, 2009
	IEPR panel provides written responses (“BackCheck comments”) and Battelle close out DrChecks	April 17, 2009
	IEPR close out	May 30, 2009

[c] Following submittal of this report, it is anticipated that USACE may seek clarification on Final Panel Comments. If needed, the USACE/Battelle/IEPR panel will participate in a teleconference to clarify these comments, and subsequently participate in a comment/response process.

2.2 Identification and Selection of Independent External Peer Reviewers

Battelle initially identified approximately 18 potential peer reviewers, confirmed their availability, evaluated their technical expertise, and inquired about potential conflicts of interest. Of those initially contacted, 14 independent peer review candidates confirmed their interest and availability; about half of the interested candidates had a potential conflict because their firms were potentially going to pursue the L-31 construction contract. These candidates did not want to preclude themselves (or their company) from working on the eventual construction project. The remaining four candidates declined either due to the schedule and anticipated level of effort, disclosed conflicts of interest, or because they did not possess the technical expertise being sought.

Corresponding to the technical content of the Work Plan and the overall scope of the L-31N SMPP Design Report, the areas of technical expertise the selected peer reviewers were evaluated according to focused on three key areas: hydrogeology; cost engineering and construction management; and geosystems. It was also emphasized that peer reviewers were familiar with karst geology.

The peer reviewers were also screened for the following *potential* exclusion criteria or conflicts of interest.[d] Participation in previous USACE technical peer review committees and other technical review panel experience was also considered.

- Involvement in any USACE L-31N Seepage Management Pilot Project (L31N-SMPP), including but not limited to producing the L-31N Seepage Management Pilot Project Draft Integrated Pilot Project Design Report/Environmental Assessment, supporting appendices, related technical data, and models pertaining to the L-31N SMPP.
- Involvement in any USACE Everglades National Park Seepage Management Project (ENP SM), including but not limited to the planning documents, technical data and models. Note: ENP SM ("full scale") is the successor to the L-31N Seepage Management (Pilot), which is currently underway.
- Involvement in any USACE L-30 levee and canal projects.
- Current USACE employee.
- Current employee of a cooperating agency for Everglades Restoration Efforts (e.g., South Florida Water Management District, Everglades National Park Service, EPA, USGS, NOAA) and currently working on Everglades Restoration Projects.
- Current Member of the South Florida Ecosystem Restoration Task Force.
- Previous employment by the USACE as a direct employee or contractor (either as an individual or through a firm) within the last 10 years. If yes, provide title/description,

[d] Note: Battelle will be evaluating whether scientists in universities and consulting firms that are receiving USACE-funding have sufficient independence from USACE to be appropriate peer reviewers. See the OMB memo p. 18, "….when a scientist is awarded a government research grant through an investigator-initiated, peer-reviewed competition, there generally should be no question as to that scientist's ability to offer independent scientific advice to the agency on other projects. This contrasts, for example, to a situation in which a scientist has a consulting or contractual arrangement with the agency or office sponsoring a peer review. Likewise, when the agency and a researcher work together (e.g., through a cooperative agreement) to design or implement a study, there is less independence from the agency. Furthermore, if a scientist has repeatedly served as a reviewer for the same agency, some may question whether that scientist is sufficiently independent from the agency to be employed as a peer reviewer on agency-sponsored projects."

dates employed, and place of employment (district, division, Headquarters, ERDC, etc.), and position/role.

- A significant portion (i.e., greater than 50%) of personal or company revenues within the last 3 years came from USACE contracts for projects specific to South Florida.
- Current or future financial interests in L-30 or L-31N related contracts/awards from USACE.
- Current or future financial interests related to the design or development of seepage management technologies.
- Any publicly documented statement made advocating for or against the subject project.
- Other possible perceived conflict of interest for consideration, e.g.,
  - Involvement in Comprehensive Everglades Restoration Program (CERP) projects.
  - Repeatedly served as USACE technical reviewer.
  - Paid or unpaid participation in litigation related to the work of the USACE.
  - Any other perceived COI not listed.

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

2.3 Preparation of the Charge and Conduct of the Peer Review

A charge for peer review, which contained specific questions regarding the L-31N SMPP Design Report, was developed to assist the IEPR panel. The draft charge was prepared by Battelle with input from USACE and guidance provided in USACE's guidance *Peer Review of Decision Documents* (EC 1105-2-410) and the Office of Management and Budget's *Final Information Quality Bulletin for Peer Review*, released December 16, 2004. A draft charge was submitted to the USACE for consideration and evaluation, and finalized by Battelle after minor clarifications were incorporated.

The final charge included general guidance for the reviewers on conduct of peer review (as shown in Appendix B of this final report). The charge consisted of 87 total questions/discussion points; 82 questions/discussion points on the L-31N SMPP Design Report and 5 questions/ discussion points on the appendices from the report.

The peer reviewers were provided an electronic version of the L-31N SMPP Design Report documents and the charge for review. A full list of the L-31N SMPP Design Report documents that were reviewed by the IEPR panel is provided in the charge in Appendix B of this report. The IEPR panel was instructed to respond to the charge questions within a comment-response form table. In addition, USACE held a panel Kick-Off Meeting via teleconference where Battelle and the panel members were introduced to the pilot project, received an overview of alternative comparison and the Selected Alternative Plan, and provided project status.

More than 270 comments were received from the individual IEPR panel members in response to the charge questions. There was no communication between the IEPR panel and the authors of the L-31N SMPP Design Report during the peer review process, but communication between Battelle and the reviewers, and among the reviewers, was conducted as needed.

2.4 Review of Individual Panel Comments

In response to the charge questions, more than 270 individual comments were received from the IEPR panel members. Battelle reviewed these comments to identify overall recurring themes, potential areas of conflict, and other impressions of the report. As a result of this review, Battelle developed a preliminary list of 52 overall comments and discussion points that emerged from the IEPR panelists' individual comments, including 29 negative comments, 7 positive comments, and 16 comments that were conflicting among the various reviewers. Each reviewer's individual comments were shared with the full IEPR panel in a merged individual comments table.

2.5 Independent Peer Review Panel Teleconference

Battelle facilitated a teleconference discussion with the IEPR panel to allow the exchange of technical information among the panel experts, many of whom are from diverse scientific backgrounds. This information exchange ensured that the IEPR report accurately represented the panel's assessment of the project and of the panel and avoided isolated or conflicting information and analyses. The panel review teleconference consisted of a thorough discussion of the overall negative comments, positive comments, and comments that appeared to be conflicting among reviewers as well as to ascertain and confirm their importance to the IEPR panel, add any missing issues of high-level importance to the IEPR panel, and resolve whether to "agree to disagree" on the conflicting comments. The main goal of the teleconference was to identify which issues should be carried forward as "final panel comments" and decide who would lead the development of those final comments.

The panel discussion resulted in 19 overall final panel comments. Following the discussion, a summary memorandum documenting each final comment identified by the panel (and organized by level of significance) was prepared by Battelle and distributed to the IEPR panel. The memorandum provided detailed guidance on the approach and format to be used in the development of the final panel comments for the L-31N SMPP Design Report.

In addition to identifying which issues should be carried forward as final panel comments to be provided to USACE, the IEPR panel discussed responses to 16 specific charge questions where there appeared to be disagreement among the reviewers. The conflicting comments were resolved based on professional judgment of the panel members and the comment was either incorporated into the final comments or determined to be a non-significant issue (i.e., either a true disagreement did not exist, or the issue was not important enough to include as a final comment).

2.6 Preparation of Final Comments

The IEPR panel used the 19 final panel comments as a basis for preparing the final comments. A memorandum was distributed to the IEPR panel providing detailed guidance on the approach and format to be used in the development of the final comments. A summary of the directive is provided below:

- <u>Lead Responsibility</u>: A lead reviewer who was responsible for coordinating the development of the final comment and submitting it to Battelle was assigned for each panel comment. Lead assignments were modified by Battelle at the direction of the IEPR panel. To assist each lead in the development of the final comments, Battelle distributed merged individual comments in the comment-response form table, a summary detailing each draft final comment statement (in the memorandum), an example final comment following the five-part structure (described below), and a template for the preparation of the final comments.

- <u>Directive to the Lead</u>: Each lead was encouraged to communicate directly with other reviewers, as needed, to contribute to a particular panel comment. If a significant comment was identified that was not covered by one of the original 19 final panel comments, the appropriate lead was instructed to draft a new panel comment. If a final panel comment was related to another final panel comment, the lead was to cross reference them.

- <u>Format for Final Comments</u>: Each final panel comment was presented as part of a five-part structure, including:
    1. Nature of comment (i.e., succinct summary statement of concern)
    2. Basis for comment (i.e., details regarding the concern)
    3. Significance (high, medium, low; see description below)
    4. Comment cross referencing (i.e., references to another final comment or comment that was related)
    5. Recommendation for resolution (see description below).

- <u>Criteria for Significance:</u> The following were used as criteria for assigning a significance level to each final panel comment:
    - *High:* Describes a fundamental problem with the project that could affect the recommendation or justification of the project
    - *Medium:* Affects the completeness or understanding of the reports/project
    - *Low:* Affects the technical quality of the reports but will not affect the recommendation of the project.

- <u>Guidance for Developing the Recommendation:</u> The recommendation was to include specific actions that the USACE should consider to resolve the 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).

As a result of this process, 19 Final Panel Comments were prepared. Battelle reviewed and edited all final comments for clarity and adherence to the requested final comment template format. There was no direct communication between the IEPR panel and the authors of the L-31N SMPP Design Report documents during the preparation of the final comments. The final IEPR comments were assembled and are presented in Appendix A.

3. PANEL DESCRIPTION

Potential peer review candidates were identified through Battelle's Peer Reviewer Database, targeted internet searches using key words (e.g., technical area, geographic region), search of websites of universities or other compiled expert sites, and through referrals from candidates who declined. A draft list of screened (for availability, technical background, conflict) potential reviewers was prepared by Battelle and provided to USACE. The final list of peer reviewers was determined by Battelle.

An overview of the credentials of the three reviewers selected for the IEPR panel and their qualifications in relation to the technical evaluation criteria is presented in Table 2. More detailed biographical information regarding each candidate and their technical area of expertise is presented following Table 2.

Table 2. L-31N SMPP Design Report Independent External Peer Report Panel: Technical Criteria and Areas of Expertise

Primary Areas of Expertise	Totals	Stewart	Fowler	Gallet
Registered professional with 10 years experience	3	X	X	X
Ph.D.	1	X		
Active participation in related professional societies	3	X	X	X
Experience in conducting and evaluating subsurface geologic data including hydraulic conductivity, groundwater modeling, computational analysis, and other groundwater design/management activities.	1	X		
Familiar with karst geology.	3	X	X	X
Familiar with the Floridian Aquifer and the hydrogeological aspects of Consumptive Use Permitting in the State of Florida.	2	X	X	
Demonstrated experience in performing cost engineering/construction management for all phases of subsurface geosystem projects including deep cut off walls.	2		X	X
Familiar with similar projects across US and related Cost Engineering.	1		X	
Experience in associated contracting procedures, total cost growth analysis and related cost risk analysis is desired.	1		X	
Panel member should be familiar with construction industry and practices used in Florida and/or the Southeastern United States.	1		X	
Experience in the design and construction of cutoff walls and successful implementation of such projects.	2		X	X
Experience in specifically, the care and diversion of water in deep trenches up to 100 ft. deep and successful implementation of such projects.	1			X

Mark T. Stewart, PhD.
Role: This reviewer was chosen primarily for his expertise in the area of hydrogeology and groundwater modeling.
Affiliation: University of South Florida

Dr. Mark T. Stewart has 37 years of experience in the field of geology and holds a Ph.D. in Geology from the University of Wisconsin. He is currently a Professor in the University of South Florida (USF) Geology Department. Dr. Stewart has been conducting studies of Florida hydrogeology since 1976, and is co-author of a USGS report on the hydrogeology of Dade County. He has extensive experience with karst hydrogeology, including the karst aquifer system in Florida. His research interests are in hydrogeology, applied geophysics, numerical modeling of hydrologic systems, and hydrology. Dr. Stewart's current research projects include the hydrology of mined lands, determination of the groundwater contribution to stream flow, separation of natural and anthropogenic stresses on groundwater, and geologic sequestration of carbon dioxide. Dr. Stewart has developed several geophysical techniques to investigate groundwater systems with geophysical methods, including a patented method for the quantification of dense non-aqueous phase liquids in soils. His active research grants include a grant from the Florida Institute of Phosphate Research to investigate (served as co-PI) the hydrology of clay storage areas, utility-funded projects on numerical modeling of carbon dioxide injection in saline aquifers (served as co-PI), evaluation of geologic sequestration of carbon dioxide in saline aquifers (served as PI), and a Southwest Florida Water Management District (SWFWMD)-funded project on methods for identifying wetlands stressed by groundwater withdrawals (served co-PI). Dr. Stewart is a Registered Professional Geologist in the state of Florida.

Deane Fowler, P.E.

Role: This reviewer was chosen primarily for his expertise in cost engineering and construction management.

Affiliation: HDR Engineering Inc.

Mr. Deane Fowler, P.E. has more then 32 years of program, project, facilities and construction contract management experience. He has held positions of increasing scope and responsibility with performance oriented organizations working every facet of engineering, including daily and long-term costing and budgeting, planning, operations, and executive level management. He has extensive experience with cost engineering and construction management including cut-off walls at projects in Maryland, farm-to-market road and airfield projects in Honduras, CA, the Republic of Korea, the Territory of the US Virgin Islands, the Rio Puerto Nuevo Flood Control and the Portuguese Dam Projects (combined valued of $1.2B) in the Commonwealth of Puerto Rico, and Morganza to the Gulf of Mexico Hurricane Protection project (valued at $8.5B) in Southeastern Louisiana, among many others. Mr. Fowler also served as project manager during the construction of a $50M eight-story concrete office building for the Baltimore District, U.S. Army Corps of Engineers. For this project, he served as the principal negotiator on all pay estimates, constructive and user-requested change orders, quality assurance and general conduct of the site and its overall looks and functionality. The site conditions involved a high level of differing site conditions, deep excavations, soil anchor system, security awareness and control of activities by prime and subcontractors due to the sensitivity of the military complex where the project site was located. The construction was accomplished without major incidents in safety or security over this three-year project and within the tight time constraints requested by the user. He is a Registered Professional Engineer licensed in the states of Florida and Virginia, is a Life Member and Fellow of the Society of American Military Engineers, Life Member of Chi Epsilon, and a member of Project Management Institute (PMI).

Alain Gallet, P.E.

Role: This reviewer was chosen primarily for his expertise in geosystems, including geotechnical and environmental engineering and design of retaining structures with groundwater cut-off systems.

Affiliation: Gallet & Associates, Inc.

Mr. Alain J. Gallet, P.E., M.S. has more than 33 years of experience in geotechnical engineering, environmental engineering, investigations for industrial, commercial, municipal, transportation and hazardous waste projects. Mr. Gallet has extensive experience in the evaluation of subsurface geological conditions and their impact onto proposed foundation systems. Mr. Gallet has worked on the design of dams and other retaining structures with required groundwater cut-off systems, and has worked on deep coffer dam designs for intake structures requiring control of groundwater. Mr. Gallet has worked on groundwater intercept systems in the design and siting of powerplants across the U.S. These systems can involve trenches from 100 feet to 150 feet in depth. His experience also includes materials engineering evaluation of soil, concrete and asphalt. Mr. Gallet has managed multidisciplinary projects, offices and companies throughout his career. His geotechnical experience includes work in karst environments. Mr. Gallet studied in Gainesville, FL (BS and MS from the University of Florida) under Dr. Schmertman and performed research and design on the impact of karst terrain. He has performed many explorations in an attempt to define the impact of karst terrain and its impact on surface stability. He has worked with geophysical techniques such as resistivity, ground radar, micro-gravity, streaming potential to map potential karst anomalies. Mr. Gallet is a Registered Professional Engineer in more than 20 states, including the State of Florida. He is a member of ASCE, NSPE, AASHTO, ASTM, ABC, CSI, Past President of ACEC-AL, ABC, CSI, is the Current Chair of Legislative issues for the American Council of Engineering Companies (ACEC) in Alabama as well as a National Liaison for the organization.

4. RESULTS • SUMMARY OF PEER REVIEW COMMENTS

The IEPR panel was in agreement about the general strengths and weaknesses of the documents, which were summarized with the following statement: Overall, the panel agreed that the USACE did a good job in developing the L-31N SMPP Design Report which clearly required a significant amount of effort. The panel commented that even though they agreed with the result, there was too much discontinuity in the value engineering process shown in the L-31N SMPP Design Report to effectively evaluate the alternatives and select the final design. In addition to this general assessment, the panel had the following comments L-31N SMPP Design Report:

- The groundwater modeling requires further analysis to quantify or bracket uncertainties in model results.
- The level of hydrologic, hydrogeologic, and geologic data currently available at the L-30 site are sufficient to determine that the project is innovative and well worth pursuing, but precludes detailed engineering of process, cost, and implementation.
- On-going monitoring is needed to calibrate modeling assumptions/project design and to ensure construction success of the pilot project.
- The environmental impacts, such as noise and ecosystems, need to be more accurately described for both the pilot project and the full-scale project.
- The commitments, as described in the report are sufficient to avoid, minimize, or mitigate adverse environmental effects.
- There has been extensive opportunity for affected parties and agencies to provide comment.

As a result of the comment/review process, the IEPR panel identified nineteen (19) final comments, segmented into rankings of high, medium, and low significance. In total, as shown in Table 3, nine (9) were identified as having high significance, five (5) were identified as having medium significance, and five (5) comments were identified as having a low level of significance. The final IEPR comments in their entirety are included in Appendix A.

Table 3. Overview of 19 Final Comments Identified by L-31N SMPP IEPR Panel.

	Significance – High
1	There are uncertainties in the model and it is unclear how these are carried through in the design elements and costing.
2	It is questionable how sheet pile and slurry wall will be installed given that no pre-blasting will be used in the construction methodology.
3	The window width selected for the pilot project requires further detailed analysis as it was not really configured sufficiently to allow scaling up to a full-scale project.
4	The subsurface geological conditions are important to the many aspects of the design, costing, and construction of the pilot project and need a more detailed discussion.
5	The model is conceptually acceptable; however it is unclear as to how the model was used in the final design, costing, and construction, and how the uncertainties were included in the project planning.
6	Until conditions have stabilized, quarterly monitoring of injection and surface water is an insufficient timeframe to fully evaluate effects on water quality.
7	More site-specific hydraulic and lithologic data are needed to address all seepage conditions expected during the wet and dry seasons.
8	Further clarification is needed on how velocities were determined.
9	The water quality concerns regarding the bentonite mixture percolating through the slurry walls and seeping into the adjacent canals and water bodies requires additional detail to validate that there will be no impact.
	Significance – Medium
10	Geological cross-sections would provide invaluable input and should be included in the report.
11	The hydrology is generally well defined, but limited in scope.
12	The assumption that long-term environmental impacts associated with the pilot project will be similar to those for the full-scale project is not proven, and that long-term impacts of the pilot project were not fully discussed.
13	The plan does not specifically state how seepage will be measured along the slurry and sheet pile walls, and the expected accuracy of the measurement of the total seepage through the pilot project window.
14	The assumptions and specifics used to develop the cost estimates need additional detail
	Significance – Low
15	The form and content of the PPDR seems to suggest that the selected pilot project design and options are those currently favored for the full-scale Everglades Seepage Management Project; however there are statements in the PPDR that the pilot project is not the final design.
16	The impacts are generally well described from the perspective of the project, but not necessarily from the perspective of the affected ecosystems or organisms.
17	Proven technologies such as pre-cast concrete panels and secant walls have not been considered in the available technologies.

18	In the comparison of alternatives, noise was not considered to be a significant criterion.
19	Figures should be revised for clarity and to better support the documentation.

Appendix A

Final Panel Comments

on the
L31N Seepage Management Pilot Project (L31N)
Draft Integrated Pilot Project Design Report/Environmental Assessment

Comment 1:
There are uncertainties in the model and it is unclear how these are carried through in the design elements and costing.
Basis for Comment:
The FEMWATER groundwater model was used to quantify key project design, planning, and costing elements, such as, but not limited to; a. Width of the window, b. Volume of water passing through the window, c. Estimated ground-water velocities, d. Volume of water that must be injected to create a hydraulic barrier. However, the model has uncertainties that cannot be quantified, such as; a. Hydraulic conductivity values at the project site, b. Effect of very large vertical variations in hydraulic conductivity on model results, c. Ability of the model to duplicate historical hydrologic conditions [calibration], d. Values of porosity used to calculate ground-water flow velocities or potential variations in porosity, and therefore, ground-water velocities, e. Effect of coarse discretization of Canal L-30 on predicted flows through the window, f. Effect of historically-observed variations in water levels in WCA 3 on predicted ground-water flows through the window and the hydraulic barrier. One example of the effect on design and construction costing are the uncertainties in the hydraulic conductivity values and vertical variation. These values directly affect the predicted volumes of water that must be extracted and injected to form an effective hydraulic barrier. The current estimate is 3 cubic feet per second (cfs) per extraction well which converts to 2 million gallons per day (mgd) per extraction well. This is a very large volume, and any uncertainty in model results will directly affect the volumes of water extracted from each well and pump. A single hydraulic conductivity value, obtained from a 1951 test, is used in the model. The results of the 1951 test suggest that there may be very large (1E03-1E04) vertical variations in hydraulic conductivity. A second example is the effect of uncertainties in groundwater velocity. During construction, direct measurements of groundwater velocity will be made to assess project effectiveness. The width of the window appears to have been set in part on the basis of the expected groundwater velocities. However, the caption in Table C-2 suggests velocities have not been correctly calculated. Furthermore, porosity values or possible range of porosities, are not provided to support the velocities reported in report figures (such as Figure C-9 and C-10). As velocities are inversely proportional to porosity, the effects of porosity variation on project design and assessment of effectiveness are important, particularly as the width of the window may affect the utility of project results to be used in designing the full-scale project. As stated on page C-10, "The model is not calibrated by changing the hydraulic conductivities for a pointwise agreement of the model results with the observed condition but visual observation of the flow field and hydraulic head variations are done to have confidence in the model." This suggests that the model has not been calibrated in the normal sense, where the hydraulic conductivity and recharge are varied to bring the model results into agreement with observed water levels. In addition, the degree to which the model can reproduce observed water levels is not discussed. Figures C-8, C-9, and C-10 and the relevant section in the text present simulated model heads, but do not indicate or quantify the ability of the model to duplicate either observed heads or heads simulated by

another calibrated model, such as the MODBRANCH model. Without such a comparison, it is difficult to assess the utility of the model results for purposes of project design and planning.
Significance – High:
The results of the FEMWATER model appear to have been used to design key project components, such as the width of the seepage window and the rates at which water will be extracted and injected, and the selection of these components has carried through to project planning and costing. If the FEMWATER model results do not accurately reflect local conditions those design elements may not be optimal, the costs may not be accurate, and it may not be possible to implement the project as designed.
Comment Cross-referencing:
Comments 5, 7, 8, and 11
Recommendations for Resolution:
To resolve these concerns, the report would need to be expanded to address the following: • The PPDR should discuss and attempt to quantify or bracket uncertainties in model results and these uncertainties should be incorporated in the project design, planning, implementation and cost engineering where appropriate. • The FEMWATER model's ability to reproduce observed hydrologic conditions, or at least the results of the calibrated MODBRANCH model, should be quantified, and the model variables adjusted as necessary to bring model results into reasonable agreement with observed conditions in a standard calibration process. • Any design elements based in whole or in part on model results should be examined in light of potential model uncertainties, and the analysis of uncertainty should be carried through the project design, implementation, assessment and costing. • Additional on-site measurements of hydraulic conductivity should be made prior to construction or early in project implementation and incorporated into revised model predictions to allow for modification of key design elements, such as the extraction and injection wells. • The project design, implementation plan, and costing should include contingencies if the results and analyses in Section 5 and Appendix C vary from those reported.

Comment 2:
It is questionable how sheet pile and slurry wall will be installed given that no pre-blasting will be used in the construction methodology.
Basis for Comment:
It is unclear how the sheet pile and SCB wall will be installed. The L-31N SMPP Design Report is inconsistent in its discussion regarding the need to pre-blast the bedrock. For instance, one portion of the report references blasting as a means to break up the bedrock to allow installation; however, the report also includes that "blasting will not be used." The panel questions how walls can be installed without pre-blasting (to fracture the rock sufficiently to allow penetration of the sheet pile wall) and excavation of the slurry wall can be accomplished without blasting. In reading the report, various techniques for installing the sheet pile wall and the SCB wall are discussed. For instance, in Section 4.1.1, there is discussion of using vibrating hammers, impact hammers or push technology and of pre-drilling to break up soil/rock. In Section 4.2, there is mention of pre-drilling, pre-blasting, and using specialized equipment. Section 5 states that it is local practice use blasting for rock removal and there is also reference to using "equipment capable of removing hard limestone." Finally, in Appendix B, the cost estimate contains line items for drilling and pre-blasting 6-foot wide sections. The risk associated with pre-blasting should be further discussed and addressed. The extent of the disturbed zone will not be consistent and will cause preferred flow paths along the walls. The construction means and methods should be discussed with a specialty contractor to determine whether the project can be constructed as proposed, including construction equipment access in and along the levees and the methods, materials, and sequencing of the construction project.
Significance – High:
This key issue for the installation of the groundwater barrier for the testing the pilot project. As currently presented, the panel is unsure as to what is proposed and how the system will be installed.
Comment Cross-referencing:
Comments 9 and 14
Recommendations for Resolution:
To resolve these concerns, the report would need to be expanded to address the following: • The report needs a section to discuss in more details the constructability of the walls. • If blasting is to be used, controls need to be in place to minimize zone of disturbance which would impact groundwater flow and bedrock permeability. • If blasting is not going to be used, a discussion of the methods to accomplish the installation of the sheet piles to elevation -22 ft, and how the SCB wall will be installed to elevation -70 feet should be included.

Comment 3:
The window width selected for the pilot project requires further detailed analysis as it was not really configured sufficiently to allow scaling up to a full-scale project.
Basis for Comment:
The L-31N SMPP Design Report does not discuss how impacts associated with the 0.2 mile pilot project relate to the 8.0 mile full-scale project, specifically on the sizing of the window. The discussion specifics should include: constraints, assumptions, cost, environmental impacts, water quality, water flow modeling and constructability over 8 miles of the full-scale project. The short term (pilot project) analysis contained in the report is sufficient for this 0.2m section test section; however, there will be an order of magnitude differential in impacts between the 0.2-mile pilot and the 8-mile full-scale project. Further, the window width selected for the pilot project was chosen in order to measure the high groundwater velocity, a crucial pilot project design criterion. However, the report does not discuss how the data from the pilot project will provide critical information for final project design and implementation of the window width for a full-scale project. In order to evaluate the differential, the following should be addressed: • Is there more than one window needed for the 8-mile section when scaled up from the pilot project? • Will the modeling but sufficiently detailed to allow up scaling from the pilot project? • Have other considerations or impacts from increasing the number of windows, their location, proximity to other structures or cumulative effects from multiple windows in the seepage barrier been determined and not reported? • Is there any danger in overwhelming the seepage barrier during a high storm event in the ENP if there are insufficient window openings in the barrier? • Will multiple barriers have an adverse impact on the overall subsurface flow rate across the entire project area?
Significance – High:
This comment was rated as highly significant because a critical goal of the pilot project is to regulate flow of subsurface water out of the ENP through manipulation of the size of the seepage window. However, it is not known whether there will there be sufficient knowledge gained from the Pilot Project to determine if multiple windows, in several unknown locations and positions meet the full requirements for the full-scale (8 mile) implementation.
Comment Cross-referencing:
Comment 9
Recommendations for Resolution:
To resolve these concerns, the report would need to be expanded to address the following: • Develop operational parameters that allow experimentation with the flow conditions through the window (1, 2 or 3 injection pumps working) for the pilot project. • Construct more than one window through the seepage barrier. • Compare the field measurements from the monitoring wells to the model results for the Pilot Project and extrapolate the data to the entire 8 mile project.

Comment 4:
The subsurface geological conditions are important to the many aspects of the design, costing, and construction of the pilot project and need a more detailed discussion.
Basis for Comment:
The USGS and Cunningham had recently completed a detailed assessment of the subsurface conditions, including borings; however, since that time, the location of the pilot project has been moved and the level of geological detail has not been provided; i.e., there are only 3 boring locations for the current pilot project site. Hydraulic conductivity is known to change by an order of magnitude of 4 to 5; therefore, there is a high level of uncertainty as to the model results, unless additional data is given for the local geology. In addition, there are more data available on the vertical heterogeneity than is given in the report. For instance, there three figures in the report showing model wet/dry season heads have not been compared to actual data. Within the known flow conditions and subsurface geology, the L-31N SMPP Design Report modeling appears to adequately address the uncertainties; however, the unknown model input, such as the areas of cavities/voids in-between boring locations and other geotechnical data, could change project results. A contractor bidding on this project would not have sufficient information to compete the bidding process. The following are sections of the L-31 SMPP where additional information is required: • The weighted average horizontal hydraulic conductivity of 91,000 feet per day is not discussed with regard to how this value was determined, how it was calculated, or if it was obtained from another study. The entire section of the Biscayne Aquifer in the model was assigned this value of hydraulic conductivity (K), and this value directly affects flows and velocities. In order to assess the degree of uncertainty of the model results, it is necessary to know the approximate uncertainty in K. • Figure 5-11: This figure illustrates that the “hard limestone” layers are not continuous between boreholes. The “hard limestone” appears to be the same unit as the “resistive” unit shown on Figure 5-10 that is shown as laterally continuous. The vertical and lateral extent of this unit within the window is very important as the hydraulic conductivity of this layer, as labeled, is 4 to 5 orders of magnitude greater than the layers immediately above and below this layer. This suggests a possible anisotropy of ratio 10,000 – 100,000 to 1. At CB-001, a layer at -35 to -40 is also labeled with a very high K value. These very high K values and the very large contrasts in K should be explicitly expressed in the ground-water model. In fact, further reading in this section shows that these K values were not obtained at the PP site, but on the east side of Krome Avenue. This needs to be noted in the caption. The figure gives the impression that these K values were obtained at the PP site. Also, the K values do not have a precision to six significant figures, even if they originally were reported with six significant figures. • Figures 5-3 and 5-4 should be marked as CB 001 not CB 000. • Section 5.3.3: There is a mention that the increased groundwater velocity will not cause dissolution of the limestone. I think this needs to be expended to state the reasoning. In karst limestone increased velocity for prolonged periods is known to cause dissolutioning and washing of the silt/peat filling within the cavities. • The report does not include a discussion as to the relative strength of the limestone and additional laboratory compressive strength tests are needed. As driving the sheet piles 5 feet into the limestone is a possibility, knowing the actual strength of that material will be an important for the contractors as the feasibility of this process is evaluated. Here, the report details the actual limestone strength “hard” which is inadequate for evaluation purposes.

Significance – Medium:
Understanding of the site specific geological setting and conditions is essential to the clearer understanding of the geological conditions of this project.
Comment Cross-referencing:
Comments 2, 9, 10, and 11
Recommendations for Resolution:
To resolve these concerns, the report would need to be address the following: • Impact of cavities and voids in the bedrock and their uncertain presence. • Discussion of impact of pumping for extended period to the cavities present in the limestone. • Discussion as to the relative strength of the limestone and its impact to the constructability. • Provide basis for the estimated horizontal hydraulic conductivity of 91,000 feet per day.

Comment 5:
The model is conceptually acceptable; however it is unclear as to how the model was used in the final design, costing, and construction, and how the uncertainties were included in the project planning.
Basis for Comment:
As discussed in Comment 1, the FEMWATER model has areas of uncertainties and neither Section 5 nor Appendix C contains a discussion outlining the magnitude of these uncertainties. For this reason, the PPDR does not explain how the uncertainties in the model results are reflected in the project design, construction plans, and cost estimates. The model results appear to have been used to select project design elements, such as the window width, and to estimate the volumes of water which will need to be injected to create the hydraulic barrier. These are critical project design elements. The uncertainties in the model results should be included in the project design, implementation plans, or costing estimates to allow appropriate flexibility to insure a successful project implementation within budget.
Significance – High:
Uncertainties in the model results that are not reflected in the project design, planning and implementation may result in a decreased effectiveness of the project as a proof of concept test of the three major design elements.
Comment Cross-referencing:
Comment 1
Recommendations for Resolution:
It is recommended that an assessment be made of those aspects of the project design, planning and implementation that rely in whole or in part on the results obtained from the FEMWATER model. Uncertainties in the model results should then be reflected in the project design, planning and implementation as required allowing for uncertainty in model results.

Comment 6:
Until conditions have stabilized, quarterly monitoring of injection and surface water is an insufficient timeframe to fully evaluate effects on water quality.
Basis for Comment:
The L-31N SMPP Design Report does not adequately address the frequency of well monitoring during construction and where the wells will be located (cluster; horizontally and vertically; top, bottom, mid-range). If the impacts of the project are not monitored, then the idea of the pilot program is lost. Depending on the rate of change, the monitoring frequency may need to be adjusted in the field. Many factors will impact the quality of the groundwater at the start of the test. When the pumps are turned on, the gradient will work on the slurry that has been installed. It is important to know if the slurry has set properly and if it has contaminated the surrounding groundwater. The frequency of sampling, the location of the wells and the location of the sampling windows will need to be looked at carefully and be very flexible during the construction process. In addition, when the injection is installed, water quality samples should be taken frequently until geochemical conditions are shown to be stable. Monitoring intervals should be very short at the start and increase with time. The panel suggests that the monitoring of the injection well be hourly, using a time factor multiplier of two, until a quarterly timeframe is reached.
Significance – High:
The high significance of this comment is related to the critical nature of the point of stabilization. The data gathered from the monitoring is the key element of the test. As in all aquifer testing, the frequency of sampling should be lower at the start, and increase with time.
Comment Cross-referencing:
Comment 6
Recommendations for Resolution:
In order to resolve these concerns, an expanded program of groundwater quality monitoring during the construction should be included in the L-31N SMPP Design Report, above that detailed in Section 6.4.1 of the report.

Comment 7:
More site-specific hydraulic and lithologic data are needed to address all seepage conditions expected during the wet and dry seasons.
Basis for Comment:
The 8-mile full-scale project has been planned to be constructed along L-31N and, for this reason, there is extensive lithologic and hydrologic data available for this area. However, as the decision to install the pilot test at L-30 was more recent, similar data are not yet available for the L-30 site. For example, a 1951 test in the unrelated area (east of Krome Avenue) is apparently used as the source to compute the average conductivity value (K = 91,000 feet per day). This average K-value is then used in the model to represent layers in the Ft Thompson/Biscayne area (Figure 5-2). The report does not detail the testing or discuss how the 91,000 ft/d value was calculated or averaged. Other sections of the report requiring further discussion include the following: • Figure 5-11 implies that the hydraulic conductivities posted at CB-001 were obtained at CB-001, and there is a label 'L-30 Seepage Report' for the 470 ft/d reported for the upper clastic unit of the Tamiami. • Figures 5-10 and 5-11 are not in agreement as to the continuity of the 'hard limestone' that is proposed as the unit that the sheet pile will be seated on. • Figure 5-2 suggests that there are three monitor wells on L-30, CB-001, -002, and -003, and at least two monitor wells in the WCA. It would be useful to discuss the historical water levels in the WCA and the water levels that might be expected over the life of the pilot project. • The water-level heads reported in Section 5 Hydrology apparently are simulated heads from the uncalibrated FEMWATER model and not measured heads or heads from the calibrated MODBRANCH model.
Significance – High:
The successful design and implementation of this pilot project relies known hydrologic and hydrogeologic conditions; without such data the pilot project effectiveness will be reduced.
Comment Cross-referencing:
Comments 1, 5, and 8
Recommendations for Resolution:
To resolve these concerns, the report would need to be expanded to address the following: • More site-specific data on hydraulic conductivity be obtained at the L-30 site prior to finalizing design elements and construction. This hydrologic and hydrogeologic data can be obtained in conjunction with the more detailed geotechnical investigation that will be required to better define subsurface geotechnical conditions prior to installation of the slurry and sheet pile barriers, especially the depth, continuity and properties of the hard limestone (shown in Figures 5-10 and 5-1). • The wet season and dry season heads from the simulated heads in the FEMWATER model be replaced with actual field observations from existing monitor wells, or at least heads from the calibrated MODBRANCH model. • Hydrostratigraphic data similar to that obtained by the USGS along L-31N would be very helpful in installing the monitoring, injection and extraction wells, and in evaluating the results obtained during project implementation.

Comment 8:
Further clarification is needed on how velocities were determined.
Basis for Comment:
As groundwater velocities are paramount in the design of the pilot project, at a minimum, the following should be clarified: • The caption for Table C-2 states "Note: velocities are obtained by dividing by the area of the cross section of the barrier wall transect (width = 1000 ft and saturated depth = 72 ft)." Calculation of ground-water velocities requires multiplying the total cross-sectional area by the fractional porosity, as ground-water flow is through the pores only, and not through the total cross-sectional area. No porosity value is mentioned or discussed, and checking the calculations shows that the velocities in Table C-2 were obtained by dividing the model-derived flux by the total area of the cross section. Apparently a porosity value was not used in the calculation. • On page C-20 it is stated that "The average velocities though the windows are obtained based on the nodal velocities simulated by the FEMWATER model". However, there is no discussion of the porosity value used in the calculation of the velocities. In Table C-4, the velocities that are reported to be simulated by FEMWATER can be obtained by dividing the flows reported in Table C-4 by the window area of 4,100 sq ft obtained by multiplying the window height by the window width. Again, it appears that porosity was not considered when calculating ground-water velocities. • The velocities shown in the legend in Figures C-27 through C-30 do not match the velocities reported in Table C-4.
Significance – High:
The groundwater velocities are discussed as a criterion for selection of the width of the seepage window, and therefore may have influenced the selection of the width of the seepage window, a key design element.
Comment Cross-referencing:
Comments 6, 7, and 13
Recommendations for Resolution:
It is recommended that the calculation of groundwater velocities be rechecked, with particular attention inclusion of porosity values. The accompanying text should also include a discussion of the porosity value used to obtain ground-water velocities and the basis for the selection of that porosity value. In addition, the role of the reported groundwater velocities in the selection of critical design elements, such as the window width should be re-examined, and the selection of such elements be reconsidered if the recalculated velocities differ from the reported values.

Comment 9:
The water quality concerns regarding the bentonite mixture percolating through the slurry walls and seeping into the adjacent canals and water bodies requires additional detail to validate that there will be no impact.
Basis for Comment:
Further discussion is needed in the L-31N SMPP Design Report on the impact of water quality control on local hydrology and hydrogeology, including the following: • Assumptions used in the model development for understanding overall flow paths for the area in the 'with' and 'without' project conditions, and the QA/QC process for the Contractor/USACE to maintain water quality during construction. • The discussion about the 6' lower permeability zone and the centering of the 30" trench within that zone for the Hybrid Alternative was confusing and required multiple reads to understand the thought process. • The proposed cut-off wall should be an effective barrier solution; however, the extremely high hydraulic conductivity and large pore spaces may affect the installation, and therefore, long- term effectiveness of using the slurry wall cut-off barrier is in question. • The report does not respond to the questions regarding the bentonite mixture: (a) at what viscosity does the mixture start seeping through the fracture zone surrounding the slurry trench and start migrating to the nearby canal (75' away) and (b) what controls are in place to prevent that occurrence or even be aware that it is occurring? Since the report did not present proof to support the hypothesis of 'no transmission' of the bentonite mixture, there is a strong concern that the substance will migrate and impact the surrounding environment. • Unless great attention to detail is given to grouting the joints on both sides of the wall, the conductivity goal for the cut off wall of 8-10 cm/sec will be difficult to verify along the slurry wall and nearly impossible to verify along the sheet pile wall due to the leaks at each joint. • Discussions regarding blasting when it was excluded as a possible construction technique in the later stages of the investigation. • The interaction of the cement-bentonite mix on the residual salts in the excavated trench and their impact on long-term strength and viability of the slurry wall for the pilot and full-scale project.
Significance – High:
The comment is rated high since there are sufficient unknowns concerning the possibility of the bentonite-slurry mixture percolating through the 6' lower permeability zone and impacting the local waterbodies plus the potential variability in field mixing of the slurry.
Comment Cross-referencing:
Comments 2 and 3
Recommendations for Resolution:
To resolve these concerns, the report would need to be expanded to address the following: • Increase the number of monitoring wells on the east side of the slurry wall to aid in early detection of the bentonite mixture traveling through the substrata to the local water bodies (canal). • Construct several test holes using the project field conditions and the bentonite mixture on site prior to construction of the 0.2 mile pilot project. Ensure there is sufficient instrumentation to determine if seepage of the mix will be a significant concern to the environment.

Comment 10:
Geological cross-sections would provide invaluable input and should be included in the report.
Basis for Comment:
The geological cross sections would provide valuable information as to the nature of the material and the problems of excavating in a wet, porous environment, driving sheet pile, and constructing slurry walls. In addition, the following were noted: • The geology and soils description in Section 3.2 are too generalized and not specific enough for the area of study. Site specific information is not provided until Section 5.3. Section 3.2 needs to also include site specific conditions based on data obtained from borings and includes reference to a geological cross-section such as presented in Figure 5-11. • Much of the information presented in Section 5.3 should be summarized and presented in Section 3.2, thus clarifying existing conditions at the test site for potential contractors.
Significance – Medium:
Although not critical to the success of this project, clarification of the localized geological conditions would serve as a basis for contractor project evaluation.
Comment Cross-referencing:
Comments 2 and 4
Recommendations for Resolution:
To resolve these concerns, the report would need to be expanded to address the following: • Expand Section 3.2 to include information included in Section 5.3.1 regarding the area specific conditions encountered in the borings. • Add a geologic cross-section such as Figure 5-11

Comment 11:
The hydrology is generally well defined, but limited in scope.
Basis for Comment:
This project is designed to test specific design elements which may be used in a full-scale seepage control design for the L-31N seepage control project. The hydrology at the pilot project site and in the region is very important to designing the pilot project and assessing the effectiveness of the design elements. As the full-scale project will be constructed along L-31N, the description and evaluation of the hydrology and hydrogeology should include data acquired in and near the pilot project site, including the data from L-31N. Very detailed hydrologic and geologic data have been acquired along L-31N (see the USGS report by Cunningham and others, 2004). The only data acquired at or near the L-30 site reported in the PPDR are the three borings CB-001,-002, and 003, and the 1951 hydraulic testing used to estimate the hydraulic conductivity of the Ft Thompson Formation at the L-30 site. These data are summarized in two figures, 5-10 and 5-11. The depth to the hard limestone appears to vary across the site. As this is the unit that the sheet pile will tie into, that will need to be excavated to install the slurry wall, and that will be the location of the injection wells, additional information on this unit and its hydraulic and geotechnical properties are important to the project design, construction and implementation. The 1951 hydraulic testing and the data developed along L-31N suggest that there may be very large variations in hydraulic conductivity within the formations under the project site. These potential variations are illustrated in Figure 5-11, but the effect of these variations is not discussed as to the possible effect on project design or implementation. The project may experience significant changes in water levels in the water conservation area during the project. The PPDR does not include discussion of the historical or potential water level changes and how they may affect the construction and implementation of the project.
Significance – Medium:
The hydrologic data presented in the L-31N SMPP Design Report are sufficient for a conceptual evaluation of the pilot project, but a more thorough discussion is required to support selected design elements and plans for implementation.
Comment Cross-referencing:
Comments 1 and 13
Recommendations for Resolution:
At a minimum, it is recommended that the hydrology discussion include the following: • Discussion of the possible local vertical heterogeneity of the Biscayne Aquifer and the potential effects of such heterogeneity on the project design and performance. • Include figures detailing historical wet and dry season ground-water levels as well as the available data point locations, • Include further discussion of subsurface flow and hydro-stratigraphy determined along L-31N, and the relationship of these studies and data to the design of the pilot project at L-30.

Comment 12:
The assumption that long-term environmental impacts associated with the pilot project will be similar to those for the full-scale project is not proven, and that long-term impacts of the pilot project were not fully discussed.
Basis for Comment:
A description of how information from the pilot-scale project will be incorporated into the final project, as it relates to the scale of the project, was not provided. The assumption that long-term impacts associated with the 0.2-mile pilot project can be extrapolated without other factors intruding on the full-scale (8-mile) project was not proven, and the long-term impacts of the full-scale project on the hydrology and environmental conditions for the Southeast area were not discussed. It appears that the Pilot Project Report was the culmination of the L-31N SMPP Design Report requirement; however, it is an intermediate step and lacks the transition language to take the results to the full-scale project.
Significance – Medium:
The ultimate success of the entire CERP/C&SF efforts are long-term sustainment of a balanced environment and this report does not prove it supports that goal.
Comment Cross-referencing:
Comment 9
Recommendations for Resolution:
To resolve these concerns, the report would need to be expanded to address the following: • Add details of how the results of the Pilot Project will be used to construct the 8 mile full project. • Incorporate additional modeling results which show the entire 8 miles of slurry wall and cut-off windows and the impact to the environmental for ENP and east of the wall. • Add decisions on the long-term impact of changing the hydraulics of the substrata for the pilot project and the 8-mile full project.

Comment 13:
The plan does not specifically state how seepage will be measured along the slurry and sheet pile walls, and the expected accuracy of the measurement of the total seepage through the pilot project window.
Basis for Comment:
The L-31N SMPP Design Report states (page 5-2), "The natural flow regime through the Everglades is dependent on the reduction of seepage losses from the natural areas toward the east coast. Adverse changes will occur in the hydrologic and hydraulic conditions in the natural areas if the seepage losses are not minimized. The hydraulic control and management of seepage along L-31N and L-30 levees and canals will have an influence on the hydrology of ENP..." In addition, Appendix C discusses the importance of estimating the success of the slurry and sheet pile walls at stopping seepage, and the effectiveness of the hydraulic control system at managing seepage through the window. However, an organized discussion of how seepage will actually be measured is not found in the report. The modeling and hydrology sections (Section 6-2) suggest that directly-measured groundwater velocities will be used to estimate seepage, but the discussion does not include details on how those measurements will be used to measure seepage, where they will be taken, how they will be taken, and how often and under what conditions they will be taken, or the capabilities of the instruments available for measurement. In addition, an estimate of the anticipated uncertainties in measurement of seepage is not provided, although the role of ground-water velocities in selecting the width of the seepage window is discussed. The purpose of the pilot project is to test the effectiveness of three design elements, slurry walls, sheet pile walls, and hydraulic barriers in controlling seepage under L-30. Measuring seepage is critical to assessing the effectiveness of the design elements used in the pilot project at controlling seepage, and in evaluating the pilot project design elements for possible use in the full-scale project.
Significance –Medium:
The pilot project is designed to test the effectiveness of three design elements to control seepage under levees. A thorough plan for measuring seepage is required in order to effectively assess the degree of effectiveness of each of the design elements. There is no more important physical measurement in this project than seepage and this should be measured accurately. The L-31N SMPP Design Report does not provide sufficient discussion; a complete plan may exist and should be included in the report.
Comment Cross-referencing:
Comment 13
Recommendations for Resolution:
Include a section on measurement of seepage volumes, including discussion of how, where, how often and with what accuracy seepage will be measured during project implementation. • The text suggests assessing the effectiveness of the slurry wall with a directional measurement of ground-water flow velocity. This will work if the ground-water velocity vector can be measured with a high degree of accuracy with a flow meter in a small diameter observation well. In addition, a three-point measurement of hydraulic gradients in three monitor wells near the upgradient side of the slurry walls will allow the hydraulic gradient direction to be resolved. • The PPDR suggests that measurements of seepage velocities will be obtained in the observation wells. It is recommended that these measurements be taken under a wide variety of conditions during project implementation, such as with the pumps on, the pumps off, during high water levels, and during low water levels. • It is recommended that 3-5 replicates of the velocity measurement in a well be made each time the seepage velocities are collected. This will allow an estimate of the accuracy of the velocity measurements to be made.

- The measurements made with the ground-water velocity meters can be compared to velocity estimates made from the measurement of hydraulic gradients and an estimate of porosity. This may allow a refinement of porosity estimates that can then be used in the ground-water model.

Comment 14:
The assumptions and specifics used to develop the cost estimates need additional detail
Basis for Comment:
There is insufficient documentation of the assumptions used in the development of the construction cost estimates. Specifically, the construction cost estimating for the soil-cement-bentonite wall and steel sheet pile wall is incomplete and requires additional detail. There will be a great amount of variability in the quantity take-off unless the parameters used for developing the estimate are included in the cost projections. In addition, the following items are not been listed in the development of the cost estimate: • Construction of haul road and egress/access road maintenance • Specialized equipment costs since no blasting (long-reach backhoe, rock hammers, circular cutting heads, etc) • MOT for SR 997/US41 • Contractor mobilization costs • Drainage during construction of the project site (dewatering costs) • Maintenance of borrow site during construction • Contingency for possible modifications of well locations • Potential increase in the sampling intervals • % OH for contractor field and home office • Contractor markup, bonds, insurance • Additional details will aid in the development of the construction contracts for both the Pilot and 8-mile full project The cost estimate does not appear to be based on a logical construction sequence and lacks detail to prove there will be no impact on the environment.
Significance – Medium:
A complete cost estimate with the associated assumptions is important to the creditability of the future budget for both the pilot project and 8 mile full-scale project
Comment Cross-referencing:
Comment 4
Recommendations for Resolution:
To resolve these concerns, the report would need to be expanded to address the following: • Provide a complete list of assumptions used to develop the cost estimate. • Provide a detailed cost estimate as a separate appendix. This will form the basis for the cost estimate for the full-scale project. • Include a copy of the Mii Cost Estimate in the report.

Comment 15:
The form and content of the PPDR seems to suggest that the selected pilot project design and options are those currently favored for the full-scale Everglades Seepage Management Project; however there are statements in the PPDR that the pilot project is not the final design.
Basis for Comment:
The concept of combining a physical barrier to seepage with hydraulic control of seepage is innovative and will test three important design elements: slurry walls, sheet pile walls, and hydraulic control. However, the L-31N SMPP Design Report states (page 9-3), “The pilot was never intended to design the solution for component V nor the other components included in the ENP SMP.” This is confusing, as pages ES-2, ES-4, 1-1, and 1-2 discuss the need to allow the pilot project to allow for scaling results up to the full-scale project. It appears that the intent is to use the pilot as a test of concept for the leading design elements for the full-scale design, but that the full-scale design elements will not be selected until the pilot project is complete and has been completed.
Significance – Low:
This comment is about clarification of the role of the pilot project as a proof of concept test of leading design elements for the full-scale project, but such clarification does not affect the implementation or success of the pilot project.
Comment Cross-referencing:
N/A
Recommendation for Resolution:
Clarify the role of the pilot project as a test of a concept project for the leading design elements for the full-scale project and discuss how the data and technical conclusions from the pilot project will be incorporated in the selection process for a full-scale project design. This clarification should be included in or near pages 1-1 and 1-2.

Comment 16:
The impacts are generally well described from the perspective of the project, but not necessarily from the perspective of the affected ecosystems or organisms.
Basis for Comment:
There is a lack of discussion on the impacts to the locale wildlife by a long horizontal seepage barrier interfering with their ability to cross between wetlands to the east and the Everglades National Park (ENP). For example, if the 2 acres of wetlands will be filled, what effect, relative or absolute, will this have on the ecosystem? If some foraging area for Snail Kites is temporarily removed, will that have any affect on the local population of Snail Kites? In addition, Table 7-2 shows no impact on water quality, noise or wetlands from pumping and yet there will be impacts due to construction. Further, there is some confusion in the three paragraphs of Section 7.1 "pumped to ENP." Pumping back into the ENP will cause additional impacts that should be fully addressed in the L-31N SMPP Design Report and are not.
Significance – Low:
The L-31N SMPP Design Report has provided details of the project; however, the impacts to the affected ecosystem are lacking the written discussion as to how, under the pilot project, wildlife will navigate the 0.2 miles of seepage barrier between the ENP and the wetland. Ultimately, the affected ecosystem impacts must be considered and addressed prior to the construction of the full-scale 8- mile project.
Comment Cross-referencing:
N/A
Recommendations for Resolution:
To resolve these concerns, the report would need to be expanded to address the following: • Provide additional details as to ecosystem impacts (specifically in Section 7). • Add a discussion on the physical impact of the pilot project and full project on species crossing between the wetland and ENP.

Comment 17:
Proven technologies such as pre-cast concrete panels and secant walls have not been considered in the available technologies.
Basis for Comment:
The L-31N SMPP Design Report did not include a discussion on the use of pre-cast concrete panels and secant walls as potential technologies. The use of cast-in-place (CIP) or pre-cast concrete panels (buried I-wall) with H-piles as guides lowered into a pre-excavated trench filled with bentonite to keep trench walls open (similar to highway sound barriers) has advantages in speed of construction, less impact on the environment and easier reversibility. These alternatives may be slightly higher in initial cost and challenging to construct; but have a longer design life, lower maintenance and life-cycle costs and are more capable of withstanding the hydraulic pressures that will be encountered at depth. In addition, cost analysis has shown that concrete panels/walls can be as cost effective when normal earthen structures/means are not meeting the special conditions of strength and resistance to lateral forces. As a result, CIP, pre-cast concrete panels and secant walls should be considered as an alternative. For instance, secant walls (overlapping concrete piers) have been successfully used for intake structures as an alternative to sheet pile wall in other projects in South Florida.
Significance – Low:
This comment is rated low because including all available technologies in the life-cycle, constructability and maintenance comparison will provide a more comprehensive analysis of the potential technologies; although, it should not change the final recommendation.
Comment Cross-referencing:
Comment 2
Recommendations for Resolution:
To resolve these concerns, the report would need to be expanded to address the following: • Conduct another Value Engineering analysis on all available technologies. • Develop a cost estimate for the use of pre-cast concrete panels/secant walls in the construction of the seepage barrier and compare to the current cost estimate.

Comment 18:
In the comparison of alternatives, noise was not considered to be a significant criterion.
Basis for Comment:
The report does not contain an evaluation of existing and project noise conditions. The extent of the coverage of this issue is one sentence in Section 3.12 of the L-31N SMPP Design Report. In Table 4.8, there is a reference to noise from each of the possible alternatives. A discussion of these noises and what the criteria for acceptable noise level is warranted. There are no baseline conditions for this area which experiences noise from the nearby casino and airport activity. Sound waves were not evaluated between alternatives. There will definitely be a noise impact during construction (i.e., when driving sheet pile into bedrock). This is a busy area; an evaluation of cumulative noise impacts on the project area businesses should be included in the report.
Significance – Low:
Although the noise factor should not change the project, the discussion of all possible sources of noise and its potential impacts is not addressed at all in the report.
Comment Cross-referencing:
N/A
Recommendations for Resolution:
To resolve these concerns, the report would need to be expanded to address the following: • Expand Section 3.12 to include the noise presently occurring due to adjoining operations of businesses and potential impact. • Address potential noise impacts during construction.

Comment 19:

Figures should be revised for clarity and to better support the documentation.

Basis for Comment:

At a minimum, the following figures and text references require clarification:

- Many figures and text references, such as Figure ES-2, use ‘depths.’ It is often unclear if these are depths below land surface or elevations.
- Figure C-4, it is unclear what is meant by ‘front view.’
- In Figures C-8, C-9, and C-10, major features such as canals C-30, C-29, and C-31 are not included.
- In Figure C-8, there is a pronounced re-entrant which is not related to any feature illustrated in the figure.
- In Figure C-25, there is no clear graphical indication of how the model layers correlate with geologic units, or where, vertically, the injection wells are located.
- In Figures C-13, C-14, C18, and C-19, the scale shown does not apply to the vertical dimension.
- The finite element mesh illustrated in Figure C-24 does not appear to correspond with the finite element mesh illustrated in Figure C-5.
- The ‘resistive’ layer in Figure 5-10 is continuous, while the ‘hard limestone’ in Figure 5-11 is not.
- In Figure 5-11, the hydraulic conductivity values appear as if they were obtained at CB-001. The text suggests that they were not.
- In many tables and figures, the results or calculations are reported without regard to significant figures. For example, Table C-2 reports fluxes with a precision of 7 significant figures, but hydraulic conductivity in the model is known only to 2 significant figures.
- The water levels in C-30 are continuous, but Figures C-22 and C-23 show the heads as isolated ‘dots.’
- In Section 3.7, there are references to many structures which are not shown on the referenced Figure 3-14.

Significance – Low:

The graphics should support the text, and are an important part of the report, but the improvement of the graphics is not critical to project success.

Comment Cross-referencing:

N/A

Recommendations for Resolution:

It is recommended that figures and tables be revised as described below:

- Use elevations referenced to a common datum in all figures, tables and in the text.
- In Fig. C-4, and other cross-sections, indicate the orientation of the section and label major features.
- In Figure C-8, include the feature that causes the major re-entrant in the heads.
- In Figs. C-8, C-9, and C-10, include the three major canals C-29, C-31, and C-30.
- In Fig C-25 indicate in either the figure or the caption where the injection wells are located and how these locations are related to major geologic units, the barrier walls, and the window
- Figures C-13, C-17, C-18, and C-19 should show the position of the barrier and window within the finite element mesh. Also provide a scale for the vertical dimension

- In Figure 5-11, clarify that the hydraulic conductivity values posted on the figure were not obtained at CB-001.
- Make the ‘resistive’ and ‘hard limestone’ layers in Figures 5-10 and 5-11 consistent, if appropriate.
- Make significant figure precision in all tables and figures match the precision of the data. For example, hydraulic conductivity in the model is known to two significant figures, and net recharge to one significant figure, so reported model heads, fluxes and velocities should be reported to no more than two significant figures.
- The C-30 Canal is represented in the model by a single row of specified head nodes. As a result, the contours in Figures C-22 and C-23 are illustrated as a series of ‘dots’ instead of a continuous feature with a specified head. At least the figure should be modified, but the figure may reflect an inappropriate representation of Canal C-30 in the model mesh.
- Any structures discussed in the text in section 3.7 should be included on Figure 3-14, and Figure 3-14 should be referenced in the text when a structure is first discussed.

Appendix B

Charge to the Independent External Peer Review Panel

on the
L31N Seepage Management Pilot Project (L31N)
Draft Integrated Pilot Project Design Report/Environmental Assessment

Charge to the Independent External Peer Review Panel on the L31N Seepage Management Pilot Project (L31N) Draft Integrated Pilot Project Design Report/Environmental Assessment

The L-31 North (L-30) Seepage Management Pilot Project Design Report/Environmental Assessment (L-31N SMPP Design Report) was included in the Comprehensive Everglades Restoration Plan (CERP) as a predecessor to the Everglades National Park (ENP) Seepage Management Project. The purpose of the L-31N SMPP Design Report is to investigate seepage management technologies in order to recommend features to control groundwater flow and levee seepage from ENP and Water Conservation Area 3B (WCA-3B). As a predecessor to the full-scale ENP Seepage Management Project, the SMPP identifies the appropriate amount of wet season groundwater flow to return to, or retain within, ENP and WCA-3B, in order to minimize potential impacts to Miami-Dade County's West Wellfield and maintain the existing levels of freshwater flows to Biscayne Bay. Additionally, the project will help determine the constructability of a seepage management barrier to various depths. Lengths within the semi-confining unit of the aquifer may yield results beneficial to the implementation of the full-scale ENP Seepage Management Project.

Some of the identified issues include uncertainty in seepage management due to the unique karst geology of the Biscayne Aquifer; a limited understanding of large-scale seepage management technologies; and seepage from the Everglades. The pilot project is anticipated to yield significant information related to the selected technology's constructability, costs, impacts on local hydrology, and impacts on local water quality. Additionally, the data collected from the pilot project will be used to calibrate a regional model that will improve the understanding of the regional impacts of seepage management used at a larger scale as well as provide a first-step in reducing seepage from the Everglades.

In compliance with WRDA 2034 (Public Law 110-114), Section 2034, and the importance of this project, an independent external peer review (IEPR) of the L-31N Seepage Management Pilot Project Draft Integrated Pilot Project Design Report/Environmental Assessment will be conducted. Independent, objective peer review is regarded as a critical element in ensuring the reliability of scientific analyses. The IEPR will follow the procedures described in the Department of the Army, USACE, guidance Peer Review of Decision Documents (EC 1105-2-410) dated August 22, 2008, CECW-CP Memorandum dated March 30, 2007, and the Office of Management and Budget's Final Information Quality Bulletin for Peer Review released December 16, 2004.

DOCUMENTS PROVIDED

The following documents will be provided to the peer reviewers:

- Electronic copy of the L-31N Seepage Management Pilot Project, Draft Integrated Pilot Project Design Report/Environmental Assessment ("L-31N SMPP Design Report").

- EC 1105-2-410, Peer Review of Decision Documents

SCHEDULE[e]

1.	L-31N SMPP Design Report review documents distributed to IEPR panel with charge	January 21, 2009
2.	Kick-off Meeting	January 21, 2009
3.	IEPR panel submits individual technical review comments to Battelle	February 13, 2009
4.	Battelle distributes summary of key issues/themes in comments to IEPR panel	February 19, 2009
5.	Facilitated IEPR panel review teleconference to confirm key issues, discuss potential conflicts, determine final comments, and assign responsibility for final comment development	February 20, 2009
6.	Battelle distributes memo directing the IEPR panel to develop final comments based on panel review teleconference	February 24, 2009
7.	IEPR Panel submits final panel comments to Battelle	March 5, 2009
8.	IEPR panel reviews and submits comments on Final IEPR Report prior to submission to USACE (if time allows)	March 6, 2009
9.	Battelle submits Final IEPR Report to USACE and posts final IEPR comments on DrChecks	March 10, 2009
10.	Teleconference with USACE to discuss clarifying questions	March 27, 2009
11.	USACE provides official responses ("Evaluator comments") to final IEPR comments in DrChecks	April 10, 2009
12.	IEPR panel provides feedback ("BackCheck comments")	April 16, 2009
13.	Battelle posts BackCheck Comments on DrChecks	April 20, 2009

CHARGE FOR PEER REVIEW

Members of this peer review are asked to determine whether the technical approach and scientific rationale presented in the L-31N SMPP Design Report are credible and whether the conclusions are valid. The reviewers are asked to determine whether the technical work is

[e] Note this schedule was shifted by approximately 2 weeks to accommodate delays with the individual peer reviews. The revised schedule is included in Section 2.1 of this report.

adequate, competently performed, properly documented, satisfies established quality requirements, and yields scientifically credible conclusions. The peer reviewers are not being asked whether they would have conducted the work in a similar manner. In addition, the reviewers are asked to determine whether the findings are appropriate to help answer the following principal study questions that USACE will consider in its decision-making process for the project.

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

General Charge Guidance

1. Please answer the scientific and technical questions listed below and conduct a broad review of the L-31N SMPP Design Report. Please focus on your areas of expertise and technical knowledge.
2. Identify, explain, and comment on assumptions that underlie economic, engineering, or environmental analyses.
3. Evaluate the soundness of models and planning methods as applicable and relevant to your area of expertise. Comment on whether models explain past events and how models will be validated.
4. Evaluate whether the interpretations of analysis and conclusions are reasonable.
5. Please focus the review on scientific information, including factual inputs, data, the use and soundness of models, analyses, assumptions, and other scientific and engineering matters that inform decision makers.
6. If appropriate, you can offer opinions as to whether there are sufficient analyses upon which to base a recommendation for construction, authorization, or funding.
7. 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.
8. If desired, IEPR panel members can contact each other. However, IEPR panel members **should not** contact anyone who is or was involved in the project, prepared the subject documents, or part of the USACE review process.
9. Please contact the Battelle project manager (Karen Johnson-Young, johnson-youngk@battelle.org) for requests or additional information.
10. In case of media contact, notify the Battelle project manager immediately.
11. Your name will appear as one of the panelists in the peer review. Your comments will be included in the final IEPR report, but will remain anonymous.
12. Upon the expiration or termination of your subcontract, you agree to not disclose any data, reports or other information furnished by Battelle or developed by you during this project without Battelle's prior written approval.

Please submit your comments in electronic form to Karen Johnson-Young, johnson-youngk@battelle.org, no later than Wednesday, February 13, 2009, 6:00 PM EDT.

CENTRAL AND SOUTHERN FLORIDA PROJECT
COMPREHENSIVE EVERGLADES RESTORATION PLAN
L-31N SEEPAGE MANAGEMENT PILOT PROJECT

Draft Integrated Pilot Project Design Report/Environmental Assessment
Independent External Peer Review

Final Charge Questions

General Questions

1. Does the report adequately support the pilot feature recommended to address seepage management within this unique geology?

2. Does the report adequately address how information gained from the pilot scale project will support the full-scale Everglades Seepage Management Project?

Section 1 – Project Purpose and Need

1. Please comment on the purpose and need of the PPDR.

2. What additional information, if any, should be discussed?

Section 2 – Problems, Opportunities, Objectives, and Constraints

<u>2.0 Problems</u>

1. Based on your area of expertise, are there any additional problems that should be considered when applying or designing seepage management technologies that have not been identified for this project?

    a. If so, what and why?

<u>2.1 Opportunities</u>

1. Can you identify any other opportunities that may arise from the conduct of the L-31N project?

    a. What and why?

<u>2.2 Goals, Objectives and Constraints</u>

1. Are there any other objectives or constraints that should be considered as part of the L-31N project that will be important to reaching the projects final goal?

Section 3 – Existing Conditions

3.1 General Environmental Setting

1. Is the overall setting of the project area accurately described? If not, what is missing?

3.2 Geology and Soils

1. Geology and soils are an extremely important component of this investigation. Do you agree or disagree with the decision not to include geological cross-sections in the report?

2. Is the description of the regional geology sufficient to relate it to more local conditions in the study area?

3. Is the degree of connectivity of the solution cavities accurately described?

3.3 Topography

1. Is the topography of the study area described accurately in this section?

    a. If not, what is missing?

3.4 Climate

1. Is the climate of the study area described accurately in this section?

    a. If not, what is missing?

3.5 Hydrology

1. Are the contributors to south Florida hydrology comprehensively listed and accurately defined?

2. Is the hydrogeology accurately defined?

3. Does the information presented in this section provide a thorough description of subsurface flow.

    a. If not, what is missing?

4. Is the hydrogeology discussion complete with respect to direction and rate of horizontal and vertical groundwater movement and its interaction with surface waters?

5. Is the relationship between hydrology and seepage adequately characterized and discussed?

6. Please comment on how lithologic information in this section describes local conditions.
    a. What, if anything, is missing from this discussion?

3.6 Water Quality

1. Are there any primary water quality concerns in the project area that were not discussed?
    a. If so, please describe them.
2. Are the surface water quality monitoring stations accurately depicted and described?

3.7 Water Control Network Operations

1. Are the impacts of water control on local hydrology and hydrogeology adequately characterized and discussed?

3.8 Vegetation and Cover Types

1. Are the plant communities of the project area comprehensively listed?
    a. If not, what has been omitted?

3.9 Wetlands

1. Are the plant communities accurately described?
    a. What additional information can be provided?

3.10 Fish and Wildlife

1. Is the list of known and potentially-occurring fish and wildlife species comprehensive?
    a. If not, which ones may have been omitted?

3.11 Threatened and Endangered Species

1. Are all the protected species that may be found in the project area listed?
    a. If not, which were omitted?
2. Are these protected species accurately described?
    a. What additional information can be provided?

3.12 Noise

1. Are the existing noise conditions in the area sufficiently and accurately described?

3.13 Hazardous, Toxic, and Radioactive Waste

1. Is the information presented for hazardous, toxic, and radioactive waste reasonable and complete?
    a. What additional information, if any, should be reported?

3.14 Land Use

1. Is the description of land use in the study area accurate and complete?
    a. Should any additional information be provided?

3.15 and 3.16 Aesthetic and Cultural Resources

1. Have the area's aesthetic and cultural resources been comprehensively and accurately described?
    a. What, if anything, is missing?

3.17 Infrastructure

1. Please comment on the completeness and accuracy of the discussion on the area's infrastructure.
    a. Should additional information be added?

Section 4 – Development of Alternatives

4.1 Management Measures

1. Please comment on the completeness and effectiveness of the screening criteria and management measures.
    a. Are there any other criteria and management measures you would recommend?
2. Based on your knowledge, is there any other technology, other than those received from the Request for Information, which can be used for this project?
3. Are the description and graphic presentation of the 12 management measures complete and sufficient for this project?

   a. Are advantages and disadvantages of each measure discussed thoroughly?

4. Please comment on whether the report describes and distinguishes the primary and secondary management measures?

5. Based on your knowledge, are scores assigned to the final management measures reasonable and well justified?

4.2 Alternatives

1. Please comment on the basic assumptions and designs for each of the alternatives.

2. Please comment on the impacts of changing the project location on costs and alternative designs discussed in the report.

3. Are the discussions for environmental impacts of alternatives complete and follow the government's rules and guidelines?

4. Should any additional environmental information be considered when evaluating the alternatives?

Section 5 – Engineering and Design

5.1 CIVIL – SITE

1. Please comment on the use of hydrographic or topographic surveys in preparing this report.

5.2 Hydrology and Hydraulics

1. Comment on the effectiveness of using the cutoff wall as a subsurface barrier to divert and control groundwater flux in the subsurface.

2. Comment on whether or not you agree with the approach taken and the results of the hydrologic modeling used.

5.3 Geotechnical Components

1. Discuss whether or not the geotechnical investigations plans and results adequately address the uncertainty of the geology of the area, the Surficial Aquifer System.

5.4 Structural Components

1. In your opinion, are the stability and safety factors properly analyzed?

2. Review and comment on the design of the mechanical and electrical components.

5.5 General Construction Components

1. Since this section was prepared for cost-estimating purposes and may not be the actual methods used during installation, please comment on rationale and completeness of information provided in using the soil-cement-bentonite wall and steel sheet pile wall as examples.

Section 6 – Recommended Plan

6.1 Components of the Recommended Plan

1. Is there sufficient documentation to support the approach for the project implementation?

2. Identify and comment on the validity of any major assumptions used in the selection of this recommended plan.

3. Do the results of the engineering and design evaluations adequately support the components of the recommended plan?

4. In your opinion, is the recommended design sufficient for evaluating seepage?

6.2 Installation (Construction) of Tentatively Recommended Plan

1. Is the anticipated construction timeframe realistic?

6.3 Real Estate

N/A

6.4 Monitoring

1. Do you agree that there should be little cause for concern with the project design in regard to the introduction of contaminants or cascading effects from changes in redox potential?

2. Based on your experience, will biofouling in the injection wells be an issue due to the temperature changes associated with bringing extracted water to the surface prior to injection?

3. If so, how can this issue be addressed?

4. Based on the project duration, is quarterly monitoring of injection and surface water sufficient to fully evaluate effects on water quality?

5. Is the groundwater monitoring well network sufficient to evaluate the effects of the seepage barrier and pumping cycles on groundwater flow?

6. Would nested or multi-port wells be useful to better evaluate vertical flow gradients?

7. Please comment on whether the inclusion of contingent monitoring locations would be beneficial in the event that monitoring data do not corroborate modeling (predicted) data?

8. Do you think operation of the injection/extraction wells should be modified during operation based on precipitation events?

6.5 Operations and Maintenance

N/A

6.6 Project Implementation

1. Comment on the risks associated with installation of a slurry wall and sheet pile wall to the depths specified.

    a. Are they realistically stated in the plan and should alternatives be developed?

6.7 Discussion of How Recommended Plan Addresses Seepage Issues and Reduces Uncertainty

1. Do you agree that the tentatively recommended plan (configuration of the barrier and associated pumping regimes) is expected to address all seepage conditions expected during the wet and dry seasons?

2. Would alternate methods (i.e., tracer tests) be useful for evaluating the design, both during the window closed (to evaluate effectiveness of hydraulic barrier) and the window open (to pass dry season flows)?

3. Do you agree with the window width evaluation, especially in regard to potential future full-scale implementation?

6.8 Cost Estimate

1. Have the project costs completely and accurately covered all necessary costs and are the costs estimated sufficient for completing the project?

2. Please comment on validity of the assumption of the Chicago, IL slurry wall.

3. Identify and comment any the major assumptions used in the cost estimates.

4. Are the documents provided sufficient for support cost estimates?

5. Are the suggested solutions sufficient to solve the issues mentioned?

6. Based on your knowledge, were any costs missed from the cost estimates?

7. Please comment on the accuracy of costs related to decommissioning of the pilot project.

8. Based on your expertise, were costs sharing, decommission and transferring of the pilot project, and performance-based contracts followed the government's rules and regulations?

Section 7 – Environmental Compliance for the Selected Alternative

1. Have the cumulative impacts of the tentatively selected alternative been comprehensively and accurately described?

2. Are the risks associated with the tentatively selected alternative described accurately?

    a. What risks, if any, are missing from the discussion?

3. Are the environmental commitments pledged by the USACE sufficiently described?

    a. Are the commitments, as described, enough to avoid, minimize, or mitigate adverse environmental effects?

4. Are there other actions or methods that could be used to prevent or mitigate environmental harm?

5. Are all the relevant federal regulations listed in the environmental compliance section?

6. Are the descriptions of the compliance statuses accurate?

Section 8 – Public Involvement and Coordination

1. Based on your experience with similar projects, have adequate public, stakeholder, and agency involvement occurred to determine all issues of interest and to ensure that they are adequately addressed to the satisfaction of those interested parties?

2. If not, what additional public outreach and coordination activities should be conducted?

Section 9 – Recommendations

1. Are the decommissioning activities described in this section complete and the estimated timeframe accurate?

APPENDIX A. REAL ESTATE

1. Does the real estate plan adequately address all issues and requirements related to real estate?

2. Are the cost estimates for real estate accurate and do those estimates cover everything that should be addressed?

APPENDIX B. VALUE ENGINEERING REPORT

1. Discuss and support your position on whether or not you agree with the approach and results of the value engineering report resulted in savings.

2. In your discussion, address any areas that you feel might comprise the overall integrity of the project.

APPENDIX C. ENGINEERING

N/A

APPENDIX D. WATER QUALITY MONITORING PLAN

1. Based on the proposed water quality impacts, is the limited amount of water quality monitoring sufficient to evaluate effects on water quality?

APPENDIX E. FWCA COORDINATION

N/A

APPENDIX F. PUBLIC AND AGENCY COMMENTS

N/A

APPENDIX G. SECTION 404(B)(1) EVALUATION

N/A

APPENDIX H. COASTAL ZONE MANAGEMENT CONSISTENCY DETERMINATION

N/A

APPENDIX I. LIST OF SCOPING LETTER AND DRAFT PPDR/EA RECIPIENTS

N/A