

Final External Peer Review Report for Freeport Harbor, Texas Draft Feasibility Report and Environmental Impact Statement

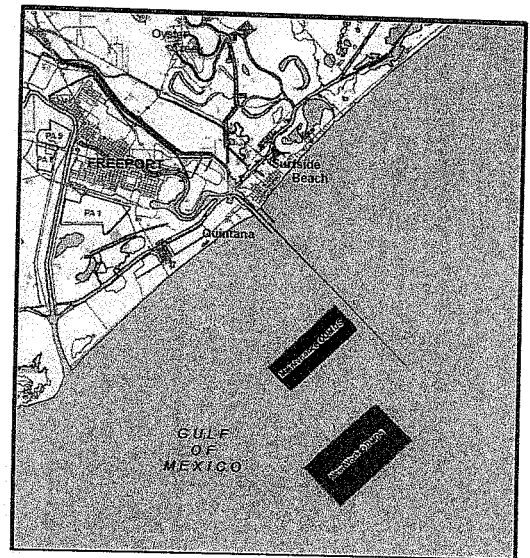
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Prepared for
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Deep Draft Navigation
Planning Center of Expertise
Mobile District

Contract No. W911NF-07-D-0001
Task Control Number: 08192

August 20, 2008



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for

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Draft Feasibility Report and Environmental Impact Statement

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

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**FINAL
EXTERNAL PEER REVIEW REPORT**

**for
Freeport Harbor, Texas
Draft Feasibility Report and Environmental Impact Statement**

EXECUTIVE SUMMARY

Freeport Harbor is located southeast of the City of Freeport in Brazoria County, Texas. Based on the economic, engineering, and environmental factors considered, the recommended plan in the Draft Freeport Harbor Feasibility Report and Draft Environmental Impact Statement (EIS) includes the following:

- Deepening of Freeport Harbor:
 - From Brazos Harbor to the Brazosport Turning Basin to -52 feet relative to mean low tide (MLT);
 - From Brazosport Turning Basin to the Lower Turning Basin to -55 feet MLT;
 - From the Lower Turning Basin to the end of the jetties in the Gulf of Mexico to -57 feet MLT;
- Deepening the remainder of the channel into the Gulf of Mexico to -59 feet MLT;
- Widening the Entrance and Jetty Channel reach to 600 feet;
- Deepening and widening the Stauffer Channel 3,600 feet at a depth of -50 feet MLT; and,
- Redredging the remainder of the Stauffer Channel to its authorized depth of 30 feet.

It is estimated that the approximately 17.7 million cubic yards of new work material would require five separate dredging contracts to complete. The work is estimated to begin in 2012 and be completed by 2015. The project cost is approximately \$282,895,000.

Because of the importance of this project and guidance provided in the Water Resources Development Act (WRDA 2007, Public Law 110-114), an external peer review (EPR) of the Draft Freeport Harbor Feasibility Report and EIS was conducted. Independent, objective peer review is regarded as a critical element in ensuring the reliability of scientific analyses. The EPR followed the procedures described in the Department of the Army, USACE, guidance *Peer Review of Decision Documents* (EC 1105-2-408) dated May 31, 2005, 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 EPR process, summarizes final comments of the EPR panel, and describes the panel members and their selection. The results of this EPR report will be taken into consideration in preparation of the Chief of Engineer's Report.

Battelle initially identified approximately 14 potential peer reviewers, confirmed their availability, evaluated their technical expertise, and inquired about potential conflicts of interest. Of those initially contacted, nine external peer review candidates confirmed their interest and availability, and five 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. The reviewers selected were from academe or were independent engineering consultants. Corresponding to the technical content of the Work Plan for the Freeport Harbor Feasibility Report and EIS, the areas of technical expertise of the selected peer reviewers included: economics, environmental processes, hydrological engineering, geotechnical engineering, real estate, cost engineering, and plan formulation.

The peer reviewers were provided an electronic version of the documents for the Freeport Harbor Draft Feasibility Report and EIS on July 9, 2008, along with a charge that solicited their comments on specific sections of the documents that were to be reviewed. Peer reviewers were instructed to submit responses to the charge questions no later than August 1, 2008. More than 500 individual comments were received from the EPR panel in response to the charge questions.

Following the individual reviews of the documents for the Freeport Harbor Draft Feasibility Report and EIS by the EPR panel members, a consensus discussion was conducted to review key technical comments, discuss charge questions in which there were conflicting responses, and reach consensus on the final comments to be provided to USACE. The final comments were documented according to a five-part format that included, (1) nature of the comment, (2) 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, 22 final EPR comments were identified and documented. Of the 22 final comments, 13 were identified as having high significance, 7 were identified as having medium significance, and 2 comments were identified as having a low level of significance.

Table ES-1 summarizes the final comments by level of significance. Clarifications of each comment are contained in Appendix A of this report.

Table ES-1. Overview of 22 Final Comments Identified by the Freeport Harbor EPR Panel

| # | Comment: |
|------------------------------|--|
| Significance – High | |
| 1 | The problem statement is too general, and does not include a quantitative analysis of current costs and operations. |
| 2 | The reports need to include an explicit, well-documented analysis of vessel drafts and loading practices. |
| 3 | The evaluation of the alternatives is too cursory, both at the initial screening and the subsequent discussion of chosen alternatives. |
| 4 | The alternatives analysis ignores major non-structural alternatives. |
| 5 | The risk from oil and chemical spills for all alternatives has not been addressed. |
| 6 | The recommended plan is not justified by the current analysis of economic factors. |
| 7 | The vessel traffic and commodity growth forecasts are not documented or justified. |
| 8 | There is insufficient detail or documentation to determine the validity of the transportation cost benefits. |
| 9 | The relationship between the channel depth, direct shipment, lightening and lightering should be documented and quantified. |
| 10 | The economic sections lack focused and useful sensitivity analysis, leaving the reliability of the findings in doubt. |
| 11 | The potential benefits of the project are not supported by the analysis in the report. |
| 12 | A detailed description of the no action and the without project alternatives must be presented in comparison to the recommended plan. |
| 13 | The DFR, DEIS, and appendices would benefit from professional editing, better maps, and better diagrams. |
| Significance – Medium | |
| 14 | The effects of deepening on hydrology and the associated water quality within the enclosed portion of the channel are not addressed adequately. |
| 15 | The impact analysis for the adjacent beaches is not complete and the opportunities for mitigation are not considered. |
| 16 | For the south jetty, the report should address stability for the end of construction condition and the low factor of safety for the long-term condition should be justified. |
| 17 | Several dredging issues should be clarified to increase confidence in predictive capability and possibly reduce dredging and adjacent beach erosion. |
| 18 | Scoping and outreach efforts appear to meet only minimal requirements for local participation, and fall short of proactive efforts needed to support report findings. |
| 19 | The project justification rests in part on data that are now several years old and must be verified and updated. |
| 20 | There remain significant uncertainties in the environmental analysis that should be addressed by further testing and documentation in the reports. |

| Significance – Low | |
|--------------------|---|
| 21 | Grassland benefits of flood protection and water quality enhancement are not captured in the HEP analysis. |
| 22 | The proposed plan for increasing the levee elevations is reasonable, however, a cost estimate that addresses the possibility that dredged sediment consolidation could inhibit the rate of levee enlargement and methods in addition to grouting for strengthening the foundation should be considered. |

1. INTRODUCTION

1.1 Background of Report Reviewed

Freeport Harbor is located southeast of the City of Freeport in Brazoria County, Texas. Based on the economic, engineering, and environmental factors considered, the recommended plan in the Draft Freeport Harbor Feasibility Report and Draft Environmental Impact Statement (EIS) includes the following:

- Deepening of Freeport Harbor:
 - From Brazos Harbor to the Brazosport Turning Basin to -52 feet relative to mean low tide (MLT);
 - From Brazosport Turning Basin to the Lower Turning Basin to -55 feet MLT;
 - From the Lower Turning Basin to the end of the jetties in the Gulf of Mexico to -57 feet MLT;
- Deepening the remainder of the channel into the Gulf of Mexico to -59 feet MLT;
- Widening the Entrance and Jetty Channel reach to 600 feet;
- Deepening and widening the Stauffer Channel 3,600 feet at a depth of -50 feet MLT; and,
- Redredging the remainder of the Stauffer Channel to its authorized depth of 30 feet.

It is estimated that the approximately 17.7 million cubic yards of new work material would require five separate dredging contracts to complete. The work is estimated to begin in 2012 and be completed by 2015. The project cost is approximately \$282,895,000.

Because of the importance of this project and guidance provided in the Water Resources Development Act (WRDA 2007, Public Law 110-114), an external peer review (EPR) of the Freeport Harbor Draft Feasibility Report and EIS was conducted. Independent, objective peer review is regarded as a critical element in ensuring the reliability of scientific analyses. The EPR followed the procedures described in the Department of the Army, USACE, guidance *Peer Review of Decision Documents* (EC 1105-2-408) dated May 31, 2005, 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 process for the EPR of the Freeport Harbor Draft Feasibility Report and EIS by an external panel of experts, summarizes final comments of the panel, and describes the panel members and their selection. The results of this EPR report will be taken into consideration in preparation of the Chief of Engineer's Report. Detailed information on the comments is provided in Appendix A.

1.2 Purpose of External Peer Review

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

To help ensure that USACE documents are supported by the best scientific and technical information, a peer review process has been implemented by USACE that utilizes EPR to complement the ITR, as described in the Department of the Army, U.S. Army Corps of Engineers, guidance *Peer Review of Decision Documents* (EC 1105-2-408) dated May 31, 2005, and CECW-CP Memorandum dated March 30, 2007. In this case, the EPR of the Freeport Harbor Draft Feasibility Report and EIS was conducted and managed using contract support from an independent 501(c)(3) organization (Battelle Memorial Institute; hereafter Battelle) to ensure independent objectivity, along with a high degree of flexibility and responsiveness, which was essential for USACE to meet deadlines.

2. METHODS

This section describes the methodology followed in selecting external peer reviewers, and in planning and conducting the EPR. The EPR was conducted following procedures described in USACE's guidance cited above (Section 1.2) 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 EPR.

Table 1. Schedule

| Task | Action | Completed by Date |
|-------------|--|---|
| Task 1 | Submit Draft Work Plan | 13 June 2008 |
| Task 2 | Recruit and collect information on 10 potential peer reviewers; prepare summary information | 24 June 2008 |
| Task 3 | Submit draft charge USACE provides comments on draft charge Submit Final charge, included in Final Work Plan USACE approves final charge | 19 June 2008 None provided 27 June 2008 1 July 2008 |
| Task 4 | Select 5 external peer reviewers Submit list of selected peer reviewers List of selected peer reviewers finalized Complete subcontracts for peer reviewers | 20 June 2008 20 June 2008 3 July 2008 8 July 2008 |
| Task 5 | Review documents and charge sent to external peer reviewers Kick off meeting with external peer reviewers | 9 July 2008 11 July 2008 |
| Task 6 | External peer reviewers complete their review Collate comments from peer reviewers Convene consensus teleconference Prepare draft final comments Submit draft final comments to USACE Submit final peer review report, including final comments | 1 August 2008 3 August 2008 4 August 2008 13 August 2008 15 August 2008 20 August 2008 |
| Task 7 | Participate in conference call with USACE to respond to questions about draft final comments | 21/22 August 2008 |
| | Project Closeout | 30 September 2008 |

2.2 Identification and Selection of External Peer Reviewers

Battelle initially identified 14 potential peer reviewers, confirmed their availability, evaluated their technical expertise, and inquired about potential conflicts of interest. Of those initially contacted, nine external peer review candidates confirmed their interest and availability, and five 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.

The reviewers selected were from academe or were independent engineering consultants. Corresponding to the technical content of the Work Plan for the Freeport Harbor Draft Feasibility Report and EIS, the areas of technical expertise of the selected peer reviewers included: economics, environmental processes, geotechnical engineering, coastal engineering, and plan formulation.

The credentials of the peer reviewers were evaluated according to the overall scope of the Freeport Harbor Draft Feasibility Report and EIS, focusing on five key areas: 1) economics, 2) environmental processes, 3) geotechnical engineering, 4) coastal engineering, and 5) plan formulation. Participation in previous USACE technical review committees and other technical review panel experience was also considered.

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

- Involvement in any USACE Freeport Harbor project;
- Current USACE employee;
- Other USACE affiliation [Scientist employed by the USACE (except as described in National Academy of Sciences criteria, see Engineering Circular 1105-2-4 section 9d)];^a
- A significant portion (i.e., greater than 80%) of personal or company revenues within the last 3 years came from USACE contracts
- Current or future financial interests in Freeport Harbor-related contracts/awards from USACE;
- Any publicly documented statement made by the reviewer or reviewer's firm advocating for or against the subject project;
- Other possible perceived conflict of interest for consideration, e.g.,
 - Former USACE employee
 - Repeatedly served as USACE technical reviewer.

In selecting final peer reviewers from the list of potential peer review candidates, an effort was also made to select experts who best fit the criteria and factors described above. Based on these considerations, five peer reviewers were selected from the potential list (see Section 3 for names and biographical information on the selected peer reviewers). Battelle established subcontracts with the peer reviewers indicating 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 Freeport Harbor Draft Feasibility Report, EIS and supporting documentation, was developed to assist the EPR panel. The draft charge was prepared by Battelle with input from USACE and guidance provided in USACE's guidance *Peer Review of Decision Documents* (EC1105-2-408) 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. The USACE approved the charge questions as submitted and the charge was finalized. The charge was presented in comment-response table format, and was organized

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

according to the order of the documents to be reviewed. The charge consisted of 128 questions/discussion points and three appendices on the Draft Feasibility Report and 50 questions/discussion points and 10 appendices on the EIS. The EPR panel was instructed to respond to the charge questions within the comment-response form table. The final charge is shown in Appendix B of this report.

The peer reviewers were provided with electronic copies of the draft final charge and supporting documentation on July 9, 2008. Peer reviewers were instructed to submit responses to the charge questions no later than August 1, 2008.

2.4 Review of Verbatim Comments

More than 500 verbatim (i.e., individual) comments in response to the charge questions were received from the individual EPR 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 51 overall comments and discussion points that emerged from the EPR panelists' verbatim comments, including 35 negative and 5 positive comments. In addition, 11 comments that were conflicting among the various reviewers were identified for further discussion by the panel. Each reviewer's verbatim comments were shared with the EPR panel.

2.5 External Peer Review Panel Consensus Discussion

Battelle convened a consensus discussion conference call with the EPR panel on August 4, 2008. The purpose of the consensus discussion was 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 EPR report represents the consensus of the panel and avoided isolated or conflicting information and analyses. The main goal of the consensus discussion was to review the overall comments and ascertain and confirm their importance to the EPR panel, remove points having a lack of consensus, identify and add any missing issues of high-level importance to the EPR panel, and finally, reach consensus on the final comments to be provided to USACE.

The panel discussion resulted in 22 overall consensus comments. A summary explaining each consensus comment organized by level of significance, as defined by the EPR panel, was also prepared and distributed to the EPR panel by Battelle in a memorandum dated August 4, 2008. The memorandum provided a detailed approach for developing the final comments for the Freeport Harbor Draft Feasibility Report and EIS.

In addition to reaching consensus on the final comments to be provided to USACE, the EPR panel discussed responses to 11 specific charge questions where there appeared to be disagreement among the reviewers. The disagreement was resolved (e.g., reviewer in conflict deferred to other panel member's professional knowledge) and the comment was either incorporated into the final comments or determined to stand as is (i.e., was not important enough to include as a final comment).

2.6 Preparation of Final Comments

The EPR panel used the 22 overall consensus comments as a basis for preparing the final comments. A memorandum was distributed on August 4, 2008 to the EPR panel providing detailed instructions on developing the final comments. A summary of the directive is provided below:

- Lead Responsibility: A lead reviewer was assigned for each consensus comment, who was responsible for coordinating the development of the final comment and submitting it to Battelle by August 13, 2008. Lead assignments were modified by Battelle at the direction of the EPR panel. To assist each lead in the development of the final comments, Battelle distributed individual verbatim comments in the comment-response table format, a summary detailing each consensus comment (in the memorandum), an example final comment following the five-part structure (described below), and a template for the preparation of the final comments.
- Directive to the Lead: Each lead was encouraged to communicate directly with other reviewers, as needed, to contribute to a particular consensus comment. If a significant comment was identified that was not covered by one of the original 22 overall consensus comments, the appropriate lead was instructed to draft a new consensus comment. If a consensus comment was related to another consensus comment, the lead was to cross-reference them.
- Format for Final Comments: Each final 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
 5. Recommendation (see description below).
- Criteria for Significance: The following were used as criteria for assigning a significance level to each final 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.
- Guidance for Developing the Recommendation: 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, etc.).

As a result of this process, 22 final comments were prepared. Battelle reviewed and edited all final comments for clarity and adherence to the requested final comment template format. The final EPR comments were assembled and are presented in Appendix A.

3. BIOGRAPHICAL INFORMATION ON EXTERNAL PEER REVIEWERS

Potential peer review candidates were identified through Battelle's EPR Database, targeted internet searches using key words (e.g., technical area, geographic region), search of websites of local 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 five reviewers selected for the EPR panel and their qualifications in relation to the technical evaluation criteria is presented in Table 2. Reviewer identities were unknown to the USACE authors of the Freeport Harbor Draft Feasibility Report and EIS during the EPR process. More detailed biographical information regarding each candidate and his or her technical areas of expertise is presented in Table 2.

Table 2. Freeport Harbor EPR Panel: Technical Criteria and Areas of Expertise

| Name | Affiliation | Primary Areas of Expertise | | | | |
|----------------|----------------------------------|----------------------------|-------------------------|--------------------------|--------------------------|------------------|
| | | Economics | Environmental Processes | Geotechnical Engineering | Hydrological Engineering | Plan Formulation |
| | Totals → | 2 | 2 | 1 | 1 | 2 |
| Charles Aubeny | Texas A&M University | | | x | | |
| Ken Casavant | Washington State University | (x) | | | | x |
| Robert Dean | University of Florida | | (x) | | x | |
| George Guillen | University of Houston Clear Lake | | x | | | |
| Dan Smith | The Tioga Group, Inc. | x | | | | (x) |

Note: (x) in parentheses indicates this reviewer is not the primary expert recruited for this category, but has expertise in this area.

Charles Aubeny, Ph.D.

Role: This reviewer was chosen primarily for his expertise in geotechnical engineering.

Affiliation: Texas A&M University

Dr. Aubeny holds a Ph.D. in Civil Engineering from Massachusetts Institute of Technology and is an Associate Professor in Civil Engineering in the Zachry Department of Civil Engineering at Texas A&M University. He teaches soil mechanics, geotechnical design, geotechnical testing, and numerical methods in geomechanics. His current research interests involve geotechnics of offshore foundations, anchors, and pipelines. Experience prior to his current academic position includes 8 years with the Embankment Dams Branch at the U.S. Bureau of Reclamation Engineering and Research Center in Denver, and 7 years in private consulting in geotechnical engineering, dam engineering, levees, flood control, and geo-environmental engineering. Much of his consulting work centered on levee systems in the Sacramento-San Joaquin River Delta in central California. His experience includes geotechnical field investigations, laboratory testing, analysis, design, construction observations, and monitoring performance of structures during operation.

Ken Casavant, Ph.D.

Role: This reviewer was chosen primarily for his expertise in economic analysis, planning experience, and deep-draft navigation experience.

Affiliation: Washington State University, School of Economic Sciences, Pullman, WA

Dr. Casavant is Professor and Transportation Economist at the School of Economic Sciences, where he teaches classes in Economics, Planning and Management, Agricultural Marketing/Transportation, and Policy. Since 2002, he has also served as an Adjunct Professor at the Upper Great Plains Transportation Institute (UGPTI), North Dakota State University. He is currently Director of the Freight Policy Transportation Institute. His areas of expertise include transportation economics and planning, international trade, public policy, and marketing. With more than 35 years of experience, Dr. Casavant has been asked to testify before congressional and state legislatures on the planning needs and policy alternatives for transportation, as well as to international trade agencies. He has provided consulting services to state and national commodity groups, legal firms, and private railroad and trucking firms on issues ranging from the development of intelligent transportation systems (ITS) applications to logistical designs for port physical distribution systems, to competitive impacts from investments in infrastructure and regulatory changes. He holds an M.S. in agricultural economics, emphasizing transportation and logistics, from North Dakota State University and a Ph.D. in agricultural economics from Washington State University.

Robert Dean, Sc.D.

Role: This reviewer was chosen primarily for his expertise in hydraulic and coastal engineering.

Affiliation: University of Florida

Dr. Dean holds a Sc.D. in Civil Engineering from Massachusetts Institute of Technology. He is an emeritus professor of coastal and oceanographic engineering at the University of Florida and a member of the National Academy of Engineering. In addition to the University of Florida, he has taught at MIT, the University of Washington and the University of Delaware. For two years, he was in charge of the beach program for the State of Florida. He has provided consulting

services to governmental agencies and private engineering firms. He has co-authored two books (*Water Wave Mechanics for Engineers and Scientists* and *Coastal Processes with Engineering Applications*) and authored one book (*Beach Nourishment*). His expertise includes coastal sediment transport, sea level change, and storm impacts. Dr. Dean served as Chair of the National Research Council. Dr. Dean served as Chair of the National Research Council Committees on the Restoration and Protection of Coastal Louisiana and on the Engineering Implications of Sea Level Change.

George Guillen, Ph.D.

Role: This reviewer was chosen primarily for his expertise in environmental processes.

Affiliation: University of Houston, Clear Lake

Dr. Guillen holds a Ph.D. in Environmental Science from University of Texas School of Public Health. He serves as Executive Director of the Environmental Institute of Houston and as an Associate Professor of Biology and Environmental Science. Previously, he served as the Chief of the Fisheries and Contaminants Program at the U.S. Fish and Wildlife Service office in California for four years. Prior to this he worked for two years at the Minerals Management Service and 10 years with the TCEQ predecessor agencies (TNRCC and TWC) as District Manager and Program Manager. Dr. Guillen also served as a Biologist with the Texas Parks and Wildlife Department for four years. He has managed various research and monitoring projects focusing on the effects of pollutants, including oil spills and sediment contaminants, on aquatic and marine organisms. Dr. Guillen's research interests include evaluation of the impacts of pollutants, altered hydrology, and habitat modification on fish and wildlife populations, with a focus on estuarine systems.

Dan Smith

Role: This reviewer was chosen primarily for his expertise in economics.

Affiliation: The Tioga Group, Inc.

Mr. Smith is a Principal and Co-Founder of The Tioga Group, a consulting firm specializing in freight transportation and logistics whose clients include ports, railroads, shippers, leasing companies, industry organizations, and government agencies. Mr. Smith has over 25 years of consulting experience in freight transportation operations, economic, policy, and planning, with special emphasis on truck, rail, and marine intermodal transportation. He has authored numerous articles in trade journals, is a contributor to industry conferences and publications, and is a member of the Intermodal Association of North America. He has testified before Congress on the economic conditions in the world shipping industry. He received his M.S. from the Graduate School of Public Policy at the University of California at Berkeley and did further postgraduate work in transportation economics and policy.

4. RESULTS – SUMMARY OF PEER REVIEW COMMENTS

After a lengthy discussion of the DFR and EIS, the EPR panel was in agreement about the general strengths and weaknesses of the documents, which were summarized with the following statement: *While the environmental and engineering documentation is generally complete, the economic documentation and discussion provided is insufficient to support project justification*

and public decision making. In addition to this general assessment, the panel had the following comments about the DFR and EIS:

- The characterization of the physical environment was complete and comprehensive.
- The environmental impacts were accurately described.
- The overall level of site investigations appears to have been adequate.
- The stability analysis of the jetties for existing conditions as well as for the proposed channel enlargements were well supported by exploratory borings and soil laboratory testing.
- The planning constraints and criteria were adequately described.

As a result of the consensus discussion process, the EPR panel identified 22 final comments, segmented into rankings of high, medium, and low significance. In total, as shown in Table 3, 13 were identified as having high significance, 7 were identified as having medium significance, and 2 comments were identified as having a low level of significance.

The majority of the comments focus on areas viewed by the reviewers as needing improvement, additional discussion, or that were omitted. The final EPR comments in their entirety are included in Appendix A.

Table 3. Overview of 22 Final Comments Identified by the Freeport Harbor EPR Panel

| # | Comment: |
|------------------------------|--|
| Significance – High | |
| 1 | The problem statement is too general, and does not include a quantitative analysis of current costs and operations. |
| 2 | The reports need to include an explicit, well-documented analysis of vessel drafts and loading practices. |
| 3 | The evaluation of the alternatives is too cursory, both at the initial screening and the subsequent discussion of chosen alternatives. |
| 4 | The alternatives analysis ignores major non-structural alternatives. |
| 5 | The risk from oil and chemical spills for all alternatives has not been addressed. |
| 6 | The recommended plan is not justified by the current analysis of economic factors. |
| 7 | The vessel traffic and commodity growth forecasts are not documented or justified. |
| 8 | There is insufficient detail or documentation to determine the validity of the transportation cost benefits. |
| 9 | The relationship between the channel depth, direct shipment, lightening and lightering should be documented and quantified. |
| 10 | The economic sections lack focused and useful sensitivity analysis, leaving the reliability of the findings in doubt. |
| 11 | The potential benefits of the project are not supported by the analysis in the report. |
| 12 | A detailed description of the no action and the without project alternatives must be presented in comparison to the recommended plan. |
| 13 | The DFR, DEIS, and appendices would benefit from professional editing, better maps, and better diagrams. |
| Significance – Medium | |
| 14 | The effects of deepening on hydrology and the associated water quality within the enclosed portion of the channel are not addressed adequately. |
| 15 | The impact analysis for the adjacent beaches is not complete and the opportunities for mitigation are not considered. |
| 16 | For the south jetty, the report should address stability for the end of construction condition and the low factor of safety for the long-term condition should be justified. |
| 17 | Several dredging issues should be clarified to increase confidence in predictive capability and possibly reduce dredging and adjacent beach erosion. |
| 18 | Scoping and outreach efforts appear to meet only minimal requirements for local participation, and fall short of proactive efforts needed to support report findings. |
| 19 | The project justification rests in part on data that are now several years old and must be verified and updated. |
| 20 | There remain significant uncertainties in the environmental analysis that should be addressed by further testing and documentation in the reports. |

| Significance – Low | |
|---------------------------|---|
| 21 | Grassland benefits of flood protection and water quality enhancement are not captured in the HEP analysis. |
| 22 | The proposed plan for increasing the levee elevations is reasonable, however, a cost estimate that addresses the possibility that dredged sediment consolidation could inhibit the rate of levee enlargement and methods in addition to grouting for strengthening the foundation should be considered. |

Appendix A

**Final Peer Review Comments on the Freeport Harbor Draft Feasibility Report and
Environmental Impact Statement**

Comment 1:

The problem statement is too general, and does not include a quantitative analysis of current costs and operations.

Basis for Comment:

The Draft Feasibility Report (DFR) does not provide sufficient detail on vessel operations in the project area to establish the need for the project. The general purpose of the project appears to be accommodating larger vessels and deeper sailing drafts, but current size and draft restrictions and their impacts on transportation costs are not explained or documented. The lack of a clear, quantified account of current and expected no action vessel operations is a major shortcoming of the documents reviewed.

The descriptions of existing commerce and navigation are neither clear nor complete. Vessel operations in the Freeport Harbor channel apparently include direct vessel calls, lightering, shuttle trips, and lightening. The DFR does not document the different types of vessel trips.

There are no maps or tables that indicate existing channel depths and widths (Table 1 lists authorized depths, not actuals). The reasons for past deauthorization of the Stauffer Channel are not explained. The Navigation Study has some additional information that should be incorporated into the DFR, but far more is necessary.

The current conditions and trends for Freeport operations and commerce are not thoroughly explained and there is almost no documentation on existing constraints or the economic impact of those constraints.

- The report mentions “shipping delays and congestion” (p.16), but no further information on these points is provided.
- Safety risks are mentioned in several places (e.g., p.16), but are not documented or quantified.
- Some of the vessel restrictions are attributed to pilots’ rules, but these rules are not completely explained.
- The report contains little information on what vessels use which parts of the channel for which purposes, and the available information is scattered.
- Problems relating to safety, national security, and energy security are given only cursory treatment.

The report does not present sufficient information on lightering and lightening practices. There are no data on the number of vessels handled, tonnages, times, or costs of these operations. The DFR does not document the capacity of the system, the policies of the operators, or other key factors. There is no map or diagram showing where or how these operations take place. The reader is left with only general descriptions of the process but none of the economics, costing or rationale used by different trade ports and traffic in deciding on whether to use either the lightening and/or the lightering process.

The problems requiring the deepening of the Stauffer Channel are not adequately explained. There is almost no information on vessel operations in the Stauffer Channel. There is no diagram showing existing or proposed uses along the channel. There is no map showing depths and widths, or even showing exactly what is meant by such terms as “Stauffer Channel Extension Lower Reach.” There is no analysis of the potential for offshore supply traffic, and the description of this business is cursory. There is no information on the current status of the Velasco container terminal, no quantitative analysis of its potential market, and no documentation of the volume estimates. No plans are provided for the Velasco container terminal and the schedule for that project is not explained. The report also lacks an explanation or history of supply and “seismic” vessel operations in the Upper Stauffer Channel.

Significance – High:

In the absence of a detailed, well-documented, and quantified problem statement, project motivation, and justification are unclear at best. Lack of clarity at the problem definition stage undercuts the validity of alternative evaluation and benefit-cost estimates.

Comment Cross-referencing:

- (2) *The reports need to include an explicit, well-documented analysis of vessel drafts and loading practices.*
- (5) *The risk from oil and chemical spills for all alternatives has not been addressed.*
- (12) *A detailed description of the no action and the without project alternatives must be presented in comparison to the recommended plan.*

Recommendations for Resolution:

To strengthen the problem statement, the DFR would need:

- A clear account of the economic, safety, and environmental problems created by current channel conditions.
- Detailed descriptions of all significant vessel operating categories – direct calls, lightering, shuttles, lightening, supply/seismic vessels.
- Quantified information on constraints imposed by depth and width.
- Up-to-date (through 2007) tabular data on the number and type of vessels in each category; commodities and tonnages; vessel sizes, design drafts, and sailing drafts; and discernable trends.
- An explanation of the decision process for direct calls vs. lightening vs. lightering; amounts transferred; locations and procedures; and cost functions.
- Documentation of the pilots’ rules, their rationale and their impact on vessel operations (including vessels handled on a “per job” basis).

Comment 2:

The reports need to include an explicit, well-documented analysis of vessel drafts and loading practices.

Basis for Comment:

Project benefits and justification rest on transportation cost savings from the scale economies of larger vessels and larger loads in existing vessels. The DFR, however, essentially assumes that vessel size and utilization is constrained by the channel, rather than analyzing data to determine if that is the case. While it is inherently reasonable to expect that vessel operators would take some advantage of wider and deeper channels, neither the impact of current restrictions nor the likely response to improvements are documented.

The DFR does not contain sufficient information on vessel drafts or analysis of vessel choice or loading practices. The lack of information on current vessel design and sailing drafts is a glaring omission. The report states twice (p. 21, p. 70) that Freeport Harbor receives fewer large vessels than other channels with comparable or even more restrictive conditions. This statement requires detailed documentation and analysis, because the initial implication is that vessel sizes and drafts are being limited by some factor besides channel depth and width.

From Table 23, it appears that, as of 2005, over 80% of the crude import tonnage was carried in vessels that did not use the available draft (e.g., were loaded to less than 42 feet). This observation suggests very strongly that 1) sailing drafts were limited by some factor other than channel depth, and 2) vessels would not invariably take full advantage of a deeper channel. Table 23 also indicates that the share of vessels using the full channel depth has declined from 43.3% in 2002 to 15.6% in 2005, calling into question that value of a deeper channel or the existence of a significant problem at present.

Table 11 shows a dramatic decline in the tonnage being lightered, a 90% drop from 2000 to 2002, calling into question the future importance of lightering. There are no data at all on lightening.

There is no correlation displayed between the trade routes in Table 11 and the vessels and loads received at Freeport. The port depths in Table 24 only indicate what is possible, not what is being operated.

Table 21 lists deadweight tonnages (DWTs), Table 22 lists design drafts, and Table 23 lists loaded drafts, but there is no linkage between them and no comparisons of design and sailing draft.

Without detailed data and analysis, the choice of design vessels appears highly questionable. From the limited data in the DFR, it appears that 99% of the petroleum tonnage is handled by smaller vessels than the design choice. The choice of the *Susan Maersk* as a design vessel for container service appears unjustified as the *Susan Maersk* was designed for and is engaged in the Asia-Europe trade. There is only a loose description of the design vessel for the supply/seismic business segment. There appears to have been no effort to verify the desire of operators to deploy such vessels in Freeport Harbor trades. The vessel simulations and choices of design vessels are not clearly linked to the existing traffic or the chosen

alternatives. The Navigation Study appears to be several years old.

Significance – High:

Without demonstrating the nature and impact of existing channel limitations on vessel size and draft, the benefits of widening and deepening the channel cannot be reliably estimated and project benefits remain questionable.

Comment Cross-referencing:

- (1) *The problem statement is too general, and does not include a quantitative analysis of current costs and operations.*
- (9) *The relationship between the channel depth, direct shipment, lightening, and lightering should be documented and quantified.*
- (11) *The potential benefits of the project are not supported by the analysis in the report.*
- (12) *A detailed description of the no action alternative and the without project description must be presented in comparison to the recommended plan.*

Recommendations for Resolution:

The DFR must demonstrate the cause-and-effect linkage between current channel dimensions, vessel choice, and vessel loading practices. It is not sufficient to assume that vessel sizes and loads will increase, or to create plausible scenarios for future vessel use. The analysis should include contacts with refineries, importers, shippers, and others engaged in making vessel choice and loading decisions.

The pilots' rules and their impact on vessel choice and loading should be clearly spelled out.

Design vessel choices should be discussed in greater detail, with documented comparisons between design vessels and existing fleets. It is not sufficient to choose a vessel that the Port of Freeport would like to accommodate (e.g., the *Susan Maersk*).

To establish the impact of channel width and depth on vessel size and draft, the report must:

- Document the design drafts and sailing drafts of current vessels on a vessel-by-vessel basis.
- Determine the typical unrestricted sailing draft for those vessels, keeping in mind that Table 28 demonstrates that vessels are not typically loaded to full capacity (e.g., sailing draft is normally less than design draft).
- Demonstrate that any differences between recorded sailing drafts and typical sailing drafts are attributable to Freeport Harbor channel depth or width.

The last point is crucial, as actual vessel loads and sailing drafts can be limited by origin port drafts, Panama Canal drafts, preferred shipment size, pilots' rules, or other factors.

Forecasts of with-project vessel size and draft, pilots' rules, and the choice of design vessel should all be subjected to sensitivity analysis.

Comment 3:

The evaluation of the alternatives is too cursory, both at the initial screening and the subsequent discussion of chosen alternatives.

Basis for Comment:

The problem statement is very general and, as such, doesn't lend itself to specific analysis of the alternatives. The initial alternatives seemed to cover the potential problems, to the extent that the problem had been specified; however, the depth of evaluation of all of the alternatives, such as non-structural changes, is so cursory that no decision on the appropriateness of the alternatives can be made. The selection of the alternatives may be comprehensive and appropriate, but the analysis and description of these alternatives does not provide a basis for agreeing with the appropriateness of any decision.

No Action Alternative. The no action alternative is not developed in sufficient detail. The need exists for the report to detail the current and expected no action alternative. The lack of a clear, quantified account of current and expected no action vessel operations is a major shortcoming of the documents reviewed. Specifically, there is no account of what portions of the channel are used by vessels and for which purposes. The DFR does not include maps showing the existing channel depths and widths or future ship operations.

Structural Alternatives. The initial screening of the alternatives, non-structural and structural, was not presented in a complete fashion. A listing of all alternatives considered, and those not considered, along with reasons for inclusion or exclusion would strengthen the discussion early in the document. It is suggested in the document that preliminary benefit cost ratios (BCRs) had been used. Such analysis needs to be included in the document and in sufficient detail for the reader to evaluate the appropriateness of the use of the tool.

Non-Structural Alternatives. Non-structural alternatives, such as consideration of modifying the Brazos River Pilots Association traffic rules of operation, should be included. Any trade-offs between safety and traffic efficiency could be at least qualitatively, if not quantitatively, delineated, thus allowing such non-structural alternatives to be eliminated in the no action/without-project condition.

The implications of the widening initiative on benefits of later determined alternatives are not adequately discussed at this point. Identification and summarization of what ships would be affected, what traffic generated, and what businesses would be affected would set up the later BCR analysis. It is stated that a BCR had been calculated; if so, this should be added to the report at this junction.

It is not clear that the Section 204 study has been accepted and the widening is indeed part of the future. Clarification of this point would help the study.

The report contains almost no information on the vessel lightering/lightening processes being used. Additional lightering/lightening is not considered as an alternative means of handling larger vessels. The total system costs of lightering, lightening and direct shipment should be compared to verify that the proposed shipment system is economically superior. As other comments will allude, a full costing of the alternatives of direct shipment, lightening and

lightening and subsequent decisions by shippers would inform that later examination of benefits from the project.

Study Improvement. The study alludes to the process of consideration of alternatives and the screening of those alternatives, but the description of the screening process left reviewers uncertain of the selection criteria and the original selection of alternatives. A fuller description of the process that was followed would be useful, increasing the confidence in the study.

The lack of adequate mapping in many sections of the document is evident but can be handled by the USACE. Much of the discussion on the impact of deepening the Stauffer Channel and the potential impact of the massive Bayport terminal would be improved by a detailed presentation, including mapping and geographical referencing.

Significance – High:

Overall concerns about how the screening of initial alternatives and derivation of the chosen alternative was done are critical and need to be addressed. A reasonable process was outlined in the document but at such a cursory level, the reader is uncertain of just what was done and how it was done.

Comment Cross-referencing:

- (1) *The problem statement is too general, and does not include a quantitative analysis of current costs and operations.*
- (4) *The alternatives analysis ignores major non-structural alternatives.*
- (9) *The relationship between the channel depth, direct shipment, lightening, and lightening should be documented and quantified.*

Recommendations for Resolution:

The resolution of this issue is possible, and the current data and study process, when presented, explained and documented, should be sufficient to improve the report. If not available from past analyses, the analyses will have to be redone, including:

- The no action alternative needs adequate description, especially about future operations. The widening project needs to be described in greater detail, and its impacts on vessel operations analyzed.
- Non-structural alternatives need further explanation and detail, including why they were not included in the alternatives. Basic information about lightening vs. lightening, vs. direct shipment and associated draft relationships would provide a base for understanding the alternatives to some degree.
- Screening criteria and the resultant analysis need to be identified for the initial screening of alternatives. The process needs to be explained fully.

Comment 4:

The alternatives analysis ignores major non-structural alternatives.

Basis for Comment:

The DFR provides only a cursory discussion of non-structural alternatives. Management and non-structural measures are dismissed in a few cursory sentences on DFR page 35. The lack of serious analysis of management and non-structural measures is a significant report shortcoming.

The fact that the River Pilots do waive some ship transits requires investigation as to the future usage of such waivers or modification of the river rules, as does other relaxation of the river operation rules. The extent of lightering and lightening of ships, with attendant cost analysis, as a future non-structural alternative should receive attention. Can these operations be expanded and at what cost?

At a minimum, the DFR should analyze the following non-structural alternatives.

Relaxation of the Pilots' Rules. The pilots' rules restrict vessel operations but are not explained in any detail. On the surface, these rules appear more restrictive than elsewhere (e.g., on the Sabine-Neches Water Way), and their necessity is not justified in the report. The report notes that Freeport receives fewer large vessels than comparable channels. The role of the pilots' rules in this phenomenon must be analyzed.

Expanded "per job" deep draft vessel transits. The practice of allowing deeper-draft vessel transits on a "per job basis" indicates that such operations can be conducted safely. The DFR needs to explain and document this practice and analyze the potential for expanding this practice as non-structural alternative to channel deepening and widening, or as a means of accommodating larger vessels with less deepening and widening.

Increased lightering/lightening. The DFR does not explore the potential for increased lightering/lightening as a non-structural alternative to deepening and widening. The cost comparisons on pages 97 through 101 are difficult to comprehend and not sufficiently documented, leaving the relative cost-effectiveness of the various practices open to question. While lightering and lightening are in use already, *expansion* of those practices should be evaluated as an alternative to deepening and widening.

Significance – High:

USACE guidelines require careful consideration of non-structural alternatives before concluding that the project is justified or selecting a recommended plan.

Comment Cross-referencing:

- (3) *The evaluation of the alternatives is too cursory, both at the initial screening and the subsequent discussion of the chosen alternatives.*

Recommendations for Resolution:

To resolve these concerns, the report would need to be expanded to:

- Replace the cursory discussion of non-structural alternatives with a serious investigation of at least the three alternatives listed above. The non-structural alternatives must be carried through the same screening process as the deepening and widening plans.

Comment 5:

The risk from oil and chemical spills for all alternatives has not been addressed.

Basis for Comment:**II. Problem Identification – Navigation and Commerce**

The authors state due to the practice of lightering “the possibility for a collision, oil spill, fire and other adverse environmental consequences is always present. Deepening of the channel will reduce the number of lightering operations.” By inference, they seem to imply that this project would reduce the likelihood of spills. However, no data or analysis is provided that lightering increases oil spill risks, or that the alternatives considered reduce it.

II. Problem Formulation - Environmental

The DFR states that the “increasing potential for environmental harm as a result of shipping accidents is a major concern.” It further states that oil spill response would not change as a result of any modifications of the channel. Consequently, they conclude “spill recovery is considered outside the scope of this study and further analysis is not necessary.” This conclusion is questionable because the DFR does not state whether there would be an increase or decrease in oil (crude and refined) and hazardous material (hazmat) risks associated with each alternative, which should be an environmental concern and part of the problem formulation.

II. Formulation Objectives: Planning Objectives

One of the planning objectives was to improve the efficiency and safety of deep-draft navigation system. However, any detailed analysis of oil spill risks under each alternative could not be found in the DFR or Draft Environmental Impact Statement (DEIS).

IV Plan Formulation:**Non-Structural Measures**

No discussion is provided on relative risks of oil and hazmat spills associated with existing or alternative non-structural measures including beam width restrictions.

Structural Measures – Environmental Considerations**No Action Plan (Future without Project)**

No discussion is provided on relative risks of oil and hazmat spills associated with the no action alternative.

Channel Deepening and Widening

The DFR states that the “proposed widening would increase the main channel size from 400 to 600 feet along most of its length for navigation safety for larger vessels.” However, no analysis or discussion is provided on relative risks of oil and hazmat spills associated with these alternatives.

X. Environmental Evaluation

No discussion is provided on relative risks of oil and hazmat spills associated with non-structural measures including beam width restrictions

DEIS

ES-2 Purpose and Need

The DEIS states that the “crude imports are on the increase and will continue to increase in the future. Increases in imports will also increase the number of lightering operations, adding to shipping delays, congestion and the risk of *collision or spill*.” However, no analysis or discussion is provided on relative risks of oil and hazmat spills associated with the various alternatives even though it appears that reduction of oil spill risks is one of the major benefits of the preferred alternatives.

Section 1.3. Existing Project

The DEIS states that “A project alleviating shipping delays while increasing safety for both the industry and the environment is needed.” However, the DEIS does not offer any quantitative data or risk analysis that supports this statement in relation to oil and hazmat spills.

Section 1.4 Problems, needs, and public concerns.

The DEIS states that one of the environmental concerns identified during the reconnaissance study included “the increasing potential for environmental harm as a result of shipping accidents.” We were not able to identify any quantitative data or risk analysis that addresses this concern.

Planning Objectives

The DEIS states that “Economic benefits could also be realized through decreased vessel delays and decreased risk of collisions and/or spills. Maintenance of the areas coastal and estuarine resources would also result from the decreased risk of accidents and spills and the avoidance of known cultural resource sites.” Again, any quantitative data or risk analysis that supports this statement could not be identified.

2.0. Alternatives.

No analyses or discussions are provided on relative risks of oil and hazmat spills associated with the various alternatives even though the authors assert that the reduction of risks from oil and hazmat spills are one of the likely benefits from the preferred alternatives.

4.0 Environmental Consequences

Relative risks of oil and hazmat spills associated with the various alternatives are not evaluated.

Significance – High:

The apparent lack of any detailed quantitative analysis of risks from spills from each alternative is highly significant, as reduction in the likelihood of collisions and spills has been identified as a major benefit from the project. It is unclear that the proposed widening and dredging will in fact reduce these risks.

Comment Cross-referencing:

- (2) *The report needs to include an explicit analysis of vessel draft and loading practices.*
- (4) *The alternatives analysis ignores major non-structural alternatives.*
- (9) *The relationship between the channel depth, direct shipment, lightening, and lightering should be documented and quantified.*

Recommendations for Resolution:

To resolve these concerns, the report would need to be expanded to include:

- A detailed analysis of oil and hazmat spill risks under all alternatives.
- A detailed analysis of potential impacts from oil and hazmat spills under all alternatives.

Comment 6:

The recommended plan is not justified by the current analysis of economic factors.

Basis for Comment:

It is difficult to determine if the economic analysis was conducted properly because the documentation, data, and study results are not presented in sufficient detail. It may have been done correctly, but the presented material is not complete enough, in both critical and non-critical areas, to allow the reader to make that decision.

Demand Analysis: The extent of traffic in the future is not documented or presented in an analytical fashion. The general background does not justify the estimated specific traffic in petroleum for the Freeport Harbor. The impact of other ports, relative to the future use of Freeport, is also not competitively evaluated. Changes in sourcing of future traffic is stated but not documented nor seemingly evaluated.

Costing of Alternative Non-structural Changes: There is a lack of explanation of the economic decision process by which lightering, lightening and direct shipment are chosen. These decisions carry forward into the final analysis of alternatives, a detail that is not in the current version of the report.

Sensitivity Analysis: The sensitivity analysis is unclear and may be incomplete. Little reasoning for the selection of the chosen variables is presented; good sensitivity analysis should indicate which variables are most important, thus causing detailed further analysis.

Significance – High:

The entire study recommendation is dependent on analysis and findings that are not fully presented in the current draft, a major failing of the report.

Comment Cross-referencing:

- (1) *The problem statement is too general and does not include a specific analysis of current costs and operations.*
- (7) *The traffic forecasts are not documented or justified.*
- (10) *The economic sections lack focused and useful sensitivity analysis, leaving the reliability of the findings in doubt.*

Recommendations for Resolution:

To resolve these concerns, the report would need to be expanded to include:

- Information on the economics in the initial screening of alternatives
- Detailed discussion on the costs of direct shipment, lightering and lightening relative to draft and shipper decisions
- Historical trends in traffic need to be documented and analyzed. Specific information on the local outlook rather than general background information needs to be presented. The apparent volatility in Freeport Harbor petroleum product imports needs to be

explained.

- Historical information on containerized cargo in the Gulf around this port needs to be presented relative to future movement on the harbor.
- The ship size analysis should be made more specific to the Freeport Harbor, with explanations of sizing choices.
- Specific attention should be paid to the supply and demand national and regional conditions of the petroleum and chemical industries, to support directly the final traffic projections.
- Overall, the study needs more detailed information on process, analysis and rationale for chosen alternatives. Again, this study and its findings may be exactly correct and defensible but this current report does not provide the analytical data and justification for the findings.

Comment 7:

The vessel traffic and commodity growth forecasts are not documented or justified.

Basis for Comment:

A complete analysis requires well-documented forecasts of vessel activity and commodity flows and/or no action and plan alternatives. The need is particularly acute where different project alternatives (including non-structural alternatives) would result in different vessel movements; when some project elements, such as dredging of the Stauffer Channel, are claimed to result in shifts of vessel traffic and commodity movements from other ports, and where the project benefits are derived almost exclusively from changes in vessel size and sailing drafts.

The DFR does not present a forecast of vessel activity by sailing depth, and commodity. Such a forecast is implicit in the transportation cost and benefits analyses, but must be made explicit and be subjected to thorough sensitivity analysis.

The commodity forecasts in the DFR exhibit some serious shortcomings.

- All commodity forecasts are based on outdated data.
- The crude petroleum forecast does not address refinery capacity, shipment size, past shifts in sourcing, or the impact of rising prices. Table 26 (p. 91) shows a very low growth rate for Freeport crude imports, with the 2010 forecast being less than the 2005 actual.
- The petroleum product import forecast is not actually shown in the DFR. Obvious past volatility (Table 2) is not explained. Import product trends are not discussed.
- The forecast for petroleum product exports is also missing from the DFR, as is any explanation of historical data or trends.
- There are no forecasts of chemical traffic, either import or export, despite its importance to Freeport.
- The critical forecast for containerized cargo growth is completely undocumented. The background material given in the DFR is not linked to the forecast. The forecast is attributed to an undocumented source, and the key forecast tables (Tables 43 and 46) appear to contain errors. The forecast also appears to rely on anecdotal or unverified statements regarding congestion at Houston, and disregards the current and future capacity of the Bayport terminal.
- The forecast for the “seismic” and supply vessels in the upper Stauffer Channel is very sketchy. It lacks any discussion of the businesses and markets involved, the history of such movements on the Upper Stauffer Channel, the basis of decision by operators or customers, or a detailed competitive assessment of the alternative bases of operation.

The DFR needs to forecast all commodities, even those for which benefits are not claimed, to provide a complete comparison between no action and plan alternatives. This forecast should include LNG movements.

Significance – High:

The plan benefits are entirely dependent on vessel and commodity forecasts. If those forecasts are not adequately documented, explained, and validated, the resulting benefits estimates and BCRs cannot be considered reliable.

Comment Cross-referencing:

- (6) *The recommended plan is not justified by the current analysis of economic factors.*
- (10) *The economic sections lack focused and useful sensitivity analysis, leaving the reliability of the findings in doubt.*
- (11) *The potential benefits of the project are not supported by the analysis in the report.*
- (19) *The project justification rests in part on data that is now several years old and must be verified and updated.*

Recommendations for Resolution:

To resolve these concerns, both vessel and commodity forecasts must:

- Begin with the most recent available detailed historical data (properly sourced);
- Explain past growth trends, discontinuities, and volatility;
- Provide a convincing, well-documented rationale for the methods used to forecast future vessel movements and commodity flows;
- Include “reality checks” for such factors as refinery capacity to process imported crude, initiatives at competing ports (e.g., the Bayport terminal at Houston), and impacts of market trends (e.g., rising crude prices and declining U.S. consumption);
- Be validated through pro-active contacts with industry participants (e.g., refineries, container shipping companies, supply vessel operators) and stakeholders (e.g., ports, government agencies, regional planners); and
- Be incorporated in a thorough sensitivity analysis.

As with other critical project analyses, the traffic forecast for no action, non-structural, and structural alternatives must contain a clear audit trail, enabling readers and reviewers to determine exactly what data were used, what assumptions were made, what methodologies were followed, and how sensitive the results are to key factors.

Comment 8:

There is insufficient detail or documentation to determine the validity of the transportation cost benefits.

Basis for Comment:

The DFR presents tables of estimated transportation cost benefits, but does not document the process by which those estimates were made. In the absence of sufficient detail and methodological documentation, the validity of the estimates remains open to question.

It is particularly important to establish a clear audit trail for transportation cost estimates. For each cost element that has been quantified, the DFR and its appendices should enable a reader to determine:

- What underlying data sources were used, and what steps were taken to verify their accuracy and applicability?
- What methodology was used to combine data elements into a cost estimate, and how that methodology was derived and verified?
- What Quality Assurance/Quality Control processes were followed and what “reality checks” were performed to validate the resulting cost estimates?
- How sensitive the results are to key cost factors or assumptions?
- What assumptions were made regarding cost factors or relationships?

The Cost Estimates portion of Section VIII does not actually give the cost estimates. There is no documentation or detail for the cost estimates given in Table 60.

Cost estimates in Tables 31 through 38 lack documentation or explanation, as do Tables 45, 49, and 50.

The cost estimates and transportation cost savings shown in Table 44 (e.g., a cost savings of over 90% for a 60 foot channel depth), and the BCRs of up to 257.4 shown in Table 46, are neither documented nor believable.

Significance – High:

The plan benefits are derived from estimated transportation cost savings. If those cost savings estimates are not adequately documented, explained, and validated, the resulting benefits estimates and BCRs cannot be considered reliable.

Comment Cross-referencing:

- (2) *The reports need to include an explicit analysis of vessel draft and loading practices.*
- (6) *The recommended plan is not justified by the current analysis of economic factors.*
- (7) *The traffic forecasts are not documented or justified.*

- (9) *The relationship between the channel depth, direct shipment, lightening, and lightering should be documented and quantified.*
- (10) *The economic sections lack focused and useful sensitivity analysis, leaving the reliability of the findings in doubt.*

Recommendations for Resolution:

A strong analysis of transportation costs and cost savings would:

- Show tabular comparisons of transportation costs for no action and plan alternatives (including non-structural alternatives) by commodity;
- Provide a step-by-step explanation of the cost estimation methodology (in an appendix, if needed);
- Explain the cost factors, and cost functions for lightening and lightering, as well as direct vessel calls; and
- Subject the cost estimates to a thorough sensitivity analysis.

For each commodity or line of business, the transportation cost estimates should encompass all elements that would vary between the no action and plan alternatives.

- For crude petroleum imports, the analysis must explicitly address the volumes and costs of direct calls, lightening, and lightering strategies under each alternative, including no-action and non-structural alternatives.
- For containerized cargo that would otherwise have moved via Houston or other ports, the analysis must include differences in terminal handling costs, port charges (wharfage and dockage), drayage costs, and inland rail transport costs for both loaded and empty containers. Changing scale economies as the Velasco Terminal expands must be considered and compared to Houston's terminal cost structure as Bayport expands. As there appears to be no plan for intermodal rail service to Velasco, the rail drayage cost comparisons should be based on trips to UP's Barbour's Cut facility. The existing "multiport analysis" is cursory and does not appear to meet USACE standards.
- For the supply and "seismic" vessel movements to the Upper Stauffer Channel, the analysis will need to compare all cost-related aspects of a shift from Galveston, including relocation of operating bases and changes in supply sourcing. These estimates should be verified in proactive contacts with industry representatives, in parallel with the realism of the forecast shift of activity.

Comment 9:

The relationship between the channel depth, direct shipment, lightening and lightering should be documented and quantified.

Basis for Comment:

One of the major non-structural alternatives is the continuing use of direct shipping, lightering and lightening in alternative ship sizes. This potential industry operation could have significant impact on the BCR and the resultant choice of alternative. Yet, no cost or efficiency analysis or discussion of the decision process by shippers or mode choice decision makers is presented.

Port/country sourcing: The characteristics of the originating ports are presented but not related to the choice of shipping alternative, now or in the future. Potential changes in such sources over time are not specified or evaluated.

Capacity of the lightering/lightening sector: The structure, conduct, and economic performance of this sector are not discussed and may not have been investigated. The current report sheds no light on capacity, costing, and responsiveness to future traffic levels.

Costs of shipping alternatives: Cost analysis of the different shipping alternatives is not presented. Therefore the future use of the differing unloading processes is unclear. Simple acceptance of the status quo is not acceptable; some analysis and costing is necessary.

Combined costs of operation: The analysis should include the detailed combined costs of line haul bulk shipment with the local distribution costs of "waiting in the sea." The current report does not allow an examination of the segmented costs.

Significance – High:

The entire study recommendation is weakened by this basic failing, causing the reader to have difficulty in understanding just how these vital decisions are made, and in what economic context.

Comment Cross-referencing:

- (2) *The reports need to include an explicit analysis of vessel draft and loading practices.*
- (6) *The recommended plan is not justified by the current analysis of economic factors.*
- (7) *The traffic forecasts are not documented or justified.*

Recommendations for Resolution:

To resolve these concerns, the report would need to be expanded to include:

- Information on the economics involved in the decision process by shippers in choosing alternative unloading means. Fully understanding this process will support the choice of alternatives and subsequent BCR in a more rigorous fashion.

- Detailed discussion and analysis on the specific costs of direct shipment, lightering and lightening. Included in this is a need for capacity estimates for each shipping alternative.
- A discussion on how this fits in the no action operations into the future.
- Overall, the study needs more detailed information on the process, analysis and rationale for chosen shipping alternatives. Again, this study and its findings may be exactly correct and defensible but this current report does not provide the institutional understanding of shippers' choices at sufficient detail to support the findings.

Comment 10:

The economic sections lack focused and useful sensitivity analysis, leaving the reliability of the findings in doubt.

Basis for Comment:

Sensitivity analysis is designed to identify critical variables and then to focus in on those variables that cause significant fluctuations in the BCR, which is a critical component of the recommendations. The brief sensitivity section in this report fails to clarify the critical issues and leaves the reader confused since it changes numerous variables simultaneously. Little understanding of the importance of the variables in the analysis is generated.

Crude Petroleum: There appears to be no sensitivity analysis on one of the most important sources of benefits, that of crude petroleum. The study needs to look at the traffic forecasts, use of larger vessels and loads, drafts, costs and savings. The study, on page 130, simply states that crude petroleum and containers would not be considered, with no reasoning or rationale.

Independent Analysis: The sensitivity analysis summarized in Table 56 hides the importance of each variable since multiple changes in multiple variables are combined. This doesn't provide definitive findings on the robustness of the cost or benefits estimates.

Choice and Proof of Assumptions: The paragraph on page 130 simply states what was done, without explaining why each of the scenarios was chosen. The entire paragraph is loaded with statements such as, "analysis of the costs suggests that the maximum costs which are associated with the 17,240 DWT vessels do not represent a likely scenario due to the relative inefficiency of that vessel size," with no explanation or proof of the assertion.

Data Sourcing: Tables 52-55, which may have been used to develop the analysis reported in Table 56, have no documentation and little explanation as to how they are used in the sensitivity analysis.

Significance – High:

A solid sensitivity analysis would increase the credibility of the BCR and the confidence in the selection of the overall recommendations. It would allow policy makers to follow relevant market variables as continuing decisions are made.

Comment Cross-referencing:

- (1) *The problem statement is too general, and does not include a quantitative analysis of current costs and operations.*
- (9) *The relationship between the channel depth, direct shipment, lightening and lightering should be documented and quantified.*
- (11) *The potential benefits of the project are not supported by the analysis in the report.*

Recommendations for Resolution:

Elements of the sensitivity are in the DFR as currently presented, but the analysis and

reporting of that analysis should be revised in the following manner:

- The sensitivity analysis should be conducted by determining which variables or assumptions would have the greatest impact on findings.
- A full sensitivity analysis of crude petroleum imports should be conducted, including consideration of costs, volumes, modes, and sizes of shipments in the first level analysis. Then, the variables that appear to have significant impact on potential benefits should receive further sensitivity analysis.
- Container projections should receive the same detailed analysis, including the potential market share captured by the Freeport Harbor facility
- The sensitivity analysis should consider the uncertain traffic forecasts, the estimates of no action transportation costs, and transportation costs/savings overall.
- The analysis should be done in a segmented fashion; comparing each issue/variable independently of others.

Comment 11:

The potential benefits of the project are not supported by the analysis in the report.

Basis for Comment:

This issue is apparent early in the report since the problem is not well defined or quantified, making the selection of the alternatives problematic. The non-structural alternatives available are not examined to any detail. Historical trends are not documented nor applied to the Freeport harbor.

- The description of existing commerce and navigation is neither clear nor complete. Little information on the no action alternative relative to current or future use of the channel is provided.
- There is too little discussion on lightening and lightering. Policies of the operators and the pilots are not evaluated.
- The entire discussion of the Stauffer Channel is not specific enough and not informed by use of charts and maps relative to facilities locating on the Channel.
- Management and non-structural measures are dismissed too lightly.
- The DFR seems to be written at a summary level and lacks much of the data, analysis and documentation required to establish feasibility.

Significance – High:

The heart of the BCR is accurate determination and justification of benefits and this was not achieved. The methodology used in identifying benefits is unclear and not fully discussed.

Comment Cross-referencing:

- (1) *The problem statement is too general, and does not include a quantitative analysis of current costs and operations.*
- (9) *The relationship between the channel depth, direct shipment, lightening and lightering should be documented and quantified.*

Recommendations for Resolution:

The study can be improved by undertaking the following steps, among others:

- Describe the screening process; include maps and comparisons between plan alternatives. Show the analysis underlying the initial screening of alternatives.
- Explain the ship simulation and show the relationship between simulations and plan alternatives.
- Describe in some detail the existing commerce and navigation on the channel.
- Develop and document historical trends in traffic and ship size in direct relationship to the Freeport Harbor and why alternatives are chosen.

- Indicate how the Stauffer Channel is being used and will be used. Evaluate the possibility of offshore supply and the Velasco container terminal's impact.
- The report needs a final straight-forward comparison of existing conditions, no action alternatives, and the recommended plan; possibly in a summary table.
- The sensitivity analysis needs to show the independent importance of relevant variables, relative to BCRs and selected plans.
- Much of the plan formulation has to be rewritten in greater detail, especially relative to the no action/without project alternative.
- Explain the calculation of the benefits estimates. BCRs of up to 257.4 suggest errors or omissions.

Comment 12:

A detailed description of the no action and the without project alternatives must be presented in comparison to the recommended plan.

Basis for Comment:

The plan formulation does not include an in-depth description of the no action and without project alternatives nor any differences between the two. The purpose, extent, and impact of the widening initiative are not described in any detail. The future of the Velasco container terminal in a no action alternative receives neither attention nor analysis. The widening of the Channel affects "some ships," but no sense of the magnitude of the impact is given. Non-structural alternatives, such as consideration of modifying the Brazos River Pilot Association traffic rules of operation, should be included. The BCR of widening the channel had been calculated but no report given on the analysis.

Significance – High:

The discussion is far too general and non-specific. The reader is left wondering if full consideration had been given to the no action or without project alternative since no data and analysis are given. These alternatives provide the base against which other alternatives are measured.

Comment Cross-referencing:

- (3) *The evaluation of the alternatives is too cursory, both at the initial screening and the subsequent discussion of chosen alternatives.*
- (9) *The relationship between the channel depth, direct shipment, lightening and lightening should be documented and quantified.*
- (11) *The potential benefits of the project are not supported by the analysis in the report.*

Recommendations for Resolution:

To resolve these problems, the report would need to be expanded to include:

- A full description of the no action and without project alternatives must developed; including current and future commercial uses of the Channel
- Inclusion of a table showing the depths and a map/figure indicating the stations along the Channel.
- The possibility of expanded or more efficient lightening/lightening operations.
- Examination of relaxation of various Pilots' rules such as requiring 10% of channel depth plus 2 feet (e.g., 6 feet under the keel in a 40 foot channel, when other channels operate with as little as 3 feet under the keel.
- Consideration of additional transits of deep draft vessels on a "per job" basis.
- Describe the future of the Velasco container terminal in a no action alternative.
- A final table showing the comparison of the no action/without project alternatives.

Comment 13:

The DFR, DEIS, and appendices would benefit from professional editing, better maps, and better diagrams.

Basis for Comment:

Need for Editing. The DFR is in need of editing for clarity and completeness. The DEIS is, in general, better written than the DFR. The Economic Appendix to the DFR is almost entirely a duplicate of the DFR section on economics. In general, the deficiencies in the sections of the DFR covering economics were much more extensive than those related to engineering and environmental issues. Specific issues are listed below.

General

- Table 1, Executive Summary p. 6 and text page 12 – there is no map and no comparison with project plans.
- Fig. 1 – map does not show channel dimensions or key facilities (= Figure 6).
- P. 10 – project area description lacks map or diagrams.
- P. 34 – no diagram or map for the non-federal widening project.
- P. 38 – no tables or diagrams to compare the alternatives. Is “widening but not deepening” the non-federal project?
- P. 59 – Channel design section has no tables or maps.

Planning and Economic Issues

The following are instances of incomplete or unclear reporting of economic information.

- Fig. 2 – old data, no discussion of variability.
- Table 2 – old data, no discussion of variability (= Table 16).
- Table 3 – old data, not meaningful averages.
- Table 4 – old data, no discussion of variability (= Table 13).
- Figure 4 = Figure 5.
- P 23. – The Bayport terminal is now open – need to update.
- Table 5 – Data on third line should refer to the MSC Barbara, which is 85,820 DWT and 6,750 TEU. This looks like a duplicate of the Regina Maersk, from the last line. (= Table 14).
- Table 6 – Regarding the comparisons to later plans; the 60.600 plan is not shown in the table.
- P. 40 – Regarding the ship simulations comparing Plans PF1-PF5 to Table 6, there are no maps or diagrams.
- P. 42 – Comparison of Alternatives 1-9 to Plans PF1-5 or Table 6 – the plans do not match.
- P. 45 – a 60' channel alternative is noted here, but not included in Table 6.
- P. 45 – the 5.375% interest rate in this section conflicts with 4.875% elsewhere.
- P. 46 – this passage states that the benefits were limited to petroleum, but rest of report estimates benefits for other commodities.
- Table 7 – the table reports the design draft, but no information is presented on the

sailing draft.

- Table 8 – Columns mislabeled.
- Table 9 – loaded draft is not related to design draft. “>= 40” is not a good category when the channel is 45'.
- Table 10 – Same as Table 29.
- Table 11 – No discussion of drastic decline in lightering, no data on lightening, averages not meaningful. Old data.
- Table 12 – 58' option disappears at bottom. No text to explain petroleum product benefits.
- Table 13 = Table 4, still no discussion of trends.
- Figure 5 = Figure 4.
- P. 51 – No data on vessels or drafts.
- P. 50-52 – No information or data on other product benefits.
- P. 52 – Text duplicates P. 23.
- Table 14 = Table 5.
- P. 54 – Initial Benefit Summary does not summarize benefits. Section VII actually has no summary of benefits.
- P. 55 – Detailed Plan Formulation does not say what plan was chosen, or even list the final alternatives
- P. 58 – Ship Simulation section says the Stauffer channel improvements were not recommended.
- Section XI. – Detailed economics analysis repeats sections of text (e.g., compare pages 3 and 67), and is almost identical to the Economic Analysis Appendix.
- Figure 6 = Figure 1.
- P. 67 – Discussion of existing channel use lacks maps, tables, etc. No information on vessels or drafts.
- Table 16 = Table 2, still no discussion
- Table 17 – Meaningless averages, misleading CAGRs, no definition of “PADD II” Actual Freeport CAGR 1998 to 2005 was just 1.7% compared to U.S. 2.1%.
- Table 19 – not meaningful averages, no implications for project
- Table 20 – No discussion or implications for project.
- P. 78 – Vessel utilization – not data or tables on utilization, specifically no comparison of design versus loaded draft.
- Tables 21 – 23 No comparison of design vs. loaded draft.
- P. 83 – (top) “42 feet or 10 percent of design draft” is clearly wrong.
- Table 26 – difficult to follow. Was Freeport Harbor volume simply regressed on U.S. volume? The “forecast” appears to predict a decline at Freeport between 2005 (22,000) and 2010 (20,914)
- Figure 9 – Text does not address obvious 2001-2005 volatility in the chart.
- P. 93 – No forecast is given for petroleum or chemical products, or other commodities (bulks, bananas, etc.)
- Table 27 – Table is U.S. data, not Freeport (as bottom of page 93 says)
- Table 29 = Table 10.
- P. 96 – “Basic procedures” not explained.

- Tables 30-35 – Impossible to reconstruct calculations from information given. No audit trail is presented.
- Tables 36-37 – No explanation of benefits estimates.
- P. 105 – Bayport citation is wrong – needs updating.
- P. 39 – Not a meaningful use of averages.
- Table 39/Figure 10/Table 40 have no bearing on Freeport container forecast
- P. 108 – “Proposals under review” – no citation or documentation. Text does not say what value between 107,000 and 230,000 was chosen.
- P.112 – Claim that Barbours Cut operated at 150% of capacity in 2006 seems unlikely.
- Table 41 – Undocumented data in a presentation slide cannot be considered conclusive.
- P. 114 – Paragraph under “Design Vessel” is confusing at best, and the port master plan is not documented.
- Table 42 – Not relevant to Freeport.
- Table 43 – Table appears to be in error. Numbers do not make sense or match text. U.S. international trade numbers are irrelevant. No basis given for Freeport forecast growth rate of 4.7% or for the starting TEU count in 2014.
- Table 44 – Table is incomprehensible. Magnitudes of savings compared to cost estimates are not believable.
- P. 118 – “Threshold depth” concept is not explained.
- Table 45 – Define “Value of goods and Services”.
- Table 46 – Appears to have serious errors. BCRs of 72.8 to 257.4 are not believable. “Alternative Optimization” and “Threshold Depth” are not explained.
- P. 125 – Attribution to “channel users” is not sourced or documented.
- Tables 49-50 – No basis is given for the 50% recovery, and no data are presented on the traffic that was to be “recovered”.
- P. 130 – The sensitivity analysis and contents of Tables 52- 56 are difficult to interpret.

Engineering and Environmental Issues

The following are instances of incomplete or unclear reporting of information supporting the engineering and environmental studies.

- P61. – There are no real conclusions or information provided on offshore disposal other than a statement that a MDFATE analysis was performed.
- P61. – The main text of the DFR is lacking a geotechnical description of the project area sediments and does not provide references to data.
- The main text of the DFR implies (P. 142) that some of the dredged material may be contaminated, but there is no follow-up on this in the upland placement plan.

The Engineering Appendix (P. 30, section bracketed in question marks) appears to contain some unresolved issues regarding environmental restrictions to placement in upland dredging areas.

Significance – High:

The lack of clarity and completeness in certain passages can impact the conclusions that are being drawn. As the editorial issues in this report go beyond simply an issue of clear exposition and can affect conclusions, this issue is given a high significance.

Comment Cross-referencing:

(19) *The project justification rests in part on data that are now several years old and must be verified and updated.*

Recommendations for Resolution:

- The reports and appendices require professional editing, reorganization, and improved graphics. Missing information need to be provided and conflicting passages need to be resolved. Text needs to be added to provide supporting discussion for all figures and tables.

Comment 14:

The effects of deepening on hydrology and the associated water quality within the enclosed portion of the channel are not addressed adequately.

Basis for Comment:**DEIS – 1.0 Need for objectives of action**

One potential impact that has not been evaluated is the potential risk of hypoxia due to increased channel depths in the deeper portions of the enclosed channel (i.e. above the intersection with the intercoastal waterway (ICWW)). One major data source that was not consulted was the Texas Parks and Wildlife Fish Kill database. Large deep harbors sometimes have a higher incidence of fish kills due to poor mixing in summer months that lead to anoxic conditions in bottom waters. The increased depths proposed may increase the risk of hypoxia.

DEIS – 3.0 Affected Environment

(ES3-ES7) The characterization of the physical environment appears to be complete and comprehensive. Major physical, hydrological and biological resources were evaluated by extensive reviews of soil, habitat and water quality data obtained from state and federal environmental and natural resource agencies. One major data set that was not consulted, however, was the Texas Parks and Wildlife Fish Kill database. Large deep harbors sometimes have a higher incidence of fish kills due to poor mixing in summer months that lead to anoxic conditions in bottom waters. If there is sufficient large vessel traffic this may not be a problem, but the authors should at least evaluate this issue and characterize the risk or lack thereof. Although surface water quality was evaluated, bottom water quality was not.

Significance – Medium:

The lack of analysis of potential effects on water column stratification, mixing, and dissolved oxygen in the deeper channels in the upper part of the project is considered a medium priority issue.

Comment Cross-referencing:

NA

Recommendations for Resolution:

To resolve these concerns, the report would need to be expanded to include:

- A detailed analysis of the effects of the various project alternatives on mixing, stratification and dissolved oxygen levels in the upper part of the project is needed. The focus should be the enclosed channel upstream of the ICWW.

Comment 15:

The impact analysis for the adjacent beaches is not complete and the opportunities for mitigation are not considered.

Basis for Comment:

The shoreline impacts study states that the effects of the project “will be minor and will not extend further than three to four miles to either side of the Freeport jetties” (p. 59, DFR). This gives rise to the desirability for considering mitigation measures and to improving estimates to minimize the possibility of litigation.

There are three issues relating to the with-project shoreline impacts: (1) No discussion of the conditions of the jetties is provided. If the jetties are not sand tight, they can contribute to erosion of the adjacent shorelines and increased dredging requirements, (2) No quantification of the existing natural beach and nearshore sediment characteristics is provided, and (3) If any of the dredged sediment characteristics are even approximately compatible with those of the native sediments, consideration should be given to placement of the dredged sediments offshore of one or both of the adjacent beaches such that the waves can transport the better quality (larger size) material shoreward. Additionally, the impact finding as indicated by the above quote is very qualitative and should be sharpened.

Significance – Medium:

Although the project could proceed without addressing the issues raised in this comment, the possible cause(s) of project-related contributions to erosion of adjacent beaches should be better understood and mitigation provided if economically viable. The desirability of mitigation where feasible is strengthened by the USACE’s “Regional Sediment Management” initiative (P. 28 of the Draft DFR).

Comment Cross-referencing:

(17) *Several dredging issues should be clarified to increase confidence in predictive capability and possibly reduce dredging and adjacent beach erosion.*

Recommendations for Resolution:

To address these concerns, the report would need to be expanded to include:

- A characterization of the conditions of the two jetties. In particular, are the jetties sand tight? If not, they will contribute to both erosion of the adjacent beaches and shoaling in the navigational channel.
- A quantitative comparison of the characteristics of the beach and nearshore sediments with those to be removed in both project construction and project maintenance.
- If some of the materials to be dredged are even approximately compatible with those of the native beach and nearshore, an economic evaluation of the beneficial placement of this material should be considered.

Following reanalysis of this issue as discussed above, rewrite the impact assessment in a more

quantitative manner. In particular, reconsider the “three to four miles to either side of the Freeport jetties.” This is an open invitation to litigation.

Comment 16:

For the south jetty, the report should address stability for the end of construction condition and the low factor of safety for the long-term condition should be justified.

Basis for Comment:**GEOTECHNICAL STUDIES**

The borings indicate the existence of soft clays and silts in the foundation of the south jetty. In such soils, the short-term (end of construction) strength will likely be considerably lower than the long-term strength. Accordingly, a stability analysis for the short-term condition should also be performed to ensure adequate stability at the end of construction. It should be noted that stability analysis for the end of construction condition is normally performed as a routine. Associated with this concern are the reported long-term factors of safety of 1.3 for the two proposed enlargement schemes. Design Manual EM 1110-2-1902 recommends a typical acceptable long-term factor of safety of 1.5, but allows for lower values (1.3 or even lower) when uncertainty and the consequences of failure are considered low. A case needs to be made here that the consequences of failure are considered low or that there is an exceptionally low level of uncertainty in the stability calculations.

Significance – Medium:

As deepening of the navigation channel is a central feature of the proposed project, the ability of the seabed soils to resist the additional stresses imposed by the deepened channel must be firmly established. Since engineering measures could most likely be adopted to upgrade the stability of the jetties, this issue is not considered in itself likely to render the project unfeasible; therefore, it was assigned medium importance. However, the engineering measures could prove costly enough to justify that this issue be considered at the feasibility stage.

Comment Cross-referencing:

NA

Recommendations for Resolution:

The geotechnical section of the report should be expanded to include:

- An end-of-construction stability analysis for the south jetty.
- Arguments justifying a factor of safety of less than 1.5 for the south jetty.

Comment 17:

Several dredging issues should be clarified to increase confidence in predictive capability and possibly reduce dredging and adjacent beach erosion.

Basis for Comment:

There are four issues of concern relating to the with-project dredging: (1) The dredging estimates are based on a “table top” study in which coefficients are applied to the changed channel dimensions. This methodology establishes that the annual dredging will increase from the present value of 2.1 million cubic yards (cy) per year to 5.1 million cy per year. No basis is provided for judging the validity of this estimate, (2) No areal distribution of the present shoaling is presented thus hindering the interpretation of the shoaling mechanisms, (3) Placement Area PA-1 may be located so close to the channel that the placed material will contribute to shoaling (recycling), and (4) No discussion is presented of whether the jetties are “sand tight.”

Significance – Medium:

Although the project could proceed without addressing the issues raised herein, the confidence in the overall predicted with-project shoaling rates could be improved, and possibly the shoaling could be reduced if these issues were examined and addressed.

Comment Cross-referencing:

(15) *The impact analysis for the adjacent beaches is not complete and the opportunities for mitigation are not considered.*

Recommendations for Resolution:

To resolve these concerns, the report would require expansion to include:

- A presentation of the applicability of the table top estimation methodology through comparisons with other constructed projects.
- A presentation and interpretation of the present areal distribution of dredging requirements.
- A description of the jetties. In particular, are they “sand tight”? If not, this condition could contribute substantially to the required present and future dredging and adjacent beach erosion.
- Inclusion in the monitoring program of the distribution of shoaling, especially in the entrance channel. If shoaling is abnormal in the vicinity of the placement areas, it may signal the need to reconsider continued placement in these areas.
- Provide cross-sections of the existing channel. In particular, is the design slope of 1:3 generally stable?

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| Comment 18: |
| Scoping and outreach efforts appear to meet only minimal requirements for local participation, and fall short of proactive efforts needed to support report findings. |
| Basis for Comment: |
| Public involvement appears to be minimal and the description of the public impact on p.36-37 is not very informative. No effort to obtain input from the refineries, from the current vessel operators (deep draft and lightering/lightening) or from potential users of the Velasco terminal was documented. No contact with competing ports (Houston and Galveston), petroleum and chemical shippers and receivers, container vessel operators, container cargo customers, the railroads, and other parties whose future activity impinges on plan feasibility was reported. |
| Significance – Medium: |
| This is a requirement of the process that seems to have received minimal attention four years ago. If other activities and contacts have been made, documentation is necessary. |
| Comment Cross-referencing: |
| NA |
| Recommendations for Resolution: |
| To resolve these problems, the report would need to be expanded to include: <ul style="list-style-type: none"> • Identification of attendees at the meeting, their interests and involvement in the plan formulation and later evaluations. • A listing of who else was contacted. • An audit trail of the interviews that were or may have been held and the information that was discovered and evaluated • New interviews with representatives from the refineries, current vessel operators, form potential users of the Velasco terminal, competing ports, shippers and receivers, railroads and container providers. • Consideration of an additional public meeting since it has been four and a half years since the one and only meeting was held. |

Comment 19:

The project justification rests in part on data that are now several years old and must be verified and updated.

Basis for Comment:

Much of the DFR uses outdated data. These data series – and the accompanying analyses, graphics, and conclusions – must be updated using the most recent data available. In most cases the report should reflect complete annual data through 2007. The sources of data should be footnoted to establish an audit trail.

Section II (Problem Identification) contains tables and figures that do not extend past 2003.

Section VI. (Initial Economic Evaluation) contains tables and figures that do not extend past 2003 (e.g., Tables 7, 11, 13, 14).

Section IX (Detailed Economic Analysis) contains tables and figures that do not extend past 2005 (e.g., Tables 16 – 26).

Significance – Medium:

The Freeport Harbor project concerns the operations of only a few terminals and the movement of only a few commodities. These factors could have changed significantly since 2003 due to new economic conditions, crude sourcing practices, post-Katrina refinery operations, or many other factors.

Comment Cross-referencing:

- (6) *The recommended plan is not justified by the current analysis of economic factors.*
- (7) *The traffic forecasts are not documented or justified.*
- (11) *The potential benefits of the project are not supported by the analysis in the report.*

Recommendations for Resolution:

The report should be updated to reflect the current status and latest plans for:

- Traffic by commodity,
- Vessels, loading, and drafts;
- Relevant refinery capacity;
- Lightening and lightering practices;
- Operation of the LNG terminal;
- Development of the Velasco container terminal;
- Pilots' rules and operating practices; and
- Developments at competing ports (e.g., Houston, Galveston).

Comment 20:

There remain significant uncertainties in the environmental analysis that should be addressed by further testing and documentation in the reports.

Basis for Comment:

The potential for contaminated sediments existing in the enclosed portion of the project area (upstream of the ICWW) is difficult to assess given the extensive history of spills and contaminated hazardous waste sites in the watershed and the limited amount of monitoring by the USACE or other agencies.

DEIS 4.9 Hazardous, Toxic and Radioactive Wastes (HTRW).

There is a "slight potential to encounter contaminated material" for three of the alternatives based on the results of the HTRW study. However, this risk is difficult to assess based on the highly industrial nature of the corridor. For example, past hazardous waste sites have contaminated sediments and/or groundwater in other urban bayous and streams. The authors state in Appendix D-1 Page 11 that Dow Chemical has had over 545 spills near or in the project area.

Appendix D. Hazardous, Toxic and Radioactive Waste

No description of the major products that have been spilled into the project area (e.g., volatile hydrocarbons, metals etc.) was provided. The major contaminants spilled (loading) should be listed for assessment of potential sediment contaminant risk.

Over 1181 facilities have had over 545 spills that have discharged into tidally influenced waters that could have transported contaminants into the study area. These spills may have included chemicals that were not monitored by PBS&J. Without knowing what was spilled, it is difficult to assess potential risks from past spills and contaminated sediments within the study area.

Significance – Medium:

Based on the numerous hazardous waste sites and chemical and oil spills that have occurred in the project area, there is significant uncertainty regarding the spatial extent of contaminated sediments in the inner portion (upstream of the ICWW) of the project area.

Comment Cross-referencing:

NA

Recommendations for Resolution:

To resolve these concerns, the report would need to be expanded to include:

- An inventory of spilled substances in order to evaluate the potential for sediment contamination.
- A detailed explanation of how the project sponsors will address the uncertainty

associated with the spatial extent of potentially contaminated sediments prior to or during actual dredging is needed. The focus should be the enclosed channel upstream of the ICWW. Elements of adaptive management should be included in their description.

- This explanation should include estimates of environmental sample frequency and location of areas known to experience a high number of spills and/or near hazardous waste sites.

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| Comment 21: |
| Grassland benefits of flood protection and water quality enhancement are not captured in the HEP analysis. |
| Basis for Comment: |
| <p>DFR: Environmental Evaluation (Pp. 139-140, 141)</p> <p>HEP, a procedure developed by U.S. Fish and Wildlife Service (USFWS), was used by the resource agencies and USACE to evaluate habitat loss and develop mitigation targets. HEP is a widely accepted method for computing loss habitat units based on key indicator species for future mitigation. Later in the DEIS and in supporting documents, there were some discrepancies between the agencies on whether the grasslands should be included in the HEP calculations and future mitigation. The USACE did not factor these in as much as USFWS. Although these disturbed grasslands provide poor quality habitat, they do have other benefits including flood prevention and water quality enhancement. These values are not captured by the HEP evaluation. These potentially altered functions need to be listed and described.</p> |
| Significance – Low: |
| Given the location of the project near the coast, many of the non-habitat impacts associated with land use changes may be minor but still need to be carefully documented. |
| Comment Cross-referencing: |
| NA |
| Recommendations for Resolution: |
| <p>To resolve these concerns, the DEIS and DFR would need to be expanded to include:</p> <ul style="list-style-type: none"> • A description of how other non-habitat values and functions such as water quality protection and flood protection will be affected as a result of the various predicted changes in land use and/or loss of wetlands/prairies under each alternative. |

Comment 22:

The proposed plan for increasing the levee elevations is reasonable, however, a cost estimate that addresses the possibility that dredged sediment consolidation could inhibit the rate of levee enlargement and methods in addition to grouting for strengthening the foundation should be considered.

Basis for Comment:

50-YEAR CAPACITY AND DREDGE MATERIAL PLACEMENT DESIGNATION PLAN (DFR Section XI)

Levee Enlargement

The proposed plan for increasing the levee heights in the upland confined placement areas is a conventional approach that first allows dredged material to consolidate, and then uses dredged material suitable for levee fill. Consistent with common practice, the proposed plan places the initial levee at the extreme outer limit of the placement area to maximize the area of the containment. However, this approach requires that the expanded levee be constructed on consolidating dredge material (Plate F-14). Since sediment consolidation occurs at a slow rate, it is likely that total settlement will not have taken place before additional space is required for more dredge material. Example measures to address this issue include: (1) an analysis confirming that the rate of consolidation of dredge material can keep pace with the rate of levee expansion, (2) in-setting the initial levees further into the PA and heightening them by expanding outward to avoid placement on consolidating dredge material, and (3) accelerating consolidation of the dredge fill by engineering measures such as trenching or vertical wick drains. Full resolution of this issue is not strictly necessary at the feasibility stage, but it would be advisable to perform cost estimates to cover the possibility that some measures may be necessary to ensure that the rate of dredge fill consolidation does not inhibit the rate of levee enlargement.

Strengthening of Levee Foundations

Soft soils encountered in the site investigations indicated potential problems with levee stability in some areas. The feasibility plan proposes to install grout columns in these areas to enhance levee stability. It is not entirely clear that grouting is the most effective, or even a workable, alternative for strengthening the foundation. Clays are too fine-grained to be permeated by the cement grout and their permeability is too low for them to be densified by a compaction grouting procedure. Alternative measures, such as vertical wick drains noted earlier for accelerating consolidation in dredged fill material, have also been used successfully for accelerating consolidation and strength gain in foundation layers. Complete resolution of this issue is not necessary at the feasibility stage; however, some input from a foundation remediation expert to be sure that a reasonable option is being put forward has value.

Significance – Low:

The issues covered here can largely be addressed through design modifications and, therefore, are not likely to directly affect project feasibility. However, since they can affect cost estimates, they merit further attention at the feasibility stage.

Comment Cross-referencing:

NA

Recommendations for Resolution:

The following measures are recommended:

- Either verify through an analysis that the rate of consolidation of the dredge material can keep pace with the planned rate of levee expansion, or adopt engineering measures to ensure that the rate of levee expansion will not be inhibited by the rate of dredge material consolidation.
- Verify that grouting is an effective alternative for strengthening a weak, fine-grained foundation.

Appendix B

Charge to the Freeport Harbor EPR Panel

FINAL CHARGE TO THE PEER REVIEWERS
for

FREEPORT HARBOR, TEXAS
DRAFT FEASIBILITY REPORT AND
ENVIRONMENTAL IMPACT STATEMENT

BACKGROUND

Freeport Harbor is located southeast of the City of Freeport in Brazoria County, Texas. Based on the economic, engineering, and environmental factors considered, the recommended plan in the Draft Freeport Harbor Feasibility Report and Draft Environmental Impact Statement (EIS) includes the following:

- Deepening of Freeport Harbor:
 - From Brazos Harbor to the Brazosport Turning Basin to -52 feet relative to mean low tide (MLT);
 - From Brazosport Turning Basin to the Lower Turning Basin to -55 feet MLT;
 - From the Lower Turning Basin to the end of the jetties in the Gulf of Mexico to -57 feet MLT;
- Deepening the remainder of the channel into the Gulf of Mexico to -59 feet MLT;
- Widening the Entrance and Jetty Channel reach to 600 feet;
- Deepening and widening the Stauffer Channel 3,600 feet at a depth of -50 feet MLT; and,
- Redredging the remainder of the Stauffer Channel to its authorized depth of 30 feet.

It is estimated that the approximately 17.7 million cubic yards of new work material would require five separate dredging contracts to complete. The work is estimated to begin in 2012 and be completed by 2015. The project cost is approximately \$282,895,000.

Because of the importance of this project, an external peer review (EPR) of the Draft Freeport Harbor Feasibility Report and EIS will be conducted. Independent, objective peer review is regarded as a critical element in ensuring the reliability of scientific analyses. The EPR will follow the procedures described in the Department of the Army, USACE, guidance *Peer Review of Decision Documents* (EC 1105-2-408) dated May 31, 2005, 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:

- Draft Feasibility Report (includes the Economic Appendix, Real Estate Plan, and Engineering Appendix) and EIS (includes Appendices A to J)
- Additional engineering reports referenced in the Engineering Appendix of the Draft Feasibility Report. (These documents are provided for reference purposes only; specific charge questions have not been developed for these documents):

1. Freeport Harbor Field Data Collection Program, Final Report. June 2007. ERDC/CHL (Tubman, M., Parchure, T.M, Brown, B., Raphelt, N., and Guay, B.)
 2. Freeport Harbor Ship Simulator Hydrodynamic Study. February 2005. ERDC-CHL (Letter Jr., J.V., Boyt, W.L., Brown, B., Goodin, C.T., and McVan, D.M.)
 3. Navigation Study for Port Freeport, Texas. August 2007. ERDC-CHL (Shelton, T.)
 4. Desktop Sediment Study for Freeport Project. Draft September 2005. ERDC-CHL (Parchure, T.M., Brown, B., Raphelt, N., Vera, L., and Pena, J.)
 5. Evaluation of Improvements to the Freeport, Texas Ship Channel Under Hurricane-Induced Storm Surge Conditions. May 2007. ERDC-CHL (Mark, David J.)
 6. Shoreline Impacts Due To Proposed Deepening of Freeport, Texas Entrance Channel. July 2007. ERDC/CHL (King Jr., David B.)
- EC 1105-2-408, Peer Review of Decision Documents

SCHEDULE

- | | |
|---|------------------|
| 1. Battelle confirms final selection of candidates | June 24, 2008 |
| 2. Freeport Harbor review documents distributed to EPR Panel with charge [15 business days for review] | July 7, 2008 |
| 3. EPR Panel submits technical review comments to Battelle | August 1, 2008 |
| 4. Battelle identifies key issues/themes in comments and distributes to EPR panel | August 4, 2008 |
| 5. Facilitated teleconference to confirm key issues, determine final comments, and assign responsibility for final comments | *August 6, 2008 |
| 6. EPR Panel prepares formatted final comments focused on key issues using formatted structure and submits to Battelle | August 13, 2008 |
| 7. Battelle provides final formatted comments to USACE | August 14, 2008 |
| 8. USACE provides clarifying questions to Battelle | August 15, 2008 |
| 9. Battelle provides the EPR Report to EPR panel for comment prior to submission to USACE (if time allows) | *August 17, 2008 |
| 10. EPR Panel submits any comments to Battelle (if time allows) | *August 18, 2008 |
| 11. Battelle submits Final EPR report to USACE | August 20, 2008 |

*Tentative dates.

CHARGE FOR PEER REVIEW

Members of this peer review are asked to determine whether the technical approach and scientific rationale presented in the Draft Freeport Harbor Feasibility Report and EIS are credible and whether the conclusions are valid. The reviewers are asked to determine whether the technical work is technically 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, 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 overview of the Draft Freeport Harbor Feasibility Report and Draft EIS. 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, EPR panel members can contact each other. However, EPR panel members **should not** contact anyone who is or was involved in the project, prepared the subject documents, or was part of the USACE Independent Technical Review.
9. Please contact the Battelle project manager (Karen Foster, foster@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 EPR Report, but will remain anonymous.

Please submit your comments in electronic form to Karen Foster, foster@battelle.org, no later than Friday, August, 12:00 PM EDT.

**FREEPORT HARBOR, TEXAS
DRAFT FEASIBILITY REPORT AND
ENVIRONMENTAL IMPACT STATEMENT**

FINAL CHARGE QUESTIONS

DRAFT FEASIBILITY REPORT

EXECUTIVE SUMMARY

[No questions]

I. INTRODUCTION

[No questions]

II. PROBLEM IDENTIFICATION

Is the information provided sufficient to describe the identified problem?

Please comment on whether the descriptions of the existing commerce and navigation conditions are clear and complete.

Are the historical trends, particularly recent trends in petroleum imports, adequately described?

Discuss whether the problem related to lightening and lightering is adequately described.

Comment on whether the problem requiring the deepening of the Stauffer Channel is adequately explained.

Are problems related to safety, national security and energy security interests of the United States adequately described?

Are other significant problems to be addressed by this project clearly summarized?

III. FORMULATION OBJECTIVES, CONSTRAINTS, AND CRITERIA

Discuss the adequacy and clarity of the planning constraints and criteria. Are any critical constraints or criteria missing?

To what extent is the sediment use objective clearly stated and constraints on its use identified?

Discuss the extent to which the planning objectives are clear and responsive to the problems identified in Section II.

There is reference to “more specific planning objectives” made in the Planning Objectives subsection. Is it clear how the “more specific planning objectives” translate

into the two broad objectives presented here? Discuss the extent to which the national objectives are reflected in these planning objectives.

Have all relevant technical and environmental issues been considered?

IV. PLAN FORMULATION

Address the extent to which the alternatives considered are comprehensive and appropriate to address the identified problems and opportunities.

Discuss the extent to which the no action/without-project condition is clearly described, including the assumed outcomes from the widening initiative that are included in the no action/without-project condition.

Discuss the adequacy and appropriateness of the approach to the formulation of this plan.

Discuss whether all reasonable nonstructural and structural management measures to address the problem were identified and adequately considered.

Was the Public Scoping Meeting sufficient to solicit comments and concerns from the general public, stakeholders, interested parties, and Federal, state, and local resource agencies?

V. PLAN ASSESSMENT AND SCREENING OF ALTERNATIVES

Please comment on the screening process used to select the initial project alternatives. Were the appropriate criteria and protocols used? Is there additional information that should be considered in the process?

Please comment on the use of the ship simulation in the screening process. Does this simulation add value to the analysis? Does the discussion sufficiently support the conclusions drawn regarding the feasibility of the design alternatives?

Are the impacts to the environment adequately addressed? In your professional opinion, are there potential impacts that were not addressed?

VI. INITIAL ECONOMIC EVALUATION

Discuss the technical adequacy and credibility of the economic analysis approach used in the screening.

Discuss the adequacy of the justification of assumptions of increased utilization of existing fleets and higher concentration of larger vessels that is used in the screening.

Discuss the appropriateness and adequacy of the initial screening approach to identify and retain for further consideration the best project alternatives.

Discuss the extent to which the initial benefit summary justifies the project alternatives carried forward for further consideration.

VII. DETAILED PLAN FORMULATION

[No questions]

VIII. ENGINEERING STUDIES

Is the summary provided in this section consistent with the engineering investigations?

Are the relevant findings presented adequate to support the conclusions drawn?

Hydrology and Hydraulics

Were the field studies conducted to obtain hydrodynamic data to validate the numerical model and for the ship simulation study sufficient for the purpose?

Comment on the representativeness of the field measurement program in terms of seasonal and storm related events. Were all extreme events captured in the field program that could result in non-trivial differences in the hydrodynamic model results or in the ship simulator results?

Comment on the applicability, accuracy, and completeness of the hydrodynamic model with regard to predictions of any significant changes in channel currents.

In your opinion, were the simplifying assumptions reasonable? Were rare strong wind events adequately considered?

Was the model validation appropriate and sufficient? In particular, were field data used for model forcing functions sufficiently independent from those data used for model validation?

Comment on the applicability, accuracy, and completeness of the analysis of wave climate and sediment transport changes caused by the deepening and widening of the offshore channel and their predicted effect on the adjacent gulf coast.

Comment on the applicability, accuracy, and completeness of the sediment transport model with regard to predictions of any significant shoreline changes.

Channel Design Considerations

Has the channel impact on adjacent shorelines been evaluated?

General Engineering

[No questions]

Structural Requirements

[No questions]

Geotechnical Studies

Are the conclusions regarding the placement of dredged material supported by the geotechnical studies?

Cost Estimates

Discuss the extent to which project costs are adequately identified and described.

Discuss the extent to which the assumptions used to make the project cost estimates are adequately identified and justified.

IX. DETAILED ECONOMIC ANALYSIS (and Economic Appendix)

Discuss your overall impression of the extent to which all costs, direct and indirect, are recognized and explained.

In your best professional judgment are the current conditions (constraints on shipping imposed by the current channel depth, width, and traffic rules) and trends are adequately presented?

Crude Petroleum Imports

Comment on the assumptions and statistical methods used to forecast petroleum shipments.

Comment on the assumptions used to project costs and savings based on different trade routes and channel depths.

Crude Petroleum Trade Routes and Methods of Shipment

Discuss whether the relationships between channel depth and the uses and costs of ships of various sizes; of lightering; and of lightening are adequately explained.

Traffic Forecast

Are the assumptions related to traffic adequately addressed and justified? Because this project largely focuses on lowered transportation costs for crude petroleum imports, discuss the adequacy of historic trends in oil use for forecasting given recent trends in oil costs, issues related to global climate change, and projected changes in oil availability over the planning period. Is uncertainty in future oil imports adequately addressed?

Trade Route Forecast

Discuss the extent to which the explanations of savings and benefits are adequately explained and justified, including assumptions of vessels with loaded drafts by route, and sources and magnitude of cost savings.

Stauffer Channel Extension Lower Reach (and Stauffer-Channel Upper Reach)

Provide your opinion on whether the uncertainty related to the strength of the dollar and changing cost of crude oil is addressed and reflected in the economic forecast and corresponding magnitude of cost savings.

Anticipated Traffic Volume

Do the market logistic considerations, regional population, market supply and demand, and Freeport market advantage support the anticipated traffic volume?

Stauffer Channel Upper Reach

[See Stauffer Channel Extension Lower Reach]

Summary of Potential Benefits

Please explain whether the potential benefits and corresponding uncertainty of the project are supported by the analyses in this report.

Summary of Average Annual Benefit to Costs

Discuss the extent to which the benefit to cost ratios and corresponding uncertainty of the project are supported by the analyses in this report.

Sensitivity Analysis

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

Economic Benefits Summary

Discuss the clarity and adequacy of the expected economic benefits to achieve the project and National Economic Development (NED) objectives.

Regional Economic Benefits

Are the expected economic benefits from a regional perspective accurately described?

X. ENVIRONMENTAL EVALUATION

Is the predicted amount of maintenance dredging reasonable? Comment on whether you agree or disagree whether the mitigation measures are suitable when considered in regards to habitat loss.

XI. 50-YEAR DREDGED MATERIAL MANAGEMENT PLAN EVALUATION AND SELECTION

Comment on the description of the project area sediment characteristics and quality. Is it complete and at an appropriate level of detail to support the feasibility analysis?

Are the statements concerning the feasibility of using existing upland confined placement areas (and increasing their levee heights) sufficiently supported and justified?

XII. PLAN SELECTION, RECOMMENDED PLAN, AND PLAN IMPLEMENTATION

Describe the extent to which the recommended plan, including the modifications of the entrance and jetty channel, main channel, and Stauffer Channel, is supported and justified by the analysis of economic factors.

Comment on whether the plan implementation, costs, and cost sharing are consistent with and justified by the preceding sections of this plan and likely to be feasible and sufficient to achieve the objectives of this plan.

XIII. SUMMARY OF COORDINATION, PUBLIC VIEWS, AND COMMENTS

Is the outreach program sufficient to solicit comments and concerns from the general public, state and Federal resource agencies, and any other interested party?

Have all applicable laws been addressed?

XIV. RECOMMENDATIONS

Address the extent to which the recommendations are consistent with the findings of the economic analysis.

Please comment on the consistency of the recommendations with the evaluation of alternatives and environmental impact analysis.

APPENDICES

Freeport Harbor Economic Appendix (105 pp)

[Covered in Section IX: Detailed Economic Analysis]

Freeport Harbor Engineering Appendix (40 pp)

[Covered in Section VIII: Engineering Studies]

Galveston District Real Estate Plan (16 pp)

Does the plan adequately address all real estate interests and requirements?

DRAFT ENVIRONMENTAL IMPACT STATEMENT (Vol I)

EXECUTIVE SUMMARY

1.0 NEED FOR AND OBJECTIVES OF ACTION

Have the environmental implications of increased vessel traffic due to deepening been thoroughly considered and described?

Do you agree that plans for this project are consistent with the USACE Environmental Operating Principles and "12 Actions for Change" mandates?

2.0 ALTERNATIVES

Please comment on whether the proposed project is adequately explained and justified.

Were the process and criteria used to screen alternatives adequate?

Was the use of the 50 year economic life appropriate in the screening analysis – why or why not?

Was the use of ship simulation beneficial to the alternatives analysis? Why or why not?

Should other factors have been considered in the screening of alternatives? If so, what should be included?

Please comment on whether the proposed alternative meets the stated purpose and need of the project at the least cost while minimizing environmental impacts and ensuring navigation safety.

3.0 AFFECTED ENVIRONMENT

3.1 Environmental Setting

Comment on the approach used for the analysis of the physical environment. Is the characterization of the physical environment complete and sufficiently justified by the data presented?

3.2 Water Quality

Comment on the approach used for the analysis of water quality. Have all of the physical, chemical, and toxicological parameters been adequately characterized? If not, what additional parameters should be discussed?

3.3 Sediment Quality

Have the chemical concentrations in, and toxicology of, the surface sediment and maintenance material been adequately characterized? If not, what additional data should be discussed?

3.4 Air Quality

Has the baseline air quality been accurately described?

Have the applicable air quality standards and attainment status for each criteria pollutant been accurately listed?

3.5 Noise

Has the existing noise environment been adequately described?

Have the sensitive receptors been accurately identified?

3.6 Energy and Mineral Resources

Have the energy and mineral resources in the project area been accurately identified?

3.7 Soils and 3.8 Groundwater Hydrology

Is the description of the soil (including prime and unique farmland) and groundwater hydrology located within the project area complete? If not, what additional information should be added?

3.8 Groundwater Hydrology

See Section 3.7

3.9 Hazardous, Toxic, and Radioactive Waste

Was the assessment of Hazardous, Toxic, and Radioactive Waste (HTWR) sites within the project area conducted in accordance with the appropriate USACE guidance? Is the review (including historical aerial photographs, interviews, regulatory agency databases, and a site visit) adequate?

3.10 Vegetation Including Wetlands

Are the upland and wetland vegetation characteristics of the study area accurately described with the appropriate level of detail?

3.11 Terrestrial Wildlife

Have species of mammals, reptiles/amphibians, and birds that occur in the study area been comprehensively and correctly identified?

3.12 Aquatic Ecology

Does the EIS include all the species for which the study area has been designated Essential Fish Habitat? Are the descriptions of the Essential Fish Habitats accurate? Explain whether the fish species and aquatic habitats in the study area are accurately and comprehensively represented.

Is the description of the highly migratory species that may be found in the study area comprehensive?

3.13 Threatened and Endangered Species

Are all the threatened or endangered plants and wildlife that may be found in the study area included and are they described accurately and with the appropriate level of detail?

3.14 Cultural Resources

Are the historical and cultural descriptions of the study area accurate?

Have all previous cultural resource investigations conducted in the study area been described accurately and with the appropriate level of detail?

3.15 Socioeconomic Resources

Comment on the economic and demographic characteristics of Brazoria County. Are they accurately described?

3.16 Land Use/Aesthetics

Has this section correctly described the land use (both present and future development) of the study area?

4.0 ENVIRONMENTAL CONSEQUENCES

4.1 Environmental Setting

Under each alternative, have all of the potential impacts to the physiography/geology of the project area been adequately characterized?

4.2 Water Quality, 4.3 Sediment Quality, and 4.8 Groundwater Hydrology

Under each alternative, have all of the potential physical and chemical impacts to the quality of water (both surface and groundwater) and sediment (both surficial and maintenance material) in the project area been adequately characterized?

4.3 Sediment Quality

See Section 4.2

4.4 Air Quality

Was the methodology used adequate to evaluate the air quality impacts of the No Action, Future Without Project (FWOP), and potential alternatives?

Were the direct and indirect air emissions accurately quantified for each alternative?

Comment on the assumptions used to estimate air emissions for each alternative.

Considering that emissions estimates for each alternative are per year or total project emissions, do you agree with the evaluation of short-term impacts on air quality in the vicinity of the project area?

4.5 Noise

Have the noise impacts associated with the No Action, FWOP, and potential alternatives been accurately described?

4.6 Energy and Mineral Resources

Have the potential impacts on existing energy resources been adequately described?

4.7 Soils Including Prime and Unique Farmlands

Under each alternative, have all of the potential impacts to soils and prime and unique farmlands been accurately characterized?

4.8 Groundwater Hydrology

See Section 4.2

4.9 Hazardous, Toxic, and Radioactive Waste (HTRW)

Under each alternative, has the potential for encountering contaminated material been sufficiently assessed? According to Appendix D, there are a large number of HTRW sites located within the project area. Do you agree with the statement that there is a "slight potential to encounter contaminated material" for three of the alternatives based on the results of the HTRW study?

4.10 Vegetation through 4.16 Land Aesthetics

Are the potential impacts from the proposed alternatives accurately described in appropriate detail? What impacts, if any, are missing?

Are the proposed mitigation activities sufficient to better prevent threatened and endangered species from being adversely impacted by the proposed alternatives?

5.0 MITIGATION

Is the mitigation proposed for the project adequate? Why or why not?

6.0 CUMULATIVE IMPACTS

Is the description of cumulative impacts sufficient to support the conclusion that significant adverse effects from the project are not expected?

7.0 COMPLIANCE WITH TEXAS COASTAL MANAGEMENT PROGRAM

[See Appendix J.]

8.0 CONSISTENCY WITH OTHER STATE AND FEDERAL REGULATIONS

Are the applicable State and Federal regulations accurately identified?

9.0 ANY ADVERSE ENVIRONMENTAL IMPACTS THAT CANNOT BE AVOIDED SHOULD THE PREFERRED ALTERNATIVE BE IMPLEMENTED

In your professional opinion, are there other environmental impacts (other than those stated in the document) that cannot be avoided if this project were to be implemented? If so, please describe.

10.0 ANY IRREVERSIBLE OR IRRETRIEVABLE COMMITMENTS OF RESOURCES INVOLVED IN THE IMPLEMENTATION OF THE RECOMMENDED PLAN.

Were any irreversible or irretrievable commitments of resources omitted? If so, please describe.

11.0 RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Please comment on whether the relationship of local short-term uses of the environment and long-term productivity resulting from project implementation is accurately described.

12.0 ENERGY AND NATURAL OR DEPLETABLE RESOURCE REQUIREMENTS AND CONSERVATION POTENTIAL OF VARIOUS ALTERNATIVES AND MITIGATION MEASURES

Are energy and natural resource requirements adequately described?

13.0 PUBLIC INVOLVEMENT, REVIEW AND CONSULTATION

Is the outreach program sufficient to solicit comments and concerns from the general public, state and Federal resource agencies, and any other interested party?

Have all applicable laws been addressed?

DRAFT ENVIRONMENTAL IMPACT STATEMENT APPENDICES (Vol II)

APPENDIX A. Public and Agency Coordination

[No questions]

APPENDIX B. Ocean Dredged Material Disposal Site Analysis

Is the argument justified that toxicity testing was not necessary?

Comment on the appropriateness of the MDFATE model.

Are the conclusions of the report justified?

APPENDIX C. General Conformity Determination and Air Emissions Estimates

Has the regulatory background and applicability been accurately described?

Is the methodology described for estimating air emissions from the project alternatives appropriate and reasonable?

Do you agree with the methodology used for the comparisons to the State Implementation Plan and General Conformity thresholds?

APPENDIX D. Hazardous, Toxic, and Radioactive Waste Analysis and Data

Appendix D-1. Hazardous, Toxic, and Radioactive Waste Report

Is the site history and description adequate and consistent with other sections of the document?

The search for HTRW sites resulted in several listings. Has the occurrence of these sites within the project area been properly accounted for and assessed for each alternative (refer to Section 4.9)?

Appendix D-2. TelALL Historic Aerial Photo Search

[No questions]

Appendix D-3. Hazardous, Toxic, and Radioactive Waste Interviews

Is the number and quality of interviews sufficient?

Appendix D-4. TelALL Data Summaries

[No questions]

Appendix D-5. Site Visit

[No questions]

APPENDIX E. Programmatic Agreement

[No questions]

APPENDIX F. Socioeconomic Baseline Conditions

Discuss the adequacy and appropriateness of the socioeconomic baseline conditions description.

APPENDIX G. Clean Water Act Section 404(b)(1) Evaluation

Discuss whether you agree or disagree that the proposed plan meets the requirements and guidelines of the Section 404(b)(1) concerning discharge of dredged or fill material into the waters of the United States.

APPENDIX H. Mitigation and HEP/Cost Analysis Report

Please comment on the adequacy of the Habitat Evaluation Procedures (HEP) analysis.

Please comment on the adequacy of the proposed mitigation strategy (Cross reference to Section 5 of the DEIS).

Please comment on the cost effectiveness and incremental cost analysis that was performed to determine which of the three mitigation sites or combination of sites would be preferred.

APPENDIX I. Draft Biological Assessment

Does the draft Biological Assessment accurately describe the potential impacts of the project activities to federally listed threatened and endangered species? Are all the appropriate species included? Are the descriptions of the species' statuses, habitats, ranges, and distributions accurately described?

Are the potential effects to the species included in the Biological Assessment comprehensively described? For those species for which potential adverse effects were anticipated, were the proposed avoidance, minimization, and conservation procedures appropriate to lessen or remove these adverse effects?

APPENDIX J. Compliance with the Texas Coastal Zone Management Programs

Do you agree with the interpretation that the proposed project is in compliance with the various Coastal Zone Management Program goals and policies listed in this document?

Do the information and studies cited sufficiently justify conclusions of compliance?

**FINAL
EXTERNAL PEER REVIEW REPORT**

**for
Freeport Harbor, Texas
Draft Feasibility Report and Environmental Impact Statement**

Executive Summary

Freeport Harbor is located southeast of the City of Freeport in Brazoria County, Texas. Based on the economic, engineering, and environmental factors considered, the recommended plan in the Draft Freeport Harbor Feasibility Report and Draft Environmental Impact Statement (EIS) includes the following:

- Deepening of Freeport Harbor:
 - From Brazos Harbor to the Brazosport Turning Basin to -52 feet relative to mean low tide (MLT);
 - From Brazosport Turning Basin to the Lower Turning Basin to -55 feet MLT;
 - From the Lower Turning Basin to the end of the jetties in the Gulf of Mexico to -57 feet MLT;
- Deepening the remainder of the channel into the Gulf of Mexico to -59 feet MLT;
- Widening the Entrance and Jetty Channel reach to 600 feet;
- Deepening and widening the Stauffer Channel 3,600 feet at a depth of -50 feet MLT; and,
- Redredging the remainder of the Stauffer Channel to its authorized depth of 30 feet.

It is estimated that the approximately 17.7 million cubic yards of new work material would require five separate dredging contracts to complete. The work is estimated to begin in 2012 and be completed by 2015. The project cost is approximately \$282,895,000.

Because of the importance of this project and guidance provided in the Water Resources Development Act (WRDA 2007, Public Law 110-114), an external peer review (EPR) of the Draft Freeport Harbor Feasibility Report and EIS was conducted. Independent, objective peer review is regarded as a critical element in ensuring the reliability of scientific analyses. The EPR followed the procedures described in the Department of the Army, USACE, guidance *Peer Review of Decision Documents* (EC 1105-2-408) dated May 31, 2005, 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 EPR process, summarizes final comments of the EPR panel, and describes the panel members and their selection. The results of this EPR report will be taken into consideration in preparation of the Chief of Engineer's Report.

Battelle initially identified approximately 14 potential peer reviewers, confirmed their availability, evaluated their technical expertise, and inquired about potential conflicts of interest. Of those initially contacted, nine external peer review candidates confirmed their interest and availability, and five 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. The reviewers selected were from academe or were independent engineering consultants. Corresponding to the technical content of the Work Plan for the Freeport Harbor Feasibility Report and EIS, the areas of technical expertise of the selected peer reviewers included: economics, environmental processes, hydrological engineering, geotechnical engineering, real estate, cost engineering, and plan formulation.

The peer reviewers were provided an electronic version of the documents for the Freeport Harbor Draft Feasibility Report and EIS on July 9, 2008, along with a charge that solicited their comments on specific sections of the documents that were to be reviewed. Peer reviewers were instructed to submit responses to the charge questions no later than August 1, 2008. More than 500 individual comments were received from the EPR panel in response to the charge questions.

Following the individual reviews of the documents for the Freeport Harbor Draft Feasibility Report and EIS by the EPR panel members, a consensus discussion was conducted to review key technical comments, discuss charge questions in which there were conflicting responses, and reach consensus on the final comments to be provided to USACE. The final comments were documented according to a five-part format that included, (1) nature of the comment, (2) 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, 22 final EPR comments were identified and documented. Of the 22 final comments, 13 were identified as having high significance, 7 were identified as having medium significance, and 2 comments were identified as having a low level of significance.

Table ES-1 summarizes the final comments by level of significance. Clarifications of each comment are contained in Appendix A of this report.

Table ES-1. Overview of 22 Final Comments Identified by the Freeport Harbor EPR Panel

| # | Comment: |
|------------------------------|--|
| Significance – High | |
| 1 | The problem statement is too general, and does not include a quantitative analysis of current costs and operations. |
| 2 | The reports need to include an explicit, well-documented analysis of vessel drafts and loading practices. |
| 3 | The evaluation of the alternatives is too cursory, both at the initial screening and the subsequent discussion of chosen alternatives. |
| 4 | The alternatives analysis ignores major non-structural alternatives. |
| 5 | The risk from oil and chemical spills for all alternatives has not been addressed. |
| 6 | The recommended plan is not justified by the current analysis of economic factors. |
| 7 | The vessel traffic and commodity growth forecasts are not documented or justified. |
| 8 | There is insufficient detail or documentation to determine the validity of the transportation cost benefits. |
| 9 | The relationship between the channel depth, direct shipment, lightening and lightering should be documented and quantified. |
| 10 | The economic sections lack focused and useful sensitivity analysis, leaving the reliability of the findings in doubt. |
| 11 | The potential benefits of the project are not supported by the analysis in the report. |
| 12 | A detailed description of the no action and the without project alternatives must be presented in comparison to the recommended plan. |
| 13 | The DFR, DEIS, and appendices would benefit from professional editing, better maps, and better diagrams. |
| Significance – Medium | |
| 14 | The effects of deepening on hydrology and the associated water quality within the enclosed portion of the channel are not addressed adequately. |
| 15 | The impact analysis for the adjacent beaches is not complete and the opportunities for mitigation are not considered. |
| 16 | For the south jetty, the report should address stability for the end of construction condition and the low factor of safety for the long-term condition should be justified. |
| 17 | Several dredging issues should be clarified to increase confidence in predictive capability and possibly reduce dredging and adjacent beach erosion. |
| 18 | Scoping and outreach efforts appear to meet only minimal requirements for local participation, and fall short of proactive efforts needed to support report findings. |
| 19 | The project justification rests in part on data that are now several years old and must be verified and updated. |
| 20 | There remain significant uncertainties in the environmental analysis that should be addressed by further testing and documentation in the reports. |

| Significance – Low | |
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| 21 | Grassland benefits of flood protection and water quality enhancement are not captured in the HEP analysis. |
| 22 | The proposed plan for increasing the levee elevations is reasonable, however, a cost estimate that addresses the possibility that dredged sediment consolidation could inhibit the rate of levee enlargement and methods in addition to grouting for strengthening the foundation should be considered. |