**MINUTES OF**
**SOUTHEAST LOUISIANA FLOOD PROTECTION AUTHORITY-EAST**
**OPERATIONS COMMITTEE MEETING**
**HELD ON JULY 7, 2011**

PRESENT: Louis Wittie, Chair
Timothy P. Doody, Committee Member
Stephen Estopinal, Committee Member

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The Operations Committee of the Southeast Louisiana Flood Protection Authority-East (SLFPA-E or Authority) met on July 7, 2011 in the Second Floor Hall of the Lake Vista Community Center, 6500 Spanish Fort Blvd., New Orleans, LA. Mr. Wittie called the meeting to order at 9:30 a.m.

**Opening Comments:** None.

**Adoption of Agenda:** The agenda was approved as presented.

**Approval of Minutes:** The minutes of the June 2, 2011 Operations Committee meeting were approved.

**Public Comments:** None.

**Old Business:**

**A. Discussion of special concrete mix used in LPV 149 (Caernarvon Sector Gate and Floodwall Raise).**

Robert Turner, SLFPA-E Regional Director, explained that issues relative to the special concrete mix originated with some mass concrete pours at the LPV 149 Project. The State requested that the U.S. Army Corps of Engineers (USACE) allow it to core the structure and test the cores. He quoted from an e-mail from John Monzon with the Office of Coastal Restoration and Protection (OCPR) to Col. Robert Sinkler with the U.S. Army Corps of Engineers (USACE) dated July 5, 2011, "Based on preliminary numbers it appears that the concrete will test no better than 2500 psi. It does appear that the concrete has better bonding and strength about 1.5" below the surface. It appears to me, based on Windsor tests performed by SSE on May 27th, and Fugro's results that the problem is not uniform. I believe that the problem is on the surface and that a comprehensive patching job will remediate any spalling problems. Thus, I would like to request that we take corings to determine the extent of the weak concrete near the surface and develop a remediation plan. In the AECOM report that we sent earlier there was a recommendation to remove loose repairs and employ the use of a Latex Modified Patching Mix. I understand that the structure is being watered up and would like to have an opportunity to verify the non-destructive test results. I ask that we, OCPR, be granted the opportunity to core the structure at six locations. Please see map with locations of Fugro's test sites and videos on the following ftp site." The USACE had decided that it would first do some non-evasive testing and would then core

the areas of concern resulting from the non-evasive testing. It was noted that the structure was flooded yesterday.

Mr. Turner pointed out that the breaks after 90 days were well above the 4,000 psi requirement. Mr. Doody commented that his understanding was that a very slow curing concrete mix was used and that there was a communication issue between the people doing the concrete specifications and the people who broke the forms. The results of the tests performed by the contractor were provided to the State. Mr. Doody requested that a copy of the test results be obtained for the Authority. Mr. Wittie commented concerning the ingredients of the special concrete mix and added that the State should have been allowed to do the core tests in order to satisfy itself and the Authority concerning the quality of the mix. The Committee discussed the behavior of the concrete and the 90-day cure time. Mr. Turner advised that the special concrete mix was only used at LPV 149. He described the process and tests that are generally used to develop a curve to determine what can be anticipated from the standpoint of curing. He stated that to the best of his knowledge the procedures he described were not done for the special concrete mix; therefore, it was difficult to know if and when the concrete would meet the design requirements. Mr. Turner further advised that discussions with the State are on-going on this issue. Mr. Doody commented that in the last e-mail communication with Colonel Sinkler, the USACE indicated that the non-evasive tests would be done first, and if the non-evasive tests showed an abnormality, then the USACE would consider other tests. Mr. Turner pointed out that the State's consultant advised that the Windsor test showed that there were problems on the surface concrete. Mr. Doody requested that Mr. Turner schedule a meeting with representatives of the SLFPA-E, OCPR and the USACE Hurricane Protection Office (HPO) on this issue.

**New Business:**

**A. Discussion of issues relative to Armoring for Hurricane and Storm Damage Risk Reduction System (HSDRRS).**

Mike Park with the USACE reviewed some of the research and development efforts that have taken place over a number of years to inform the armoring alternatives and the optimum configuration for armoring the HSDRRS:

- Colorado State University was commissioned to erect the world's largest wave simulator. The simulator allows a continuous flow of water over the testing apparatus.
- Texas A&M has carried out research to analyze the designs for transition armoring and to test the erodability of various materials commonly used in levee construction.
- The LSU AgCenter has supported the USACE in the analysis of grasses commonly used on area levees.
- Experts from the Netherlands have been commissioned to support the design of the testing apparatus and the actual tests at Colorado State University and to analyze the results of these tests to determine the expected performance ranges that could be anticipated from various armoring materials, including grass, turf reinforcement mat, articulated concrete blocks and other types of materials.

- Former members of IPET (Interagency Performance Evaluation Team) were commissioned to conduct a risk analysis that looked at the various armoring alternative configurations under consideration and to estimate the efficacy of the armoring solutions in reducing risks of a breach that could result in a catastrophic flood event and to support the USACE in its armoring evaluation process.

Mr. Park explained that all of the research and development efforts coalesced to the degree that the USACE was prepared about a month ago to move ahead with an armoring alternative analysis process. The USACE will use a multi-criteria decision analysis process that weighs the various alternatives under consideration for their performance against multiple criteria. Generally, the criteria used in the process include risk and reliability, operations and maintenance, environmental impacts, costs and schedule. The USACE's team for the alternative analysis process was convened on May 25, 2011. Six different configurations of armoring that could be put in place around the system were considered. Three configurations were based on delivering at least a uniform level of resiliency for a storm surge from a 500-year or **.**2 percent event and three configurations were based on at least a 750-year event.

Mr. Park reviewed the first set of alternatives that deal with a 500-year storm surge event:

- The first alternative is strictly based on estimated performance ranges for various armoring materials using overtopping rates expected for a 500-year storm surge event with a 50 percent confidence of non-exceedance. Grass is the effective armoring material for an area where the overtopping rate is between zero and one cubic foot per second (cfs) per foot. Turf reinforcement mat (TRM) is the effective armoring material for an area where the overtopping rate is in excess of one cfs per foot, but less than four cfs per foot. Articulated concrete block would be used in excess of four cfs per foot at any point around the perimeter. The USACE did not find any location around the east or west bank perimeter where the overtopping rate would exceed four cfs per foot for a 500-year storm surge event. Therefore, all of the alternatives were based on either turf cover or TRM for the 500-year event.
- The second alternative considered whether a modest increase in elevation would result in the ability to use grass in lieu of the TRM.
- The third alternative basically is the equivalent of the first alternative; however, in areas where a breach in the system would result in catastrophic losses, the application of an armoring solution such as TRM would be used to abate the risk of catastrophic loss and make the system more resilient, even though the overtopping rate for the 500-year event would not have led to such an application.

Mr. Park advised that the second set of alternatives that deal with a 750-year storm surge event are pair-wise the same concepts as the 500-year event. He discussed some of the tests performed on different grasses under various conditions, as well as TRM and articulated concrete block, and the performance results.

Mr. Park explained that the alternative analysis process was conducted on May 25th with an internal USACE team and that he, at the request of the Coastal Protection and

Restoration Authority (CPRA), represented the concerns of the non-Federal sponsor. The team included representatives from USACE's Project Delivery team, the IPET Risk Team, the USACE's Operations Division and environmental specialists. Dean Arnold and Rubin Mabry have been the program management team for the development of the armoring process. The outcome of the analysis was that the highest ranked alternative was alternative three for a 500-year uniform level of resiliency all around the system's perimeter, but with an enhanced level of resiliency in those areas where a breach in the system would result in catastrophic losses. Virtually every point around the perimeter of the system has some form of enhancement to make the system more resilient under this scenario. The equivalent 750-year armoring alternative did not rank at the top primarily because the overtopping with a storm surge for a 750-year event would be so massive around the perimeter that you would not buy down much risk by having a system in a no fail condition because the area would be inundated anyway.

Mr. Park explained that a meeting was convened on June 6th with representatives from the CPRA, the Flood Protection Authorities and levee districts. In the June 6th meeting the results determined by the alternative analysis process team were laid out and input was solicited from the State. Another meeting was convened on June 20th during which the USACE heard the concerns of the State. The State provided a written response to the USACE by June 24th. The State's written response requested that TRM and articulated concrete block not be used because of issues relative to the operation and maintenance of those applications. The State indicated that it wanted the levees built higher in order to reduce the overtopping rates to less than one cfs per foot all around the system with grass used as the method of armoring. The USACE gave consideration to the State's request and to the method proposed to accomplish the request through the placement of gravity walls on top of the levees. The gravity walls could be removed in the future when a lift is required. However, the USACE determined that the method proposed to meet the State's request would not meet the purpose of the authorization for armoring, which is to make the system resilient when it would be overtopped. He pointed out that methods for raising the levees have the potential to be overtopped; therefore, a failure of the system could be precipitated should the system not be armored with measures to abate the erosion. Additional technical concerns were brought up during the USACE's consideration relative to the potential inducement of a more erosive environmental on the floodside where waves would be breaking against the vertical bases.

Mr. Park advised that the alternative analysis team was reconvened on June 28th. A seventh alterative was added based on the non-federal sponsor's concern about the use of TRM and articulated concrete block and the team sought in its analysis to minimize the use of these materials. The seventh alternative removed the use of TRM or articulated concrete block in areas contained in the optimum alternative determined in the first analysis where these applications were to be used to improve resiliency because of the potential for catastrophic loss should a breach occur and used grass instead. The seventh alternative ranked fourth in the second iteration of the alternative analysis. The alternative selected by the team in the first iteration emerged as the leader again in the second iteration. A sensitivity analysis was conducted to determine whether the ranking was sensitive to the weights given to the respective criteria and the weights were subsequently adjusted. The alternative based on a 500-year level of

resiliency with enhanced levels of resiliency in areas subject to catastrophic losses in the event of a breach ranked highest. The outcome of the alternative analysis process was communicated by e-mail yesterday to the State and other interested entities with an offer to convene a meeting with the Flood Protection Authority, the levee districts and OCPR in order to lay out the details and outcome of the analysis.

The Committee discussed the initial establishment of turf, the re-establishment of turf, when required, and the use of TRM. Mr. Doody requested that the SLFPA-E have input into the process in areas where levees may need to be raised within the next ten years and costs would be incurred removing the TRM. Mr. Park advised that he would not advocate foregoing the placement of armoring materials at this time that would reduce the risk of a breach or failure until the point that a levee lift is constructed. He acknowledged that there would be challenges with replacing armoring materials in the future and suggested that the restoration of armoring applications should be considered in future levee lifts. He noted that the installation of TRM is not an extraordinarily costly application. Mr. Park clarified that the USACE's authorization is for implementation of armoring at 100 percent Federal cost upon completion of the construction of the system; however, the USACE does not have Congressional authorization to fund armoring at 100 percent Federal cost at a future time.

Mr. Turner expressed concern about the use of sod on levees. He explained that he was unsure that the sod would hold on the levee slope the first time the grass is cut by a levee district tractor. Mr. Park explained that the USACE has used sod discretely around the system in small applications. The USACE's intent is not to use sod on an earthen section along levee reaches until the point when the sod would be applied over the TRM to achieve a uniform and robust turf cover in less time in order to reduce risks. Sod specifications and application were discussed.

Mr. Park advised that a presentation on armoring would be provided to the SLFPA-E Board at its meeting on July 21st and to the CPRA at its July 20th meeting.

**B. <u>Discussion of repairs at Pump Stations 2 and 3. (LBBLD)</u>**

Stuart Williamson, Lake Borgne Basin Levee District (LBBLD) Executive Director, explained that an emergency was declared by the Board in 2010 for a contractor to perform temporary repairs. The LBBLD has been coordinating its activities with FEMA and a FEMA Project Worksheet has been signed for the project at Pump Stations 2 and 3. A competitive selection process was conducted by the SLFPA-E and W. S. Nelson and Company was selected for the project. A scope of work and contract were negotiated with W. S. Nelson for Phase One of the project with a not-to-exceed amount of $42,000. Eustis Engineering was the sub-consultant on Phase One. A report was provided by the consultant on a path forward with the repairs. The consultant also asked to perform a global stability analysis on the structure. An estimated construction cost of $3 million was received from W. S. Nelson ($1,700,000 for Pump Station 2 and $1,300,000 for Pump Station 3), which is being reviewed by FEMA. A contract is needed with W. S. Nelson for Phase Two (engineering and design services). Estimates were received from W. S. Nelson of $195,000 for engineering and design and $214,000 for construction management and inspection. The aggressive schedule that was

developed is achievable if the engineering and design contract is in place by mid-July. The schedule anticipates the development of plans and specifications by September 30th, the bid process to take place between November 1st and December 31st, award of the contract around January 1, 2012 and construction completed by May 31, 2012.

Mr. Turner advised that he would consult with Mr. Lacour on the drafting of a resolution to present to the Board relative to the negotiation of the contract with W. S. Nelson for the required engineering and design services (Phase Two).

**Levee District Reports:**

**East Jefferson Levee District (EJLD):** Jonell Blowers, EJLD Administrative Assistant, reviewed the highlights of the monthly status report (copy appended to minutes).

**Orleans Levee District (O.L.D.):** Gerry Gillen, O.L.D. Executive Director, reviewed the highlights of the monthly status report (copy appended to minutes). Mr. Gillen advised that three or four of the floodgates have not been operated and that a backup plan will be needed for the current hurricane season. Mr. Doody requested that Mr. Gillen send a letter to the USACE relative to this issue and that a copy of the letter be sent to Board members and OCPR.

**Lake Borgne Basin Levee District (LBBLD):** Stuart Williamson, LBBLD Executive Director, reviewed the highlights of the monthly status report (copy appended to minutes). He advised that the USCE will be driving sheetpile at the berm constructed at the location of the Chalmette Ferry Landing. In addition, an after action report on the high river will be developed by the LBBLD in July. Mr. Doody requested that an after action report be prepared by each of the levee districts. At LPV 145 the temporary bridge is scheduled to be abandoned on 8-26-11. The lack of access to floodgates in this area was discussed and Mr. Doody recommended that a waiver be sought to keep the gates closed during the current hurricane season due to the access problem.

Mr. Turner informed the Committee about the possibility of obtaining additional grant funding. The Authority is working with the State on this matter. A list of potential projects for grant funding is being compiled.

There was no further business; therefore, the meeting was adjourned.