

MEMORANDUM FOR RECORD

SUBJECT: Minutes from the 27 February 2009 CWPPRA Technical Committee Special Work Group Meeting on the West Bay Sediment Diversion Project

1. Mr. Thomas Holden opened the meeting at 9:35 a.m. The following Technical Committee members were in attendance:

Mr. Darryl Clark, U.S. Fish and Wildlife Service (FWS)
Mr. Rick Hartman, National Marine Fisheries Service (NMFS)
Mr. Thomas Holden, U.S. Army Corps of Engineers (USACE), Chairman
Mr. Tim Landers, Environmental Protection Agency (EPA)
Mr. Britt Paul, Natural Resources Conservation Service (NRCS)
Mr. Kirk Rhinehart, LA Office of Coastal Protection and Restoration (LAOCPR)

A copy of the agenda is included as **Encl 1**. A copy of the sign-in sheet is included as **Encl 2**.

2. Agenda Item 1. Welcome (Holden). Mr. Holden announced that the purpose of this meeting is to review and discuss the draft Work Plan and Scopes of Work (SOW) for the West Bay Sediment Diversion Project. In November 2008, the Task Force directed the USACE and State to find an alternative funding source to cover the Pilottown Anchorage Area (PAA) dredging cost or closure of the diversion channel by 2012. The Task Force also directed the USACE and State with consultation from the maritime industry to finalize a Work Plan on river shoaling in the West Bay Project area by February 28, 2009. The Work Plan shall include an analysis of the current and historic bathymetry, quantify the total historic and recent shoaling before and after project construction, estimate the volume of shoaling resulting from the project and from natural processes, and estimate the volume of sediment that has been removed from the river resulting in a decrease in dredging required in the vicinity of and downstream of the West Bay Diversion. A final report must be provided to the Task Force within six months. The final Work Plan and report should be independently reviewed by members of the CWPPRA Academic Advisory Group and the Louisiana Coastal Area (LCA) Science and Technology (S&T) Program within 30 days of completion.

Mr. Holden said that the USACE and State have been working on the draft Work Plan since November 2008 and will present what has been done to date. There are some areas where the USACE and State have achieved alignment and commonality and some areas that still need improvement. The USACE New Orleans District Project Team has been working with the USACE Mobile District, the USACE Engineer Research and Development Center (ERDC), and S&T Program Director Dr. Barb Kleiss, while the State has been working with a consultant, BCG. The focus of this meeting is for the West Bay Project Teams to obtain guidance and direction from the Technical Committee to move forward with the proposed scope, cost, and schedule.

Mr. Holden expects the USACE and State Project Managers to work side-by-side to resolve any issues and form a partnership that demonstrates the two parties' commitment to answer the questions posed by the Task Force.

Mr. Rhinehart echoed Mr. Holden's sense of urgency. The State wants a resolution as quickly as possible and wants to know: Is the West Bay Sediment Diversion Project causing shoaling in the PAA and if so, how much? The State started to provide technical support towards addressing this issue immediately after the Technical Committee discussion in the fall of 2008. While Mr. Rhinehart agrees with Mr. Holden that the State and USACE should work together and engage all Technical Committee members as the Work Plan moves forward, he expressed that there has been a disconnect in the Work Plan development to date as far as the State's involvement with what was presented at this meeting.

Mr. Rhinehart stated his preference to kick off the meeting with a review of the State's strawman report that outlines a possibly cheaper and faster way to find a resolution. There may not be a need for more detailed studies, modeling, and data collection in order to address the issue. The Technical Committee may be able to first look at the issue from a broader perspective to determine if the physics support looking into a more detailed effort. Mr. Rhinehart proposed that Mr. Luke LeBas, Senior Technical Engineer for LAOCPR, present the update on the State's efforts earlier in the meeting, before the more detailed SOWs are presented.

Mr. Holden tabled responses to Mr. Rhinehart's proposal until after all Technical Committee members had an opportunity to make opening comments.

Mr. Clark commented that the FWS wants to keep the channel open and believes river diversions are one of the main sustainable restoration activities. He said that the draft Work Plan is well written, but includes information that is not needed. FWS would like the sponsoring agencies to work together on the main elements of the Work Plan that address the Task Force issues concerning the effects of West Bay on the anchorage area while minimizing costs.

Mr. Paul is interested in the outcome of a lighter version of the Work Plan as Mr. Rhinehart mentioned and is in favor of starting at the first phase: How much, if any, shoaling is caused by the West Bay Diversion? Mr. Paul would also like to see the State and USACE coordinate more closely together during the Work Plan development.

Mr. Hartman said that the Work Plan needs to be completed in a short period of time because next year the Task Force will be asked to fund \$15 to \$20 million for a 2012 West Bay Project dredging event in the PAA. The money will either be used for a dredging event or to plug the channel. NMFS does not want to put the USACE's efforts on hold unless the USACE officially determines that the State's efforts would be sufficient. In the past the USACE has determined that CWPPRA navigation channel studies were not sufficient. Mr. Hartman would like the State and USACE to work together to move as quickly as possible towards a Work Plan on which both sides can agree.

Mr. Landers thanked the USACE and the State for rapidly working on this effort and giving other restoration partners the opportunity to engage on the West Bay issue. It is important to

resolve this issue definitively and rapidly, as there are clear implications to the direction of significant coastal restoration activities. The EPA has determined that freshwater reintroductions are an absolute tool to address land loss. CWPPRA needs to work collaboratively on techniques that can address the 23 square miles of land loss per year in coastal Louisiana in a decisive manner that is consistent with the way the delta was first formed. The single most important question is whether or not the West Bay Diversion is causing shoaling in the PAA. Mr. Landers hopes that this effort will bring a better understanding of and empirical evidence for what has historically happened in the anchorage area.

DECISION: Mr. Rhinehart proposed moving Mr. Luke LeBas' report on the State's efforts in Agenda Item 6 before Agenda Item 3. Mr. Clark seconded. Mr. Holden tabled the motion for further discussion.

Mr. Holden said that one of the challenges is to ensure that the information used to make decisions on river management is in line with the USACE's Federal responsibility to manage the Mississippi River and tributaries. The USACE has managed the Mississippi River for over eight decades without major incidents. The Mississippi River Commission (MRC) will ultimately challenge the comprehensiveness and adequacy of the science and engineering discussed at this meeting. CWPPRA must be able to withstand the MRC's scrutiny of the Work Plan. The Task Force requires that the Work Plan include estimates on the volume of shoaling resulting from the West Bay Project, volume of shoaling from natural processes, and the volume of sediment that has been removed from the river decreasing the dredging required. The State's consultant, BCG, had full disclosure to the USACE's data. Part of the development of the agenda flow was to present the information in a logical order. The very essence of the accuracy under scrutiny is to address the assumptions of problem definition, boundary conditions, and unknowns. The State and USACE Project Managers have to lead this effort.

Mr. Rhinehart stated that Mr. LeBas was going to present high-level information that should be discussed early in the meeting. Mr. Hartman stated that he was okay with switching the order of agenda items and added that the USACE has to be satisfied with the Work Plan to be able to defend the results.

Mr. Rhinehart posed the question to the Technical Committee: What is the decision process for the West Bay issue? This is a CWPPRA issue and is also part of the Mississippi River and Tributaries Project. Ultimately, do the conclusions made by the CWPPRA community have any weight on the issue, or does it then go before the MRC? Mr. Rhinehart added that since there are competing interests, he was not sure what the ultimate path would be for a final decision. Mr. Holden encouraged Mr. Rhinehart to pose this question to the Commander General at the Mississippi River Freshwater Diversion Summit in New Orleans March 3-5, 2009.

Mr. Rhinehart expressed his concern that though the Task Force may reach a resolution and consensus, the State and USACE may never be on the same page with regard to shoaling issues. Mr. Rhinehart stated that he understands that the Work Plan must pass USACE muster, but remains slightly pessimistic.

Mr. Hartman commented that CWPPRA is legally bound to dredging the anchorage area because there is a document in the navigation industry that says that if CWPPRA is responsible for shoaling, then CWPPRA will pay for the dredging. The USACE does not have authorization to dredge the anchorage area. If it is determined that CWPPRA is responsible for a portion of the shoaling, then either CWPPRA has to pay for dredging that portion, the authorization needs to be changed to allow the USACE to dredge the anchorage area, or the channel should be closed. Mr. Hartman added that recent reports show that sea level rise is higher than expected with an estimated 4 to 5 feet rise by the end of the century. Mr. Hartman asked: Does CWPPRA really want to invest money this far down into the system? If at the end, there is still a disagreement between the USACE and State on who is responsible for the shoaling, CWPPRA may have to cut and run. Mr. Paul said that the Task Force has to make the final decision using information provided to them by the Technical Committee.

DECISION: Mr. Holden returned to the previous motion offered by Mr. Rhinehart to move Mr. LeBas' presentation from Agenda Item 6 before Agenda Item 3, which Mr. Clark seconded. All members of the Technical Committee voted in favor except for Mr. Holden. The motion was approved.

Mr. Holden announced that Ms. Cherie Price, USACE, would be in charge of the rest of the meeting.

3. Agenda Item 2. Overview/Report: West Bay Project Background, Status, and Work Plan (Price). Ms. Price reported that the original West Bay concept was part of the LCA Land Loss and Marsh Creation Feasibility Study in 1990. The project was added to CWPPRA PPL 1 in 1992. Initial construction of the 20,000 cubic feet per second (cfs) diversion was completed in November 2003. The diversion conveyance channel is located at mile 4.7 above Head of Passes. The PAA extends from mile 1.5 to mile 6.7 along the right descending bank of the Mississippi River. The United States Coast Guard designated the PAA as a safe harbor outside of the Federally maintained navigation channel. The pre-construction agreement with river users called for maintaining certain depths to allow ship access and anchoring. The project cost share agreement provides details on anchorage area maintenance requirements and states that "...the anchorage and access areas shall be maintained at the depths existing at the time the Phase One interim conveyance channel is constructed..." and that "...above the cut, three 45-foot deep by 1,500 feet long anchorage berths shall be constructed and/or maintained." At the time of construction, the USACE was only dredging the shallow draft portions of the PAA and there was a deeper portion upstream of the cut that did not require maintenance. Ms. Price reported that 488,000 cubic yards of material were dredged from the PAA in 2003 and 1.4 million cubic yards were dredged in 2006. Approximately 1.75 million cubic yards will be dredged in 2009. The USACE Operations Division has been absorbing the cost of maintenance dredging the navigation channel in the vicinity of West Bay.

Project monitoring, including river depth surveys, channel condition surveys, and monthly discharge volume measurements, has been ongoing since construction. The State has been involved with the ecological monitoring and collection of aerial photography and will complete an updated survey of the receiving area. To date, there has been no sub-aerial marsh creation, but 364 acres were created through the beneficial use of material dredged from this area.

Ms. Price reported that the West Bay Draft Work Plan is complete. The Schedule and Cost Change Request (SACCR) was approved by the Task Force in November 2008 and was amended in January 2009 to only include the \$11 million needed for the 2009 dredging event. The State will receive the SACCR for review during the week of March 2nd. The Project Team is on track to meet the June 2009 deadline to dredge the anchorage. An emergency closure plan and specifications are under development.

Ms. Price said that the dredging costs for West Bay have increased from \$1.65 per cubic yard in 2002 for a fully funded 20-year estimate of \$22.3 million to \$6.10 per cubic yard in 2009 for a fully funded 20-year estimate of \$140.8 million. Dredging quantities have also increased, which prompted re-evaluating the shoaling in the PAA to determine exactly how much shoaling was induced by the West Bay Project and potentially how much would have occurred naturally without the project.

Components of the Work Plan include: conveyance channel discharge analysis and development, chronological study of the lower Mississippi River hydraulic modifications, data collection, geomorphic river bed analysis and 1D numerical riverine modeling, update on the State's efforts, multidimensional riverine numerical modeling, West Bay receiving area analysis, report development, peer review, cost estimate and duration, and alternative funding sources.

Ms. Price explained that existing hydraulic and sediment transport modeling has several limitations. Previous modeling efforts were performed and developed independently over 10 years and all models predicted different shoaling rates. A comprehensive modeling approach will be employed using modeling and analysis tools designed to overcome previous modeling limitations.

Benefits of the Work Plan include: providing a foundation and lessons learned for planning other river diversions, improved sediment transport modeling technology, collaborative process, comprehensive systems approach, adaptive management, and unprecedented sediment data collection on the lower Mississippi River.

Ms. Price opened the floor to comments from the Technical Committee.

Mr. Rhinehart asked Ms. Price about the preliminary budget. Ms. Price replied that there are two options: Option 1 is for the multidimensional modeling of sands and Option 2 is for the multidimensional modeling of sands and silts. The cost estimates to CWPPRA are broken down in the table below:

Option	Data Collection	Modeling and Analysis	Fed Project Management	External Peer Review	Total	Duration
Option 1	\$262,545	\$296,600	\$110,000	TBD	\$669,145	6 months
Option 2	\$262,545	\$356,600	\$110,000	TBD	\$729,145	12 months

Mr. Rhinehart asked about additional funding sources. Ms. Price replied that the LCA S&T Program paid for the first round of data collection, absorbing nearly \$200,000 for this effort. This cost is not included in the table above. Dr. Kleiss clarified that the federal cost share was

\$121,000 and was used to collect high-water data in support of the West Bay Project as well as the regional modeling plan.

Mr. Rhinehart asked how many funds accrued to date would be charged to CWPPRA. Ms. Price asked Ms. Melanie Goodman, USACE, to respond. Ms. Goodman said that those reports were not yet available and added that most expenditures are for USACE New Orleans District and ERDC labor.

Mr. Rhinehart said that he wants to focus on the empirically derived data and not pit modeler versus modeler. Models are tools, but discharge volumes and bathymetry should be reviewed first. Mr. Clark agreed that an emphasis should be placed on analyzing the pre- and post-bathymetry for West Bay.

Ms. Price noted that while bathymetry and stage data is available for the lower river, there is no suspended sediment data in the vicinity of West Bay. Ms. Nancy Powell, USACE, added that particle size and suspended sediment data is being collected to establish a solid understanding of particle distribution in the water column.

Mr. Hartman asked that since modeling clays and silts will not occur within the year, will there be an answer in six months? Ms. Price said that Mr. Gary Brown, USACE-ERDC, would cover this topic during his presentation in Agenda Item 7.

Mr. Landers asked if the maintenance dredging target elevation in the anchorage area is based on the elevation before or after the advanced dredging in 2003. Ms. Price replied that the target elevation was prior to the 2003 advanced dredging event. Mr. Keith O’Cain, USACE, added that each subsequent maintenance cycle re-dredges the advanced maintenance area.

Ms. Price opened the floor to comments from the public.

Mr. George Duffy, NSA Agencies and a member of the Governor’s Maritime Advisory Task Force, expressed concern that the maritime industry had not been consulted during development of the Work Plan. The maritime industry challenged previous modeling efforts and felt based on experience that the shoaling would occur and asked for the dredging agreement to be included. Shallowing in the area is causing a serious safety issue as more vessels are being forced into the main navigation channel. The maritime industry has asked the USACE to determine the value of sediment being placed in the area. Ms. Price added that the models developed during the planning phase were the best available at that time and met their original intent. There is now room for improvement as ten years have passed since the first modeling effort.

Mr. Sean Duffy, representing the Gulf States Maritime Association, the Lower Mississippi River Water Safety Advisory Commission, and the Maritime Navigation Safety Association, said that the Task Force motion clearly states that the Work Plan will include input from the maritime industry, yet the maritime industry has not been advised. There are safety issues, such as nonprofessional mariners encroaching on the deep-draft channel, which have not been addressed. The Work Plan development is not going the way the maritime industry expected. The Work Plan has been finalized, but members from the maritime industry have not been consulted. The

anchorage area used to hold 30 deep-draft vessels and now only five or six can use the anchorage. The agreement between the State and maritime industry is not being upheld. The maritime industry wants to see restoration, but the West Bay Project has not created a single acre. The acres created have been from beneficial use of dredge material. Ms. Price clarified that the Work Plan is still in draft form and the intent of this meeting is to receive comments from the Technical Committee and maritime industry.

Mr. Holden said that Mr. Sean Duffy is correct; the maritime industry should be given the opportunity to be part of the Work Plan team. Mr. Holden said that the project managers will ensure that the maritime industry is consulted henceforth.

Mr. Hartman asked when would be the appropriate time to provide comments on the draft Work Plan. Ms. Price stated that everyone would have two weeks to provide written comments.

Mr. Hartman asked if the Work Plan included any alternative actions or construction modifications that could be done to reduce sedimentation in the river and anchorage area. Ms. Price replied: No. Mr. Hartman added that there should be a discussion on whether CWPPRA should use adaptive management to modify the project.

4. Agenda Item 6. Report: Update on State efforts (LeBas). Mr. Luke LeBas, Engineer Manager with OCP&R and State Technical Lead for the West Bay Project, presented the State's effort on the West Bay analysis and potential implications of shoaling. The State's intention is to provide an independent view to supplement, but not supersede the USACE's effort. The State would like to include the analysis performed with BCG as an appendix or chapter in the Work Plan.

The main tasks are data collection, riverine geomorphic analysis, numerical HEC-6 modeling, and a project timeline. The State is comparing USACE bathymetric surveys to determine how elevations have changed over time in the vicinity of the anchorage area. Four conditions will be modeled: pre-project, advanced maintenance of the anchorage and access area without the diversion, diversion without advanced maintenance, and a combination of the diversion with advanced maintenance. The constructed diversion flow of 20,000 to 25,000 cfs will be used during modeling. The State will work with the USACE to make sure both agencies are on the same page to develop concrete evidence and clear tools for decision-making.

The State's main issue is that potential financial implications to CWPPRA are devastating. If the diversion is causing the shoaling, then the State will determine how to best handle the situation as an agency. The fact that the anchorage area is shallowing at an alarming rate and causing a safety issue is frightening. If this occurs on a 20,000 cfs diversion, then CWPPRA will have to re-evaluate how to handle large-scale diversions such as Myrtle Grove. Mr. LeBas added that the State hopes to begin surveying the outfall area within the next four to six weeks.

Ms. Price opened the floor to comments from the Technical Committee.

Mr. Rhinehart asked Mr. LeBas about the budget for the State's efforts. Mr. LeBas replied that the estimated budget is \$150,000. The report should be finished within four to six weeks and will be circulated to everyone for review.

Mr. Rhinehart would like to mesh the State's and USACE's efforts so they are combined as best as possible. Mr. Clark suggested developing more detailed scopes of the State's efforts and said that it is reasonable to include this information in the Work Plan.

Ms. Price asked Mr. LeBas if a peer review of the State's efforts would be conducted before submittal. Mr. LeBas replied that all parties will have the opportunity to review the State's report.

Mr. Holden would like input from Dr. Kleiss on how to best incorporate the State's report into the Work Plan without duplicating the information. Mr. Rhinehart would also like to hear thoughts from the maritime industry as the Technical Committee devises a path forward. Ms. Price added that the navigation industry will have an opportunity to provide feedback before the Work Plan is finalized. Mr. Sean Duffy said that he would solicit information from the crescent and bar pilots.

Mr. Landers commented that there are potential synergies in the data collection and interpretation phases. It is helpful that the costs are inclusive and not additive. Ms. Price added that the USACE would take advantage of BCG's efforts and utilize this information in the Work Plan.

5. Agenda Item 3. Reports: West Bay Conveyance Channel: Discharge Analysis and Development (O'Cain and Henville).

West Bay Conveyance Channel: Development

Mr. Keith O'Cain, USACE Engineering Division, provided an overview of the diversion channel development. The original channel template has a 195-foot bottom width to an elevation of minus 25 feet with a top width of 450 feet. The USACE has been taking periodic surveys since construction of the channel. Mr. O'Cain presented bathymetric survey data from January 2004 to January 2009. Over the past five years, shoaling has progressed across the initial dredging cut and scour holes developed to depths of minus 60 feet. The January 2009 survey shows that the scour hole is now at a minus 70 foot depth. Mr. O'Cain also presented channel cross-section data to show the changes in channel geometry over time. The data shows that the cross-sections have doubled in size and capacity.

Mr. O'Cain discussed the potential closure plan. The USACE is looking into preliminary design efforts. A similar issue occurred in 2003 14 miles below Head of Passes at Burrwood Bayou. The USACE built a closure structure at Burrwood Bayou because this channel was capturing 35 to 40 percent of the flow from Southwest Pass. The area recovered after closure. For the West Bay Diversion, the potential closure plan includes construction of a 2,500 linear foot rock structure using approximately 150,000 tons of rock. Another option would be to construct a 200-foot crown width peninsula of earthen fill with sand available on-site. A notice to proceed has been issued to a contractor to conduct site-specific surveys that should begin the week of March 2nd.

Ms. Price opened the floor to comments from the Technical Committee.

Ms. Price asked if the conveyance channel would eventually reach an equilibrium point or continue to grow over time. Mr. O’Cain replied that the construction process was two-phased and started with a 20,000 cfs diversion that could go up to 50,000 cfs. As the first large scale diversion project, there was a wide range of possibilities on what the channel would actually do. There has been fairly uniform scouring of 5 to 10 feet each year. Soil borings indicate that there is a stiff clay layer at minus 120 feet, so the scour should not go beyond this depth. Mr. O’Cain does not believe that the channel has finished developing and will continue to migrate.

Mr. Hartman asked about the closure cost at Burrwood Bayou. Mr. O’Cain said that he was not sure, but could get this information to the Technical Committee.

Mr. Holden asked: 1) Is the issue of channel movement and increased flow through the channel captured in the current Work Plan effort, and 2) When should CWPPRA start to develop a modification plan to adjust the channel to stay within certain parameters in lieu of closure? Mr. O’Cain responded that West Bay is capturing between six and eight percent of the river flow. If the flow should increase or the scour hole extends into the channel beyond the rock dike, this would trigger a closure similar to Burrwood Bayou.

Mr. Clark expressed his hope that CWPPRA does not reach a closure situation with the West Bay Diversion. If closure is required, would dredge material from the PAA be used to form an earthen-plug? Mr. O’Cain said this would be an option. Mr. Clark commented that sediment retention enhancement devices or Shreds could also be used to trap more sediment and could be used during the next PAA dredging activity. Mr. O’Cain added that the Shred concept was considered in the original design for West Bay, but was not installed. Shreds will be used during the upcoming PAA dredge event to build an island in the middle of the receiving area.

Mr. Hartman asked if there was a potential that the USACE would decide to close the West Bay Diversion and then present CWPPRA with the bill since it is a CWPPRA project. Mr. O’Cain said that having CWPPRA pay for closure was part of the original emergency closure plan. Mr. Paul asked if money for closure was included in the original cost. Mr. Clark noted that the Task Force voted in November 2008 to fund a closure plan, if needed.

Mr. Holden asked if the monitoring plan included methods for modifying the diversion to keep the channel from migrating. Ms. Goodman said that the original idea was to cut the channel for 20,000 cfs flow and then monitor it for three years. If the channel worked as planned, then the cut would be expanded for 50,000 cfs and lined with rock. The channel has not been physically expanded.

Mr. Holden asked if the Work Plan would include an evaluation of shoaling based on expansion to 50,000 cfs. Ms. Price said that this was not a line item in the Work Plan, but is considered in the project monitoring plan. Mr. Rhinehart believes that this could be a future item for discussion depending on the results of the Work Plan. Mr. Rhinehart feels that CWPPRA only needs an estimate of cost and method for closure and not necessarily full plans and specifications at this time. Ms. Price stated that the plans and specifications need to be completed in case of an

emergency closure. Ms. Goodman added that the intent was to have an emergency closure plan ready at the beginning of the project, but it was never completed.

Mr. Rhinehart asked how long it took to complete the closure plan for Burrwood Bayou. Mr. O’Cain said that it took approximately a month to prepare the plans and specifications and 30 to 60 days after that to close the diversion. Mr. Rick Broussard, USACE, added that field and geotechnical investigations were also required prior to closure. Mr. Joaquin Mujica, USACE, commented that the scour hole at Burrwood Bayou was discovered in April/March and the diversion was closed the next fall. Mr. Chris Accardo, USACE, said that the USACE became aware of the navigation impact at Burrwood Bayou because vessels were being pulled into the opening. Mr. Broussard added that the trigger mechanism for West Bay was the 50 percent enlargement of the cross-section and the impact to navigation.

Mr. George Duffy added that the problem at Burrwood Bayou was a serious navigation hazard. Vessels were being pulled into the area as the scour hole deepened. Burrwood Bayou was a different location and situation than West Bay.

Mr. Holden commented that members of the navigation industry should be engaged during development of the closure plan. Mr. Holden asked Mr. George Duffy what should trigger the closure at West Bay. Mr. George Duffy stated that the scouring of the southern area is a contributing factor into the buildup of material in the anchorage area and the cross-section is bigger than intended. Mr. O’Cain added that West Bay was never intended to be just a channel; there was also marsh and delta development. Mr. Duffy said that he did not see any potential beneficial use from West Bay until Mr. Mitch Andrus’ presentation in November 2008. Mr. Clark reminded the Technical Committee that Mr. Andrus’ thesis discussed the shoaling in the receiving area.

Mr. Clark asked if the amount of scouring in the channel could be decreased by using Shreds. Mr. O’Cain replied that scouring would be reduced to a degree.

West Bay Conveyance Channel: Discharge Analysis

Ms. Malene Henville, USACE, reported on the West Bay Diversion Channel flow measurement analysis. Since construction of the West Bay Diversion Channel in December 2003, there has been a noticeable difference in the channel morphology resulting in an increase in flows. This analysis was performed using flows that correlate to the 50 percent exceedance stage at Venice (2.48 feet) from 1964 to 1987. Monthly flows from January 2004 to December 2005 were compared to the 50 percent exceedance stage at Venice and a logarithmic regression curve was developed. The coefficient of determination value was 0.2305, which shows a wide variability in the data set caused by changes in channel morphology. The correlated flow capacity for the 50 percent exceedance stage is 14,000 cfs and is an estimate of the starting size.

The correlated flow at the 50 percent exceedance stage during 2007 and 2008 was 27,000 cfs or nearly double the amount of flow that is carried through the diversion channel 50 percent of the year. An overall trend of flow measurements taken since construction completion in January 2004 to January 2009 shows a continued increase in flows through the diversion channel.

Ms. Price opened the floor for comments from the Technical Committee.

Mr. Rhinehart asked Ms. Henville if she had the discharge estimates for the river at Venice. Mr. Rhinehart would like see the relationship between the channel and river discharges. Ms. Henville replied that she has this data and noted that there is no direct relationship between the two discharges.

Mr. Holden asked if there has been an increase in the percentage of river captured by the West Bay Diversion. Ms. Henville said that there has been an increase and that the diversion carries 6 to 8 percent of the river flow.

Mr. George Duffy asked about the percentage of river flow going through the diversion at the highest stage of the river. Ms. Henville said that she could provide this information to the Technical Committee after the meeting. Ms. Price said that the maximum discharge measured through the diversion was 51,000 cfs.

Mr. Hartman would like to look at the data on the same scale in terms of the percentage of river discharge at Venice that is flowing through the diversion. Ms. Price said that the information presented by Ms. Henville shows that at the 50 percent exceedance stage, the flow capacity through the channel has doubled since construction.

Mr. George Duffy remarked that since the channel has expanded beyond the original template, the project has reached the Phase II capacity of 50,000 cfs without any involvement from the USACE.

6. Agenda Item 4: SOW: Lower Mississippi River Hydraulic Modifications Chronological Study (Broussard). Mr. Rick Broussard, USACE, reported on the SOW to document developments and improvements to the Mississippi River system from Belle Chase to the Gulf since 1960. All USACE documents will be researched and all operations and maintenance data will be compiled to determine the quantities of material moved, the method of dredging, how the material was disposed, and the associated costs. Data for channel improvement features including deepening phases, revetment work, and dike construction as well as a history of developments along the river below Venice and in the vicinity of West Bay will be summarized.

Ms. Price opened the floor for comments from the Technical Committee.

Mr. Clark asked if the USACE and State were working together to develop the project history and timeline. Mr. Broussard said that he did not specifically know what the State was doing with regards to the project timeline and expects there to be some overlap. Ms. Price said that the USACE would meet with the State and BCG to make sure the USACE will not duplicate an effort that has already been completed. Mr. Broussard's work will be completed by April 1st to support the modeling and analysis efforts.

7. Agenda Item 5: SOW: Data Collection (Pratt). Mr. Thad Pratt, USACE-ERDC, discussed collecting data to support the modeling efforts. The intent is to quantify all discharges that are

leaving the system before and after the cut. The different discharges are removing energy, sediment, and water from the system, which affects what happens at the West Bay Diversion. Discharge measurements will be made at Venice, Grand Pass, Baptiste Collette, and Cubit's Gap. Measurements will be taken multiple times during different stages to quantify the percentage of flow that is leaving the different channels. An Acoustic Doppler Current Profiler will be mounted to a vessel and used to measure the total flow. This instrument can also be used to correlate back scatter intensities to suspended sediment concentrations and collect crude bathymetry data. The data will be used by modelers to try to quantify the flow patterns at the entrance of the cut.

Mr. Pratt said that different methods would be used to sample the bed and water column at different sites. The samples will be analyzed for grain size distribution. The bed material samples must be collected before the June 2009 dredging event and will help to determine what percentage of certain grain sizes is actually moving out of the main channel and into the receiving area. Core samples at one-meter and half-meter depths will also be taken and analyzed at discrete intervals.

Ms. Price opened the floor for comments from the Technical Committee.

Mr. Rhinehart asked how often the data would be collected. Mr. Pratt replied that they propose a three, six, or twelve event collection effort. The number of collection events will be determined by the funding available. Ms. Price noted that the estimate she presented earlier included data collection for six single events. Mr. Rhinehart commented that tidal cycles should be considered. Mr. Pratt said that this could be done.

Mr. Clark asked what information was expected from samples taken north and south of the receiving area. Mr. Pratt said that samples taken south of the receiving area would indicate how much material is fine and coarse, which reflects how the grain size distribution changes downstream of the receiving area.

Mr. Clark asked if Mr. Pratt had considered collecting data below Head of Passes in Southwest Pass. Mr. Pratt said that it would be easy to add those data points. The main expense is getting to the field; it is not a big expense to analyze the samples.

Mr. Hartman said that there is some controversy at Pass a Loutre. The USACE may want to extend the sampling effort to include this area while they are in the field.

Ms. Price opened the floor for public comments.

Mr. George Duffy asked what effect passing deep draft vessels and dredging would have on the data collection. Mr. Pratt replied that they will collect the bed load samples before the June dredging event in the anchorage. Mr. Holden asked if any data would be collected after the June dredging event to determine the change in bed load movement after the anchorage has been reestablished. Mr. Pratt said that this could be arranged but would probably be during a low water event.

Ms. Price asked when the data collection would begin. Mr. Pratt replied that data collection started the week of February 23rd.

Mr. Rhinehart wanted to make sure that the number of data collection sites is adequate to capture what is going on in this area. Mr. Pratt said that he or another engineer reviews the samples as they are collected and can add samples as needed to capture the change in grain size.

Mr. Rhinehart commented that if core samples were taken from the anchorage area, it would provide an opportunity to gather more history about the area.

8. Agenda Item 6. SOW: Geomorphic River Bed Analysis and 1D Numerical Riverine Modeling (Pinkard). Mr. Freddie Pinkard, USACE-ERDC, discussed plans for the geomorphic assessment and 1D modeling. Lane's Relationship defines channel reach stability and includes four variables: discharge, slope, bed material load, and median size of the bed material. As water is removed by a diversion, the system will shift towards aggradation unless more sand is added to keep the system in equilibrium. If sand is removed, the system will shift to degradation unless more water is added. A geomorphic assessment is needed to determine the changes in sediment deposition in the PAA. This will help to determine if the changes are a result of system-wide long-term morphologic changes in the river, attributed to the West Bay Project, or a combination of both. The spatial limits of the study are from Belle Chase (River Mile 75) to Head of Passes (River Mile 0). The temporal limits include data from 1960 to present.

Tasks of the geomorphic assessment include: data compilation, geometric data analysis, gage and discharge data analysis, review of dredge records, sediment data analysis, events timeline analysis, and integration of results. The geomorphic assessment will establish baseline conditions critical to the modeling efforts. The HEC-6T model, which is a movable bed model that takes water and sediment load to predict what the bed will do, is a 1D model and will be used for this SOW. The HEC-6T model will be modified for use in the West Bay area.

A sensitivity analysis conducted by Dr. Ron Copeland and Mr. Tony Thomas in 1992 looked at the effect of sand concentration in the diversion versus the increase in mean annual dredging and deposition for the Tarbert's Landing area in the Lower Mississippi River. The results showed a change from 44,000 cubic yards in mean annual dredging for 100 percent sand concentration in the diversion to 87,000 cubic yards for 0 percent sand concentration. The increase in mean annual dredging and deposition ranged from 760,000 cubic yards (100 percent sand concentration) to 1.26 million cubic yards (0 percent sand concentration). Results from a 32-year simulation for Tarbert's Landing showed a continual increase in dredging and deposition.

A 1D model allows for long term simulations (50 to 100 years) and includes a dredging option. The disadvantages are that a 1D model is used to simulate 3D processes, uniform erosion and deposition are applied across the entire channel section, and sediment concentrations for diversions are a user input. HEC-6T model inputs include channel geometry as well as flow and sediment data for the mainstem and diversion.

First the water surface elevation will be calibrated to known flow events and then the bed changes will be calibrated to more recent channel surveys. Model simulations will include: the

addition of major distributaries, a 50-year simulation based on a selected typical hydrograph, with and without West Bay Diversion conditions, and utilization of the dredge option. The 1D modeling will provide a qualitative assessment and a more detailed prediction of potential long-term channel morphological changes.

Ms. Price opened the floor to comments from the Technical Committee.

Dr. Paul Kemp, National Audubon Society, commented that any water diverted causes dredging because the concentration of the flow moving downstream is not modified. You always end up with an increase in dredging because the model does not change anything further downstream. He asked if Mr. Thomas was addressing this with the current modeling. Mr. Pinkard replied that he did not know what Mr. Thomas was doing at this time. Dr. Kemp said that this is crucial to the modeling effort and should be addressed upfront. Mr. Pinkard said that a new sediment rating curve could be added at the boundary condition. Dr. Kemp commented that deposition shouldn't always occur; there should be a benefit from taking sediment out. Mr. Pinkard added that it depends on the ratio of sediment concentration to water in the river. With most diversions, more water is removed than sediment, resulting in a reduced sediment transport capacity downstream.

Mr. Clark commented that a 1D model provides an average of sedimentation, but that a 2D or 3D model is needed down river of a diversion.

An audience member asked if the model runs would include simulations to evaluate conditions for with- and without dredging scenarios in the anchorage access area. Mr. Pinkard replied that it was not in the proposal, but it would be relatively easy to do.

Mr. George Duffy asked where the flow measurements would be taken for this study. Mr. Pinkard replied that the data collected by the study Mr. Pratt presented would be used as input for the model. Mr. George Duffy asked if the modeling report would be completed within the timeframe allowed by the Task Force. Mr. Pinkard said that it would depend on when the measurements are taken.

Mr. George Duffy commented that the channel changed dramatically with the deepening from 40 to 45 feet in the 1980s. The history that comes before the deepening is not what the channel is doing now because newer areas are being dredged. Will the data from the period when the channel experienced significant deepening be reviewed? Will this data provide any credibility to the previous data? Mr. Pinkard said that data from 1960 to present would be reviewed to determine any impact the deepening had on the system.

Mr. Rhinehart asked if the model would take sea level rise into account since dredging is required further upstream as the delta sinks and the sea level rises. Mr. Pinkard said that this has not been identified, but could be assessed. Mr. George Duffy noted that no dredging has historically been performed between Cubit's Gap and the crossings above New Orleans. Mr. Holden asked if there was potential for the dredging to back up along Southwest Pass and increase the volume towards West Bay. Mr. George Duffy said that this was currently not the case. Mr. Holden asked Mr. Rhinehart if BCG had considered this as part of their analysis. Mr. Rhinehart replied: No.

Mr. Clark asked Mr. Rhinehart if the State had an internal study to address the issue of sea level rise and a possible increase in shoaling north of Head of Passes. Mr. Rhinehart said that he was not aware of any study, but would look into it.

Ms. Price stated that she was not sure the sea level rise component would fit in with the West Bay effort, but would definitely come into play with the comprehensive diversion effort. Dr. Kemp said that he feels the sea level rise problem should be included in the West Bay effort.

Mr. Hartman asked if there would be enough time to include data collected during sampling trips taken after June 2009 in the models and have the results ready by October 2009. Mr. Pinkard said that it would depend on when the data is collected and added that it would not take long to run the 1D model.

9. Agenda Item 7. SOW: Multidimensional Riverine Numerical Modeling (Brown). Mr. Gary Brown, USACE-ERDC, reported that sediment transport is a multidimensional problem as there is significant vertical and horizontal spatial variation of suspended sediment with a higher concentration of sediment near the bed. There is also variability in the modes of transport. Bed loads migrate very slowly, whereas suspended loads move at the same rate of speed as the water. Sediment transport is very nonlinear with respect to the energy and flow. There is also a gravitational component to the bed load; a sand grain cannot climb a hill to get through a diversion. Another aspect involves the sorting of grains in the bed; erosion of the stream bed can winnow away the fine materials.

This SOW proposes to use the AdH and CH3D sediment transport models. The first effort will just look at the sand transport, which should be adequate to answer the question associated with the anchorage area. The AdH model framework permits high resolution in areas of interest and has the capability of dynamically modifying its own resolution to capture concentration clouds and flow features. The lowest dimensional modeling system that can provide scientifically defensible results will be used. In reality, it is not known what the lowest dimensional model is for this system. Diversions are 3D in nature, so the SOW proposes to use higher dimensional models to quantify the results. The qualitative understanding of whether or not the West Bay Diversion contributes to shoaling is a first order approximation. In order to understand the concentration, a higher order process is necessary.

The CH3D model will be used to determine the significance of the vertical variations at the diversion site. The AdH model will be used to investigate the significance of the horizontal resolution as well as provide improved boundary condition information to the CH3D model. Redundancy and cross-checking can be used to determine how well the models are simulating the processes.

10. Agenda Item 8. SOW: West Bay Receiving Area Analysis (Padgett). Mr. Clint Padgett, USACE Mobile District, stated that this SOW would provide a more comprehensive aerial analysis using data from 1956 to present, provide a bathymetric survey comparison of pre-construction and 2009 survey data, provide a historical assessment of subsidence, and assess whether historical LiDAR data exists for the project area. Between 1956 and 1965 there was a

major loss of land in the delta. This land loss is most likely contributed to Hurricane Ethel in 1960. The delta is losing land at approximately 5 square kilometers a year and the land loss rates oscillate yearly depending on any hurricane events. In 2006 to 2008, the aerial analysis showed a gain in land, but this is probably due to low water events exposing more mud flats. Most gains in land in the delta are attributed to sediment placement or small crevasses.

The bathymetric survey comparison will be generated using a custom eCoastal survey tool to display the subaqueous land contours and profile. A TIN/GRID surface will be generated and used to calculate a 3D depth difference. The historical assessment of subsidence for the receiving area will be documented. Subsidence for the Mississippi River Delta Basin is about 0.12 centimeters per year and is the highest in coastal Louisiana. New LiDAR will be flown in 2009 and compared to existing LiDAR data sets to evaluate the elevation changes in the area.

Ms. Price opened the floor to comments from the Technical Committee.

Mr. Clark commented that there has not been much aerial change in the last few years and that the main part of this SOW would be depicting the bathymetric changes in the receiving area.

Mr. Hartman asked if there has been any hurricane-related loss in the West Bay area. Mr. Padgett said that the major land loss in the receiving area occurred before the cut. The bathymetric survey will show where the volume is building and potentially about to go sub-aerial.

Mr. Clark asked Mr. Padgett if he had the bathymetry data sets from Mr. Mitch Andrus' 2007 thesis and the BCG bathymetry. Mr. LeBas recommended comparing the USACE survey results to data from Mr. Andrus' thesis. Mr. Padgett said that the additional bathymetry data sets would provide a post-construction baseline and be important to include in the comparison.

Dr. Alex Kolker, LUMCON, said that he collected sediment samples in the West Bay area during the 2008 spring flood and found deposited sediment ranging from 2 to 25 centimeters thick. Ms. Price added that the USACE plans to incorporate Dr. Kolker and Mr. Andrus' findings into the new data collection.

11. Agenda Item 9. Discussion/Decision: Summary and Path Forward (Price).

Ms. Price announced that everyone would have two weeks to provide written comments on the draft Work Plan. All comments should be received by March 13th.

Mr. Holden asked if the Technical Committee felt comfortable with what was presented at this meeting to allow the project team to continue to move forward during the comment period. Mr. Hartman recommended that the project team move forward with the Work Plan and asked for clarification about Mr. LeBas' comment to include a report on the State's effort as an appendix in the Work Plan. Mr. LeBas said that the State's intent was to complete another analysis that is comparable to the USACE's effort to aid in the decision making process. Mr. Clark also suggested including BCG's report as an appendix to the Work Plan.

Mr. Rhinehart said that the State would like to incorporate their report as part of the Work Plan and would meet with the USACE to reduce redundancies between the two efforts. Ms. Price suggested the State compare the draft Work Plan with BCG's report and provide comments on any duplicated efforts. Mr. Rhinehart stated his preference to have the State work directly with the USACE as opposed to just providing comments. Mr. Holden agreed and said that Ms. Price and Mr. Robert Routon, the State's PM, could work out the details.

Ms. Price said that the USACE would incorporate all comments into a revised final Work Plan. She suggested setting a date of March 20th for a Technical Committee fax vote to accept the final Work Plan.

Mr. Holden requested that the Work Plan be sent to members of the maritime industry for review. Ms. Price said that she would send the document to Mr. Sean Duffy as well as members of the State's project team. Mr. Duffy will circulate the Work Plan to crescent and bar pilots for review and comment.

Mr. Clark said that the six month cost and timeline should be used since the Task Force asked for the Work Plan to be completed within six months. Mr. Landers mentioned that the Task Force motion advised that the CWPPRA Academic Advisory Group and LCA S&T Group be given 30 days to provide comments on the deliverables. Dr. Jenneke Visser said that the CWPPRA Academic Advisory Group would try to provide comments within the two week time frame.

Mr. Holden suggested starting the peer review on Work Plan components that are close to completion and where no additional comments were provided. Mr. Hartman does not believe that anyone objects to any of the components and would like the bathymetry surveys and river sampling to begin as soon as possible. Mr. Clark said that he did not have any problems with the Work Plan components.

Dr. Kleiss said that it would be helpful to discuss the differences between the six and 12 month timelines and what may be missed by having the shorter timeline. Mr. Brown said that it is a silt and clay problem; the six month timeline does not allow for the multidimensional modeling of silts and clays. Mr. Hartman asked if anything would be lost by not analyzing the deposition of silts and clays. Mr. Brown said that it was a possibility, but the assumption is that silt and clay deposition is more dominant south of Head of Passes and would not be a primary concern. Ms. Lisa Hubbard, USACE-ERDC, noted that there is a paragraph in the scope that discusses this issue. If the bed samples show appreciable quantities of silts and clays (10 to 15 percent), then perhaps a more detailed analysis of the scour rates on those materials would be necessary. Mr. Hartman expressed concern about not being able to model the deposition rates of silts and clays within six months and potentially missing some important data.

Mr. Hartman asked if there was a composition analysis of the material in the anchorage area. Mr. Broussard said the USACE should have sample data from the PAA. Mr. Holden asked Mr. Broussard to review the PAA sample data and advise the Technical Committee on whether or not additional modeling is needed for the silts and clays. The Technical Committee will hold the decision on the Work Plan timeline until Mr. Broussard's recommendation.

Mr. Alex Kolker, LUMCON, reported that the river system is roughly 10 percent sand in terms of suspended loads and is dominated by silts and clays. There is also a different scour relationship between the sediment transport and discharge. There are roughly two orders of magnitudes difference between sediment transported at high versus low discharge rates. The issue of silt and clay transport is very important. Mr. Kolker recommended using the 12 month timeline.

Mr. Hartman agreed with Mr. Holden to hold the timeline decision until the Technical Committee hears from Mr. Broussard about the PAA sample. There may be enough information in six months to take action with the potential to extend the sampling time frame if needed. Mr. Clark agreed.

Mr. Holden asked Ms. Price to keep everyone updated on the Work Plan progress. Ms. Goodman added that the public will be informed of any program decisions through the Breaux Act Newsflash and meeting transcripts and minutes, which will be available at the CWPPRA website (LACoast.gov).

12. Adjourn. Ms. Price adjourned the meeting at 2:40 p.m.