MINUTES OF
SOUTHEAST LOUISIANA FLOOD PROTECTION AUTHORITY-EAST
COASTAL ADVISORY COMMITTEE MEETING
HELD ON JANUARY 17, 2014

PRESENT: G. Paul Kemp, Chair
Rick Luettich, Committee Member
Carlton Dufrechou, Committee Member
John Lopez, Committee Member
Albert Gaude, Committee Member

The Coastal Advisory Committee (CAC) of the Southeast Louisiana Flood Protection Authority-East (SLFPA-E or Authority) met on Friday, January 17, 2014, in Meeting Room 201, Orleans Levee District Franklin Administrative Complex, 6920 Franklin Avenue, New Orleans, Louisiana. Mr. Kemp called the meeting to order at 9:45 a.m.

Opening Comments: Mr. Kemp advised that as a result of discussions regarding reorganization, it was determined that the CAC would narrow its focus to a few topics of critical importance to the Authority and levee districts.

Adoption of Agenda: The agenda was approved as presented.

Public Comments: There were no public comments. Mr. Kemp advised that the public will be incorporated into the CAC's discussions as much as possible.

Presentations:

A. Post-Barrier effects on hydrology in MRGO area - Dr. Chris Swarzenski, USGS

Dr. Chris Swarzenski with the U.S. Geological Survey (USGS) Louisiana Water Science Center advised that he has worked on the Mississippi River Gulf Outlet (MRGO) for the past four years. He described the work of the Louisiana Water Science Center, which collects and disseminates groundwater and surface-water data (quality and quantity). The USGS works with Federal, State and local agencies in all 50 states to collect data that other agencies are unable to collect. Real-time data is accessible on the USGS website for 243 sites nationwide. The site located at the Inner Harbor Navigation Canal (IHNC) near the Seabrook Bridge provides real-time data on velocity. Other USGS sites also provide water quality data.

Dr. Swarzenski explained that the U.S. Army Corps of Engineers (USACE) contracted with the USGS to provide salinity and dissolved oxygen data in relation to the MRGO rock barrier located at Bayou LaLoutre and later the Hurricane Surge Risk Reduction Complex (IHNC Surge Barrier and Seabrook Complex). The monitoring commenced prior to the construction of the MRGO rock barrier in August, 2008. The monitoring includes a combination of continuous logging salinity recorders at various locations on the MRGO and Inner Harbor Navigation Canal (IHNC) and depth profiles of dissolved oxygen, salinity, temperature and occasionally velocity taken every two to three months.

Two reports were produced: 1) a data report that focused on the rock barrier was issued in 2012, and 2) an interpretative report that includes the IHNC Surge Barrier will be accessible on the USGS website in four to five months.

Dr. Swarzenski provided as an example the data for the month of May on the discharge at the IHNC at the Seabrook Bridge, which was determined with the use of a velocity meter. A water level gage is also located at the site. The USGS data collection at Seabrook was project driven; the USACE was concerned that velocities not rise above a specific number of feet per second because it would impede the movement of sturgeon into the structure. Monitoring took place over a year under various conditions and velocities seemed to remain within the tolerance limit. The USACE's contract with the USGS terminated at the end of 2013 and no additional funding is available. Therefore, the USGS planned to dismantle the equipment [Acoustic Doppler Current Profiler (ADCP)] at the Seabrook Bridge station at the end of January.

Mr. Kemp stressed the importance of having the USGS instrumentation remain at the Seabrook station in order to provide information needed for operating the IHNC Surge Barrier gates (sector gate and barge gate located at the GIWW). Robert Turner, SLFPA-E Regional Director, inquired about the cost to operate and maintain the equipment. Dr. Swarzenski explained that much of the expense is upfront for the acquisition and installation of the instrumentation. He estimated the operation and maintenance cost at $20,000 to $25,000 per year, which includes delivery of readings on the website from a desktop computer. The present instrumentation provides stage, temperature, velocity and discharge; however, a salinity gage could be added. Mr. Turner pointed out that an alarm can be set to give notice when velocities at the location go above or below a certain threshold. He added that the remote sensing tide gage located on the Seabrook structure (inside and outside) is operated and maintained by the SLFPA-E; however, the SLFPA-E does not have instrumentation to measure velocity. He explained the importance of real-time velocity data, particularly during hurricane season. One of the triggers for closing the IHNC Surge Barrier gates is water stage; however, the closures must take place within certain velocity limits. Dr. Swarzenski advised that the USGS would not dismantle the instrumentation at the end of January in order to allow the SLFPA-E time to explore the option of taking over its operation and maintenance.

Dr. Swarzenski advised that the USGS matched the vertical datum used by the USACE at this station; however, at other installations the USGS uses GPS and Gulfnet and established NAVD88 with a GEOID 12A. He added that the USGS spends a great amount of time writing up the data so that it is accessible 50 to 100 years in the future.

Dr. Swarzenski explained that the three installations for monitoring water quality effects are located at the MRGO rock barrier at Bayou LaLoutre, the IHNC Surge Barrier and the Seabrook Complex. A cofferdam was put in place for the construction of the Seabrook Complex; therefore, flow was interrupted for about a year and a half. Construction was completed by February, 2012, and partial to normal exchange was achieved. The data collection expands a period from 2008 to 2012. The monitoring included the following:

- Synoptic measurements – Transects were revisited every two to three months.
- Five vertical profiles were done at 10-ft. intervals at wide sections of the channel. If there was a rapid change in oxygen, the vertical profiles were done at 5-ft. intervals.
- Continuous YSIs logging hourly salinities were located at the IHNC Surge Barrier, Lake Pontchartrain and downstream of the rock barrier. The funding for the instrumentation downstream of the rock barrier ended in September, 2010, and the data collection ceased at this location. The USACE's interest at that time shifted to the IHNC Surge Barrier.

Dr. Swarzenski reviewed a slide that showed a sampling of salinity levels at the sites from January, 2009, to October, 2012. The sampling downstream of the rock barrier ended in 2010. Salinity levels jumped over a very short period after the rock barrier was constructed and remained 10 to 15 parts higher with much greater fluctuation. The rock barrier caused a huge shift in salinity levels. The construction of the IHNC Surge Barrier did not cause much of a change in the salinity levels. He pointed out the signatures on the sampling of the opening of the Bonnet Carre Spillway, which caused levels to drop and quickly rebound in Lake Borgne, and Hurricane Isaac, which quickly pushed salt water into the system that flushed right back out. He noted that the diversions operating at full throttle freshened areas more than the 2011 flood. It was pointed out that the salinity was width averaged and not depth averaged.

Mr. Turner commented that due to the dramatic change in salinity levels there is a greater amount of aquatic vegetation in the MRGO, the GIWW channel between the rock dike and the IHNC Surge Barrier, the Violet Canal and the Central Wetlands than previously experienced.

Dr. Swarzenski discussed a slide showing a time series of dissolved oxygen and salinity profiles at Transect 2 downstream of and closest to the rock barrier (about two miles below the barrier). In August, 2008, there is no indication of hypoxia; however, by June, 2009, hypoxia is indicated up to three feet. Therefore, the rock barrier introduced some element of hypoxia and was conducive to the formation of low oxygen conditions. In November, 2009, the water temperature was much cooler and the hypoxic condition ended. He pointed out that the worse hypoxia developed downstream of the barrier. Once the USGS realized the strength of the hypoxia, two additional stations were added at miles 20 and 59 in order to follow the hypoxia downstream. The hypoxia at its worse in October, 2009, covered almost half of the channel depth and approximately 36 miles of the MRGO. Below the rock barrier a much higher hypoxic condition nearly 5-ft. from the top of the channel was the typical pattern.

Dr. Swarzenski reviewed the timing and depth of hypoxic conditions for 2010, 2011 and 2012. During 2010 hypoxia was found at Transect 4 located about three miles above Shell Beach during the period May through August, at Violet in June, upstream of Violet in May and August, and in the GIWW west of the I-510 Bridge in June and August. The hypoxia was along the bottom of the channel from four to six-feet. The hypoxic conditions were fairly consistent from July through September of 2011 and 2012 and located only along the bottom four to six-feet of the channel. The focus of the testing was above the rock barrier. It was quickly learned that conditions became consistently hypoxic almost to the top of the channel below the rock barrier. He pointed out that the hypoxic condition in this situation is due to salinity stratification and the limited exchange of water. It does not involve nutrients such as takes place in offshore hypoxia.

Dr. Swarzenski commented that monitoring also took place in the borrow pit in Bayou Bienvenue near Paris Road and in Bayou Bienvenue downstream of the structure. These sites would occasionally develop short term hypoxia; however, the hypoxia seemed to result from a large amount of rainfall or a high tide that drained water from the marshes and loaded the bayous and waterways with organic materials.

Dr. Lopez asked were the hypoxic conditions downstream and upstream of the MRGO rock barrier related or independent. Dr. Swarzenski responded that the hypoxic condition was related to summer temperatures that make it difficult for the water to hold oxygen. Dr. Lopez commented that the rock barrier could be leaking high salinity and hypoxic waters. Dr. Swarzenski pointed out that Bayou LaLoutre runs across the area and could break up the water.

Mr. Kemp inquired about the collection of velocity data at the GIWW gate and the adequacy of information for operational purposes. Mr. Turner responded that there is not a lot of good velocity data at the GIWW gate; however, there is some extensive archived information on stage at this location both inside and outside of the IHNC Surge Barrier. This is bare bones information and knowledge of velocities associated with the differential tide gage readings inside and outside of the Surge Barrier should be developed. The barge gate in particular has operational limitations related to current velocity. The USACE has had difficulty obtaining good information from the velocity meter at this site. At this time the SLFPA-E is relying on the USACE to provide velocity information in order to operate the barge gate. If the velocity is not known, in all probability the Seabrook Complex gate will be closed, then the barge gate will be closed and the Seabrook gate reopened. However, the velocity cannot be controlled in the channel using the Seabrook Complex gate. Maritime traffic will be interrupted. In addition, if the Seabrook gate is closed, certain floodgates along the IHNC would also have to be closed due to the buildup of water and caution will have to be taken so that the businesses along the IHNC do not flood. Mr. Kemp pointed out that good velocity data would provide an objective criterion for the operation of the barge gate. Bob Jacobsen commented on the need for a good detailed hydraulic study and model that capture the variabilities around the structures. Mr. Luettich pointed out the importance of having real time velocity information at the Seabrook Complex. Mr. Turner added that a major inspection of the scour stone at the bottom of the structure must take place when velocities exceed seven-feet per second. Therefore, velocity data is needed in order to trigger the inspection process. Mr. Luettich recommended that a targeted effort take place to attempt to correlate head differences at Seabrook and the IHNC Surge Barrier with the velocity at both locations.

Mr. Kemp reiterated the need for instrumentation at the GIWW gates for monitoring velocities. Mr. Turner noted that the USACE has handed over the remote sensing water surface gages to the SLFPA-E. The USACE has not handed over the current velocity meters. Mr. Luettich suggested that the USACE be requested to provide information to the Committee on its accomplishments thus far in terms of a data set and on its plans in terms of going forward.

B. New survey leveling needs and implications for levee management – <u>Cliff Mugnier, LSU Center for GeoInformatics</u>

Mr. Cliff Mugnier, Chief of Geodesy, Center for GeoInformatics, Louisiana State University, explained that elevations and GPS are two entirely differently things. Elevation benchmarks do not record ellipsoid heights. Ellipsoid heights are derived from GPS. The information provided by GPS has nothing to do with elevation. Elevations are based on the tides and local mean sea level as it varies throughout the country. The two primary types of tides are diurnal (Gulf of Mexico) and semidiurnal (East and West U.S. coasts). There are also mixed tides. The high and low tides vary each day by about 11 minutes due to the orbit of the moon around the Earth. A slide map showed Tidal Benchmarks (TBM) along the Gulf coast with elevation ties to the old datum [North American Vertical Datum (NAVD) 29] versus the current official datum for the U.S. (NAVD88). The primary benchmark for NAVD88 is located in the St. Lawrence Seaway on the Canadian border. The prior primary benchmark was located in Galveston, Texas. Tides are effected by 1) the Chandler motion (the migration of the poles), 2) the Great Venus term (the effects of the planet Venus that occurs once in a Metonic cycle), and 3) perturbations and nutations of the axes of the orbit of the Earth around the Sun and the moon around the Earth. It takes 18-2/3's years (one Metonic cycle) to determine an average sea level. Every five to ten years new tidal Epochs are determined. The National Oceanic and Atmospheric Administration (NOAA) recently announced that Co-Ops (the Tides and Gauging agency for NOAA) is changing local mean sea level at Grand Isle and that it is being raised by two-inches. This change is a function of the rise of sea level, eustatic rise and accumulative effects of subsidence in South Louisiana. Various types of tidal datums are used by navigators, civil engineers and land surveyors.

Mr. Mugnier advised that the gravimetric surface (zero elevation) is used to model the geoid. The geoid (an imaginary three-dimensional surface) is bumpier than the ellipsoid, but it is a dampened version of the topography. It varies as a function of height above the ellipsoid as well as variations in the Earth's density to affect its gravity field. Geoid models are commonly referenced to either spherical harmonics or on a grid system and represents the theoretical zero elevation for most intents and purposes. In the past, the geoid was used solely for the targeting of International Ballistic Missiles (IBM). The Department of Defense declassified the mathematic model of the geoid after the fall of the Iron Curtain. In 1996 the world had an Earth gravity model that was accurate to plus or minus one-meter (a little over three feet). Subsequently, the National Geodetic Survey (NGS) took versions of the original model with updates and perturbed it to best fit the continental United States (GEOID96, GEOID99 and GEOID03). The current geoid is GEOID12. The problem with the geoid is that as NGS continues to update the geoids, it still only represents guesses as to where the geoid is actually located. When a vertical number is obtained from a GPS receiver, a fudge factor must be added (geoid) in order to determine elevation. Continuously operating reference stations (CORS) provide accurate, reliable ellipsoid heights; however, once the ellipsoid height is provided by GPS, a mathematical fudge factor must be applied to determine the elevation. At this time ellipsoid heights can be obtained accurate to plus or minus two-centimeters (better than one-inch). However, the unknown factor for the geoid is currently about one-foot. The presumption in the United States is that the current geoid published by NGS is the best estimate of where NAVD88 is located. When GEOID12 was issued, areas in Mississippi, Louisiana and Texas were grossly in error based on bad data that was unrecognized from a theoretical standpoint. Once local land surveyors raised a commotion, NGS knew where to look to edit out the blunder points and issued GEOID12A. GEOID12A is a modification based on the theoretical guesstimate of where NAVD88 is located with respect to the ellipsoid.

Mr. Mugnier reviewed the history of leveling with reference to southeast Louisiana, which includes:

- The General Survey of the Mississippi river in 1976 by the USACE
- Setting up of tide gages by Coast and Geodetic Survey for the Atlanta, Pacific and Gulf coasts
- The Sea Level Datum of 1929 [subsequently renamed National Geodetic Vertical Datum of 1929 (NGVD29)] (26 tide gages were used along with Pensacola and Galveston based on full Metonic cycles)

Mr. Mugnier explained that the accumulative kilometers of leveling were increased during the twentieth century and benchmarks were established throughout the country. The Sea Level Datum of 1929 was adjusted in 1935 in New Orleans. From time immemorial the surface of Louisiana has been consolidating and subsiding. In 1935 existing benchmarks were visited that had numbers established in 1929; however, the benchmarks had subsided during the subsequent six years. The starting elevations were the 1929 values. Additional kilometers of leveling was done throughout metropolitan New Orleans and southeast Louisiana and new elevation benchmarks were established based on the old estimates from 1929. Adjustments were made to the 1929 values plus the 1935, 1951, 1963 and 1969 values. In 1976 Congress passed a law allowing the New Orleans District (NOD) Corps of Engineers to channelize the Red River. The NOD attempted to determine reliable new elevations; however, it was unable to adjust the level lines to fit existing elevations that were previously thought to be stable. A decision was made to mathematically change all the elevations of benchmarks in south Louisiana. This was a theoretical, paper adjustment and no additional leveling was done. As a result of the May 3, 1979 and April 12-13, 1980 catastrophic flooding in metropolitan New Orleans, the USACE was concerned about the paper adjustment referred to as the NGS Free Adjustment. At this time the NGS came up with a new method for establishing benchmark monuments based on research performed by the Waterways Experiment Station in Vicksburg and deep casement marks were introduced. Deep casement marks were used every 20 kilometers of leveling. The deep-casement sleeved benchmarks were installed in triplicate because of the high organic content of the soils in metropolitan New Orleans (Jefferson, Orleans, St. Bernard and Plaquemines Parishes). Levels could then be run among the three marks to determine which mark had subsided and which mark is reliable. As part of the 1986-1988 local government funded geodetic surveys, relative gravity observations were done at 350 benchmarks in Jefferson Parish and about 100 benchmarks in St.

Bernard Parish in addition to the geodic leveling. Relative gravity was observed at existing and new elevation benchmarks.

Mr. Mugnier advised that the North American Vertical Datum of 1988 (NAVD88) was observed through Basic Net A and published for the majority of the country in 1990; however, south Louisiana was not included because it was recognized as being in a crustal motion area.

Mr. Mugnier explained that coinciding with the declassification of the geoid, a new type of absolute gravity instrument was invented. The Absolute Gravity Meter (FG 5) is accurate to within one microgal (nine significant digits). He explained the method used for observing absolute gravity at a specific point. An observation using an GF 5 Meter generally takes between two to three days and a temperature controlled, indoor environment is needed. An observation in New Orleans indicated that absolute gravity increased between 1989 and 1991; i.e., the basement of the structures in the University of New Orleans moved closer to the center of the earth by 9 millimeters. Due to the efforts of Louisiana's Congressional delegation, funds were made available in 1991-1992 to establish topographic mapping for Jefferson and Calcasieu Parishes with some work in Orleans Parish. Additional leveling was done in metropolitan New Orleans. Ties were made to the benchmark at the Rigolets Bridge, previously thought to be one of the most stable points in south Louisiana, and the old State Police Station on Jefferson Highway at the Orleans Parish Line. NGS published adjusted elevations for south Louisiana in 1993. The security classification was downgraded on the geoid. In 1993 and 1994 two additional observations were made on absolute gravity and it was found that absolute gravity was still sinking at 9 millimeters per year. The Defense Mapping Agency awarded one million dollars to Professor Richard Rapp at Ohio State University to take all of the classified gravity data in the World Geodetic Gravity Library in St. Louis and re-compute the geoid, which resulted in Earth Gravity Model 96 (EGM96). EGM96 was compared to the datum of NAVD88 and contours were developed. GEIOD03 was released with a claim of accuracy to within one centimeter; however, this was not the case. Accuracy is close to zero for parts of Louisiana; however, there are problems on the surface.

Mr. Mugnier stated that Congress asked the NGS in 1998 to come up with an idea for updating the way elevations are obtained and maintained in the United States. The NGS developed the National Height Modernization Study, which used CORS and GPS. Slides showed CORS currently in place and maintained by LSU in the C4G network and a list of stations where absolute gravity was observed either once or twice.

Mr. Mugnier explained that subsidence is caused by both natural and human-induced processes. One cause of subsidence is faults, such as the Michoud Fault. The Michoud Fault goes through Benchmark J92 at the Rigolets Bridge. He discussed two stations established at Michoud: one station goes down about 200 meters and a second station is on the surface about ten feet away. Both stations have GPS antennas and provide continuous reports. The subsidence of the stations with respect to each other is being observed. He commented that the subsidence rate at Cocodrie, LA, vertically represents over eight feet per century (about an inch per year). The Baton Rouge fault is moving at five millimeters per year.

Mr. Mugnier briefly addressed transformation parameters developed for local surveyors in order to move from the old horizontal datum (NAD83) based on CORS 96 to the current datum and changes in certain ellipsoid heights from 1996 to 2011.

Mr. Mugnier advised that corrections are continually being made to enhance the accuracy of GPS; however, this only provides the ellipsoid height. The elevation must be determined by adding the fudge factor (the geoid) to the ellipsoid height. The NGS is in the process of flying gravity (aerial gravity) throughout the continental United States at the one milligal (MGAL) level. However, in order to have reliable elevations at the accuracy level of about two centimeters (about an inch) on the ground, absolute gravity observations are needed so that the information is obtained at the microgal level. The A10 Gravity Meter was developed subsequent to the FG 5 Gravity Meter. The A10 Gravity Meter was built to be used outdoors in the field. An observation with the A10 Gravity Meter takes about 15 minutes and is accurate to within plus or minus 10 microgals. He pointed out that the A10 is not quite as accurate as the FG 5; however, instead of taking three days to make an observation inside a building, the A10 can make an observation outdoors in 15 minutes.

Mr. Mugnier commented that observations are needed throughout the state in 40 kilometer grids using a gravity meter in concert with GPS observations and a Zenith camera that takes photographs of the stars at night in order for NGS to have sufficient observations to develop a quasi-geoid for Louisiana with a reliable geoid accuracy of about two centimeter. NGS is in the process of obtaining aerial gravity that will enhance gravity data for the entire continent, but it will not be good enough for south Louisiana. Most of the U.S. does not need one-inch accuracy on elevations; however, south Louisiana does need this accuracy. He pointed out that NGS does not have the funding or the personnel to do the additional observations with the specialized equipment needed to develop the quasi-geoid for Louisiana; however, this task could be accomplished with the appropriate funding at the university level using graduate students. He estimated that the task would take about five years. He noted that this task must be accomplished on a regional level (i.e., Louisiana and portions of Mississippi) and not a metropolitan scale. A metropolitan area is too small to come up with the relationships.

Mr. Luettich inquired about the accuracy of the geoid in south Louisiana and, in particular, New Orleans. Mr. Mugnier responded that it is believed that the accuracy is within about 10 centimeters. Josh Kent commented on the variability of subsidence rates observed through various surveys that were conducted. Mr. Turner noted a variation of 3/10's-foot (about five centimeters) at the IHNC Surge Barrier primarily due to the way the USACE did its measurements. Mr. Luettich inquired about using the ellipsoid to observe changes in going forward. Mr. Mugnier responded that the current scientific thought is that it can be expected that for some short period of time (perhaps a century) changes in elevation will almost mirror changes in ellipsoid height. Mr. Luettich inquired about using a GPS based system to track changes related to the ellipsoid in order to monitor impacts to the Hurricane and Storm Damage Risk Reduction System (HSDRRS). Mr. Mugnier recommended, at least for the metropolitan area, that absolute gravity be reobserved. He suggested that a letter from the Commander of the New

Orleans District Corps of Engineers through the Secretary of the Army to the Secretary of Defense could request assistance (a resurvey) from the National Geospatial Analysis Center (NGA) in St. Louis. The NGA could provide personnel with an FG 5 Gravity Meter to observe absolute gravity at the current CORS at the cost of per diem and mileage. This was last done in 2006 at a cost (per diem and mileage) of about $25,000. Mr. Luettich asked the value of observing gravity in terms of monitoring the HSDRRS. Mr. Mugnier replied that gravity observation is a validation of subsidence rates entirely independent of GPS and ellipsoid heights. Mr. Luettich asked whether there is reason for concern about the integrity of ellipsoid based subsidence measurements. Mr. Mugnier responded that slight variations in the local area are smoothed over in order fit the continental model relative to ellipsoid heights and the solution provided by the NGS. Mr. Luettich suggested that ellipsoid heights should be supplemented with absolute gravity measurements. Mr. Mugnier concurred with Mr. Luettich's suggestion at least at the CORS. Mr. Kemp commented that the SLFPA-E's primary interest should be an ellipsoid based network in order to understand how the HSDRRS structures are moving relative to the ellipsoid and that a secondary interest should be updating the geoid, which must be done in a larger regional effort. Mr. Luettich asked the error in measurement relative to the ellipsoid. Mr. Mugnier replied one to two centimeters (less than an inch). He noted that there are over 70 CORS in Louisiana and about 30 within the SLFPA-E's jurisdiction. The greatest density of CORS is in south Louisiana.

Mr. Luettich offered a motion that the CAC recommend to the Board that funding be provided to the USGS to maintain the ADCP velocity meter at the Seabrook Complex structure for calendar year 2014. He noted that the funding should be reconsidered on an annual basis. The CAC authorized the SLFPA-E Regional Director to work with the USGS to develop an estimated cost for operating and maintaining the meter. The motion was seconded by Dr. Lopez and unanimously adopted.

Mr. Luettich recommended that the SLFPA-E Regional Director be directed to explore through one of the SLFPA-E's Indefinite Delivery-Indefinite Quantity (ID-IQ) contracted consultants what it would take to determine if a relationship exists between water level data that has been collected over the last year or two and existing velocity data at the Seabrook Complex and/or the IHNC Surge Barrier. A proposal and estimated cost should be sought in order to ascertain the feasibility of determining the relationship between head differential between the Seabrook Complex gate and the Surge Barrier gates and the velocities through those two locations. Part of the proposal would be to explore the sufficiency of the existing data. The Committee concurred with the recommendation.

Mr. Luettich requested that the USACE be invited to the next CAC meeting to advise the Committee concerning the status of the gage at the IHNC Surge Barrier and the data collected at this location. The CAC at that time can determine whether further action will be needed. The Committee concurred with the recommendation.

Mr. Luettich suggested that the SLFPA-E approach the USACE relative to a request for the NGA to conduct a gravity study at the CORS located within its jurisdiction. Mr. Mugnier was asked to provide additional information to assist Mr. Turner with the request. Mr. Luettich added that the request should be coordinated with the Coastal

Protection and Restoration Authority (CPRA) in order to avoid any possible duplication of efforts and to ensure consistency. Mr. Turner suggested that a local member of the Mississippi River Commission also be approached relative to support for the request. Mr. Luettich commented that the SLFPA-E should pursue partners in a grander strategy for a system-wide monitoring system.

Mr. Turner noted that the levee districts are required by law to profile all levees at least once every three years. The Orleans Levee District does an annual check of much of the HSDRRS, particular floodgate sills, using conventional leveling procedures.

The CAC did not take up the agenda items listed under New Business. Mr. Kemp advised that instrumentation ideas will be discussed at next month's CAC meeting. Mr. Luettich commented that he would continue a dialog with the members of The Water Institute of the Gulf in order to gain a full understanding of its agenda.

There were no further discussions; therefore, the meeting was adjourned at 12:25 a.m.