

CELMN-ED-HC

2 Feb 95

## MEMORANDUM FOR RECORD

SUBJECT: LAKE PONTCHARTRAIN & VICINITY MODEL RESTUDY - DATA COLLECTION

1. Spoke to Lee Butler at CERC this morning about data collection.
2. CERC has about 50% of the required quadrangle data digitized, about 20 quad maps. About 20 - 25 quad maps remain to be digitized. These are north of Lake Pontchartrain, west of Lakes Pontchartrain and Maurepas and south of Lake Pontchartrain into Lake Borgne. Elevations from sea level up to the limit of flooding are required. We are comparing time and costs to see which organization can perform this task most efficiently.
3. NOD needs to provide digital data, x, y and z coordinates, for structural features in the area from Pass Christian to Atchafalaya Bay, from the Gulf north to the limit of flooding.
4. Work on modifying the ADCIRC program to allow cells to wet and dry has begun. Wave model development also began in Jan 95.
5. We will set up a meeting with CERC as soon as the data is ready to be transferred, or another significant milestone occurs. CERC will begin progress reports in March 95.
6. POC at CERC is David Mark at 601 634 2094.

Janis Hote

3-10-95

## LAKE PONTCHARTRAIN STORM SURGE STUDY

<u>TASK</u>	<u>BEGIN</u>	<u>COMPLETE</u>
1. GRID DEVELOPMENT	9-95	11-95
2. HYDRODYNAMIC TESTING (PRELIM. GRID W/ WIND)	10-95	1-96
3. TIDAL VERIFICATION	11-95	2-96
4. FLOOD-DRY SENSITIVITY	12-95	3-96
5. HURRICANE VERIFICATION	4-96	6-96
6. TRANSITION STORM SURGE MODEL	6-96	7-96

CELMN-ED-HC

5 Nov 96

## MEMORANDUM OF RECORD

SUBJECT: Phone conversation with Butler & Scheffner concerning ADCIRC

Laurent, Combe, Powell, Stutts, Pourtaheri, Herr & Hote called CERC, and spoke to Butler and Scheffner concerning the schedule delays in the ADCIRC modeling of Lake Pontchartrain and Morganza.

B&S explained that delays have resulted from computer problems and problems with the grid topography. Norm side-stepped the topography problem by increasing all interior elevations within the New Orleans levee system to the height of the levee elevation. Lee promised a better fix on the topography problem within the New Orleans levee system before the Lake Pontchartrain study is completed. Norm said that this latest grid ran for Hurricane Betsy, but storm surge elevations were generally too low. Jay, Hasan, Vann & I have looked at this grid and still see where additional data is needed to better define essential features, such as roads, levees and channels. Our plan is to add topographic data to the grid within the next few days. Jimmy Ledet from TBS will be here Wednesday to assist. In the meantime Norm will be trying to correct the Betsy stages. When we complete our corrections to the grid, Norm will use this grid to verify Andrew, Juan and Betsy. Norm thinks this will be completed by Friday, 8 Nov. We want to see the verified hydrographs from these storms, before he continues. We may also have to change or add gage locations to the final grid depending upon how much the grid changes.

If all goes well, Nancy's estimate of the revised schedule for Morganza looks like this:

- 6 Nov - grid calibrated
- 22 Nov - all runs made for storm surge; existing conditions boundary conditions to FTN
- 22 Dec - UNET results to CERC for frequency analysis
- 4 Jan - frequency curves to NOD for review
- 18 Jan - frequency curves to Planning
- 18 Mar - future conditions frequency curves to Planning Div

We did not schedule another call with B&S; but we should conference call again, if additional problems arise or delays persist.

**From:** Janis M Hote  
**To:** laurenta,powellna,herrlisa,stuttsva,combeadr,hotej...  
**Date:** 11/26/96 12:12pm  
**Subject:** ADCIRC Model

I spoke with Norm this morning. He is approaching the finishing touches in calibrating the grid for Hurricanes Betsy, Juan and Andrew. CRAY computer turn around time has really slowed them down. He and his team are working on converting the ADCIRC program to parallel processing, so it will run on work stations. He was getting very high stages in Lake Maurepas during Hurricane Betsy and discovered the source of the problem was that Highway 51 was not in the model. He added the highway and the model is responding much better. This problem originates from the random smoothing that was done to the grid to eliminate data points several months ago. Hopefully, no other problems like this are still in the grid that we haven't seen. We've looked the grid several times in the past few weeks and made corrections. Anyway, he feels that once the grid is calibrated satisfactorily, he and his team can begin production runs and should be able to provide existing conditions to FTN a couple of weeks later. This time line looks like: grid calibrated by 29 Nov; exist. conditions parameters to FTN by 16 Dec.

**From:** Janis M Hote  
**To:** LMNC30(GREENSTA)  
**Date:** 1/13/98 12:28pm  
**Subject:** Lake Pontchartrain Hurricane Reevaluation -Reply -Reply

Stan, it appears that we need about \$100K this FY for our inhouse work and an additional 25K for a contract with the ADCIRC developer at North Carolina State Univ. We have not set up the contract yet; so we do not need this money yet. Bet we do need all or a portion of the 100K to get started. Can you set up an account with our CEFM's group asap? Thanks.

>>> Stanley B Jr Green 01/12/98 09:25am >>>

Janis,

We expect to have funds available for the reevaluation study (the \$100k figure you mentioned is not out of the ballpark), but we need a good estimate of your FY98 requirement.

Stan

**CC:** winerhar,LMN01.LMNC30(COTTONEE),LMN01.LMNN20(COMB...

Lisa x 2425

21 AUG 96

31 Aug Norm will run Hussein Andrew in  
the grid now existing in ADCIRC.  
Some can be seen when grid is refined.  
Norm need Lat/Long from Marc Jalun<sup>son</sup> for locations  
of boundaries

L. Point. Lat/Long of stations for frequency relationships

Frequency for L. Point/Margaya will be completed  
by end of Sep

L. Point grid is complete  
Norm seems to think that the grid has been calibrated  
He will check with Dave Mark to see what the results  
of the calibration runs were. He should be able to  
answer this question by end of the week  
Call him 26 Aug 96

Lake Pont. Model Restudy - Spent up to 1 Oct 95

WES - \$51,000

Obligated for Work Station - \$34,460

Contract for writing + drying - \$25,000

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CELMN-ED-HC

29 Oct 96

## MEMORANDUM FOR RECORD

SUBJECT: ADCIRC MODELING OF LAKE PONT. AND MORGANZA

1. Background. The grid originated from the old grid created several years ago by CERC to answer questions about datum problems and impacts on surge caused by changes in hurricane parameters.

a. During the first year of the study NOD sent numerous files to CERC containing surveyed heights of all federal levees in the district, and quad maps with significant features, such as, roads, channels and local levees. These details were incorporated into the Lake Pontchartrain grid. About 9 months ago, we were told this data was overloading the grid with unnecessary detail that caused ADCIRC to either not run or run too slowly. So the grid detail was reduced by using a program which randomly selected an elevation that was representative of a group of grid nodes. This grid was run in the ADCIRC program and allegedly worked for some cases, although we did not see any verification runs.

b. Wetting and drying was added to the ADCIRC model to produce inland flooding.

c. A copy of the grid was furnished to NOD. Upon examining the grid we found that the random smoothing of the entire grid had left many areas, such as, Golden Meadow-Larose, East & West of Harvey and Morganza, without a closed levee system. We also noticed that no data was provided for the areas interior to the Lake Pontchartrain Levees. At that time, NOD sent additional data to CERC and it was incorporated into the grid. NOD made adjustments to the areas on the west bank inside the Cataouatche levee and in the Golden Meadow to Larose project area. NOD was under the impression that the model would compute overtopping and flood interior areas.

 d. While trying to run Hurricane Betsy using this grid, the ADCIRC program became unstable. CERC attributed this instability to the level of detail in the grid and the elevations below sea level that had been added to the grid within the New Orleans area levees. We learned at this point that when ADCIRC

starts, it floods all areas below sea level, leveed or unleveed.

e. To solve the existing instability, CERC proposed to put a barrier around New Orleans at elevation 6 meters NGVD. NOD is concerned that when production runs are started with other levee systems corrected they will enclose some areas with elevations below sea level and the instability will return. In addition we noticed many channels were not included in the grid, such as, Mississippi River, Bayou Terrebonne, Petite Caillou, etc. Some of these channels will be important in the Morganza study to assess the impact that these channels have on water movement during a storm surge.

2. At this point we know that repairing the grid to show some of the other leveed areas will introduce additional instabilities; difficulties that will be compounded if the enclosed areas are below sea level, either now or in the future. We will not be able to rely on the model accurately flooding leveed basins; we may be able to retrieve the volumes of levee overtopping into the leveed basin from the ADCIRC results. The program may have to be modified, turning off the wind stress over enclosed areas that might be flooded during the course of the storm to prevent additional instabilities. And we have to decide whether to modify the grid ourselves or to rely on CERC to modify the grid and let us check it. We're not leaning in this direction now, because the random point modification was not done logically, or with any understanding of the way drainage and levee protection operates in this area.

3. N.Powell, L.Herr and J. Hote met on 28 Oct to discuss ADCIRC modeling. The model grid is still not acceptable. When we reviewed the grid last week, we found numerous instances where many features were not described in sufficient topographic detail to reflect their potential for affecting storm surge or vice versa. Much time has been lost on the development of the grid. And the grid, which CERC told us was built and verified in Aug 96, is far from being complete. For the Morganza study, Norm was to provide boundary conditions (WSEL & Rain amounts) for existing conditions to FTN on 4 Nov. He said he will be at least till 18 Nov. After seeing the grid, we feel the date will slip to 31 Dec, even with our help with the grid. FTN will need a month to get UNET results (31 Jan 97). Norm will need till 15 Feb to complete his frequency analysis of storm surge and rainfall. We will need till 28 Feb to review the results. If we have any other problems, which almost seem a certainty at this point,

additional time will be needed to sort them out. Thus, 31 Mar is the most reasonable date for completion of existing conditions for the Morganza study.

4. In the midst of the Morganza work, we should be able to get some results for the Lake Pontchartrain study. After the grid has been corrected, the ADCIRC program has to be verified for a few storms. After verification a large number of hurricanes must be run through the ADCIRC program to develop elevations for use in the frequency analysis. Once the ADCIRC program is verified, we can start running it independently here at NOD. But we will have to wait until after the frequency analysis is completed before we can answer questions regarding stage/frequency relationships for the Lake Pontchartrain project.

JMH

, and contours of the interior area within the New Orleans hurricane protection levee system

CEMVN-ED-HC

2 June 1997

MEMORANDUM FOR : Director, Waterways Experiment Station,  
3939 Halls Ferry Road, Vicksburg, MS 39180-6199

SUBJECT: ADCIRC Modeling Of Lake Pontchartrain and Morganza Projects

1. The New Orleans District several years ago decided to revisit the Lake Pontchartrain & Vicinity Hurricane Protection Project. The project serves to protect a large populace in and adjacent to New Orleans. Our basic objective was to re-compute storm surges and wave climates using the latest technology in order that expenditures for raising and maintaining levees could be wisely directed. Additionally, we were interested in the project's ability to safely handle the design storm and the level of protection that the project provided using the latest criteria. To accomplish these objectives, we contracted with WES in January 1995 to develop the ADCIRC model as well as a wave climate model for the project area and perform statistical analysis of the results. The study has now been underway for more than 2 years and, except for the wave climate hindcast, we have failed to receive a product that we can place any level of confidence in. Our concerns include wetting and drying in selected areas, basic grid development, omissions of varying wind stress to account for varied land features, and basic quality control measures to ascertain a quality product is being delivered. Our concerns have been brought to the attention of several personnel working on the study, with the understanding that these issues would be addressed. However since last November, we have continued to experience these concerns with apparently little results.

2. In March 1996, we further contracted with WES to assist in developing storm surges, sub-tidal boundary conditions for extratropical events, and statistical analysis of stages for tropical and extratropical events for the Morganza to the Gulf of Mexico Feasibility Study. We have experienced similar problems with the development of these studies. Now the study schedule will have to be modified because we are unable to deliver our input to the local sponsor who has contracted the H&H portion of the study.

CEMVN-ED-HC

SUBJECT: ADCIRC Modeling Of Lake Pontchartrain and Morganza Projects

3. Please give your immediate attention to helping resolve the difficulties of these studies so that a quality and timely product can be achieved. Our point of contact on these projects is Mr. Jay Combe, (504) 862-2480.

FOR THE COMMANDER:

W. EUGENE TICKNER  
Chief, Engineering Division

  
CEMVN-ED-HC  
COMBE

  
CEMVN-ED-H  
COMBE  
2-15-07

  
CEMVN-ED  
TICKNER

CF: CEMVN-PD-FB

**From:** Adrian J Combe III  
**To:** x400("C=us;A=attmail;P=gov+usace;O=WES01;OU1=CEWES...  
**Date:** 9/30/97 8:56am  
**Subject:** Sorry -Reply

Reply requested when convenient

C C C:

No problem. I had hoped to have you and Joe McCormick both available last Thursday, but neither of you could make it so I guess that's okay.

My major concern with ADCIRC modeling for both Lake Pontchartrain, Morganza to the Gulf, and eventually Atchafalaya Re-evaluation is that the model we produce is the best available for the money spent. To this end it is imperative that we can present model results and possibly a simulation that we all have a high degree of confidence in and that a layman seeing the simulation loop can feel that yes ! that's reasonable.

With respect to Lake Pontchartrain, model results are available from SLOSH, Joe Suhayda's application of a "FEMA" model, and our ADCIRC simulation. Based on the SLOSH model NWS and the MVN produced hurricane evacuation maps that show all of New Orleans with a stage of 25 feet NGVD for a slow-moving, Saffir-Simpson category 4 hurricane. This is of course based on the MEOW's from 256 hurricanes on parrallel tracks from 6 compass points with various points of criticality. Suhayda's model flooding is not quite as extensive as he is using single tracks to try and show that the Red Cross can open shelters south of the I-10/ I-12 corridor for some hurricanes. I would like to be able to use ADCIRC to show the frequency of inundation for shelter location so that the State Emergency Operations Managers and Red Cross will know that if they open a shelter at a location (e.g. Cannal and the River) the chance of flooding the shelter is 1 in 1,000 or 1 in 10,000 in any year so they can understand the risk to personell and evacuees in the shelter. When I look at the simulation from ADCIRC, the whole New Orleans area is blanked out because we set the ground elevation at + 18 feet NGVD so the model doesn't become unstable. We really need to modify the code so that areas within levees start off dry even if they are below the start-up sea level. If during the storm, they get wet, they need to have the wind stress dropped to zero within the levees so that the model does not become unstable. I need to be able to put natural ground elevatoins within the leveed areas so that if a hurricane stage exceeds levee heights I can show flooding heights within the levees. Even though the WETTING AND DRYING does not apparently cause problems with the Lake Pontchartrain Model as it does in the Morganza Grid, we need to fix W&D for ADCIRC so that it works all the time, then I can be sure that its current bugs don't affect the surge for Lake Pont model.

*(One of the difficulties with relying on my memory is that when we meet to discuss a proposed model and I ask questions about coupling wind wave models to storm surge models and to wave run-up and overtopping, I think I hear the answer from Lee or Bruce that this is no problem and I think they mean the model will be able to do that and they may mean that they will give the various components and I can add them together after the model is finished to produce interior flooding. And I think that wetting and drying includes*

leveed areas, but they don't. And I think that since we talked discussed various things like the SPH hurricane runs that they are part of the modeling effort, even though they are not specifically mentioned in the written proposal. Since storm surge travels up the Mississippi River during events such as Betsy, Camille, and the 1915 hurricane, I expected the Lake Pont Model to include the River and was suprised when it did not.)

On Morganza to the Gulf, we, MVN Coastal Engineering Section, were not originally involved except to coordinate. Three model were to be used: ADCIRC, TABS, and UNET. The contractor (FTN) doing the UNET model talked with MVN Hydrologic Engineering and Norm and decided, possibly incorrectly, that they didn't need the TABS model. Later FTN asked Norm to move his boundaries shoreward and he agreed to do that. The farther along we go the more involved Hasan, Janis, and I seem to become.

On Atchafalys Re-evaluation I expect we will continue to be involved.

I guess the bottom line is that I continually press to get WES involved in modeling hydraulics and hydrology for us and we keep having trouble communicating what models are going to do for us. You need to insure that I can convince my boss and me that we are getting good results for our money. To do this, we need to communicate more openly with each other. During the course of the modelling, we need to meet whenever the modeler is having trouble in case we can offer suggestions as to how to overcome difficulties. For example, on Lake P grid, we provided levee heights and ground elevations, but we provided all the data we had, and then the data had to be thinned to reduce the numbr of nodes added to the model.

Jay Combe

CC:           laurenta, combeadr, pourtahe, hotejani

