DAEN-CWH(11 May 84) 2d Ind

SUBJECT: Lake Pontchartrain, Louisiana and Vicinity Hurricane Protection Project, - Memorandum of Meeting Orleans Parish Outfall Canal Model Study Butterfly Control Valve

HQ US Army Corps of Engineers, Wash, D.C. 20314

20 June 1984

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Commander, Lower Mississippi Valley Division, CATTN: LMVED-WH

Subject memorandum is approved.

FOR THE COMMANDER:

VERNON K. HAGEN Chief, Hydraulics and Hydrology Division Directorate of Civil Works

CF wo incl: LMNED-SP LMVED-WH (NOD 11 May 84) 3d Ind

SUBJECT: Lake Pontchartrain, Louisiana and Vicinity Hurricane Protection Project, - Memorandum of Meeting Orleans Parish Outfall Canal Model Study Butterfly Control Valve

DA, Lower Mississippi Valley Division, Corps of Engineers, Vicksburg, MS 39180

27 JUN '84

TO: Commander, New Orleans District, ATTN: LMNED-SP

The subject memorandum has been reviewed and approved.

FOR THE COMMANDER:

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R. H. RESTA, P. E. Chief, Engineering Division Cook/j1/591!

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RK Resta ED

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SUBJECT: Lake Pontchartrain, Louisiana and Vicinity Hurricane Protection Project, - Hemorandum of Heeting Orleans Parish Outfall Canal Hodel Study Butterfly Control Valve

DA, Lower Mississippi Valley Division, Corps of Engineers, Vicksburg, MS 39180

11 JUN'84 TO: COR USACE (DAEN-CHN-D) MASH DC

It is The subject memorandum has been reviewed and is satisfactory to LMVD. forwarded for your review and approval.

FOR THE COMMANDER:

R. H. RESTA, P.E. Chief, Engineering Division

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1 Incl

CF we incl: LMNED-SP

5mc 6-11-84



DEPARTMENT OF THE ARMY

NEW ORLEANS DISTRICT. CORPS OF ENGINEERS P.O. BOX 60267 NEW ORLEANS, LOUISIANA 70160

ATTENTION OF:

LMNED-SP

11 May 1984

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SUBJECT: Lake Pontchartrain, Louisiana and Vicinity Hurricane Protection Project - Memorandum of Meeting Orleans Parish Outfall Canal Model Study Butterfly Control Valve

Commander, Lower Mississippi Valley Division ATTN: LMVED-WH

1. Inclosed for your information and comment is a copy of the memorandum of meeting for the subject 1 May 1984 meeting.

2. An expeditious review of the memorandum is appreciated so that any omission or inaccuracies can be corrected and incorporated in the testing program.

l Incl as FREDERIC M. CHATRY Chief, Engineering Division

Copies Furnished: w/incl WESHS WESCW

LMNED-SP

MEMORANDUM OF MEETING

SUBJECT: Model Study Meeting, Lake Pontchartrain, La. & Vicinity Hurricane Protection Project Orleans Parish Outfall Canals - Butterfly Control Valve Structures

Place & Date of Meeting : 1 May 1984 Vicksburg, Mississippi Waterways Experiment Station

Attendants: List of Attendants is attached (incl 1).

<u>Purpose of Meeting</u>: The meeting was held to discuss the model testing program and answer questions relative to the proposed design. A copy of the meeting agenda is attached (incl 2).

Brief Summary of Meeting: Mr. Chatry opened the meeting by welcoming those in attendance and explaining the purpose of the meeting. He indicated that the unique nature of the proposed plans and the engineering questions that need resolution require that a model test be conducted concurrent with General Design Memorandum preparation. The prime purpose of the first phase of testing would be to establish concept feasibility and to resolve engineering questions about optimum pinning location as well as examine various loading cases and the effects of wave action on gate operation.

Mr. Stutts then gave a brief summary of the outfall canal problem and explained the interior drainage system for the City of New Orleans as it relates to the outfall canals. The principle behind the asymmetrically pinned butterfly control valve was then discussed and slides showing various views of the proposed valve system were shown. It was indicated that the current testing program would be for the London Avenue Canal only. Mr. Stutts stated that model study input is required at the earliest possible date so that a firm schedule for the GDM on this project feature can be established.

Following the slide presentation in accordance with the prepared agenda, LMN personnel discussed the various engineering considerations which are to be examined in the model.

Mr. Soileau discussed the hydraulic design aspects of the model testing program. The program is designed to answer questions about gate response under various head differentials and pumping conditions. Other hydraulic design questions normally tested during a model study would also be examined in this model. These include but are not limited to the following, design of scour protection; examining flow characteristics through the structure; and establish head loss characteristics under various pumping conditions and lake stages. Specifically, the model is needed to determine the hydraulic loading

on the valves or gates so that these loads can be translated into mechanical loads needed to design the butterfly valve system. The single overriding question to be resolved during the first phase of testing concerns establishing concept feasibility of the proposed butterfly valve plan.

Mr. Combe discussed the tidal hydraulic considerations that are to be simulated and tested in the model. The testing program is designed to simulate the design SPH hydrograph for Lake Pontchartrain critical to south shore. The coincidental wave characteristics associated with the design storm will also be simulated in the model. Mr. Combe indicated that wave data from the Seabrook Wave Hindcast study is available to use in the testing program. Gate response under various lake stages and pumping conditions are to be tested. Mr. Combe then summarized results of an interior drainage study conducted by LMN which was designed to examine the potential effects of the proposed gate structures on the City's interior drainage system. Inclosure 3 is attached as a summary of these results.

Mr. Strecker explained the proposed hydraulic operating system that could be used to override the valve's self-activating mode of operation. The hdyraulic system also serves as a dampening device which regulates the rate of opening and closing of the valve. An optimum rate of opening and closing is to be established based on an integrated response of the valves to pumping, canal currents and wave conditions which are to be examined in the model. Inclosure 4 gives a schematic detail of the hydraulic system's internal valve arrangement and operating sequence.

Meeting attendants agreed that at least one of the gates for the model should be built to simulate the dampening characteristics of this system, i.e., opening and closing rates.

Mr. Romero discussed the structural design aspect of the proposed butterfly control valve plan. He indicated that the structure would be a pile supported, reinforced concrete structure and that the valves or gates would be fabricated of structural steel with horizontal framming members and skin plates on both sides. Design of the concrete structure is routine in that normal accepted structural design techniques will be used. Design of the gates or valves can be accomplished by using the same hydraulic load cases necessary for the mechanical design. Model study results will be used for this purpose.

Mr. Fletcher from WES presented a generalized plan for the proposed first phase of modeling. He indicated that the model would be built to a 1:20 scale which would simmulate the wave action from Lake Pontchartrain and the discharge for the pumping station. During the course of Mr. Fletcher's presentation, meeting attendees agreed that the model should simulate the effects of a rising lake stage and not be limited to a static test as had originally been planned for the model. This would necessitate adding an additional pump to the model layout as well as locating within the WES facilities an available reservoir adequate to simulate the rising lake

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stage. It was further pointed out that the surcharge storage characteristics in the outfall canals should be incorporated in the model since only a portion of the canal would be simulated in the model.

Mr. Chatham the CERC representative indicated that the wave testing proposed for the London Avenue model would, he believed, be applicable to the Orleans Avenue Canal structure but that further tests may be necessary for the Metairie Relief Canal. The testing could be done at a smaller scale than the 1:20 scale for the proposed London Avenue model, i.e., 1:50 scale.

Mr. Louque, LMV's hydraulic design representative, stated that the testing program must be organized so that an early decision about concept feasibility can be established. This will enable management, early on, to make decisions relative to the need for Phase II testing.

In summarizing Mr. Dressler, OCE structural design representative, indicated that he was concerned that the Phase I model testing program as discussed up to that point did not incorporate adequate load monitoring for structural design of the gate. He expressed concern for monitoring internal stress on framing members and indicated that monitoring instantaneous trunnion torques would not give the structural designer sufficient information. Attendants agreed that future testing during Phase II of the model testing program could address these issues. Concept feasibility should be established before entering into this kind of detail study. However, it was agreed that it would not be an excessive cost during the Phase I testing to incorporate load cells to monitor forces at the trunnion pins. Mr. Dressler further stated that he was also concerned that there would be pressure to dismantle the model once initial testing was complete and that care should be taken to insure that the dismantling process is not premature. Additional model input might be necessary during DDM preparation. A final comment from Mr. Dressler concerned the effect that debris might have on gate operation. LMW attendants stated that debris on both London Avenue and Orleans Canal would not be a problem. However debris in the Metairie Relief Canal could potentially be a problem. This issue will be investigated during GDM preparation or during the Phase II model study.

Early in the meeting Mr. Powell, OCE hydraulic design representative, recommended that the district examine some of the design work accomplished by the Bureau of Reclamation in connection with dampening systems for their gates. He further indicated that the 1:20 scale of the model is probably a reasonable compromise in size but that Phase II testing may require a larger scale model to determine design forces on the valves. In conclusion Mr. Powell indorsed the testing program as currently planned including the additional load cells at the valve trunnions resulting from Mr. Dressler's comments.

In summary remarks, WES representatives indicated that model construction could begin in approximately two weeks. LMN stated that field survey data are available for model construction and will be furnished as soon as possible.

D. Varue thills D. VANN STUTTS

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LIST OF ATTENDANTS

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MEETING BUTTERFLY CONTROL VALVE STRUCTURE ORLEANS PARISH OUTFALL CANAL LAKE PONTCHARTRAIN, LA. & VICINITY HURRICANE PROTECTION PROJECT 1 MAY 1984

NAME

ORGANIZATION

Sam Powell Randy Oswalt D. D. Davidson Douglas G. Outlaw Ray Bottin Jay Combe Robert Guizerix Dennis Strecker James Miskelley D. Vann Stutts Jack Bardwell Jorge Romero Donald R. Dressler Gene Chatham Frank Weaver Henry Simmons Frederic M. Chatry Claudy E. Thomas Glenn C. Miller John L. Grace, Jr. Larry Cook Bob Louque Terry Cox Bob Fletcher

DAEN-CWH WESHS-S WESCW-R WESCW-P WESCS-P LMNED-HC LMNED-DG LMNED-DG LMVED-TD LMNED-SP LMVED-TD LMNED-DD DAEN-ECE-D WESCW LMVED-G RETIRED. LMNED LMVED-TM LMVED-TE WESHS LMVED-W LMVED-W LMVED-TS WESHS-S

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8 May 1984

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AGENDA

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MEETING FOR MODEL STUDY TESTING OF BUTTERFLY CONTROL VALVE STRUCTURE ORLEANS PARISH OUTFALL CANAL LAKE PONTCHARTRAIN, LA. & VICINITY HURRICANE PROTECTION PROJECT 1 MAY 1984

10:00 Welcome and Introduction Purpose of Meeting Mr. Chatry/Mr. Resta

- 10:15 Brief summary of Outfall Canal Problem and Mr. Stutts description of Proposed Butterfly Control Valve - GDM Schedule and Model Study input requirements.
- 10:30 LMN recommended Model Study Testing Program and desired output
 - a. Hydraulic Design Considerations
 - b. Tidal Hydraulic Considerations
 - c. Mechanical/Electrical Considerations
 - d. Structural Design Considerations
- 10:45 WES Comments and Recommendations
- 11:30 Lunch
- 12:15 LMV Recommendations
- 12:30 OCE Recommendations

1:15 General Comments

1:45 Meeting Adjourned

Mr. Soileau Mr. Combe Messers. Guizerix and Strecker Mr. Romero

Messers. Fletcher, Chatham, Oswalt and Grace

Messers. Louque and Cook

Messers. Powell and Dressler

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HYDRAULIC SYSTEM OPERATION

Rotation of the gate in a clockwise direction will cause the piston rods of each hydraulic cylinder to retract. This action will in turn expel hydraulic fluid from the rear end of the cylinders. The expelled fluid is then forced through the pressure compensated adjustable flow control valve "C2", through the open center of valve "E" and into the reservoir. The rod end of the cylinders draw fluid from the reservoir through the open center of valve "E" and through check valve "D1".

Rotation of the gate in the counter-clockwise direction will result in hydraulic fluid being expelled from the rod end of the cylinders through flow control valve "C1" and through the open center of valve "E" and into the reservoir. The rear end of the cylinders draws fluid from the reservoir through the open center of valve "E" and through check valve "D2".

Flow control valves "C1" and "C2" are pressure compensating and can be adjusted to control the rate of gate rotation regardless of gate forces.

Two pumps are provided, one electric motor driven and the other engine driven. Either pump can be used to manually open and close the gate.

Valves "A1" and "A2" are used to lock the cylinder and gate in its position.

Valves "G" and "H" are used to prevent back flow through the pumps.

Valves "B1" and "B2" are used as counter balancing valves or to permit flow past the flow control valves "C1" and "C2" when operating the gate using either pump.

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| ERENCE OR OFFICE SYMBOL | Lake Pontchartrain, L Project - Memo of Mee Model Study Butterfly | A and Vicinity Hurricane Protection ting Orleans Parish Outfall Cana! Control Valves |
| Mr. Hill (ED-T) | FROM Mr. Louque | DATE 14 May 84 CMT 1 |
| Mr. Weaver Mr. Graham (ED-R) (CY TO EACH) | | Wall Cook/DS/3913 |
| Please review the subject | memo and furnish comments by | 7 25 May 84. |
| | My | |
| l Incl as | LOUQUE | |
| CF: Mr. Resta Mr. Kaufman | · · | |
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| LMVED-R | | · · · · · · · · · · · · · · · · · · · |
| TO Mr. Louque | FROM Mr. Graham | DATE 25 May 84 CMT 2 11is/caf/5910 |
| No comment. | | |
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LT. LAMP: Ray 15 Mar St DISPOSITION FORM Ulca 25 May 84 S: For use of this form, see AR 340-15; the proponent agency is TAGO. REFERENCE OR OFFICE SYMBOL SUBJECT Lake Pontchartrain, LA and Vicinity Hurricane Protection Project - Memo of Meeting Orleans Parish Outfall Canal LMVED-WH Model Study Butterfly Control Valves FROM DATE CMT 1 то 14 May 84 Mr. Louque Mr. Hill (ED-T) Cook/bs/5915 Mr. Weaver Mr. Graham (ED-R) (CY TO EACH) Please review the subject memo and furnish comments by 25 May 84. LOUQUE 1 Incl as CF: Mr. Resta Mr. Kaufman CMT 2 15 May 84 To; Mr. Lougua From: Mr. Weaver Subject mamo is satisfactory to GSM Br F.J. Weaver

LMVED-TD (14 May 84)

SUBJECT: Lake Pontchartrain, LA and Vicinity Hurricane Protection Project - Memo of Meeting Orleans Parish Outfall Canal Model Study Butterfly Control Valves

TO C/WC Br FROM C/Tech Eng Br DATE 22 May 84 CMT 2 Miskelley/mas/5922

Tech Eng Branch has no comments on the subject memo.

'R. HILL W.

wd incl