

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

Commander, Lower Mississippi Valley Division, 0

ATTN: 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

1514-14 (memo) Lake Pont.

LMVED-WH (NOD 11 May 84) 3d Ind

Cook/j1/591

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

Walker
ED-WI

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

27 JUN '84

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

Louque
ED-1

The subject memorandum has been reviewed and approved.

Hill
ED-T
Kaufman
ED-1
28
of 8

FOR THE COMMANDER:

1 Incl *PH*
as

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

R. H. RESTA
EE

JMC
6-27-84

Cook/bs/5915

LMVED-WH (NOD 11 May 84) 1st Ind
SUBJECT: Lake Pontchartrain, Louisiana and Vicinity Hurricane Protection
Project, - Memorandum of Meeting Orleans Parish Outfall Canal
Model Study Butterfly Control Valve

W
Walker
ED-WH

Louque
Louque
ED-W

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

11 JUN '84
TO: CDR USACE (DAEN-CWH-D) WASH DC

Hitt
Hitt
ED-T

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

Weaver
Weaver
ED-G

FOR THE COMMANDER:

Graham
Graham
ED-R

1 Incl
nc

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

CF w/o Incl:
LMVED-SP

RDK
Kaufman
ED-A
RDK
for
Resta
ED

Jmc
6-11-84



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

REPLY TO
ATTENTION OF:

LMNED-SP

11 May 1984

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.

FREDERIC M. CHATRY
Chief, Engineering Division

1 Incl
as

Copies Furnished: w/incl
WESHS
WESCW

1514-14 (revised) Lake Pont.

11 May 84

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).

Purpose of Meeting: 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 hydraulic 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 framing 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 simulate 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

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. LMV 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. Vann Stutts
D. VANN STUTTS

4 Incl
as

8 May 1984

LIST OF ATTENDANTS

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

<u>NAME</u>	<u>ORGANIZATION</u>
Sam Powell	DAEN-CWH
Randy Oswalt	WESHS-S
D. D. Davidson	WESCW-R
Douglas G. Outlaw	WESCW-P
Ray Bottin	WESCS-P
Jay Combe	LMNED-HC
Robert Guizerix	LMNED-DG
Dennis Strecker	LMNED-DC
James Miskelley	LMVED-TD
D. Vann Stutts	LMNED-SP
Jack Bardwell	LMVED-TD
Jorge Romero	LMNED-DD
Donald R. Dressler	DAEN-ECE-D
Gene Chatham	WESCW
Frank Weaver	LMVED-G
Henry Simmons	RETIRED
Frederic M. Chattry	LMNED
Claudy E. Thomas	LMVED-TM
Glenn C. Miller	LMVED-TE
John L. Grace, Jr.	WESHS
Larry Cook	LMVED-W
Bob Louque	LMVED-W
Terry Cox	LMVED-TS
Bob Fletcher	WESHS-S

8 May 1984

AGENDAMEETING 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. Nesta
10:15	Brief summary of Outfall Canal Problem and description of Proposed Butterfly Control Valve - GDM Schedule and Model Study input requirements.	Mr. Stutts
10:30	LMN recommended Model Study Testing Program and desired output	
	a. Hydraulic Design Considerations	Mr. Soileau
	b. Tidal Hydraulic Considerations	Mr. Combe
	c. Mechanical/Electrical Considerations	Messers. Guizerix and Strecker
	d. Structural Design Considerations	Mr. Romero
10:45	WES Comments and Recommendations	Messers. Fletcher, Chatham, Oswalt and Grace
11:30	Lunch	
12:15	LMV Recommendations	Messers. Louque and Cook
12:30	OCE Recommendations	Messers. Powell and Dressler
1:15	General Comments	
1:45	Meeting Adjourned	

Incl 2

EXISTING
CONDITION

BUTTERFLY GATES INSTALLED
CONDITION

REACH NUMBER	100-YEAR RAINFALL ACRE-FT	HOURS PUMP OFF	STAGE FEET NGVD	500-YEAR RAINFALL ACRE-FT	HOURS PUMP OFF	STAGE FEET NGVD
6 & 7	1616.7	4-11	- 3.5	2249.8	3-13	- 3.1
	1663.8	4-12	- 3.5	2311.3	3-14	- 3.1
	1700.7	4-13	- 3.5	2372.8	3-15	- 3.0
8	1013.1	4-11	- 1.1	1245.0	3-13	- 0.7
	1042.6	4-12	- 1.1	1284.0	3-14	- 0.7
	1065.7	4-13	- 1.0	1323.0	3-15	- 0.6
9	1084.8	5-11	- 2.3	1333.2	4-12	- 1.9
	1116.4	5-12	- 2.2	1374.4	4-13	- 1.9
	1141.2	5-13	- 2.1	1415.6	4-14	- 1.8
1	2422.3	5-11	- 3.4	2686.6	4-12	- 3.2
	2492.9	5-12	- 3.4	2778.7	4-13	- 3.2
	2548.2	5-13	- 3.3	2870.8	4-14	- 3.1
6 & 7	1616.7	4-11	- 2.8	2249.8	3-13	- 0.8
	1013.1	4-11	0.0	1245.0	3-13	+ 4.0
	1084.8	5-11	- 1.4	1333.2	4-12	0.0
1	2422.3	5-11	- 3.4	2686.6	4-12	- 3.2

Incl 3,

10-yr

<u>REACHES</u>	<u>9 hour DELAY</u>	<u>Diff.</u>	<u>No Delay 100% Pumping</u>
1	-3.8	0.7	-4.5
6 & 7	-3.9	0.4	-4.3 (1hr. delay)
8	-1.6	0.7	-2.3
9	-2.8	0.8	-3.6
10C	+0.3	1.1	-0.8
11	+2.7	4.4	-1.7
12	+0.2	0.4	-0.2
14C	+0.6	1.0	-0.4
15C & 13	-0.8	1.4	-2.2
16C	+0.4	3.0	-2.6

100-yr

<u>REACHES</u>	<u>9 hour DELAY</u>	<u>Diff.</u>	<u>No Delay 100% Pumping</u>
1	-1.3	0.5	-1.8
6 & 7	-2.6	1.3	-4.0
8	0.5	0.6	-0.1
9	-1.3	0.4	-1.7
11	-0.1	1.1	-1.2
12	0.4	1.2	-0.8
10C	0.7	1.2	-0.5
16C	1.3	3.6	-2.3
15C + 13	-0.2	1.6	-1.8
14C	1.3	1.4	-0.1

Incl 32

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".

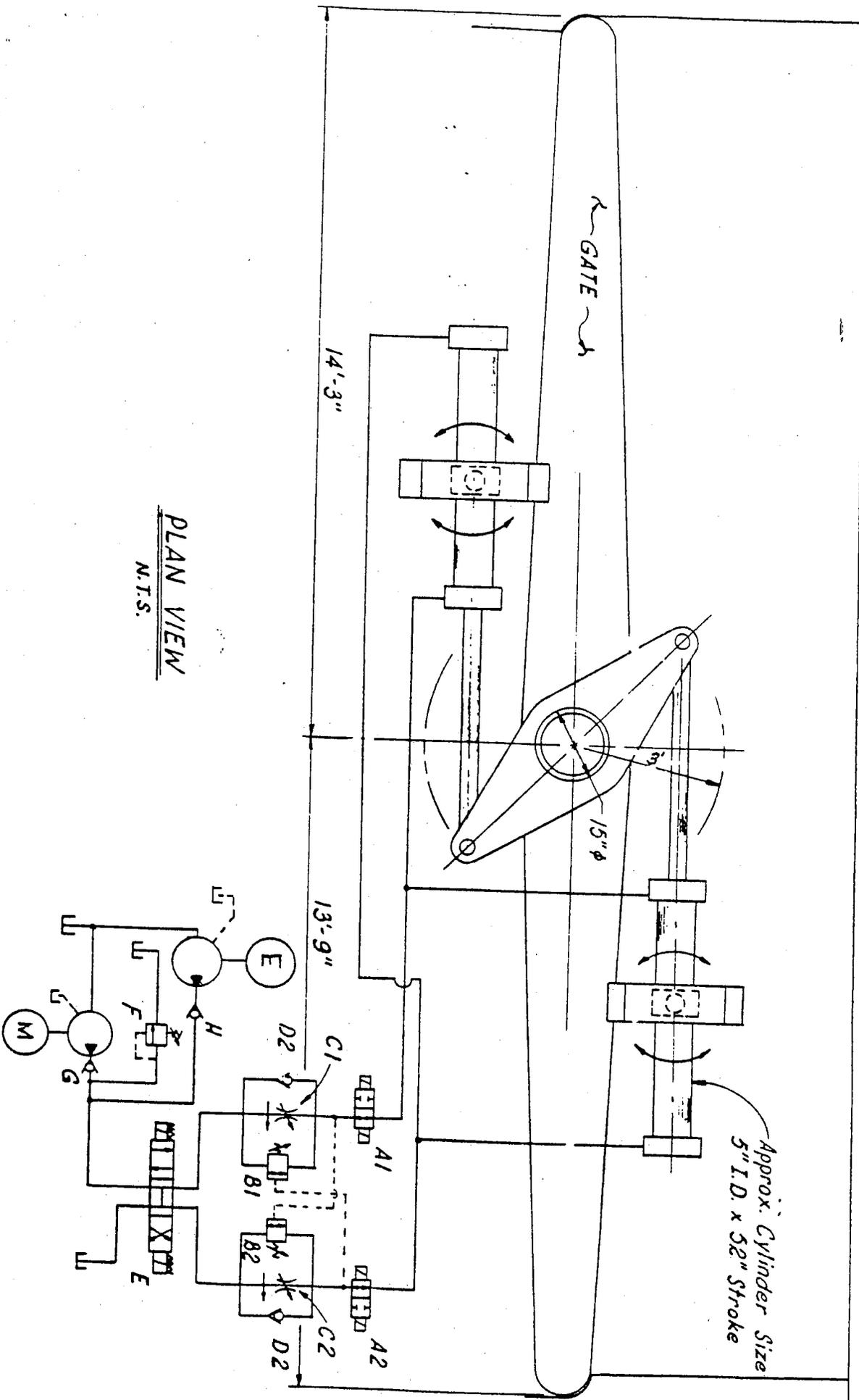
Flow control valves "C1" and "C2" are pressure compensating and can be adjusted to control the rate of gate rotation regardless of gate forces.

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.



PLAN VIEW
N.T.S.

Incl 4₂

DISPOSITION FORM

onwall

For use of this form under FAR 340-15; the proponent agency is TAGO.

S: 25 May 84

REFERENCE OR OFFICE SYMBOL LMVED-WH	SUBJECT Lake Pontchartrain, LA and Vicinity Hurricane Protection Project - Memo of Meeting Orleans Parish Outfall Canal Model Study Butterfly Control Valves
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TO Mr. Hill (ED-T) FROM Mr. Louque DATE 14 May 84 CMT 1
 Mr. Weaver
~~Mr. Graham (ED-R)~~ *ASW* Cook/bs/5915
 (CY TO EACH)

Please review the subject memo and furnish comments by 25 May 84.

1 Incl
as

[Signature]
LOUQUE

CF:
Mr. Resta
Mr. Kaufman

LMVED-R

TO Mr. Louque FROM Mr. Graham DATE 25 May 84 CMT 2
[Signature] *itis/caf/5910*

No comment.

1 Incl
nc

[Signature]
JIMMIE GRAHAM

DISPOSITION FORM

For use of this form, see AR 340-15; the proponent agency is TAGO.

R: 15 May 84 *LTJAN*
S: 25 May 84 *Weaver*

REFERENCE OR OFFICE SYMBOL LMVED-WH	SUBJECT Lake Pontchartrain, LA and Vicinity Hurricane Protection Project - Memo of Meeting Orleans Parish Outfall Canal Model Study Butterfly Control Valves
--	---

TO Mr. Hill (ED-T) FROM Mr. Louque DATE 14 May 84 CMT 1
 ✓ Mr. Weaver *HEW* Cook/bs/5915
 Mr. Graham (ED-R)
 (CY TO EACH)

Please review the subject memo and furnish comments by 25 May 84.

1 Incl
as

[Signature]
LOUQUE

CF:
Mr. Resta
Mr. Kaufman

To: Mr. Louque
From: Mr. Weaver

CMT 2
15 May 84

Subject memo 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 *kan* CMT 2
Miskelley/mas/5922

Tech Eng Branch has no comments on the subject memo.

wd incl

W. R. Hill
W. R. HILL