MISSISSIPPI RIVER-GULF OUTLET, MICHOUD CANAL, LOUISIANA

LETTER

FROM

THE SECRETARY OF THE ARMY

TRANSMITTING

A LETTER FROM THE CHIEF OF ENGINEERS, DEPARTMENT OF THE ARMY, DATED JUNE 3, 1968, SUBMITTING A REPORT, TOGETHER WITH ACCOMPANYING PAPERS AND ILLUSTRATIONS, ON A REVIEW OF THE REPORT ON MISSISSIPPI RIVER-GULF OUTLET, MICHOUD CANAL, LOUISIANA, REQUESTED BY A RESOLUTION OF THE COMMITTEE ON PUBLIC WORKS, UNITED STATES SENATE, ADOPTED JUNE 9, 1964

PRESENTED BY MR. BYRD OF WEST VIRGINIA
(FOR MR. RANDOLPH)

JULY 11, 1968.—Referred to the Committee on Public Works and ordered to be printed with illustrations

U.S. GOVERNMENT PRINTING OFFICE
WASHINGTON : 1968

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(Only Plate 1 printed)

LETTER OF TRANSMITTAL

DEPARTMENT OF THE ARMY
WASHINGTON, D.C. 20310

July 8, 1968

Honorable Jennings Randolph
Chairman, Committee on Public Works
United States Senate
Washington, D. C. 20510

Dear Mr. Chairman:

I am transmitting herewith a favorable report dated 3 June 1968, from the Chief of Engineers, Department of the Army, together with accompanying papers and illustrations, on a review of the report on Mississippi River-Gulf Outlet, Michoud Canal, Louisiana, requested by a resolution of the Committee on Public Works, United States Senate, adopted 9 June 1964.

The views of the State of Louisiana and the Departments of the Interior and Transportation are set forth in the inclosed communications.

If the project is authorized and before any request for funds to initiate construction, the Chief of Engineers will obtain assurances from local interests that facilities adequate to insure multiple use and to justify the proposed project will be constructed.

The Bureau of the Budget advises that there is no objection to the submission of the proposed report to the Congress; however, it states that no commitment can be made at this time as to when any estimate of appropriation would be submitted for construction of the project modification, if authorized by the Congress, since this would be governed by the President's budgetary objectives as determined by the then prevailing fiscal situation. A copy of the letter from the Bureau of the Budget is inclosed.

Sincerely yours,

Stanley R. Resor

STANLEY R. RESOR
Secretary of the Army

1 Incl
Report

COMMENTS OF THE BUREAU OF THE BUDGET

EXECUTIVE OFFICE OF THE PRESIDENT
BUREAU OF THE BUDGET
WASHINGTON, D.C. 20503

July 2, 1968

Honorable Stanley R. Resor
Secretary of the Army
Washington, D. C. 20310

Dear Mr. Secretary:

Mr. Robert E. Jordan's letter of June 29, 1968, submitted the favorable report of the Chief of Engineers on Mississippi River-Gulf Outlet, Michoud Canal, Louisiana, requested by a resolution of the Committee on Public Works, United States Senate, adopted June 9, 1964.

I am authorized by the Director of the Bureau of the Budget to advise you that there would be no objection to the submission of the proposed report to the Congress. No commitment, however, can be made at this time as to when any estimate of appropriation would be submitted for construction of the project, if authorized by the Congress, since this would be governed by the President's budgetary objectives as determined by the then prevailing fiscal situation.

Sincerely yours,

Carl H. Schwartz, Jr.
Director, Natural Resources
Programs Division

COMMENTS OF THE STATE OF LOUISIANA

STATE OF LOUISIANA
DEPARTMENT OF PUBLIC WORKS
BATON ROUGE, LA. 70804

June 7, 1968

LEON GARY
DIRECTOR

Lieutenant General William F. Cassidy
Chief of Engineers
Department of the Army
Washington, D. C. 20315

Re: ENGCW-PD

Dear General Cassidy:

Receipt is acknowledged of your letter dated April 30, 1968, transmitting a copy of the proposed report of the Chief of Engineers, together with other pertinent papers on the Gulf Intracoastal Waterway east of the Mississippi River-Gulf Outlet and Michoud Canal, Louisiana.

The Louisiana Department of Public Works has reviewed the report and we find that the Corps of Engineers has made a complete study and submitted an excellent report. We are pleased to concur with the recommendations of the report.

The report of the Chief of Engineers has been referred to the Louisiana Wild Life and Fisheries Commission, and if any further comments are made, they will be forwarded to you immediately. It is noted that prior comments on this project by the Louisiana Wild Life and Fisheries Commission are contained in the report, and recommended features of the project have not been changed since that time.

This project is urgently needed to eliminate double handling of cargo for inbound and outbound shipment and make available additional space for the expansion of the crowded facilities in the Port of New Orleans.

The Department appreciates the opportunity to review and comment on the proposed report.

Sincerely yours,

Calvin T. Watts

CALVIN T. WATTS
Assistant Director

COMMENTS OF THE DEPARTMENT OF THE INTERIOR

UNITED STATES
DEPARTMENT OF THE INTERIOR
OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

June 18, 1968

Dear General Cassidy:

This is in reply to your letter of April 30, 1968, requesting our comments on Gulf Intracostal Waterway East of the Mississippi River-Gulf Outlet and Michoud Canal, Louisiana.

The Fish and Wildlife Service finds that your recommended plan would not adversely affect fish and wildlife nor does it provide opportunities for the improvement of these resources.

The Bureau of Outdoor Recreation advises that the proposed project would not significantly affect recreation resources in the area, and that no outdoor recreation developments are proposed.

The Federal Water Pollution Control Administration states that the proposed project is not expected to have adverse effects on the water quality of the area. It is recommended that, during the construction period, the contractors should:

1. Exercise care in the relocation of petroleum product pipelines and other hazardous material to prevent accidental spillages that would result in degradation of the water quality.

2. Provide and operate sanitary facilities to adequately treat and dispose of domestic wastes in conformance with Federal and State water pollution control regulations.

3. Schedule clearing, excavation and construction operations to reduce turbidity and siltation to the lowest level practicable. Spoil produced during dredging operations should be confined behind dikes or otherwise disposed of in such a way to preclude its flowing back into the stream.

The opportunity of submitting our comments is appreciated.

Sincerely yours,

Robert W. Nelson

Deputy Assistant Secretary of the Interior

Lt. General William F. Cassidy
Chief of Engineers
Department of the Army
Washington, D. C. 20315

COMMENTS OF THE DEPARTMENT OF TRANSPORTATION

OFFICE OF THE SECRETARY OF TRANSPORTATION
WASHINGTON, D.C. 20590
June 7, 1968

Lieutenant General William F. Cassidy
Chief of Engineers
Department of the Army
Washington, D. C. 20315

Dear General Cassidy:

This is in answer to your letter of April 30, 1968 to Secretary Boyd requesting Departmental review of your proposed report concerning improvements on the Gulf Intracoastal Waterway east of the Mississippi River-Gulf Outlet and the Michoud Canal in Louisiana.

Your report recommends navigational improvement in the Gulf Intracoastal Waterway Reach between the Mississippi River-Gulf Outlet and the Michoud Canal. The principal improvement would be to increase the depth of this section of the waterway to 36-feet to allow for access by deep-draft vessels. The report also recommends increasing the depth of Michoud Canal to 36-feet and construction of a turning basin at the head of the Canal 800-feet square. The estimated cost of the project is $1,363,000. It has a benefit/cost ratio of 7.1 to 1.

In the Coast Guard review of this proposal, it was noted its primary concern would lie in the requirement to provide the necessary aids to navigation. In this regard, the Commander, Eighth Coast Guard District was consulted by the District Engineer. The estimated cost of the installation of new aids to navigation is $20,000 with an annual maintenance expense of $1,500.

The Department of Transportation has no objection to your recommendations and findings and appreciates this opportunity to comment on your report.

Sincerely yours,

M. Cecil Mackey
Assistant Secretary
for Policy Development

x

MISSISSIPPI RIVER-GULF OUTLET, MICHOUD CANAL, LOUISIANA

REPORT OF THE CHIEF OF ENGINEERS, DEPARTMENT OF THE ARMY

DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
WASHINGTON, D.C. 20315

IN REPLY REFER TO

ENGCW-PD

3 June 1968

SUBJECT: Mississippi River-Gulf Outlet, Michoud Canal, Louisiana

THE SECRETARY OF THE ARMY

1. I submit for transmission to Congress the report of the Board of Engineers for Rivers and Harbors, accompanied by the reports of the District and Division Engineers, on Mississippi River-Gulf Outlet, Michoud Canal, Louisiana, in response to a resolution of the Committee on Public Works of the United States Senate adopted 9 June 1964, requesting a review of the reports on the Gulf Intracoastal Waterway (Louisiana Section) and on the Mississippi River-Gulf Outlet with a view to determining the advisability of providing ship channels in the Gulf Intracoastal Waterway east of the Mississippi River-Gulf Outlet and in the Michoud Canal.

2. The District and Division Engineers recommend the modification of the existing project for the Mississippi River-Gulf Outlet, Louisiana, to provide a deep-draft navigation channel in the Gulf Intracoastal Waterway and Michoud Canal by enlargement to a depth of 36 feet over a bottom width of 250 feet from the Mississippi River-Gulf Outlet channel to and including a turning basin 800 feet square at the north end of the Michoud Canal. They estimate the cost at $1,363,000 of which $1,300,000 would be the Federal cost of construction, exclusive of $20,000 for aids to navigation, and $43,000 would be the non-Federal cost for lands and damages. Annual cost of maintenance would be increased $12,800. The annual charges are estimated at $69,900 and average annual benefits at $495,000, resulting in a benefit-cost ratio of 7.1.

3. The Board of Engineers for Rivers and Harbors concurs in general in the findings of the reporting officers and recommends the modification, generally in accordance with the plan of the District Engineer, subject to local

cooperation, including the additional requirement that local interests agree to provide without cost to the United States retaining dikes for disposal of spoil from maintenance dredging, if required.

4. I concur in the views and recommendations of the Board.

WILLIAM F. CASSIDY
Lieutenant General, USA
Chief of Engineers

REPORT OF THE BOARD OF ENGINEERS FOR RIVERS AND HARBORS

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS
BOARD OF ENGINEERS FOR RIVERS AND HARBORS
WASHINGTON, D.C. 20315

IN REPLY REFER TO

ENGBR

26 March 1968

SUBJECT: Mississippi River-Gulf Outlet, Michoud Canal, Louisiana

Chief of Engineers
Department of the Army
Washington, D. C.

1. Authority.--This report is in response to the following resolution adopted 9 June 1964:

> Resolved by the Committee on Public Works of the United States Senate, That the Board of Engineers for Rivers and Harbors, created under Section 3 of the River and Harbor Act approved June 13, 1902, be, and is hereby requested to review the reports of the Chief of Engineers on the Gulf Intracoastal Waterway (Louisiana Section), published as House Document Numbered 96, Seventy-ninth Congress, First session, and on the Mississippi River-Gulf Outlet, published as House Document Numbered 245, Eighty-second Congress, Second Session, and other pertinent reports, with a view to determining the advisability of modifying the existing projects in any way at this time, with particular reference to providing ship channels in the Gulf Intracoastal Waterway east of the Mississippi River-Gulf Outlet and in the Michoud Canal.

2. Description.--The study area, located within the corporate limits of New Orleans, consists of that section of the Gulf Intracoastal Waterway (GIWW) that lies between the Mississippi River-Gulf Outlet and the Chef Menteur Pass, a distance of about 9 miles. It includes the privately owned Michoud Canal, which intersects the GIWW near the Mississippi River-Gulf Outlet and extends about 1.5 miles in a northerly direction. The study area is connected to the Mississippi River by the Mississippi River-Gulf Outlet and the Inner Harbor Navigation Canal ship channels

(also the route of the GIWW) and to the Gulf of Mexico by the Mississippi River-Gulf Outlet. Normal tidal ranges are less than 2 feet; however, hurricanes may cause them to range up to 10-12 feet or more. The channels under study vary in length and depth due to their use as borrow areas for construction of the levees along their banks.

3. Existing projects.--The following Federal projects are of interest to the study area:

a. The GIWW provides for a continuous barge channel of various dimensions from Florida to the Mexican border. In the study area, it provides for a channel 150 feet wide and 12 feet deep from the Mississippi River via the Inner Harbor Navigation Canal and Lock and a land cut to Lake Borgne Light No. 41 and a channel 100 feet wide and 9 feet deep via the Inner Harbor Navigation Canal and Lock to Lake Pontchartrain and the Rigolets to Lake Borgne Light No. 41. Federal improvements in the study area have been completed.

b. The Mississippi River-Gulf Outlet provides for a ship channel 500 feet wide and 36 feet deep from the Inner Harbor Navigation Canal through the marshes southeast of New Orleans to the Gulf of Mexico and for a replacement of the existing Inner Harbor Navigation Canal Lock or the construction of a new lock and connecting channel in the vicinity of Meraux when justified, construction of a highway bridge over the ship channel, and maintenance of the Seabrook Lock in Lake Pontchartrain at the entrance to the Inner Harbor Navigation Canal. The ship channel was opened to traffic in 1963. The highway bridge over the channel is complete and in operation.

c. The Lake Pontchartrain and Vicinity project, authorized by the Flood Control Act of 1965, provides for the construction of a barrier at the east end of Lake Pontchartrain to control hurricane tides entering the lake from Lake Borgne; a multiple-purpose lock in the lake (Seabrook Lock) at the entrance to the Inner Harbor Navigation Canal for control of hurricane tidal inflow, prevention of salt water intrusion, and the prevention of excess currents in the navigation channels; enlargement of the existing levees along the GIWW, the Inner Harbor Navigation Canal, and the south shore of Lake Pontchartrain in Orleans Parish; the construction of the new

lake front levees in Orleans and St. Charles Parishes; the strengthening of the seawall at Mandeville; and the enlargement of existing levees and the construction of new levees for protection of the Chalmette area. The lock is to be maintained under the Mississippi River-Gulf Outlet project. The barrier will extend from high ground north of the Rigolets and follow the approximate alignment of U. S. Highway No. 90 across the Rigolets and Chef Menteur Pass to and along the GIWW and Inner Harbor Navigation Canal to the Lock and then along the west side of the Inner Harbor Navigation Canal to the Mississippi River levee. It includes flood control and navigation structures in both the Rigolets and Chef Menteur Pass.

4. Tributary area and commerce.--The study area (known as New Orleans East) consists of a 32,000-acre tract of land which is presently being developed into residential, commercial, and industrial areas. Approximately 1,700 acres fronting the GIWW and Michoud Canal have been set aside for heavy industrial development. Several industries have located already on the Michoud Canal and others are anticipated in the near future. The National Aeronautics and Space Administration facility (NASA) in New Orleans is located along the GIWW west of the Michoud Canal. The existing commerce over the route of the proposed improvement is now limited to shallow-draft commerce (up to about 15 feet). The waterway traffic on the Michoud Canal in 1964 was about 572,000 tons consisting principally of shells and building materials.

5. Improvement desired.--Local interests desire the enlargement of the GIWW eastward from its junction with the Mississippi River-Gulf Outlet to the vicinity of the Chef Menteur Pass, including the Michoud Canal to a depth of 36 feet over a bottom width of 250 feet and the construction of a turning basin at the northern end of the Michoud Canal. They also requested construction of a turning basin and mooring area by excavation of the triangular area bounded by the GIWW, the Mississippi River-Gulf Outlet, and the southerly extension of the Michoud Canal; however, this can be constructed under the present authorization for the Mississippi River-Gulf Outlet project, when justified, and was not given further consideration in this study.

6. Plan of improvement.--The District Engineer finds that enlargement of the GIWW from its intersection with the Mississippi River-Gulf Outlet to the Michoud Canal and the Michoud Canal to a width of 250 feet and

a depth of 36 feet is justified. Enlargement of the GIWW would be on the south side so that the levee along the north side would not be endangered. The enlargement of the Michoud Canal would be centered in the existing channel to allow space on both sides for wharves, docking facilities, and other structures. A turning basin 800 feet square would be provided at the north end of Michoud Canal. He further finds, however, that no benefits would result from enlargement of the GIWW east of the Michoud Canal at this time.

7. Costs and justification.--Using July 1967 prices, the District Engineer estimates the first cost of the proposed channel improvement at $1,363,000, exclusive of preauthorization costs, of which $1,320,000 would be Federal, including $20,000 for aids to navigation by the U. S. Coast Guard, and $43,000 would be non-Federal for lands and damages. The annual charges are estimated at $69,900, including $12,800 for channel maintenance and $1,500 for maintenance of navigation aids by the U. S. Coast Guard. The average annual benefits are estimated at $495,000 from transportation savings. The benefit-cost ratio is 7.1, based on an interest rate of 3-1/4 percent and a 50-year period of analysis. The District Engineer recommends modification of the existing project for the Mississippi River-Gulf Outlet to provide for the construction of a ship channel from that project to the north end of the Michoud Canal in accordance with his plan, subject to certain requirements of local cooperation. The Division Engineer concurs.

8. Public notice.--The Division Engineer issued a public notice stating the recommendations of the reporting officers and affording interested parties and opportunity to present additional information to the Board. Careful consideration has been given to the communications received.

Views and Recommendations of the Board of Engineers for Rivers and Harbors.

9. Views.--The Board of Engineers for Rivers and Harbors concurs in general in the views and recommendations of the reporting officers. The Board notes that the District Engineer has planned adequately for disposal of spoil from construction in a manner acceptable to fish and wildlife and other conservation interests in the area. However, for disposal of spoil from maintenance dredging, the Board believes local interests should be

required to furnish the necessary retaining dikes, bulkheads, and embankments or the cost of such retaining works in event that such works are determined by the Chief of Engineers to be required. The improvements proposed are suitable and economically justified.

10. Recommendations.--Accordingly, the Board recommends modification of the existing project for the Mississippi River-Gulf Outlet to provide for enlargement of the existing channels of the Gulf Intracoastal Waterway and Michoud Canal to provide a channel 36 feet deep over a bottom width of 250 feet from the Mississippi River-Gulf Outlet to the north end of the Michoud Canal, including a turning basin 800 feet square at its upper end, generally in accordace with the plan of the District Engineer and with such modifications thereof as in the discretion of the Chief of Engineers may be advisable; at an estimated cost to the United States, exclusive of aids to navigation, of $1,300,000 for construction and $12,800 annually for maintenance in addition to that now required: Provided that prior to construction local interests agree to:

a. Provide without cost to the United States all lands, easements, and rights-of-way required for construction and subsequent maintenance of the project and for aids to navigation upon the request of the Chief of Engineers, including suitable areas determined by the Chief of Engineers, to be required in the general public interest for initial and subsequent disposal of spoil, and also retaining dikes for disposal of spoil from maintenance dredging, if required;

b. Accomplish without cost to the United States such utility or other relocations or alterations as necessary for project purposes;

c. Hold and save the United States free from damages due to the construction and subsequent maintenance of the project, including any erosion beyond the rights-of-way furnished; and

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d. Provide, maintain, and operate without cost to the United States adequate public wharf facilities on the Michoud Canal open to all on equal terms.

FOR THE BOARD:

R. G. MacDONNELL
Major General, USA
Chairman

REPORT OF THE DISTRICT ENGINEER

REVIEW OF REPORTS
ON THE
GULF INTRACOASTAL WATERWAY EAST OF THE
MISSISSIPPI RIVER-GULF OUTLET AND THE MICHOUD CANAL

SYLLABUS

The study area is located in the eastern part of the city of New Orleans, Louisiana, in the coastal marsh area adjacent to Lake Borgne. The area is traversed by the 12- by 150-foot Gulf Intracoastal Waterway and is just east of the 36- by 500-foot Mississippi River-Gulf Outlet ship channel.

Industries located on the Michoud Canal, a privately-owned canal, the Board of Commissioners of the Port of New Orleans, and other local interests have requested the enlargement to 36 by 250 feet of the existing Gulf Intracoastal Waterway between the Mississippi River-Gulf Outlet and Chef Menteur Pass, a distance of about 9 miles and of the Michoud Canal, about 1.5 miles in length, to provide additional deep-draft channels to an existing and potential industrial area.

Benefits to existing industries and a relocated plant for importing, storing, and servicing imported automotive vehicles are estimated at $495,000 annually, consisting of $188,000 for imported vehicles; $176,000 for overseas shipment of anhydrous ammonia; and $131,000 for other fertilizers.

Enlargement of the Gulf Intracoastal Waterway to 36 by 250 feet east of the entrance to the Michoud Canal would produce little or no transportation savings and is not recommended at this time.

Modification of the existing project for the Mississippi River-Gulf Outlet to provide for a ship channel 36 feet deep over a bottom width of 250 feet from the Mississippi River-Gulf Outlet eastward in the Gulf Intracoastal Waterway to the Michoud Canal and in the Michoud Canal for its entire length is recommended at an estimated Federal cost of $1,300,000 for construction and $12,800 annually for maintenance, exclusive of costs for aids to navigation, subject to the condition that prior to the initiation of construction local interests furnish assurances satisfactory to the Secretary of the Army that they will:

a. Provide without cost to the United States all lands, easements, and rights-of-way required for construction and subsequent maintenance of the project, and for aids to navigation upon the request of the Chief of Engineers, including suitable areas determined by the Chief of Engineers to be required in the general public interest for initial and subsequent disposal of spoil.

b. Accomplish without cost to the United States such utility or other relocations or alterations as necessary for project purposes.

c. Hold and save the United States free from damages due to the construction and subsequent maintenance of the project, including any erosion beyond the rights-of-way furnished.

d. Provide, maintain, and operate without cost to the United States adequate public wharf facilities on the Michoud Canal open to all on equal terms in accordance with plans approved by the Chief of Engineers.

The estimated cost to local interests for providing the necessary rights-of-way, easements, spoil disposal areas, and relocations is $43,000. The estimated benefit-cost ratio is 7.1 to 1.

DEPARTMENT OF THE ARMY
NEW ORLEANS DISTRICT, CORPS OF ENGINEERS
New Orleans, Louisiana

LMNED-PR 18 December 1967

SUBJECT: Review Report on Gulf Intracoastal Waterway East of the Mississippi River-Gulf Outlet and Michoud Canal, Louisiana

TO: Division Engineer, Lower Mississippi Valley

SECTION I - AUTHORIZATION AND PURPOSE

1. AUTHORITY

This report is submitted in response to the following resolution adopted 9 June 1964:

> "RESOLVED BY THE COMMITTEE ON PUBLIC WORKS OF THE UNITED STATES SENATE, That the Board of Engineers for Rivers and Harbors, created under Section 3 of the River and Harbor Act approved June 13, 1902, be, and is hereby requested to review the reports of the Chief of Engineers on the Gulf Intracoastal Waterway (Louisiana Section), published as House Document Numbered 96, Seventy-ninth Congress, First session, and on the Mississippi River-Gulf Outlet, published as House Document Numbered 245, Eighty-second Congress, Second Session, and other pertinent reports, with a view to determining the advisability of modifying the existing projects in any way at this time, with particular reference to providing ship channels in the Gulf Intracoastal Waterway east of the Mississippi River-Gulf Outlet and in the Michoud Canal."

2. PURPOSE AND EXTENT OF STUDY

a. Purpose. The purpose of this report is to determine the advisability and justification of modifying the existing project on the Gulf Intracoastal Waterway to include construction of a ship channel in the section eastward from its junction with the Mississippi River-Gulf Outlet to about mile 20 east of Harvey Lock, including the Michoud (also spelled Micheaud) Canal.

b. Extent of investigation. Available data for the study include aerial photographs, quadrangle maps, soil borings, field surveys and construction drawings for the existing Federally-constructed Gulf Intracoastal Waterway and Mississippi River-Gulf Outlet projects, records of waterway traffic over the existing Federal waterways, and prior reports. Specific investigations for the study include field reconnaissance, field surveys and design, cost and benefit studies of all improvements considered. The economic studies included the determination of potential traffic and transportation savings which would accrue from the proposed ship channel. This was accomplished by a field canvass of the industries and prospective shippers, either operating or owning land along the proposed improvement. The following agencies were consulted or furnished information for this study: Board of Commissioners of the Port of New Orleans; U. S. Fish and Wildlife Service; Louisiana Wild Life and Fisheries Commission; Air Products and Chemicals, Inc.; International Auto Sales and Services, Inc.; and the State of Louisiana, Department of Public Works.

SECTION II - DESCRIPTION

3. DESCRIPTION

a. The study area is located in the coastal marsh area adjacent to Lake Borgne and within the corporate limits of the city of New Orleans. Specifically, the study area consists of that part of the Gulf Intracoastal Waterway between the Mississippi River-Gulf Outlet and Chef Menteur Pass, miles 14 to 23 east of Harvey Lock, and the Michoud Canal. This area is connected to the Mississippi River by the Mississippi River-Gulf Outlet and the Inner Harbor Navigation Canal ship channels (also the route of the Gulf Intracoastal Waterway) and to the Gulf of Mexico by the Mississippi River-Gulf Outlet. The area is subject to tidal fluctuations of the Gulf of Mexico ranging from less than 2 feet up to 10-12 feet or more from severe hurricanes. The existing channels do not carry any floodflows. They vary greatly in width and depth because they have been used as the borrow area for the construction of levees along their banks to protect adjacent lands from tidal overflow. The existing channels are adequate for barge traffic but must be enlarged for ship use. (See photograph 1 and plates 1 and 2.)

b. The study area is located adjacent to the National Aeronautics and Space Administration facility in New Orleans and in a rapidly developing area. Several industries are now located on the Michoud Canal, a privately-owned channel about 1.5 miles in length, and others are anticipated in the near future.

4. TRIBUTARY AREA

a. The tributary area to the proposed channel improvements consists of a 32,000-acre tract of land known as New Orleans East. This tract is located in the eastern one-third of New Orleans, Louisiana

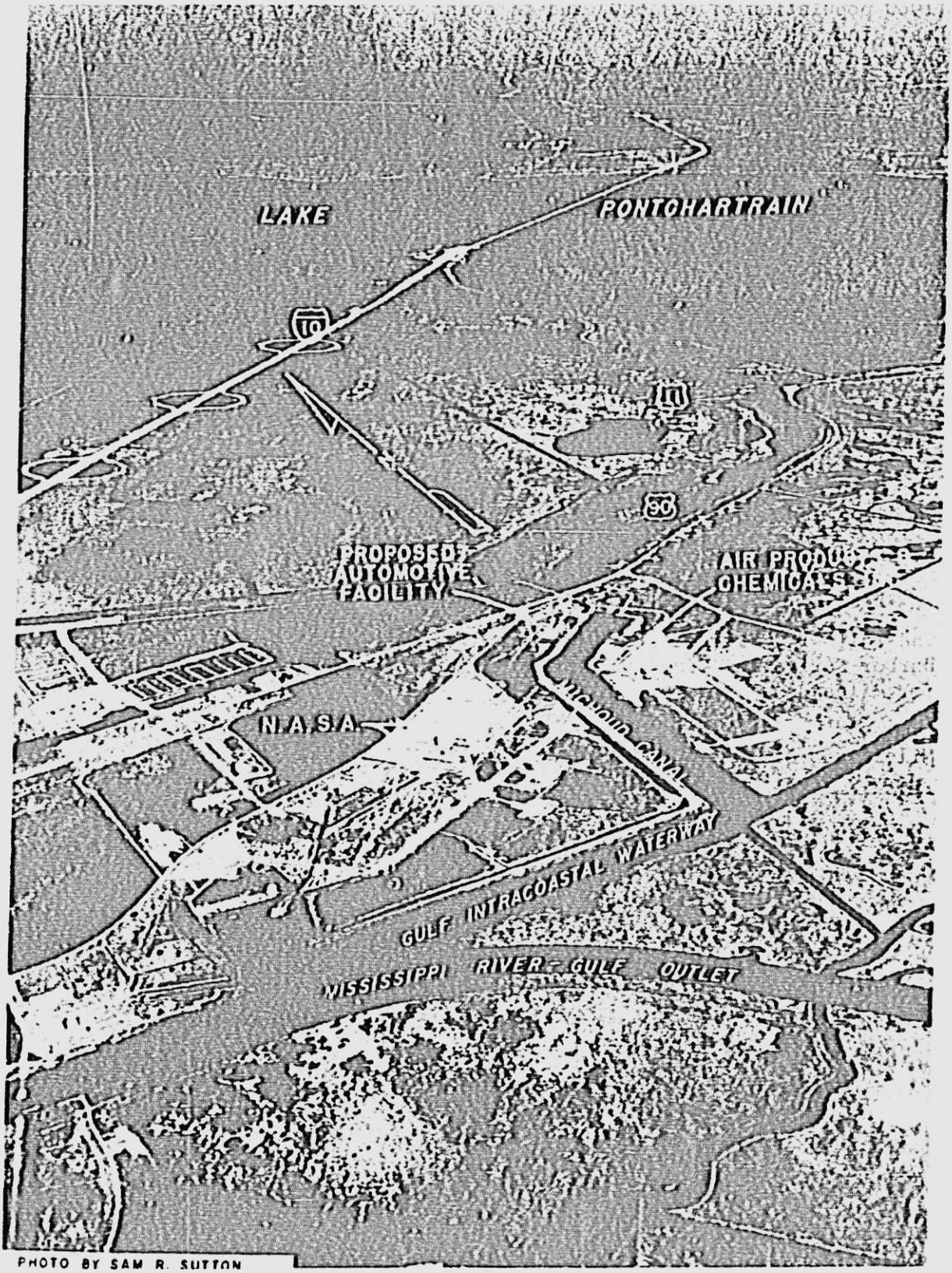

PHOTO BY SAM R. SUTTON

Photograph No. 1 - Aerial View of Study Area, 1965

(1960 population of 627,500) and is being developed by New Orleans East, Inc., a real estate development firm. Under their master plan, the area will eventually be developed into residential, commercial, light industrial, and heavy industrial areas.

b. Approximately 1,700 acres of the tract have been set aside for the development of a heavy industrial area. This is the area from which the tonnage for the proposed improvement will be drawn. At the present time, two industrial gas plants and a cement manufacturing plant are operating in the area. An additional 800-900 acres, fronting the west side of the Michoud Canal and the Gulf Intracoastal Waterway, are being utilized by the National Aeronautics and Space Administration for the production of the Saturn Rocket.

c. The tributary area is traversed by U. S. Highway No. 90 and the main line of the Louisville and Nashville Railroad. Further transportation will be provided by U. S. Interstate Highway No. 10, now under construction. Shallow-draft water transportation is provided by the Gulf Intracoastal Waterway which, in turn, connects with both the Mississippi River-Gulf Outlet and the Mississippi River for deepwater transportation.

5. BRIDGES

a. There are no bridges over the reach of waterway under study. The following bridges are in the study area over either the Inner Harbor Navigation Canal or the Gulf Intracoastal Waterway (see plate 1 for mileages).

Miles east of Harvey Lock	Type	Clearance above H.W. Hor.	Clearance above H.W. Vert.	Owner	Plans appvd. by Dept. of the Army
6.1	Hwy, bascule	75 ft.	-	Board of Commissioners, Port of New Orleans	-
6.4	Hwy, vert.lift	305 ft.	41(closed) 156(open)	State of La., Dept.of Hwys.	15 Dec 54
7.3	Hwy-RR bascule	94 ft.	-	Board of Commissioners, Port of New Orleans	-
13.0	Hwy, pontoon	100 ft.*	-	United States	-
		154 ft.*	-	United States	-

*Bridge has two navigation openings.

b. The pontoon bridge at mile 13.0 east of Harvey Lock is being replaced by a fixed span bridge with a horizontal clearance of 500 feet and a vertical clearance of 135 feet above mean high water. The bridge is being constructed by the State of Louisiana, Department of Highways, under contract with the United States as a feature of the Mississippi River-Gulf Outlet project. The plans were approved by the Department of the Army on 25 November 1964.

6. PRIOR REPORTS

a. House Document Numbered 96, Seventy-ninth Congress, First Session, is a review of reports on the "Intracoastal Waterway from Mobile, Alabama, to New Orleans, Louisiana, including the Violet Canal route, Louisiana." The report recommended modification of the existing project to provide for a 12- by 150-foot channel from the mouth of the Rigolets to the Mississippi River near New Orleans, Louisiana; the construction of a bridge at Louisiana State Highway No. 61 (now Louisiana State Highway No. 47); the enlargement of the existing channel in Lake Borgne and Mississippi Sound to 12 by 150 feet; and rental of a part of the Inner Harbor Navigation Canal facilities from the Board of Commissioners of the Port of New Orleans under conditions acceptable to the Secretary of War. These recommendations were authorized by the River and Harbor Act of 23 July 1942. The latest report on the Gulf Intracoastal Waterway, published as House Document Numbered 556, 87th Congress, Second Session, pertains to that part of the waterway west of the Mississippi River only.

b. House Document Numbered 245, Eighty-second Congress, First Session, is a review of reports on the "Mississippi River-Gulf Outlet and the Mobile, Alabama, to New Orleans Intracoastal Waterway." This report recommends modification of the "Mississippi River, Baton Rouge to the Gulf of Mexico," project to provide for construction of a 36- by 500-foot seaway canal extending from the Inner Harbor Navigation Canal to a turning basin south of Michoud, then extending as a land and water cut from the turning basin southeasterly to and along the south shore of Lake Borgne and through Chandeleur Sound and Islands to deep water in the Gulf of Mexico, a distance of approximately 76 miles. The improvement was authorized by the River and Harbor Act of 29 March 1956.

c. House Document Numbered 231, 89th Congress, First Session, is an interim survey report on "Lake Pontchartrain and Vicinity, Louisiana," which recommends a plan of protection against hurricane tides consisting of a barrier across the eastern entrance to Lake Pontchartrain to reduce the flow into the lake during the approach of hurricanes; new and enlarged levees for the protection of areas along the south shore of Lake Pontchartrain; a lock in the lake at the entrance to the Inner Harbor Navigation Canal to prevent excessive velocities in the canal and increased salinities in the lake; repairing and strengthening the existing seawall at Mandeville on the north shore of the lake; and new and enlarged levees for the protection of the Chalmette

area. The above plan includes structures in both Chef Menteur Pass and the Rigolets. In the study area it includes enlargement of the existing levees along the north side of the Gulf Intracoastal Waterway, including those around the Michoud Canal. The recommended improvements were authorized in the Flood Control Act of 1965 (Public Law 89-298 approved 27 October 1965).

7. EXISTING CORPS OF ENGINEERS' PROJECTS

a. Gulf Intracoastal Waterway. This project provides for a continuous barge channel of various dimensions from Florida to the Mexican Border. In the study area, the project provides for a 12- by 150-foot channel from the Mississippi River via the Inner Harbor Navigation Canal (also called the Industrial Canal) and a new land cut through the marsh to Lake Borgne Light No. 41 and a 9- by 100-foot channel via the Inner Harbor Navigation Canal, Lake Pontchartrain, and the Rigolets. The Inner Harbor Navigation Canal Lock (75 feet wide by 640 feet long and 31.5 feet deep) is operated as a part of the Federal project under a lease arrangement with the Board of Commissioners of the Port of New Orleans, the state agency owning the lock and canal. The Federal improvements have been completed. Costs are not separable from other costs for the project in the New Orleans District. The waterway was used as a borrow area for the construction of a non-Federal levee which extends eastward along its north bank from the Inner Harbor Navigation Canal to mile 20 east of Harvey Lock and as a result, the existing channel, in some locations, exceeds the authorized dimensions considerably. For further information on this project, see page 552 of the "Annual Report of the Chief of Engineers, U. S. Army on Civil Works Activities, 1966."

b. Mississippi River-Gulf Outlet. This project, authorized by the River and Harbor Act of 29 March 1956 as a modification of the Mississippi River, Baton Rouge to the Gulf of Mexico, La., project, provides for a 36- by 500-foot ship channel from the Inner Harbor Navigation Canal to the Gulf of Mexico via a new land cut through the marshes southeast of New Orleans; a dike across Breton Sound; the replacement of the existing lock or the construction of a new lock and connecting channels in the vicinity of Meraux when justified by the obsolescence of the existing lock or by increased traffic; and the construction of a bridge over the ship channel at the Louisiana Highway No. 47 crossing. The Flood Control Act of 1965 (Public Law 89-298 approved 27 October 1965) provides for the construction of the Seabrook Lock in Lake Pontchartrain at the entrance to the Inner Harbor Navigation Canal for the purpose of hurricane protection and prevention of excessive velocities and increased salinities in the lake. The lock is to be constructed under the hurricane project and operated and maintained under the Mississippi River-Gulf Outlet project. Construction of the ship channel is complete except for the plug at the highway crossing. It was opened to traffic in July 1963. Work is under way on the highway bridge and a dike across Breton Sound to reduce maintenance work. The cost of the project to 30 June 1967, including maintenance

of channel during construction is $60,182,400 for new work and $7,873,380 for maintenance.

c. Lake Pontchartrain and Vicinity. This project, authorized by the Flood Control Act of 1965, provides for a barrier at the east end of Lake Pontchartrain to prevent hurricane tides entering the lake; a multiple-purpose lock in the lake at the entrance of the Inner Harbor Navigation Canal for the control of hurricane inflows, prevention of increased salinities in the lake and the prevention of excess currents in the navigation channels; enlargement of some of the existing and construction of new protective works along the lakeshore in Orleans and St. Charles Parishes; the strengthening of the seawall at Mandeville; and the enlargement of existing and construction of new levees for the protection of the Chalmette area. The barrier extends from high ground north of the Rigolets generally along or in vicinity of U. S. Highway 90 across the Rigolets and Chef Menteur Pass thence to and along the Gulf Intracoastal Canal and the Inner Harbor Navigation Canal to the authorized Seabrook Lock and along the west side of the Inner Harbor Navigation Canal to the Mississippi River levee. Flood control and navigation structures are provided in the Rigolets and Chef Menteur Pass. Planning is underway. Construction was initiated in 1967. Costs to 30 June 1967 were $2,128,844 for new work.

8. LOCAL COOPERATION ON EXISTING AND PRIOR PROJECTS

a. Gulf Intracoastal Waterway. The existing project for the Intracoastal Waterway east of the Mississippi River provides that local interests furnish, free of cost to the United States, all rights-of-way and spoil disposal areas required for construction and maintenance of the waterway. These conditions have been complied with as required.

b. Mississippi River-Gulf Outlet. The Board of Commissioners of the Port of New Orleans (Dock Board) provided assurances on 4 April 1957 that they would furnish without cost to the United States all lands, easements, rights-of-way, and spoil disposal areas for initial construction, and when and as required for subsequent maintenance; accept ownership of the highway bridge and approaches upon completion of construction, together with maintenance, operation, and future replacement or alteration as may be required; provide and maintain any other bridges over the waterway, and accomplish all necessary utility and other highway relocations and alterations and the maintenance thereof; construct, maintain, and operate terminal facilities commensurate with requirements of the expanded port; and hold and save the United States free from all claims for damages due to construction, maintenance, and operation of the project. The assurances were accepted by the United States on 29 August 1957.

c. Lake Pontchartrain and Vicinity. The local cooperation for this project consists of the following:

(1) Provide all lands, easements, and rights-of-way, including borrow and spoil disposal areas, necessary for construction of the project;

(2) Accomplish all necessary alterations and relocations to roads, railroads, pipelines, cables, wharves, drainage structures, and other facilities made necessary by the construction works;

(3) Hold and save the United States free from damages due to the construction works;

(4) Bear 30 percent of the total cost of the improvement. (The fair market value of the items listed in subparagraphs (1) and (2) above is included in the 30 percent.)

(5) For the barrier plan, provide an additional cash contribution of the estimated capitalized value of the operation and maintenance of the Rigolets navigation lock to be undertaken by the United States.

(6) Provide all interior drainage and pumping plants required for reclamation and development of the protected areas;

(7) Maintain and operate all features of the works in accordance with regulations prescribed by the Secretary of the Army, including levees, floodgates and approach channels, drainage structures, drainage ditches or canals, floodwalls, seawalls, and stoplog structures, but excluding the Rigolets navigation lock and channel and the modified dual-purpose Seabrook Lock; and

(8) Acquire adequate easements or other interest in land to prevent encroachment on existing ponding areas unless substitute storage capacity or equivalent pumping capacity is provided promptly.

Assurances of local cooperation for that part of the project adjacent to the study area have been furnished and accepted.

9. IMPROVEMENTS BY OTHERS

a. Inner Harbor Navigation Canal. This project, known also as the Industrial Canal, consists of a navigation channel extending from the Mississippi River to Lake Pontchartrain, a distance of 5.5 miles. Controlling dimensions are 20 by 150 feet at the lake, the depth increasing to 30 feet at the turning basin, 2 miles from the river. From there to the river, the depth is 32 feet except through the lock, located about 2,000 feet from the river, where usable dimensions are 75 feet wide, 640 feet long with 31.5-foot depth over the sills. The canal and lock were completed by the Board of Commissioners of the Port of New Orleans in 1922. In 1944 the United States leased that part of the canal between the river and mile 2.2 for use as a part of the Gulf Intracoastal Waterway.

b. Michoud Canal. This privately-owned canal extends about 1.5 miles northward from the Gulf Intracoastal Waterway at mile 15 east of Harvey Lock. The canal has been used as a borrow area for enlargement of the levees around the canal. It is about 800 feet

wide and irregular in cross section varying in depth from 18 to over 50 feet. Michoud Canal serves the industrial complex along the canal, including support industries for the NASA missile plant at New Orleans. Additional areas are available for industrial development as needed.

10. TERMINAL AND TRANSFER FACILITIES

a. There are no public wharves located on either the section of the Gulf Intracoastal Waterway under study or on the Michoud Canal. However, the developer of the area, New Orleans East, Inc., states it has retained a tract of land at the north end of the Michoud Canal for the construction of a public wharf for seagoing and other marine traffic. This wharf would be available for use by industries without frontage on the waterways.

b. A private wharf on the Michoud Canal is owned and operated by Air Products and Chemicals, Inc., producers of industrial gas. The wharf, presently used for barge operations, is adequate for handling oceangoing vessels. The International Auto Sales and Service, Inc., a foreign car distribution firm, states it will build a concrete wharf on the Michoud Canal for unloading and handling of automobiles from oceangoing vessels if the project is authorized. A cement producing plant now has docking facilities for the handling of barges on the Michoud Canal.

c. All industrial sites within the project area are provided with spur tracks connecting them directly with the main line of the Louisville and Nashville Railroad Company and indirectly with rail switching service to all trunkline railroads serving New Orleans. In addition to rail access the study area also has sufficient highway and water access. U. S. Highway No. 90 and Interstate Highway No. I-10 (under construction) both provide heavy duty roadways easily accessible from all points of the study area. Industries fronting on or near the Michoud Canal have direct access by water to both Gulf and midcontinent river ports via the Gulf Intracoastal Waterway which provides an avenue for barge traffic in an east-west direction. Approximately 1.5 miles westward from the Michoud Canal, the Gulf Intracoastal Waterway intersects the Mississippi River-Gulf Outlet. This outlet, in turn, provides a direct tidewater route for ocean shipping.

d. Approximately 6 miles from the Michoud Canal in a westerly direction is the New Orleans Tidewater Bulk Terminal which is owned and operated by the Port of New Orleans. The terminal fronts along the Mississippi River-Gulf Outlet and provides wharves and mooring dolphins to accommodate the loading and unloading of bulk cargo vessels.

SECTION III - PROBLEMS UNDER INVESTIGATION

11. IMPROVEMENT DESIRED

a. A public hearing was held by the District Engineer in New Orleans, Louisiana, on 16 December 1964. Those attending the hearing represented Federal, state, and city agencies and businesses, industrial, and civic groups. These representatives requested enlargement of the Gulf Intracoastal Waterway eastward from its junction with the Mississippi River-Gulf Outlet to the vicinity of the Chef Menteur Pass (about mile 23), including the Michoud Canal, to a depth of 36 feet and width of 250 feet and the construction of a turning basin at the northern end of the Michoud Canal.

b. The construction of a turning basin and mooring area by excavation of the triangular area bounded by the Gulf Intracoastal Waterway, the Mississippi River-Gulf Outlet, and the southerly extension of the Michoud Canal also was requested. This improvement can be constructed under the existing authorization for the Mississippi River-Gulf Outlet whenever justified and is not further considered herein.

c. There was no opposition to any of the requested improvements.

12. EXISTING AND PROSPECTIVE COMMERCE

a. Existing commerce. Existing commerce on the Gulf Intracoastal Waterway over the route of the proposed improvement is limited to shallow-draft commerce since the existing channels are insufficient to accommodate oceangoing vessels. The annual tonnage of existing traffic on the Gulf Intracoastal Waterway east of the Mississippi River-Gulf Outlet between 1959 and 1965 is shown below:

Year	Total tons
1959	6,934,560
1960	7,342,042
1961	7,555,653
1962	7,582,584
1963	8,154,078
1964	8,928,782
1965	9,713,604

In the year 1965, this tonnage was composed of the following major items of commerce:

Commodity	Percent of total
Petroleum and petroleum products	37
Limestone (crushed)	6
Corn	8
Sodium hydroxide, caustic soda	3
Sand, gravel, crushed rock	5
Phosphate rock	2
Shells, unmanufactured	5
Soybeans	3
Sulphur, liquid	2
Bituminous coal and lignite	8
Other coal tar products	1
Industrial chemicals, n.e.c.	3
Wheat	1
All other	16

The Michoud Canal contributed the following tonnages to the Gulf Intracoastal Waterway traffic between 1959 and 1964:

Year	Tons
1959	22,626
1960	14,040
1961	684
1962	12,531
1963	261,326
1964	571,511

Tonnages to and from Michoud Canal are included in the tonnages previously given for the Gulf Intracoastal Waterway.

b. Prospective tonnage. The tonnages handled on the Gulf Intracoastal Waterway and on the Michoud Canal have been handled in shallow-draft equipment. However, with improvement of the waterways to provide a 36- by 250-foot channel import and export tonnages which require transportation in seagoing vessels will be handled. These tonnages will consist of imported automobiles and exported fertilizers. For purpose of this analysis, the proposed channel enlargement to 36 by 250 feet is estimated to be in operation for 1970, and prospective tonnages for that year as well as the years 1995 and 2020 are shown as follows:

Projected Tonnage

Commodities	1970 (tons)	1995 (tons)	2020 (tons)
Automobiles	31,412	73,000*	73,000*
Anhydrous ammonia	58,400	168,000	329,000
Other fertilizer	96,400	188,000	323,600
Total	186,212	429,000	725,600

*The tonnage will remain constant as the maximum handling capacity of the facility will not allow further increases.

Large additional sites fronting the Michoud Canal are available for industrial development. Because of the close proximity to NASA and existing shallow and deep-draft channels, further development is anticipated. The types of industry, whether to be serviced by shallow or deep-draft vessels, are not determined at this time and no tonnage has been estimated for future industrial developments.

13. VESSEL TRAFFIC

a. Present traffic. The trips and drafts of vessels using the Gulf Intracoastal Waterway over the route of the proposed improvement during 1965 are shown below:

Trips and Drafts of Vessels
(1965)

Draft (feet)	Self-propelled vessels	Nonself-propelled vessels	Total
12	4	36	40
11	21	36	57
10	267	188	455
9	1,035	3,612	4,647
8	1,124	2,238	3,362
7	1,678	3,455	5,133
6 and less	2,572	7,859	10,431
Total	6,701	17,424	24,125

Data are not available as to trips and drafts of vessels now using Michoud Canal. However, these trips and drafts are included in the figures for the Gulf Intracoastal Waterway.

b. Future traffic. The seagoing vessels that will be required in the future to handle the prospective tonnage over the proposed improvement are shown below:

Future Vessel Requirements

Year	Draft (feet)	No. of trips
1970	27	15
	31	24
1995	27	34
	31	55
2020	27	62
	31	55

14. DIFFICULTIES ATTENDING NAVIGATION

The existing channel of the Gulf Intracoastal Waterway between the Mississippi River-Gulf Outlet and the Michoud Canal has a controlling depth of about 19 feet over a bottom width of 150 feet. The Michoud Canal has a controlling depth of about 30 feet over a bottom width of 200 feet. These depths are not adequate for the seagoing vessels necessary for the handling of import and export tonnage. The oceangoing vessels needed for handling the cargo have loaded drafts ranging from 27 to 31 feet, beams of 64 to 70 feet, and lengths from 515 to 520 feet, thus requiring the 36- by 250-foot channel as proposed.

15. WATER POWER AND OTHER SPECIAL SUBJECTS

The section of waterway under study is tidal throughout. Water power and other special subjects are not involved.

SECTION IV - PROPOSED SOLUTION AND PROJECT FORMULATION

16. PLAN OF IMPROVEMENT

a. Recommended plan.

(1) The most suitable plan of improvement to meet the needs of the study area for a ship channel and the desires of local interests is the construction of a 36- by 250-foot ship channel from the Mississippi River-Gulf Outlet along the present alignment of the Gulf Intracoastal Waterway and the Michoud Canal to and including a turning basin at the head of the Michoud Canal. The enlargement of the Gulf Intracoastal Waterway would be to the south to prevent jeopardizing the levee along the north bank. The enlargement of the Michoud Canal would be generally centered in the existing channel thus

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leaving room on each side of the channel for construction of wharves and the tieing up and servicing of ships outside the project channel. No dredging will be accomplished within 100 feet of any pierhead, wharf, or other structure. The location and typical sections for this plan are shown on plates 1 and 2. A 2-foot overdepth for advanced maintenance and an additional allowance of 2 feet to cover the inaccuracies in dredging have been included in the cost estimate.

(2) The plans for spoil disposal have been extensively discussed with engineering representatives of the Board of Commissioners of the Port of New Orleans, the prospective assuring agency should a project be authorized. The material excavated from the point between the Gulf Intracoastal Waterway and the Mississippi River-Gulf Outlet, to provide a satisfactory alignment, will be placed in existing spoil areas on the southwest side of the Mississippi River-Gulf Outlet where it can be used in future levee construction. The remainder of the spoil will be placed in areas east of the Michoud Canal already acquired by the sponsoring agency. This plan meets the desires of the Federal and state fish and wildlife agencies.

b. Coordination with the Lake Pontchartrain and Vicinity project. This hurricane protection project (see par. 7.c.) provides for a substantial increase in the height of the existing levee along the north side of the Gulf Intracoastal Waterway including the levee around the Michoud Canal. The increased levee height in the developed areas will be obtained by constructing I-type wall sections. The remainder of the levee will be raised by enlargement to the landside. The source of material for levee construction is indefinite at this time. Some material may be borrowed from existing channels. The plans for levee construction and channel enlargement will be coordinated to construct both at a minimum total cost. It appears at this time that the levee enlargement may be underway before the channel project.

c. Other plans considered. Preliminary studies were made for extending the 36- by 250-foot ship channel eastward along the Gulf Intracoastal Waterway to Chef Menteur Pass, a distance of about 8 miles. A large part of this channel has been excavated to a 30-foot depth over a very narrow bottom width during the construction of the levee on the north bank. The preliminary first cost of construction is about $1-1/2 million. No significant benefits would accrue from the construction of the improvement in the near future and it was not considered further.

17. SHORELINE CHANGES

The improvements considered in this report will have little or no effect on the existing shorelines.

18. REQUIRED AIDS TO NAVIGATION

The United States Coast Guard, Eighth Coast Guard District, has been consulted in regard to costs for aids to navigation for the plan of improvement. The estimated cost of installation of new aids is $20,000. The estimated annual maintenance cost is $1,500.

SECTION V - ECONOMIC ANALYSIS

19. ESTIMATES OF FIRST COST

The estimate of first cost for construction of the proposed improvement is based on experienced cost for similar work in the general area. All costs are based on July 1967 price levels. Estimates for rights-of-way costs are based on the current market value of the land. A summary of the estimated first cost is given in table 1 below. A more detailed estimate is included in appendix B.

TABLE 1

ESTIMATES OF FIRST COSTS[1]

Cost acct. No.	Item	Estimated cost
	FEDERAL COSTS	
09	Channels and canals	
	Excavation	$1,171,000
30	Engineering and design	59,000
31	Supervision and administration	70,000
	Total Federal construction cost	$1,300,000
	Aids to navigation (U.S. Coast Guard)	20,000
	Total Federal first cost	$1,320,000
	NON-FEDERAL COSTS	
	Lands and damages	
	Channel rights-of-way	$ 6,600
	Spoil rights-of-way	35,400
	Acquisition costs	1,000
	Total non-Federal first cost	$ 43,000

[1] Estimates include contingencies and are exclusive of $26,500 preauthorization study costs.

20. ESTIMATES OF ANNUAL CHARGES

The estimated annual charges for the plan of improvement, based on a 50-year project life, are shown in table 2 below and in appendix A. The estimated average annual cost for maintenance of the channel based on redredging every 10 years is $4,000 per mile.

TABLE 2

ANNUAL CHARGES

Item	Estimated cost Federal	Non-Federal
Estimated first cost	$1,320,000	$ 43,000
Interest	$ 42,900	$ 1,400
Amortization	10,900	400
Maintenance (general)	12,800	-
(navigation aids)	1,500	-
Subtotal	$ 68,100	$ 1,800
Total annual charges	$69,900	

21. ESTIMATE OF BENEFITS

a. An investigation of the transportation savings which might accrue from the proposed improvement revealed that two existing industries would derive benefits. One of these industries is a firm importing foreign automobiles and the other is a manufacturer of fertilizers. Other existing industries on the Michoud Canal are serviced by barge transportation which is adequate for their needs and would not be benefited by the proposed ship channel. Space is available for additional industrial development which may or may not benefit from the proposed ship channel. In view of the uncertainties of the future developments, no benefits have been estimated therefor.

b. A study of the operations of the foreign car importer revealed that during 1965 approximately 20,000 vehicles would be imported through the Port of New Orleans. These vehicles are imported in shipload quantities and due to the lack of adequate dock space on the existing wharves considerable additional handling and movement of these vehicles are necessary. Such additional handling and movement of the vehicles add considerable cost to the operation. It is estimated that this additional cost amounts to $3.35 per vehicle. This company owns 75 acres of land fronting Michoud Canal which could be used for unloading these automobiles. The unloading site now has buildings and other facilities which make it suitable

for a staging area and for preparing the vehicles for delivery to dealers. The only feature lacking at the site on Michoud Canal is a suitable dock for the docking of the ships carrying the vehicles. The estimated total annual cost for the required dock facility is $25,400.

c. The Michoud Canal site can handle a total of 6,000 vehicles at a time. Present indications are that this number of vehicles can be moved out in 30 days so that the turnover rate of the staging area will average 200 vehicles per day. It is estimated that the demand for vehicles imported through this facility will reach its capacity of 73,000 vehicles per year by 1985. It will be fully utilized for the remaining part of the project life. The average annual benefits on the importation of automobiles for the 50-year project life (1970-2020) are estimated at $188,400 ($213,800 gross less $25,400 annual charges for the wharf). Details of the estimate are contained in appendix A.

d. The owner of the fertilizer plant on the Michoud Canal is currently exporting about 45,000 tons of anhydrous ammonia annually to foreign ports. Since ships cannot reach his plant, the New Orleans manufacturer has entered into an agreement under which a Texas City manufacturer located on a ship channel supplies the 45,000 tons of overseas shipments and the New Orleans producer supplies a like amount to domestic customers of the Texas City producer at a discount of $2.00 per ton. However, it is estimated that the New Orleans firm could transfer the anhydrous ammonia from its facilities on Michoud Canal by barge to ships in the New Orleans harbor area for about $1.55 per ton. If ships could reach the facilities on the Michoud Canal, the product could be loaded from the plant direct to the ship at a cost of 35¢ per ton or at a saving of $1.20 per ton. It is estimated that the overseas shipment of anhydrous ammonia by the Michoud Canal manufacturer will increase over the life of the project from the present 45,000 tons to 329,000 tons in year 2020. The estimated average annual savings over the life of the project are $176,000. Details of the estimate are contained in appendix A.

e. In the event that the project is constructed, the fertilizer firm contemplates the production of other chemical fertilizers such as phosphate, potash, and other nitrogen-based fertilizers in addition to the anhydrous ammonia. In estimating the quantities of additional fertilizers which this plant would produce, it was assumed that production would begin in 1970, the same year in which the project will become active. It is estimated that in the year 1970, an additional 96,400 tons of potash, phosphate, and other nitrogenous fertilizers (excluding anhydrous ammonia) will be exported from the Michoud plant. By 2020, this amount will have increased to an estimated 323,600 tons. The savings are estimated at 76¢ per ton. The estimated average annual benefits for these products are estimated at $131,000. Details of the estimate are contained in appendix A.

f. A summary of all benefits expected to accrue to the proposed project is shown below:

Source of benefit	Average annual benefit
Imported vehicles	$188,000
Anhydrous ammonia	176,000
Other fertilizers	131,000
Total average annual benefits	$495,000

Details relative to the projection of the various commodities and the computation of benefits are given in appendix A.

22. MAXIMIZATION OF BENEFITS

The anticipated traffic (see par. 13.b.) consists of 31-foot draft vessels for Volkswagens and 27-foot draft vessels for fertilizer. The proposed 36- by 250-foot channel is the minimum size channel that can safely accommodate the 31-foot draft vessels which will produce approximately 40 percent of the benefits. Larger channels would not produce any additional benefits since access is limited by the 36-foot depth in the Mississippi River-Gulf Outlet. Therefore, the proposed 36- by 250-foot ship channel will produce the maximum excess of benefits over annual costs.

23. COMPARISON OF BENEFITS AND COSTS

The estimated average annual benefits from the proposed improvements are $495,000 and the estimated average annual charges are $69,900. The resulting benefit-cost ratio is 7.1 to 1.

SECTION VI - COORDINATION AND LOCAL COOPERATION

24. PROPOSED LOCAL COOPERATION

The proposed items of local cooperation for the recommended improvements consist of those normally required for navigation improvements. A "hold-and-save" clause is considered necessary because of the possibility of erosion beyond the rights-of-way furnished. The proposed local cooperation consists of the following:

a. Provide without cost to the United States all lands, easements, and rights-of-way required for construction and subsequent maintenance of the project, and for aids to navigation upon the request of the Chief of Engineers, including suitable areas determined by the Chief of Engineers to be required in the general public interest for initial and subsequent disposal of spoil.

b. Accomplish without cost to the United States such utility or other relocations or alterations as necessary for project purposes.

c. Hold and save the United States free from damages due to the construction and subsequent maintenance of the project, including any erosion beyond the rights-of-way furnished.

d. Provide, maintain, and operate without cost to the United States adequate public wharf facilities on the Michoud Canal open to all on equal terms in accordance with plans approved by the Chief of Engineers.

25. ALLOCATION OF COSTS AMONG PURPOSES

Purposes other than navigation are not involved in this study. All costs are allocated to navigation.

26. APPORTIONMENT OF COSTS AMONG INTERESTS

The apportionment of costs between Federal and non-Federal interests is set forth in paragraph 19, "Estimates of First Cost," and in paragraph 20, "Estimates of Annual Charges."

27. COORDINATION WITH OTHER AGENCIES

a. The notice of public hearing for this study was given wide distribution among Federal, state, and local agencies and to individuals known to be interested in the study. The extent of consultation with state agencies and local organizations is indicated in paragraph 2, "Purpose and Extent of Study."

b. The proposed plan of improvement was furnished to the U. S. Fish and Wildlife Service and the Louisiana Wild Life and Fisheries Commission for suggestions as to modifications from their viewpoint and for comments for inclusion in the report. These agencies request that the spoil from the channel excavation be placed on the north side of the Gulf Intracoastal Waterway (see appendix C).

c. The proposed local cooperation and plan of improvement were fully discussed with representatives of the Board of Commissioners of the Port of New Orleans (a state agency supervising port facilities in the New Orleans area). These discussions included the public wharf facilities and spoil disposal areas. This agency desires the removal of the large triangular area between the Mississippi River-Gulf Outlet, the Gulf Intracoastal Waterway, and the Michoud Canal extension as an anchorage area. An acceptable arrangement was reached to place the spoil from the channel enlargement in the

existing spoil area southwest of the Mississippi River-Gulf Outlet and in areas east of the Michoud Canal, thus avoiding use of the area south of the Gulf Intracoastal Waterway. This arrangement meets the desires of the fish and wildlife agencies and is suitable from a construction standpoint. The Board of Commissioners of the Port of New Orleans has agreed to provide the local cooperation should a project be authorized (see appendix D).

d. Draft copies of this report were furnished the following Department of the Interior agencies for field level review and for their comments to accompany the report:

Regional Director
Bureau of Sport Fisheries and Wildlife
Southeast Region
Peachtree-Seventh Building
Atlanta, Georgia 30323

Regional Hydrologist
U. S. Geological Survey
Mid Continent Region
Federal Building, Room 1252
1520 Market Street
St. Louis, Missouri 63103

Regional Director
Bureau of Outdoor Recreation
Southeast Regional Office
810 New Walton Building
Atlanta, Georgia 30303

Regional Director
Federal Water Pollution Control Administration
South Central Region
1114 Commerce Street
Dallas, Texas 75202

Acting Area Director
Bureau of Mines, Area IV
204 Federal Building
Bartlesville, Oklahoma 74004

The only opposition to the proposed plan of improvement was from the Bureau of Sport Fisheries and Wildlife in regard to the placement of spoil. The arrangements for spoil disposal developed in discussions with the Board of Commissioners of the Port of New Orleans meets the objections to the placement of the spoil material in the marsh area south of the Gulf Intracoastal Waterway. The U. S. Fish and Wildlife Service, the Louisiana Wild Life and Fisheries Commission, and the Federal Water Pollution Control Administration will be consulted further during the detailed planning stage.

SECTION VII - RESULTS OF THE INVESTIGATION

28. DISCUSSION AND CONCLUSION

a. Existing industries on the Michoud Canal desire and need channels of adequate size to permit oceangoing ships to reach their facilities. The existing 36- by 500-foot Mississippi River-Gulf Outlet project and the state-owned Inner Harbor Navigation Canal (the part under lease to the United States) provide an adequate access route to the Gulf of Mexico and to the Mississippi River. Enlargement of the existing channels of the Gulf Intracoastal Waterway and Michoud Canal to a depth of 36 feet over a bottom width of 250 feet would adequately serve the existing and foreseeable industries to be located on the Michoud Canal. The estimated first cost and annual charges for such an improvement, including a turning basin at the north end of the Michoud Canal, are $1,363,000 and $69,900, respectively. The average annual benefits are estimated at $495,000. The resulting benefit-cost ratio is 7.1 to 1. Construction of the improvement is economically justified.

b. The information called for by Senate Resolution 148, 85th Congress, adopted 28 January 1958, is provided in an attachment hereto.

29. RECOMMENDATION

The District Engineer recommends that the existing project for the "Mississippi River-Gulf Outlet, La.," be modified to provide for enlargement of the existing channels of the Gulf Intracoastal Waterway and Michoud Canal to provide a channel 36 feet deep over a bottom width of 250 feet from the Mississippi River-Gulf Outlet to the north end of the Michoud Canal, generally in accordance with the plan of improvement described in paragraph 16 and shown on plates 1 and 2, at an estimated Federal cost of $1,300,000 for construction and $12,800 annually for operation and maintenance (exclusive of aids to navigation), subject to the provisions that prior to the initiation of construction, local interests furnish assurances satisfactory to the Secretary of the Army that they will:

a. Provide without cost to the United States all lands, easements, and rights-of-way required for construction and subsequent maintenance of the project, and for aids to navigation upon the request of the Chief of Engineers, including suitable areas determined by the Chief of Engineers to be required in the general public interest for initial and subsequent disposal of spoil.

b. Accomplish without cost to the United States such utility or other relocations or alterations as necessary for project purposes.

c. Hold and save the United States free from damages due to the construction and subsequent maintenance of the project, including any erosion beyond the rights-of-way furnished.

d. Provide, maintain, and operate without cost to the United States adequate public wharf facilities on the Michoud Canal open to all on equal terms in accordance with plans approved by the Chief of Engineers.

THOMAS J. BOWEN
Colonel, CE
District Engineer

[First endorsement]

LMVPD-F (NOD rpt 18 Dec 67)
SUBJECT: Review Report on Gulf Intracoastal Waterway East of the Mississippi River-Gulf Outlet and Michoud Canal, Louisiana

DA, Lower Miss. Valley Div, CE, Vicksburg, Miss. 39180 9 Feb 68

TO: Chief of Engineers

I concur in the findings and recommendation of the District Engineer.

R. G. MacDONNELL
Major General, USA
Division Engineer

REVIEW OF REPORTS
ON THE
GULF INTRACOASTAL WATERWAY EAST OF THE
MISSISSIPPI RIVER-GULF OUTLET AND MICHOUD CANAL, LOUISIANA

APPENDIX A

ESTIMATE OF BENEFITS

REVIEW OF REPORTS
ON THE
GULF INTRACOASTAL WATERWAY EAST OF THE
MISSISSIPPI RIVER-GULF OUTLET AND MICHOUD CANAL, LOUISIANA

APPENDIX A
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REVIEW OF REPORTS
ON THE
GULF INTRACOASTAL WATERWAY EAST OF THE
MISSISSIPPI RIVER-GULF OUTLET AND MICHOUD CANAL, LOUISIANA

APPENDIX A
ESTIMATE OF BENEFITS

I - INTRODUCTION

1. GENERAL

This appendix is concerned with the navigation benefits that would accrue from the proposed enlargement of the channel in that portion of the Gulf Intracoastal Waterway from its intersection with the Mississippi River-Gulf Outlet eastward for a distance of approximately 1.5 miles to the Michoud Canal, and enlargement of Michoud Canal for a distance of approximately 1.5 miles northerly from the Gulf Intracoastal Waterway. The channel in the Gulf Intracoastal Waterway and the Michoud Canal would be enlarged to provide a channel 36 feet deep and 250 feet wide, with a turning basin at the upper end of the channel in Michoud Canal. This enlarged channel would provide access for ocean shipping to the industrial plants now fronting Michoud Canal and for any industrial activity which might locate in the area in the future.

2. INDUSTRIAL DEVELOPMENT

The area along Michoud Canal is located in New Orleans East, the eastern one-third of the city of New Orleans (Orleans Parish). Some 1,700 acres of land adjacent to both the Intracoastal Waterway and the Michoud Canal have been designated as a heavy industrial area by the developer of New Orleans East, Inc. An industrial gas producing plant (130 acres) and a cement manufacturing plant (50 acres) are presently operating on Michoud Canal, as well as Saturn rocket production by the National Aeronautics and Space Administration. A tract of land fronting the Michoud Canal has been retained by the developer for construction of docking facilities to accommodate any water shipments to and from plants that are located within the designated industrial area not fronting the canal.

3. TRANSPORTATION BENEFITS

A study of the navigation benefits revealed that two companies would realize transportation savings with the ship channel in place; namely, the industrial gas producer who is now operating on the Michoud Canal and a foreign car distributor who presently owns land fronting approximately 0.4 mile along Michoud Canal, and who is now importing automobiles over existing dock facilities along the Mississippi River.

II - PRESENT VEHICLE IMPORTS

4. FOREIGN VEHICLE IMPORT

a. Under present conditions, 20,000 foreign-made cars[1] were imported by the distributor during 1965 (base year). Adequate accommodations are not available at any one docking facility in the Port of New Orleans for handling these vehicles after unloading from the ships. This makes it necessary to unload the vehicles frequently at more than one wharf and transport them by land to a central staging area, or storage facility, in New Orleans while awaiting further shipment by rail or truck to inland points in Louisiana, Mississippi, Alabama, and parts of Tennessee. This creates problems involving additional costs in maintaining control over the vehicles at these scattered riverfront points.

b. The distributor's base of operations is near the Michoud Canal, and the firm presently owns 75 acres fronting the canal which would provide the site for a specially designed wharf for receiving the shipments, as well as providing a central staging, inspection, and storage area for handling the imported vehicles. The savings that could be realized from handling automobiles on Michoud Canal as compared to existing costs of handling automobiles from the Mississippi River docks are $3.35 per vehicle, as shown in the table below:

TABLE 1

ANNUAL VEHICLE MOVEMENT EXPENSES
(20,000 vehicles)

Employment	Present cost for handling at Miss. River docks		Estimated cost for handling at Michoud canal facilities	Savings
Wharf handlers (6)	$ 23,220	(5)	$19,350	$ 3,870
Guards (5)*	15,660	(3)	9,395	6,265
Supervisors, dispatchers, and checkers (5)	34,835	(5)	34,835	0
Payroll taxes	4,295		2,145	2,150
Insurance	7,160		3,580	3,580
Contract drivers	17,725		0	17,725
Company vehicle expense	1,690		420	1,270
Storage lot rentals	19,200		0	19,200
Pilferage**	3,000		0	3,000
Vehicle movement damage**	10,000		0	10,000
Total	$136,785		$69,725	$67,060
Unit savings	$ 67,060 ÷ 20,000 = $3.35			

( )Number of employees.
*Located at riverfront locations and storage lot.
**Amount not covered by insurance.

[1]Volkswagens

5. PRIVATE MAINTENANCE COSTS

a. In order to utilize Michoud Canal for the discharge of automobiles, it will be necessary to construct a specially-designed permanent wharf. It is estimated that the cost of this private facility would be $500,000 and that the annual maintenance cost would be approximately $5,000.

b. The estimated annual charges for the wharf, based on an interest rate of 3-1/4 percent and an economic life of 50 years, are shown below:

$500,000 x 0.0325	(interest)	= $16,250
$500,000 x 0.00823	(amortization)	= 4,120
	(maintenance)	= 5,000
Average annual cost		$25,370
	(Rounded)	$25,400

III - AUTOMOBILE PROJECTIONS

6. GENERAL

a. In order that some figure be derived for future deliveries of Volkswagen automobiles imported to the Port of New Orleans, the existing data were analyzed and assumptions stated. The Volkswagen automobile has been, and it is assumed will continue to be, the most popular imported automobile in the United States. Over recent years, the number of these vehicles sold in this country has steadily increased. Even when other foreign models experienced sharp decline in sales from the "compact experiment" by the United States producers, Volkswagen sales increased.

b. It was further assumed that the past policy of the Volkswagen producer and distributors would continue. By assuming a continuity of policy, there is no implication of stagnation, but an explicit assumption that policy changes will be undertaken as necessary to preserve the definite market advantage now held by Volkswagen. Volkswagen has been careful not to flood its market. In fact, the supply has purposefully been maintained slightly below anticipated demand. This policy has kept demand conditions firm and allowed company officials to predict the following year's sales. Such tight supply conditions have contributed to the Volkswagen image in America. The image is one of a car far different from the home products in every way, even to a dealer waiting list. As long as such policy suits the needs of the producer, it will be followed.

7. COEFFICIENT OF DETERMINATIONS

a. The first step in projecting Volkswagens entering through the Port of New Orleans was to project a set of figures for total

imports of the vehicles into the country. The projected total of Volkswagens entering the United States was derived through simple linear regression analysis relating demand for the automobile to the United States population. The relationship established between population and Volkswagen sales for the years 1959 to 1964, inclusive, showed a coefficient of determination of 0.99. The coefficient of determination indicates the usefulness, in this case, of population for determining Volkswagen sales. If the coefficient had been zero, the indication would be no relationship existing between Volkswagen sales and population. On the other hand, a coefficient equal to 1 would be indicative of a constant relationship between Volkswagen sales and population. If such were the case, the exact number of sales of the import could be derived from population.

b. The actual coefficient of determination for this data indicates that for the years involved, Volkswagen sales could be predicted with results 99 percent closer to actual sales if population were used, than if time were the only other variable. This high coefficient of determination is assumed to remain high enough to provide stability for a 50-year projection link to projected population. Relating sales projections to population bring another projected parameter into the analysis. The projected values of population for the year 2020 were taken from the report of the Economic Task Group of the Ad Hoc Water Resources Council Staff issued in July 1963.

8. - POPULATION INDICATOR

a. The projected population figures were assumed to be related to future Volkswagen sales in the same way that the past population figures were related to past sales through the regression equation $Y = a + bx$. "Y" is the projected Volkswagen sales, expressed in thousands; "a" represents the vertical intercept when the line is plotted on a two-dimensional graph; "b" is the slope of the regression line; and "x" is the value of population, expressed in millions. The values of "a" and "b" were -2028.66 and 12.16, respectively. Table 2 presents the past data used to derive the regression equation and the projected population and sales figures. Figure 1 indicates the high, medium, and low United States population projections to 2020. Figure 2 illustrates the projections of Volkswagens imported into the United States to 2020.

b. For this report, Volkswagen sales and imports are assumed to be the same. Also, although there are various varieties of the vehicle, they are all thrown into the category of automobiles.

TABLE 2

HISTORIC AND PROJECTED SALES OF VOLKSWAGEN IMPORTED AUTOMOBILES IN THE UNITED STATES: 1959 - 1964, AND 2020: HISTORIC AND PROJECTED UNITED STATES POPULATION: 1959 - 1964, AND 2020

Year	Population (millions)	Volkswagens (thousands)
1959	177.1(1)	120(3)
1960	180.7(1)	180(4)
1961	183.7(1)	200(4)
1962	186.6(1)	240(4)
1963	189.4(2)	271(5)
1964	192.1(2)	310(5)
Projections		
(low	443.0(1)	3,358
2020 (medium	502.0(1)	4,076
(high	560.0(1)	4,781

(1) Economic Task Group of the Ad Hoc Water Resources Council Staff.
(2) Economic Report of the President 1965.
(3) United States News and World Report.
(4) New York Times.
(5) Wall Street Journal.

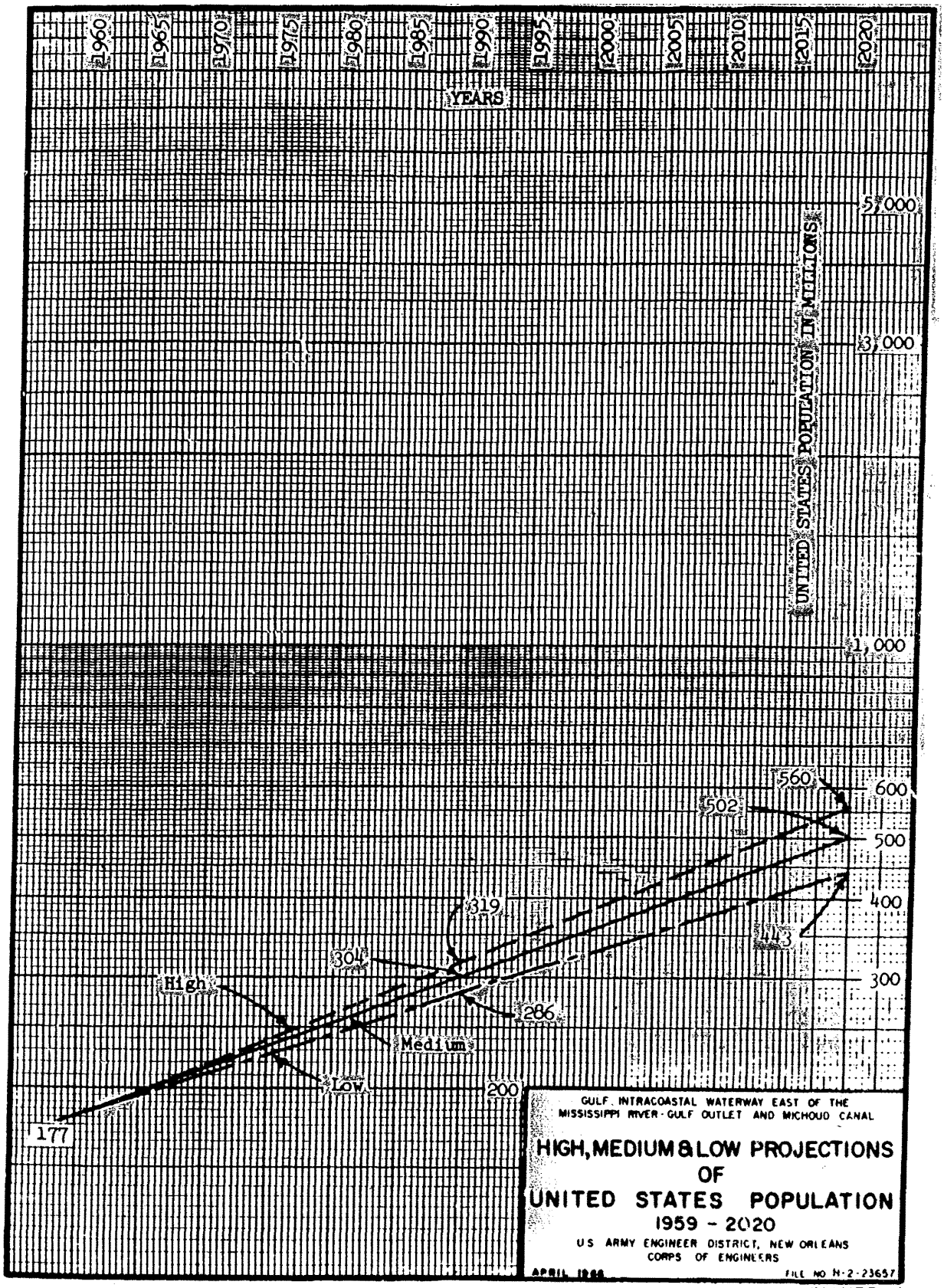
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
2015
2020
YEARS
UNITED STATES POPULATION IN MILLIONS
5,000
3,000
1,000
600
500
400
300
200
560
502
443
319
304
286
High
Medium
Low
177
GULF INTRACOASTAL WATERWAY EAST OF THE MISSISSIPPI RIVER-GULF OUTLET AND MICHOUD CANAL
HIGH, MEDIUM & LOW PROJECTIONS OF UNITED STATES POPULATION 1959 - 2020
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
APRIL 1968
FILE NO. N-2-23657

FIGURE 1

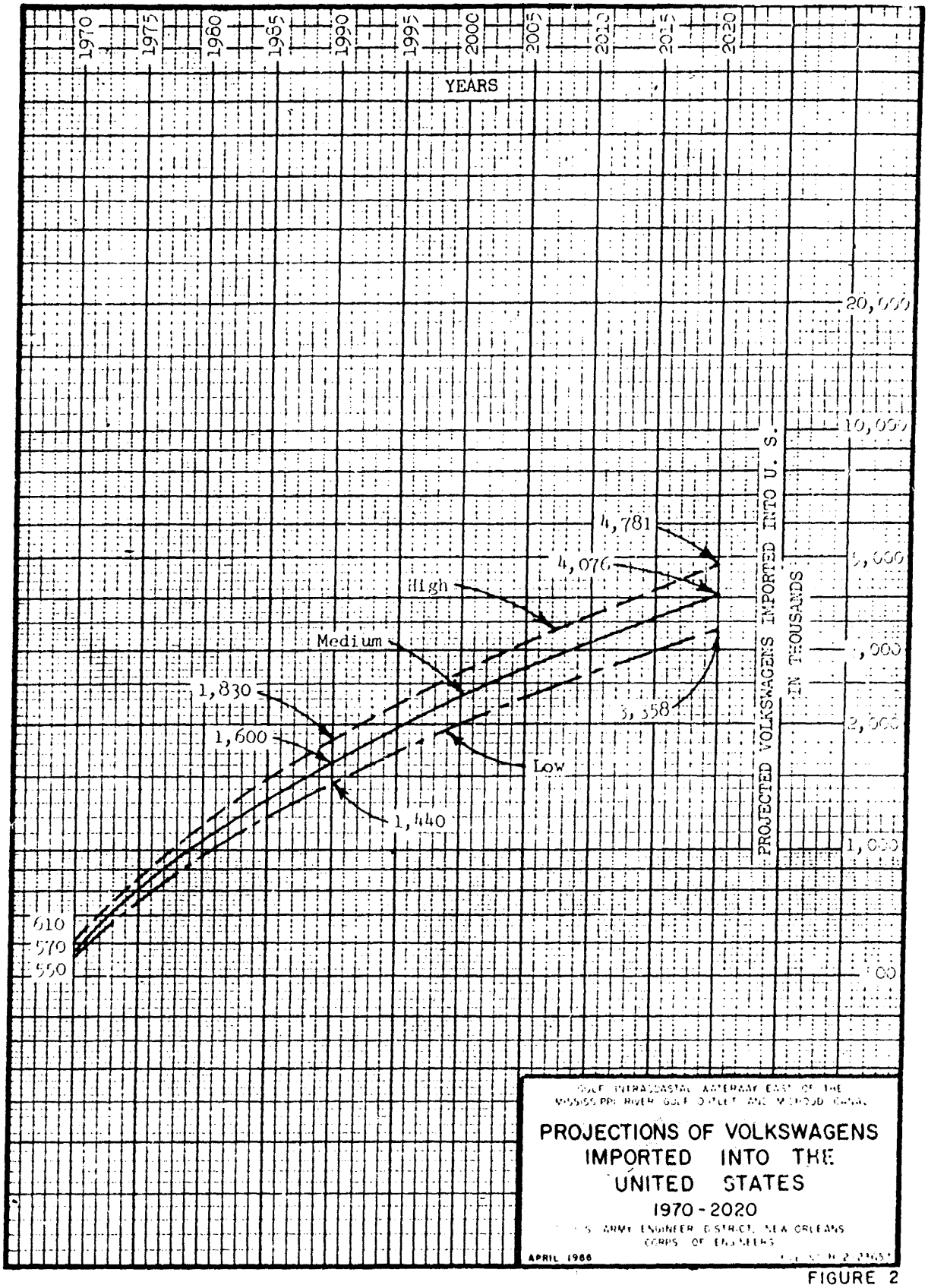
1970
1975
1980
1985
1990
1995
2000
2005
2010
2015
2020
YEARS
20,000
10,000
5,000
1,000
2,000
1,000
100
PROJECTED VOLKSWAGENS IMPORTED INTO U. S.
IN THOUSANDS
4,781
4,076
High
Medium
1,830
1,600
1,440
3,358
Low
610
570
550
GULF INTRACOASTAL WATERWAY EAST OF THE
MISSISSIPPI RIVER GULF OUTLET AND MICHOUD CANAL
PROJECTIONS OF VOLKSWAGENS
IMPORTED INTO THE
UNITED STATES
1970 - 2020
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
APRIL 1966

FIGURE 2

9. FACILITY'S VEHICLE HANDLING CAPACITY (NORMAL)

This study and its projections are only concerned with the number of vehicles imported through the proposed facilities fronting the Michoud Canal. So, a limit to the number of vehicles which will be handled by the proposed facility should be established. The facility will, if it is constructed, be designed to efficiently handle 6,000 vehicles at any one time. The turnover of units is a function of the transportation employed to dispatch the Volkswagen vehicles to the respective dealers. Both rail and highway transit will be utilized. At present, it is anticipated that the capacity will be turned over in 30 days. Although it is possible that the time of turnover for automobiles can be reduced in the future, a 30-day turnover period (an average of 200 vehicles per day) has been used to establish the estimated annual capacity of the facilities at 73,000 units.

10. VEHICLE PROJECTION SUMMARY

Table 3 and figure 3 effectively summarize the projections of Volkswagen vehicles expected to be brought through the Port of New Orleans. High, medium, and low projections of imports are made relative to the corresponding high, medium, and low population projections. The New Orleans imports are simple enough, 5.5 percent of total United States Volkswagen imports.

TABLE 3

HIGH, MEDIUM, AND LOW PROJECTIONS OF VOLKSWAGEN AUTOMOBILES IMPORTED THROUGH THE PORT OF NEW ORLEANS: 1970 - 2020

Year	Volkswagens high	Volkswagens medium	Volkswagens low
1970	33,620	31,412	29,741
1980	63,248	58,365	53,483
2000	145,109	128,054	111,000
2010	199,014	172,128	145,309
2020	262,951	224,161	184,702

11. NAVIGATION BENEFITS (IMPORTED VEHICLES)

Navigation benefits attributed to the project by savings accruing to the foreign car distributor were based on medium projections of the foreign car imports and the assumption of the vehicle capacity turnover to be 30 days. The average annual economic benefits are based on an interest rate of 3-1/4 percent during the 50-year life of the proposed project. The results are shown as follows:

TABLE 4

VOLKSWAGEN PROJECTION
(1970-2020)
(MEDIUM BASE - 30-DAY TURNOVER)

Year	Annual Volkswagen imports	Annual savings @ $3.35/unit	Present worth factors for 3-1/4%	Savings at present worth
1970	31,412	105,230	1.00000	105,230
1971	33,700	112,895	.96852	109,341
1972	36,000	120,600	.93804	113,128
1973	38,700	129,645	.90851	117,784
1974	41,200	138,020	.87991	121,445
1975	43,900	147,065	.85222	125,332
1976	46,700	156,445	.82539	129,128
1977	49,600	166,160	.79941	132,830
1978	52,400	175,540	.77425	135,912
1979	55,400	185,590	.74988	139,170
1980	58,365	195,523	.72627	142,002
1981	61,200	205,020	.70341	144,213
1982	64,300	215,405	.68127	146,749
1983	67,300	225,455	.65983	148,762
1984	70,300	235,050	.63906	150,211
1985 Cap. level	73,000	244,550	.61894	151,362
1986	"	"	.59946	146,598
1987	"	"	.58059	141,983
1988	"	"	.56231	137,513
1989	"	"	.54461	133,184
1990	"	"	.52747	128,993
1991	"	"	.51087	124,933
1992	"	"	.49479	121,001
1993	"	"	.47921	117,191
1994	"	"	.46413	113,503
1995	"	"	.44952	109,930
1996	"	"	.43537	106,470
1997	"	"	.42167	103,119
1998	"	"	.40839	99,872
1999	"	"	.39554	96,729
2000	"	"	.38309	93,685
2001	"	"	.37103	90,735
2002	"	"	.35935	87,879
2003	"	"	.34804	85,113
2004	"	"	.33708	82,433
2005	"	"	.32647	79,838
2006	"	"	.31620	77,327
2007	"	"	.30624	74,891
2008	"	"	.29660	72,534
2009	"	"	.28727	70,252
2010	"	"	.27823	68,041

TABLE 4 (cont'd)

VOLKSWAGEN PROJECTION

Year	Annual Volkswagen imports	Annual savings @ $3.35/unit	Present worth factors for 3-1/4%	Savings at present worth
2011	73,000	$244,550	.26947	$ 65,899
2012	"	"	.26099	63,825
2013	"	"	.25277	61,815
2014	"	"	.24481	59,868
2015	"	"	.23711	57,985
2016	"	"	.22965	56,161
2017	"	"	.22242	54,393
2018	"	"	.21542	52,681
2019	"	"	.20863	51,020
2020	"	"	.20207	49,416
			50 years	$5,249,409

$5,249,409 x 0.0325 (int.) =	$170,600	Gross avg.ann.benefits=	$213,800
$5,249,409 x 0.00823(amort.) =	43,200	Less: Annual wharf cost	25,400
Gross avg. annual benefits	$213,800	Net avg. ann. benefits	$188,400
		(Rounded)	$188,000

IV - LIQUID FERTILIZER EXPORT

12. GENERAL

The industrial gas firm has under construction a chemical complex which is presently producing 45,000 tons of anhydrous ammonia annually and contemplates future production of such commodities as ammonium sulphate, urea, ammonium nitrate, and diammonium phosphate, all of which are used in the production of fertilizers. These chemical fertilizers are in addition to the production of liquid hydrogen and oxygen for the National Aeronautics and Space Administration. The supply of liquid hydrogen and oxygen to the National Aeronautics and Space Administration was the reason why the plant was located on the Michoud Canal.

13. PRESENT OPERATIONS

a. At the present time the 45,000 tons of anhydrous ammonia, which is under firm contract, is actually being traded-out with a firm that is producing the same commodity at Texas City, Texas. This arrangement was made because of the lack of deep water to the Michoud

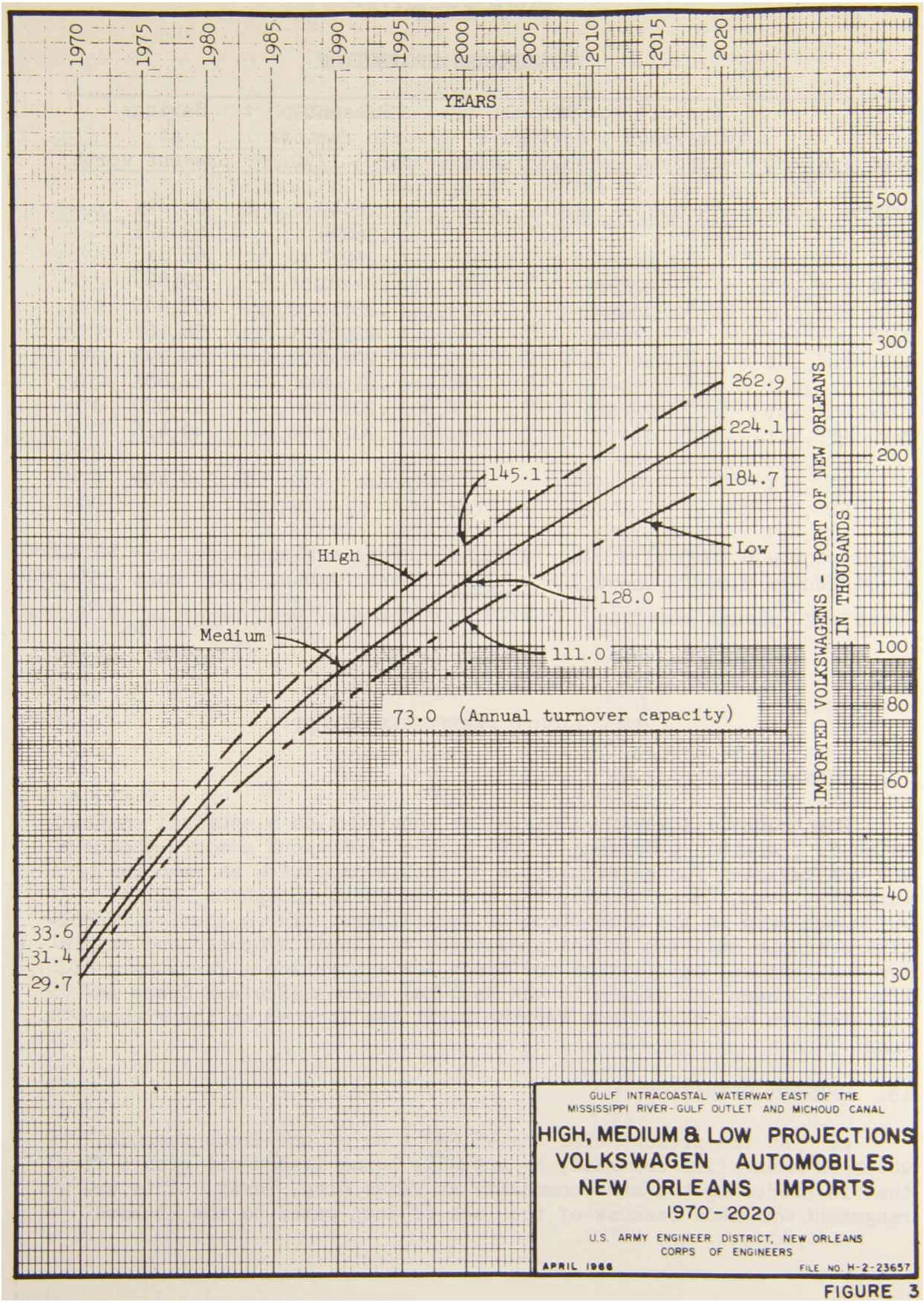
1970
1975
1980
1985
1990
1995
2000
2005
2010
2015
2020
YEARS
500
300
200
100
80
60
40
30
IMPORTED VOLKSWAGENS - PORT OF NEW ORLEANS
IN THOUSANDS
262.9
224.1
184.7
145.1
High
Low
128.0
Medium
111.0
73.0 (Annual turnover capacity)
33.6
31.4
29.7
GULF INTRACOASTAL WATERWAY EAST OF THE
MISSISSIPPI RIVER-GULF OUTLET AND MICHOUD CANAL
HIGH, MEDIUM & LOW PROJECTIONS
VOLKSWAGEN AUTOMOBILES
NEW ORLEANS IMPORTS
1970-2020
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
APRIL 1966
FILE NO. H-2-23657

FIGURE 3

Canal plant. The Texas firm is now loading anhydrous ammonia at Texas City into special vessels for carrying the commodity--chargeable to the New Orleans firm's account. In arranging the trade-out agreement, a premium of $2.00 per ton is being paid to the Texas firm. However, it is believed that the product could be shipped from the Michoud Canal plant at a cost of approximately $1.55 a ton.

b. Under the latter condition the movement of the 45,000 tons of anhydrous ammonia would be in shipments of 10,000 tons per ship and would involve, first, the loading of barges at the Michoud Canal wharf; next, transporting the barges approximately 6 miles to the bulk terminal on the Gulf Outlet; and, finally, transferring the liquid fertilizer from the barges to ocean-going vessels for foreign export. Below is the itemized cost for such a movement under both present and improved conditions.

TABLE 5

ANHYDROUS AMMONIA (LIQUID)
PRESENT COST OF MOVEMENT
(10,000 tons)

Barge operating costs/hour	$7.37		
Number of barges	x 5	$ 36.85	
Cost for tug/hour		+ 25.00	
Total cost/hour		$ 61.85	
Required hours to load and move barges to ship		x 48	
		$2,968.80	
Cost to load 10,000 tons on barges @ $0.35/ton		+3,500.00	
Total cost for loading and moving barges to ship		$6,468.80	
Cost for loading ship and returning barges		+6,468.80	$12,937.60
20% for contingencies			2,588.00
Total present cost			$15,525.60

With the ship channel in place, the anhydrous ammonia could be loaded directly aboard the ship at the company's wharf in the Michoud Canal at a cost of $0.35 per ton for a total cost of $3,500.

Savings

Present cost	$15,526
Improved cost	3,500
Total savings	$12,026 or $1.20/ton savings

14. ANHYDROUS AMMONIA PROJECTION

a. In projecting the increase of anhydrous ammonia tonnage from the Michoud plant, it was assumed that the present output of the plant for export would increase in direct proportion to the increase in the United States production of anhydrous ammonia. In turn, the United States production of anhydrous ammonia was related to world population through regression analysis. The world population figures, both historical and projected, were obtained through methods as set forth in paragraph 19.

b. It is anticipated that the enlargement of the Gulf Intracoastal Waterway and Michoud Canal will be completed and in operation by 1970. The output of anhydrous ammonia has, therefore, been projected from the year 1966 to 1970, the year in which the proposed project will be in operation, and beyond 1970 for a period of 50 years to the year 2020. Table 6 and figure 4 show historical production figures for anhydrous ammonia in the United States with projections showing a high, medium, and low rate of production. Table 7 and figure 5 provide similar projection data for operations at the Michoud plant.

TABLE 6

HISTORICAL AND HIGH, MEDIUM, AND LOW PROJECTIONS OF U. S. PRODUCTION OF ANHYDROUS AMMONIA: 1959-2020

Year	Anhydrous ammonia (thousands of short tons)
1959	3,717
1960	3,962
1961	4,282
1962	4,778
1963	5,466

Year	Projected anhydrous ammonia production (thousands of short tons)		
	High	Medium	Low
1966	6,969	6,678	6,550
1970	9,511	8,664	8,322
1980	15,306	14,288	13,269
1990	23,027	20,887	18,798
2000	32,390	28,830	25,269
2010	43,629	38,022	32,425
2020	56,964	48,876	40,051

TABLE 7

PROJECTED ANHYDROUS AMMONIA EXPORTS OF AIR PRODUCTS AND CHEMICALS, INC., MICHOUD PLANT
(short tons)
1966-2020

Year	Anhydrous ammonia (short tons)		
	High	Medium	Low
1966	45,000	45,000	45,000
1970	61,400	58,400	57,000
1980	98,900	96,300	91,000
1990	148,800	140,800	129,000
2000	209,000	194,000	174,000
2010	282,000	256,000	223,000
2020	368,000	329,000	275,000

15. NAVIGATION BENEFITS (ANHYDROUS AMMONIA)

Navigation benefits attributed to the project by savings accruing to the industrial gas firm from its export of anhydrous ammonia were based on the use of the medium projections. The average annual benefit based on the medium projection from 1970-2020 when brought to present worth and paid out over the 50-year period at an annual rate of 3-1/4 percent is $176,000.

V - OTHER FERTILIZER EXPORTS

16. INDUSTRIAL GAS FIRM'S FUTURE OPERATIONS

a. Anhydrous ammonia is the only fertilizer being produced at the present time at the chemical plant on Michoud Canal; however, if the proposed ship channel is authorized and constructed, the production of other chemical fertilizers is contemplated. Plans are to produce a complete line of chemical fertilizers in the event ocean shipping is available. This can be done with relative ease. The present complex consists of three plants--an anhydrous ammonia plant (600 tons/day capacity), a liquid hydrogen and oxygen plant (32 tons/day capacity), and a miscellaneous gas plant (1,000 tons/day capacity). This complex occupies only 30 acres of land. The firm has an additional 100 acres in reserve which is more than adequate to provide for any necessary expansion in the Michoud Canal area. Representatives of the company have indicated that expansion of the plant will be undertaken as required.

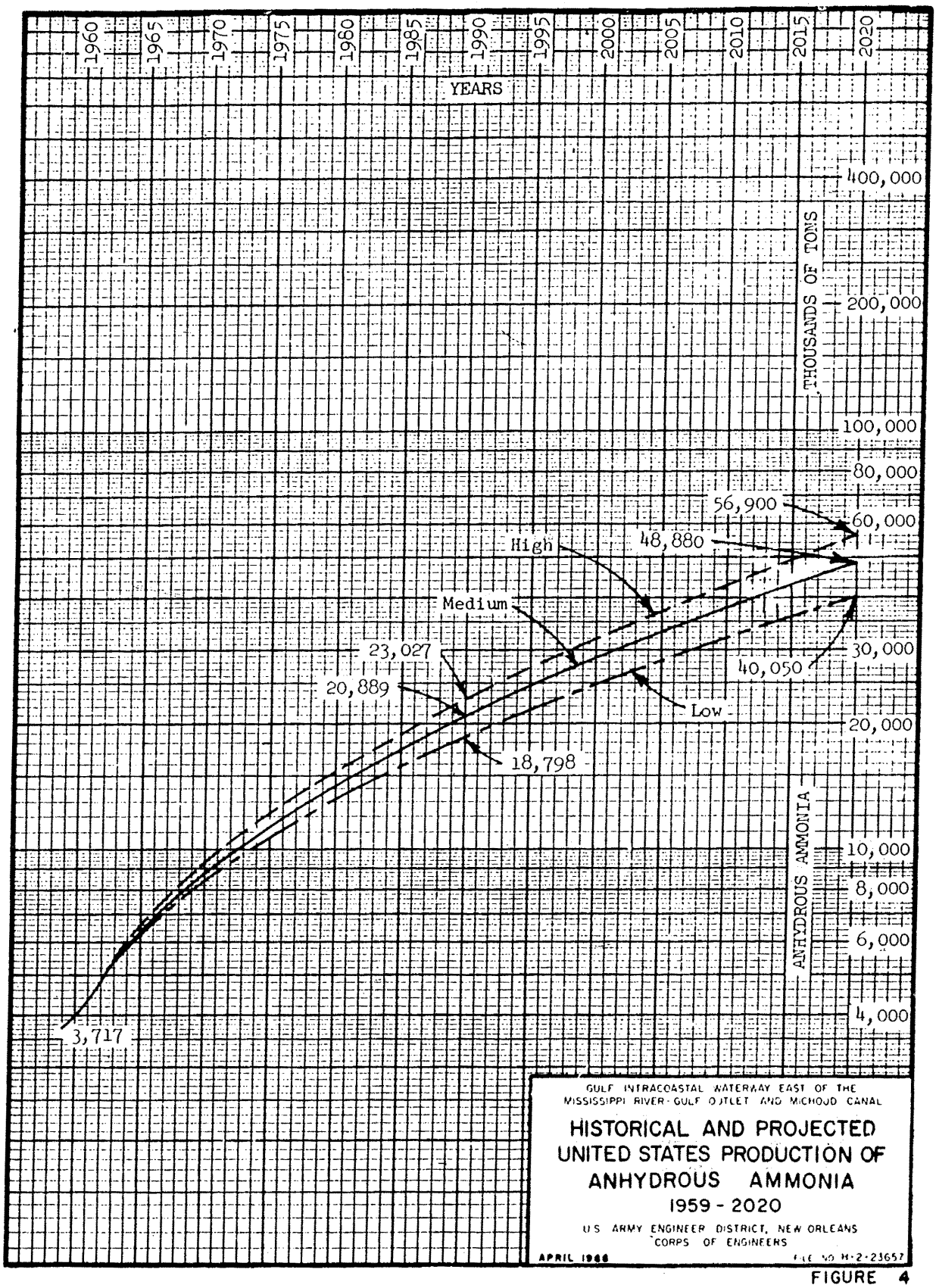
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
2015
2020
YEARS
400,000
200,000
100,000
80,000
60,000
30,000
20,000
10,000
8,000
6,000
4,000
THOUSANDS OF TONS
ANHYDROUS AMMONIA
56,900
48,880
High
Medium
23,027
20,889
40,050
Low
18,798
3,717
GULF INTRACOASTAL WATERWAY EAST OF THE MISSISSIPPI RIVER-GULF OUTLET AND MICHOUD CANAL
HISTORICAL AND PROJECTED UNITED STATES PRODUCTION OF ANHYDROUS AMMONIA
1959 - 2020
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
APRIL 1966
FILE NO. H-2-23657

FIGURE 4

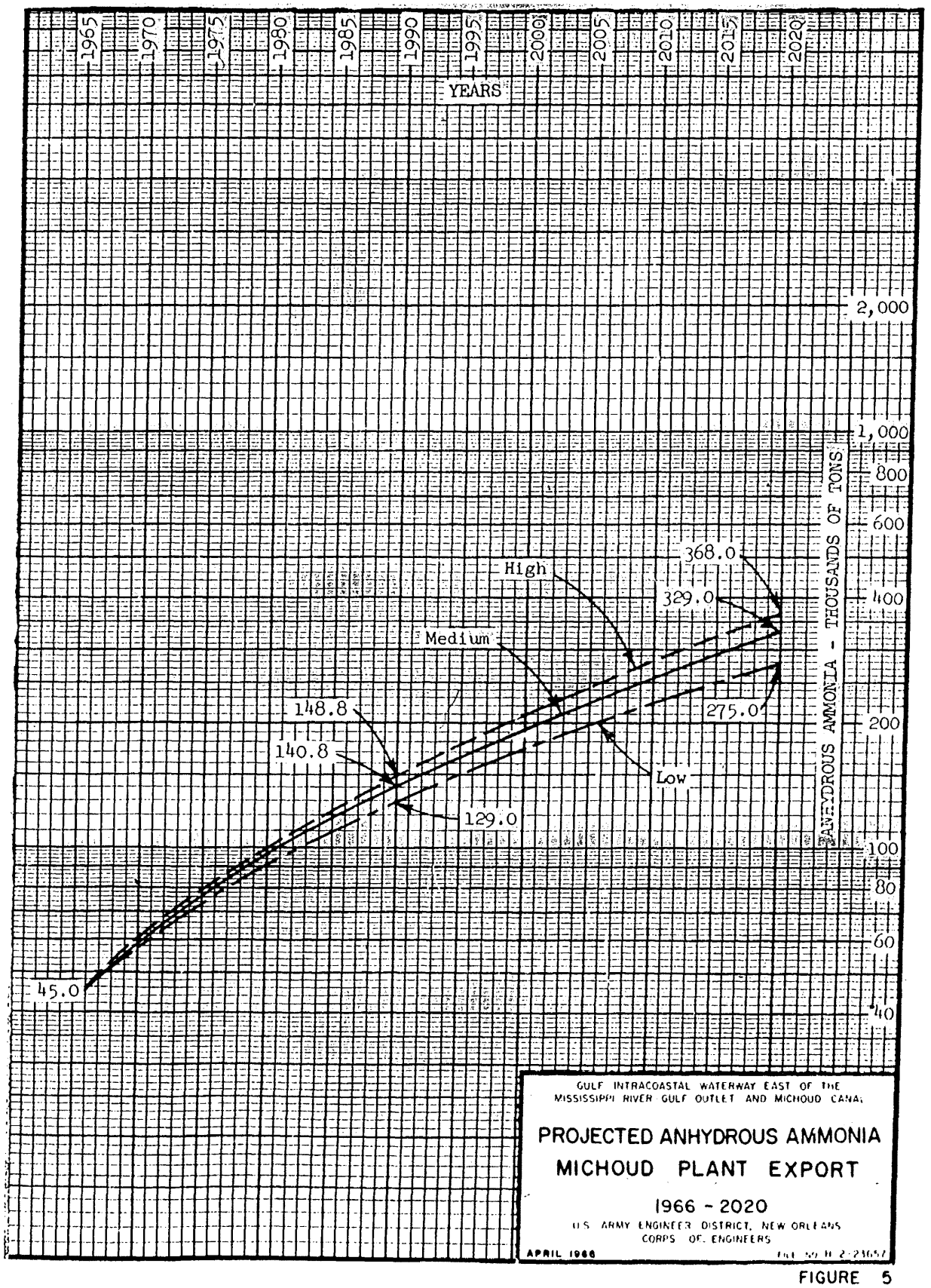

FIGURE 5

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b. Fertilizers can be divided into three basic groups:

(1) Phosphate fertilizers.

(2) Potash fertilizers.

(3) Nitrogen-based fertilizers.

The nitrogen products, such as the anhydrous ammonia now being manufactured, will be produced at the plant on Michoud Canal and will not require raw materials for their production. The phosphate and potash fertilizers will require the transportation of raw materials to Michoud Canal. However, as there is a domestic source of supply for potash and phosphate, it is believed that existing water depths together with available railroad transportation will afford an economical and satisfactory medium of transportation for the raw materials. Consequently, deep-draft channels are not considered essential at the present time for the transportation of phosphate or potash.

17. OTHER FERTILIZER PROJECTION--GENERAL

a. In estimating the benefits to be derived from the shipment of fertilizers other than anhydrous ammonia, it has been assumed that the manufacture of these fertilizers would begin in the year 1970, the same year that a deep-water channel would be available at the plant site.

b. In order to arrive at an estimate of the amount of fertilizers which might be exported from the plant on Michoud Canal, projections were made based on a correlation between world population and the demand for fertilizers.

18. POPULATION INDICATOR

a. Fertilizer demand was projected as a function of population because of the necessity for increasing food output during a period of time too short for any other method to take effect. Fertilizer produces a crop increase even when employed with backward agricultural methods. With underdeveloped countries experiencing a fall in death rates due to modern disease-control techniques and a constant, high birth rate and no change in farm output, fertilizer application alone offers an immediate balm to the problem.

b. In addition, underdeveloped economies lack the necessary capital for production of fertilizers; consequently, the market for American products becomes visible. South America, for example, is a continent of small nations suffering from development pains. A fertilizer producer located on Michoud Canal, with access to ocean shipping, could expect to receive a sizable share of the United States

contribution to South America. This type of sale could be expected to come through the Agency for International Development (AID) and similar programs.

19. LINEAR REGRESSION ANALYSIS--WORLD POPULATION

To project world population historical figures were obtained from the Statistical Abstract of the United States and the United Nations Statistical Yearbook. These figures were related to the United States figures through regression analysis. The historical figures used were for 1940, 1950, and 1958 through 1962, inclusive. World figures were derived from United States figures because of the high coefficient of correlation between the historical statistics, availability of projected United States population, and need for internal consistency of the projections. The population projections for the United States are shown in table 2, page 44. The values for "a" and "b" in the regression equation Y = a + bx were computed to be 69.6 and 16.3, respectively, with "Y" (world population) and "x" (United States population) values expressed in millions. The coefficient of determination was 0.995 between the two sets of historical data. The results of this projection are stated, by decade, in table 8 and illustrated in figure 6.

20. WORLD FERTILIZER DEMAND

The world population projections (par.19) were used to project the future world demand for the three types of fertilizer discussed below. The values for "a" and "b" shown in the subparagraphs of this paragraph are for use with the world population projections expressed in millions and the demand for fertilizer expressed in thousands of short tons.

a. Nitrogen. Table 9 and figure 7 present in figures and curves, respectively, the high, medium, and low projections of world demand for nitrogenous fertilizers. The "a" and "b" values, -33,941 and 14.7, respectively, were used to project the future world demand. The coefficient of determination is 0.992.

b. Potash. The three-level projections for demand of potash fertilizers over the 100-year period are depicted in table 10 and figure 8. For these projections, the value of "a" was -12,279 and "b" 7.04. The coefficient of determination of the historical figures for world population and potash fertilizer demand was 0.981.

c. Phosphate. Phosphate fertilizer demand was projected with an "a" of -15,214 and a "b" of 8.5. The coefficient of determination was 0.987. The high, medium, and low projections are found in table 11 and figure 9. Figure 10 and table 12 depict the three levels of projections of world demand for all fertilizer. These figures were derived by addition of the three separate projections of nitrogen, phosphate, and potash.

TABLE 8

HISTORICAL AND HIGH, MEDIUM, AND LOW PROJECTIONS
OF WORLD POPULATION
1940-2020

Year	World Population (millions)
1940	2,249
1950	2,509
1958	2,893
1959	2,948
1960	3,010
1961	3,073
1962	3,135

Year	Projected World Population (millions)		
	High	Medium	Low
1970	3,653	3,554	3,514
1980	4,330	4,211	4,092
1990	5,232	4,982	4,738
2000	6,326	5,910	5,494
2010	7,639	6,984	6,330
2020	9,197	8,252	7,221

TABLE 9

HISTORICAL AND HIGH, MEDIUM, AND LOW PROJECTIONS
OF WORLD DEMAND FOR NITROGENOUS FERTILIZERS
1955-2020

Year	World Demand - Nitrogenous Fertilizers (thousands of short tons)
1955	6,834
1956	7,275
1957	8,047
1958	8,708
1959	9,700
1960	10,141
1961	11,244
1962	11,795

TABLE 9 (cont'd)

Year	Projected World Demand - Nitrogenous Fertilizers (thousands of short tons)		
	High	Medium	Low
1965	13,731	13,658	13,584
1970	19,758	18,303	17,715
1980	29,710	27,961	26,211
1990	42,969	39,294	35,708
2000	59,051	52,936	46,821
2010	78,352	68,724	59,110
2020	101,255	87,363	72,208

TABLE 10

HISTORICAL AND HIGH, MEDIUM, AND LOW PROJECTIONS
OF WORLD DEMAND FOR POTASH FERTILIZERS
1955-2020

Year	World Demand - Potash Fertilizers (thousands of short tons)
1955	7,055
1956	7,496
1957	7,937
1958	8,157
1959	8,708
1960	9,039
1961	9,259
1962	9,480

Year	Projected World Demand - Potash Fertilizers (thousands of short tons)		
	High	Medium	Low
1965	10,553	10,518	10,482
1970	13,439	12,742	12,460
1980	18,205	17,367	16,530
1990	24,555	22,795	21,078
2000	32,257	29,328	26,400
2010	41,500	36,889	32,285
2020	52,469	45,816	38,558

TABLE 11

HISTORICAL AND HIGH, MEDIUM, AND LOW PROJECTIONS
OF WORLD DEMAND FOR PHOSPHATE FERTILIZERS
1955-2020

Year	World Demand - Phosphate Fertilizer (thousands of short tons)
1955	8,378
1956	8,598
1957	9,039
1958	9,370
1959	10,031
1960	10,582
1961	10,803
1962	11,133

Year	Projected World Demand - Phosphate Fertilizer (thousands of short tons)		
	High	Medium	Low
1965	12,351	12,309	12,266
1970	15,836	14,995	14,655
1980	21,591	20,580	19,568
1990	29,258	27,133	25,059
2000	38,557	35,021	31,485
2010	49,718	44,150	38,591
2020	62,960	54,928	46,164

TABLE 12

HISTORICAL AND HIGH, MEDIUM, AND LOW PROJECTIONS
OF WORLD DEMAND FOR FERTILIZERS
1955-2020

Year	World Demand - All Fertilizers (thousands of short tons)
1955	22,267
1956	23,369
1957	25,023
1958	26,235
1959	28,439
1960	29,762
1961	31,306
1962	32,408

TABLE 12 (cont'd)

Year	Projected World Demand - All Fertilizers (thousands of short tons)		
	High	Medium	Low
1965	36,635	36,485	36,332
1970	49,033	46,040	44,830
1980	69,506	65,908	62,309
1990	96,782	89,222	81,845
2000	129,865	117,285	104,706
2010	169,570	149,763	129,986
2020	216,684	188,107	156,930

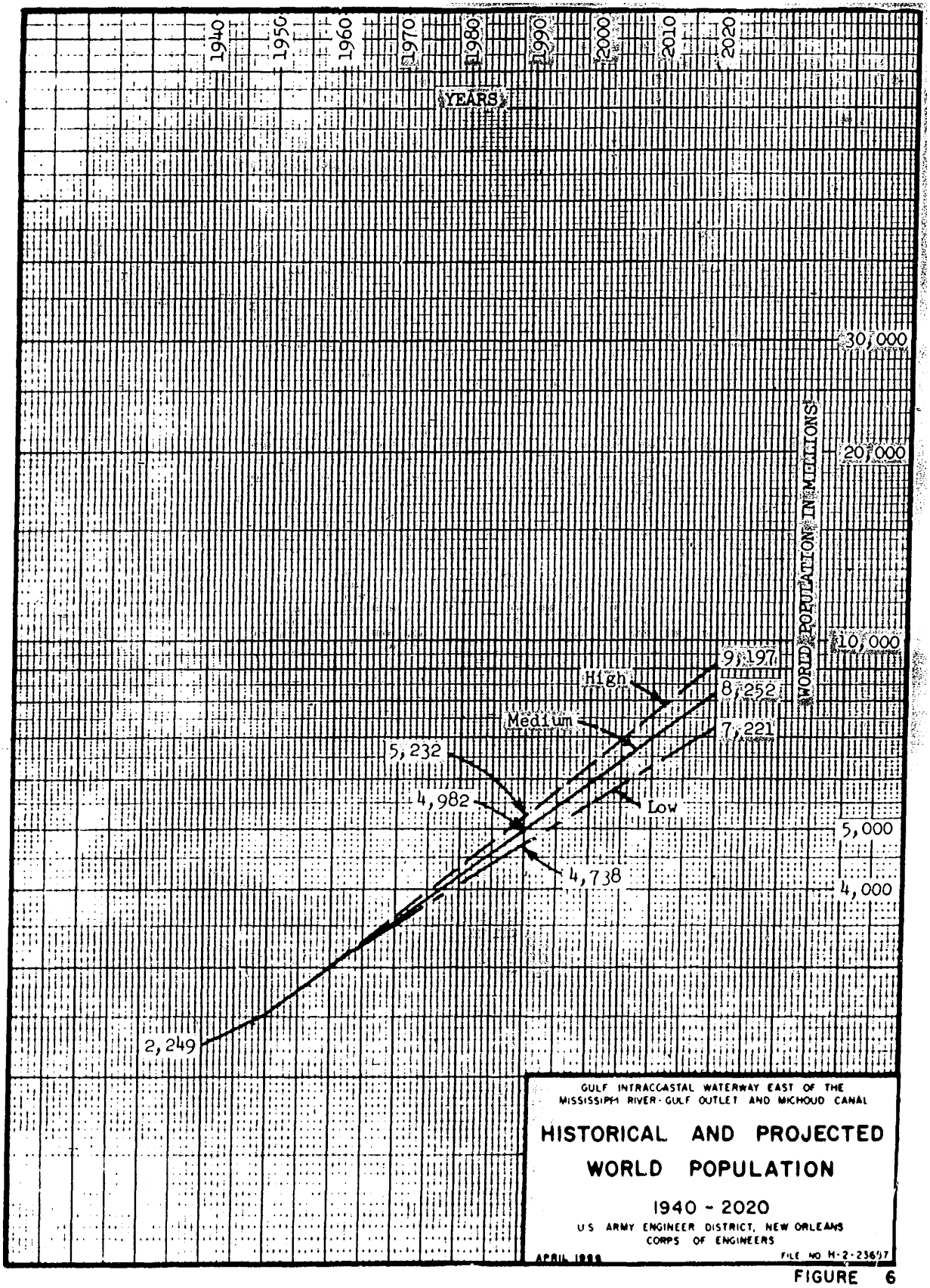

1940
1956
1960
1970
1980
1990
2000
2010
2020
YEARS
30,000
20,000
10,000
5,000
4,000
WORLD POPULATION IN MILLIONS
9,197
8,252
7,221
High
Medium
Low
5,232
4,982
4,738
2,249
GULF INTRACOASTAL WATERWAY EAST OF THE
MISSISSIPPI RIVER-GULF OUTLET AND MICHOUD CANAL
HISTORICAL AND PROJECTED
WORLD POPULATION
1940 - 2020
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
APRIL 1969
FILE NO H-2-23657

FIGURE 6

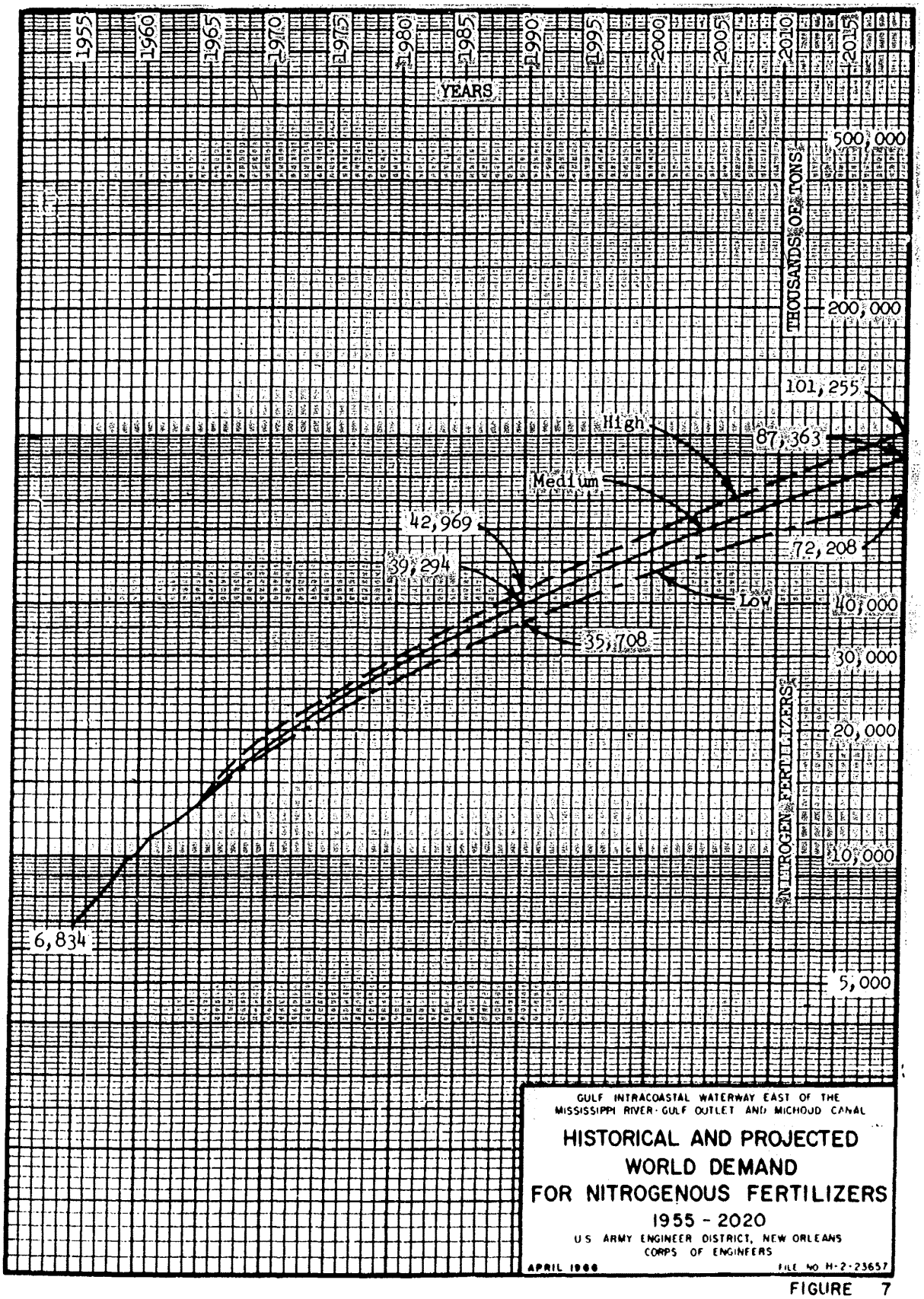

1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
2015
YEARS
500,000
200,000
THOUSANDS OF TONS
101,255
High
87,363
Medium
42,969
39,294
72,208
Low
40,000
35,708
30,000
20,000
NITROGEN FERTILIZERS
10,000
6,834
5,000
GULF INTRACOASTAL WATERWAY EAST OF THE
MISSISSIPPI RIVER-GULF OUTLET AND MICHOUD CANAL
HISTORICAL AND PROJECTED
WORLD DEMAND
FOR NITROGENOUS FERTILIZERS
1955 - 2020
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
APRIL 1966
FILE NO H-2-23657

FIGURE 7

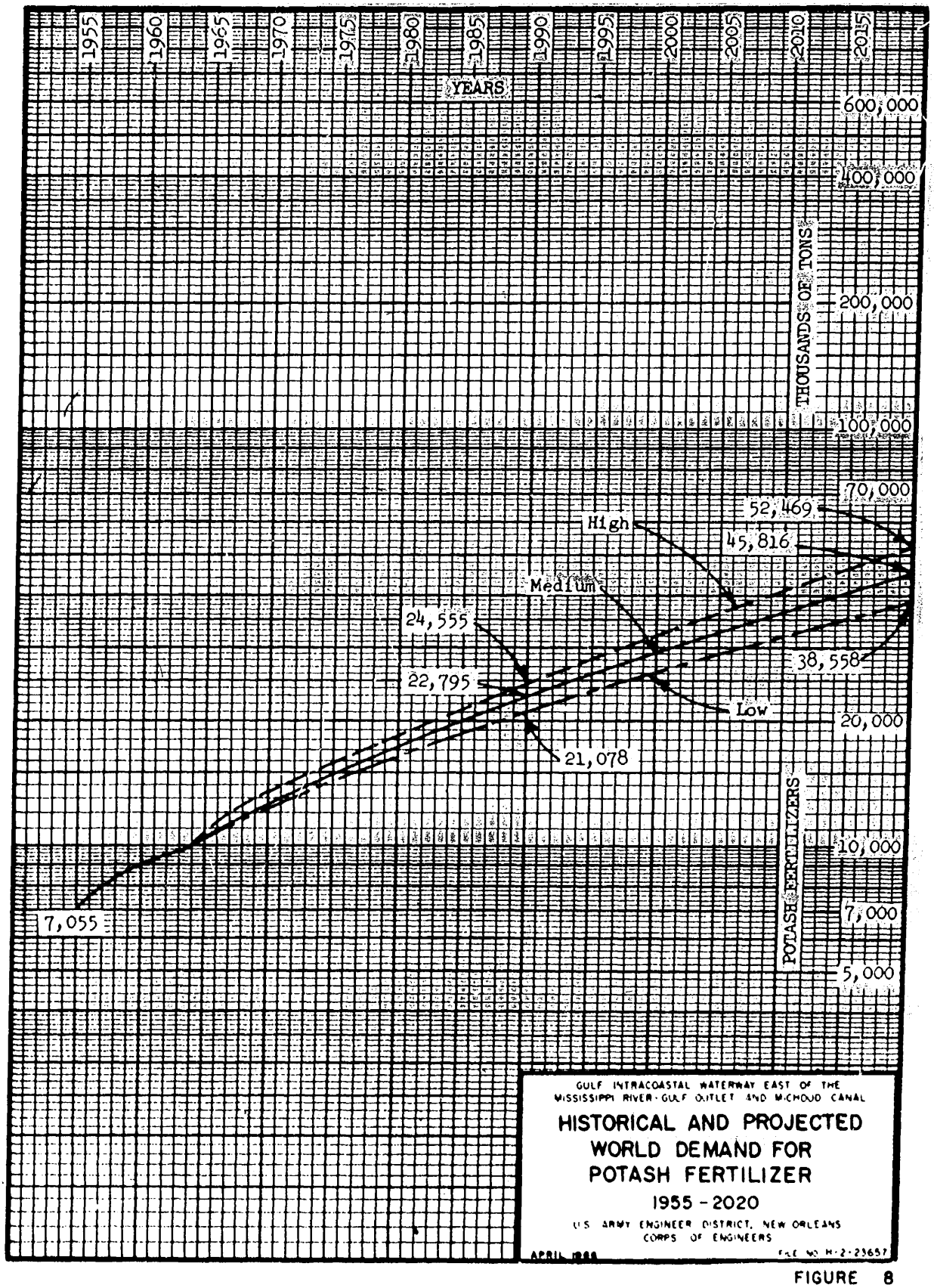

1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
2015
YEARS
600,000
400,000
200,000
100,000
70,000
20,000
10,000
7,000
5,000
THOUSANDS OF TONS
POTASH FERTILIZERS
High
Medium
Low
52,469
45,816
38,558
24,555
22,795
21,078
7,055
GULF INTRACOASTAL WATERWAY EAST OF THE MISSISSIPPI RIVER-GULF OUTLET AND MICHOUD CANAL
HISTORICAL AND PROJECTED WORLD DEMAND FOR POTASH FERTILIZER
1955 - 2020
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
APRIL 1968
FILE NO. H-2-23657

FIGURE 8

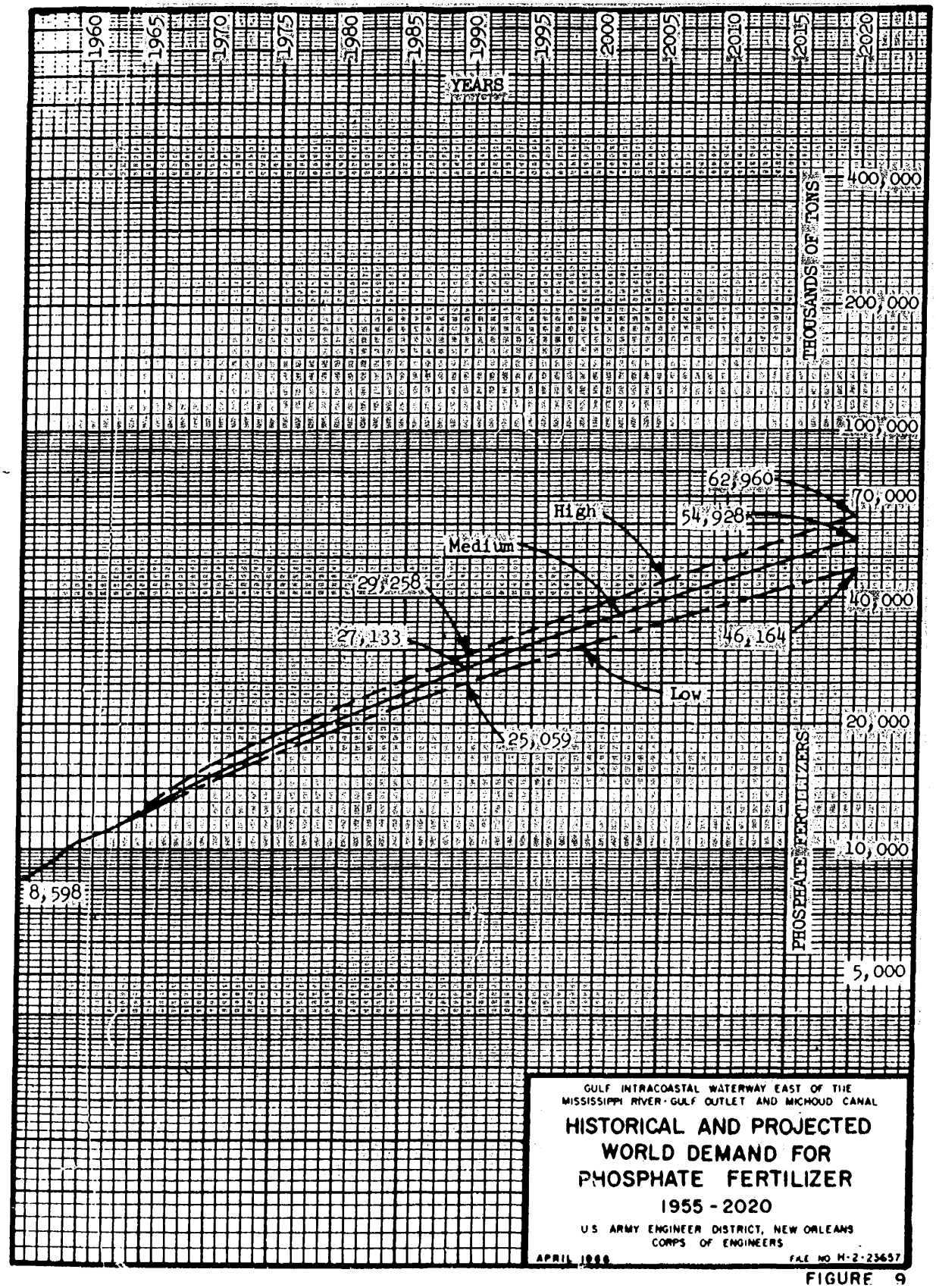

1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
2015
2020
YEARS
THOUSANDS OF TONS
400,000
200,000
100,000
70,000
40,000
20,000
10,000
5,000
PHOSPHATE FERTILIZERS
62,960
54,928
High
Medium
29,258
27,133
46,164
Low
25,059
8,598
GULF INTRACOASTAL WATERWAY EAST OF THE
MISSISSIPPI RIVER-GULF OUTLET AND MICHOUD CANAL
HISTORICAL AND PROJECTED
WORLD DEMAND FOR
PHOSPHATE FERTILIZER
1955 - 2020
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
APRIL 1968
FILE NO H-2-23657

FIGURE 9

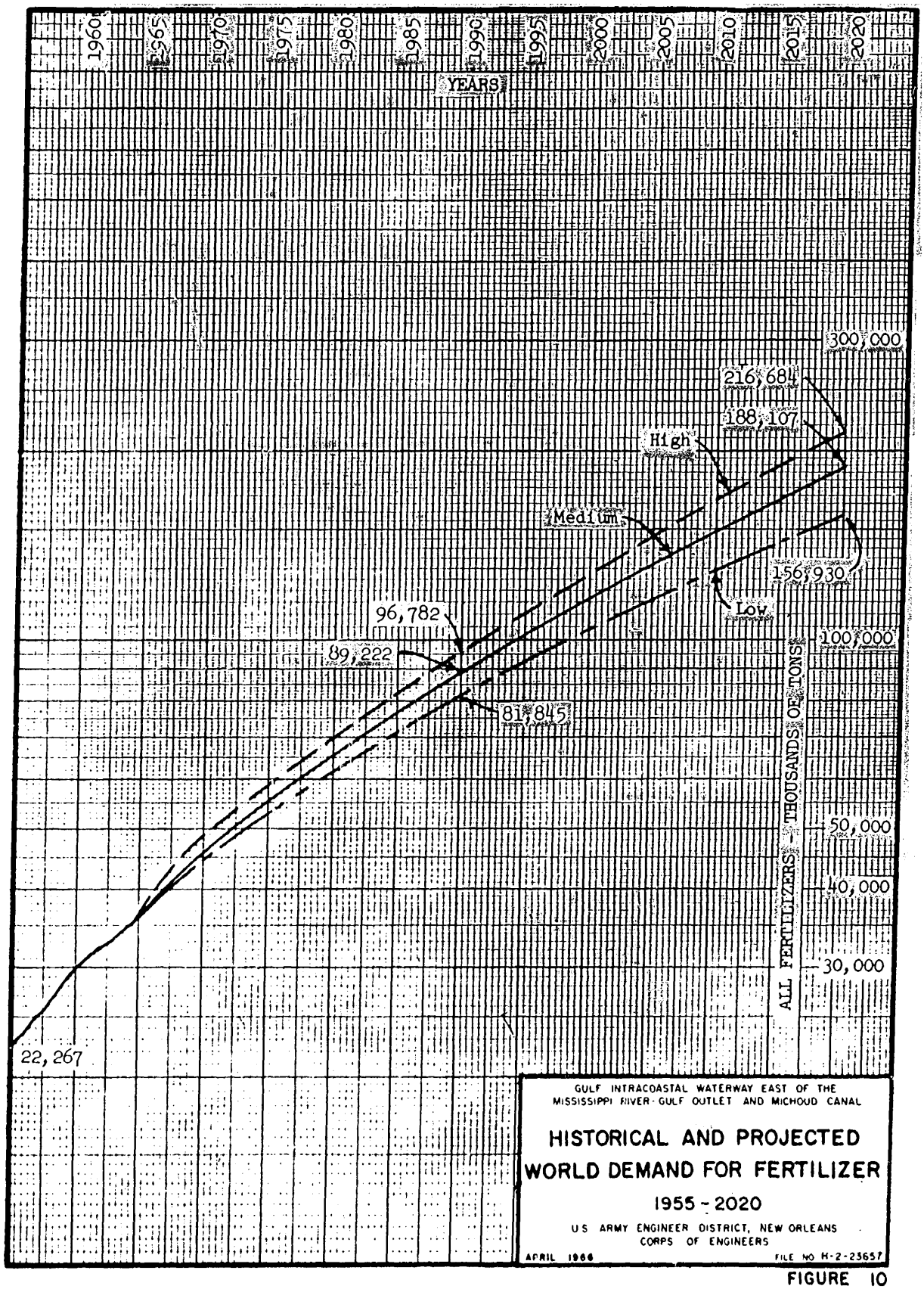

1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
2015
2020
YEARS
300,000
216,684
188,107
High
Medium
156,930
Low
96,782
89,222
81,845
100,000
50,000
40,000
30,000
ALL FERTILIZERS - THOUSANDS OF TONS
22,267
GULF INTRACOASTAL WATERWAY EAST OF THE
MISSISSIPPI RIVER-GULF OUTLET AND MICHOUD CANAL
HISTORICAL AND PROJECTED
WORLD DEMAND FOR FERTILIZER
1955 - 2020
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
APRIL 1966
FILE NO H-2-23657

FIGURE 10

21. MICHOUD PLANT - FOREIGN FERTILIZER DEMAND

a. The industrial gas firm's total projected output of the three types of fertilizers is shown in tables 13, 14, and 15, and figures 11 and 12. These figures were derived as follows: the medium 1970 projections were either taken from the brief presented by the industrial gas firm at the hearing on this proposed project, or obtained by subsequent consultation with representatives of the firm. This figure was used to determine the industrial gas firm's percent of the world market as projected, on the medium level, for 1970 for the particular type of fertilizer. The percentage obtained was assumed constant throughout the study period and was used to complete the tables by multiplying each world demand figure by it. The percentages used were 4.37 percent, 1.33 percent, and 1.57 percent for nitrogen, phosphates, and potash, respectively.

b. Since only the foreign exports of fertilizer from the plant would require a deep-draft channel, the fertilizer output by the firm was further refined to reflect only that portion of each type of fertilizer that would enter the foreign market. The projection of the nitrogen fertilizer output by the Michoud plant included all nitrogenous materials. Inasmuch as anhydrous ammonia is a nitrogenous fertilizer and is presented separately in the appendix, it was necessary to subtract its projection figures (table 7) from the total output. The results are shown in table 16.

c. Tables 16, 17, and 18 and figure 13 present the quantities of the three types of fertilizers projected as entering the foreign market. These were derived as follows: In 1963-64, the United States exported 6 percent of its production of nitrogenous fertilizer products, so 6 percent of the projected industrial gas firm's output was taken as the low projection of what the company will ship abroad; in 1964-65 (July-June) it is expected that 10 percent of nitrogen products went abroad, so 10 percent served as the medium projection.[1] The change from 6 to 10 percent is equivalent to a change from 10 to 16.6 percent, which is used as the high export projection. The same procedure was used for phosphate and potash products. For potash 19 percent is low, 24 percent medium, and 30.3 percent high. For phosphate 10.4 percent is low, 13.4 percent medium, and 17.3 percent high.

---

[1] H. H. Shepard and J. N. Mahan, "The Fertilizer Situation 1964-65," Farm Chemicals, May 1965, pp. 13-14.

TABLE 13

HIGH, MEDIUM, AND LOW PROJECTIONS OF NITROGEN FERTILIZER OUTPUT BY INDUSTRIAL GAS FIRM AT THE MICHOUD CANAL PLANT

Year	Projected output of nitrogenous fertilizer (thousands of short tons)		
	High	Medium	Low
1970	864	800	774
1980	1,298	1,222	1,145
1990	1,878	1,717	1,560
2000	2,580	2,313	2,046
2010	3,424	3,003	2,583
2020	4,425	3,818	3,155

TABLE 14

HIGH, MEDIUM, AND LOW PROJECTIONS OF POTASH FERTILIZER OUTPUT BY THE INDUSTRIAL GAS FIRM AT THE MICHOUD CANAL PLANT

Year	Projected output of potash fertilizer (thousands of short tons)		
	High	Medium	Low
1970	211	200	196
1980	286	273	260
1990	386	358	331
2000	506	460	414
2010	652	579	507
2020	824	719	605

TABLE 15

HIGH, MEDIUM, AND LOW PROJECTIONS OF PHOSPHATE FERTILIZER OUTPUT BY THE INDUSTRIAL GAS FIRM AT THE MICHOUD CANAL PLANT

Year	Projected output of phosphate fertilizer (thousands of short tons)		
	High	Medium	Low
1970	211	200	195
1980	288	274	261
1990	390	362	334
2000	514	467	420
2010	663	589	515
2020	840	733	616

TABLE 16

HIGH, MEDIUM, AND LOW PROJECTIONS OF NITROGEN FERTILIZER PRODUCTS EXPORTED FROM MICHOUD CANAL PLANT (EXCLUDING ANHYDROUS AMMONIA)

Year	Projected exports of nitrogenous fertilizer products (thousands of short tons)		
	High	Medium	Low
1970	82.0	21.6	*
1980	116.6	25.9	*
1990	162.9	30.9	*
2000	219.3	37.3	*
2010	286.4	44.3	*
2020	366.6	52.8	*

TABLE 17

HIGH, MEDIUM, AND LOW PROJECTIONS OF POTASH FERTILIZER PRODUCTS EXPORTED FROM MICHOUD CANAL PLANT 1970-2020

Year	Projected exports of potash fertilizer products (thousands of short tons)		
	High	Medium	Low
1970	63.9	48.0	37.2
1980	86.6	65.5	49.4
1990	117.0	85.9	62.9
2000	153.3	110.4	78.7
2010	197.6	139.0	96.3
2020	250.0	172.6	115.0

TABLE 18

HIGH, MEDIUM, AND LOW PROJECTIONS OF PHOSPHATE FERTILIZER PRODUCTS EXPORTED FROM MICHOUD CANAL PLANT 1970-2020

Year	Projected exports of phosphate fertilizer products (thousands of short tons)		
	High	Medium	Low
1970	36.5	26.8	20.3
1980	49.8	36.7	27.1
1990	67.5	48.5	34.7
2000	88.9	62.6	43.7
2010	114.7	78.9	53.6
2020	145.3	98.2	64.1

*Under low projections only anhydrous ammonia would be produced.

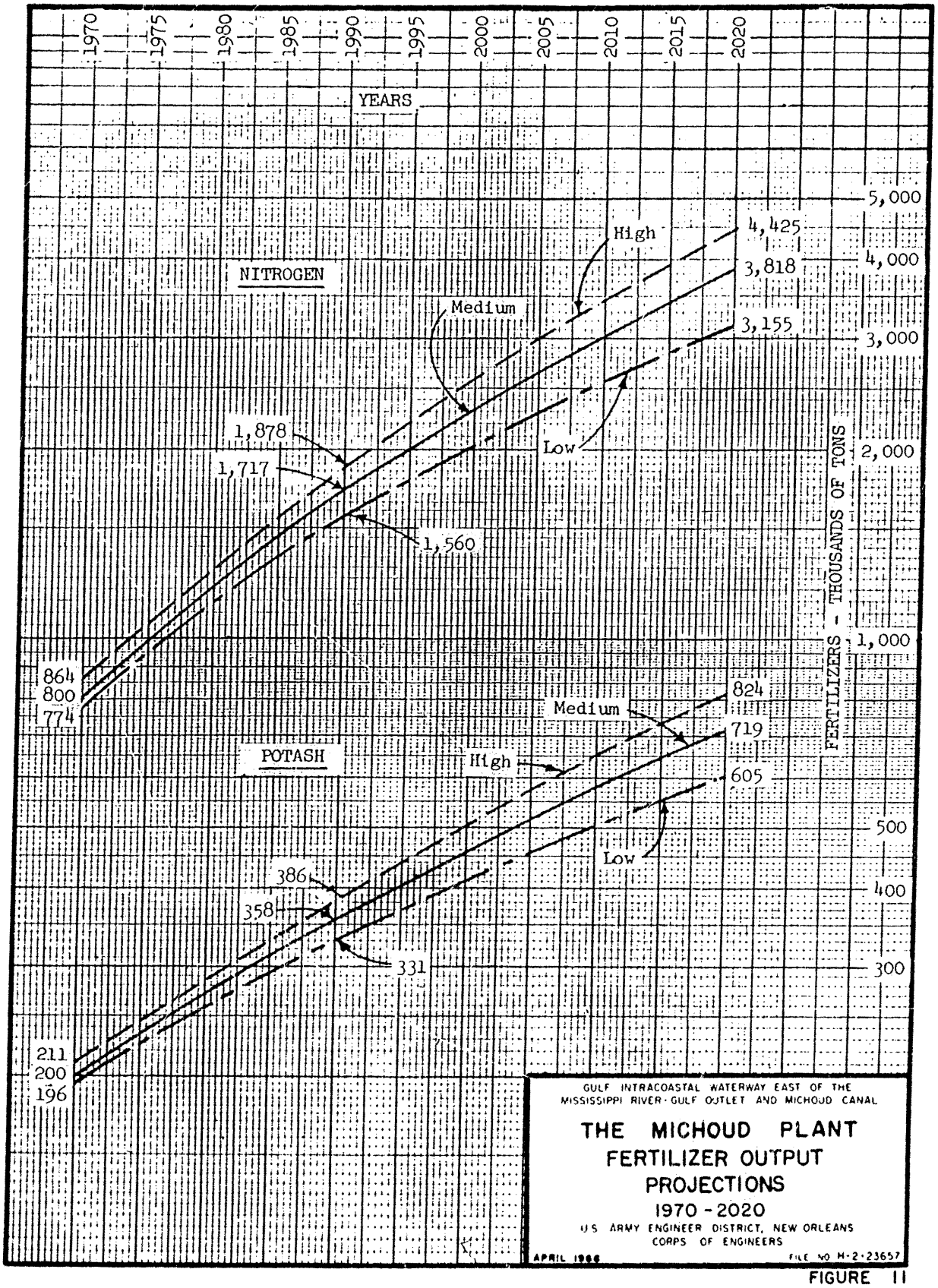

1970
1975
1980
1985
1990
1995
2000
2005
2010
2015
2020
YEARS
NITROGEN
High
Medium
Low
4,425
3,818
3,155
1,878
1,717
1,560
5,000
4,000
3,000
2,000
1,000
FERTILIZERS - THOUSANDS OF TONS
864
800
774
POTASH
Medium
High
Low
824
719
605
386
358
331
211
200
196
500
400
300
GULF INTRACOASTAL WATERWAY EAST OF THE MISSISSIPPI RIVER-GULF OUTLET AND MICHOUD CANAL
THE MICHOUD PLANT
FERTILIZER OUTPUT
PROJECTIONS
1970 - 2020
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
APRIL 1966
FILE NO. H-2-23657

FIGURE 11

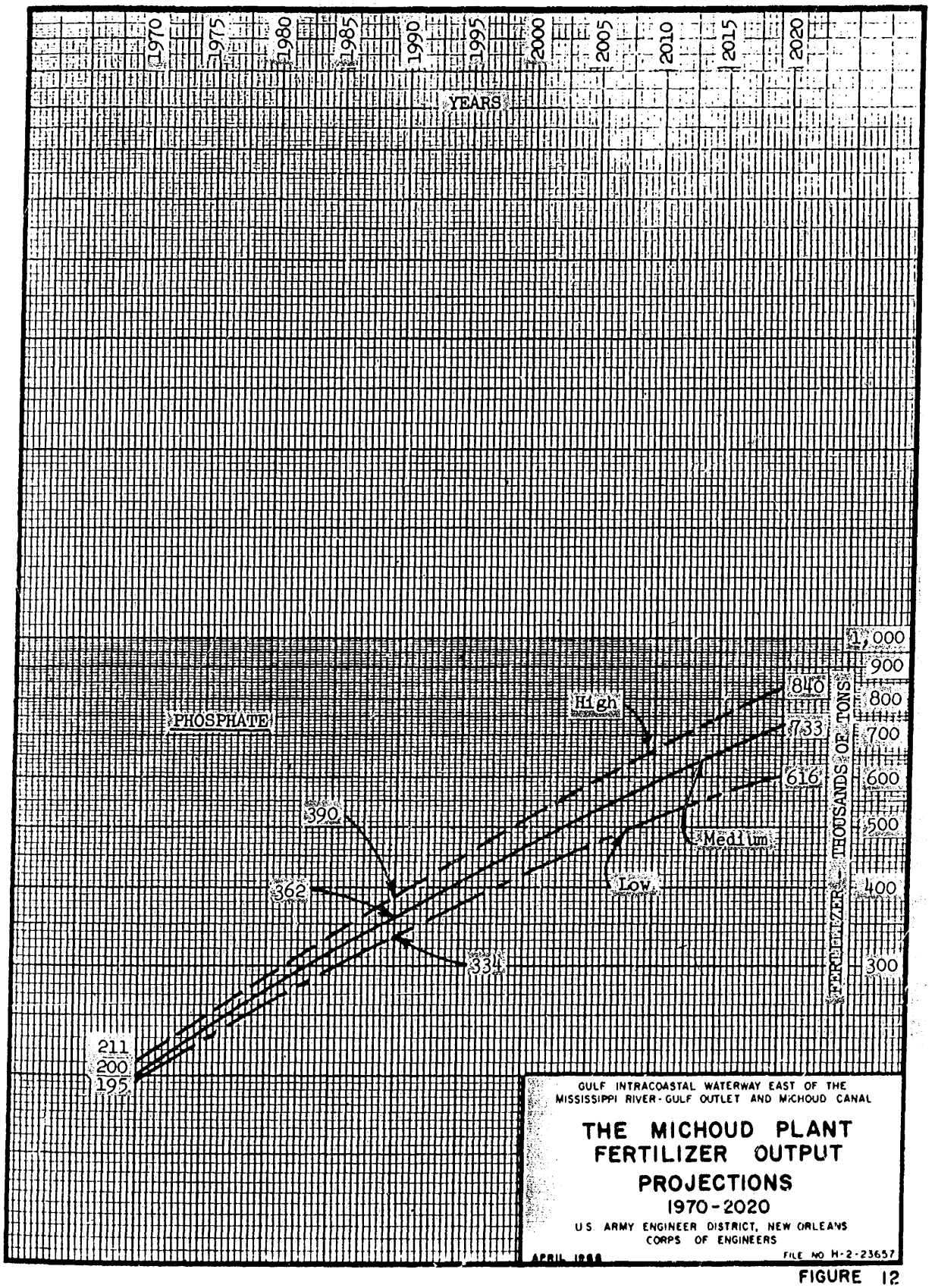


FIGURE 12

96-700 O-68--6

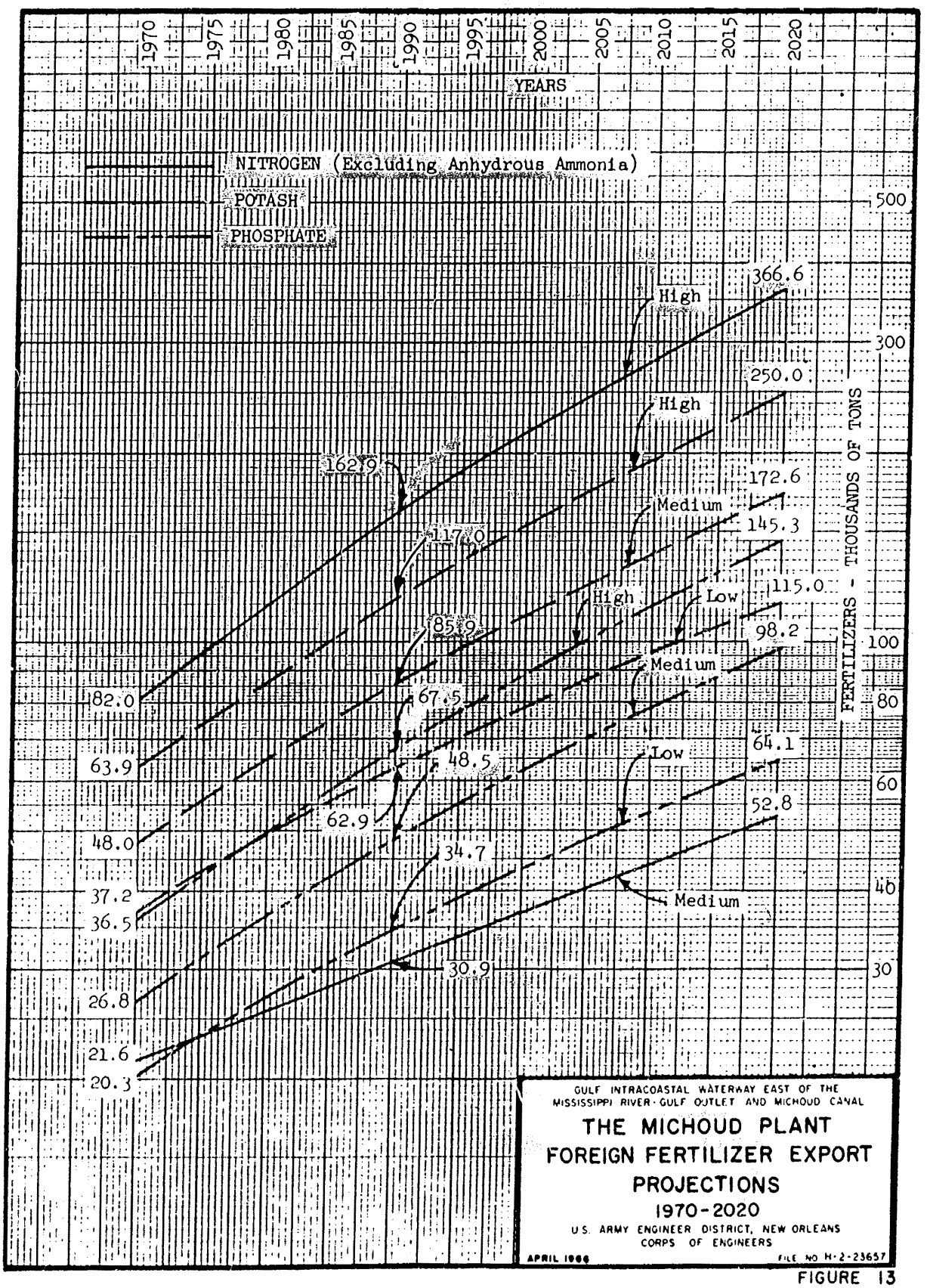

1970
1975
1980
1985
1990
1995
2000
2005
2010
2015
2020
YEARS
NITROGEN (Excluding Anhydrous Ammonia)
POTASH
PHOSPHATE
FERTILIZERS - THOUSANDS OF TONS
500
300
100
80
60
40
30
366.6
High
250.0
High
162.9
172.6
Medium
145.3
117.0
115.0
High
Low
85.9
98.2
Medium
82.0
67.5
64.1
Low
63.9
48.5
52.8
62.9
48.0
34.7
37.2
36.5
Medium
30.9
26.8
21.6
20.3
GULF INTRACOASTAL WATERWAY EAST OF THE MISSISSIPPI RIVER-GULF OUTLET AND MICHOUD CANAL
THE MICHOUD PLANT
FOREIGN FERTILIZER EXPORT PROJECTIONS
1970-2020
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
APRIL 1966
FILE NO H-2-23657

FIGURE 13

22. BULK FERTILIZER MOVEMENT (DRY)

a. In the event that the proposed project becomes a reality, the contemplated production of the other line of chemical fertilizers would bring about additional benefits that could be attributed to the project. It is considered that any movement of dry fertilizers from the Michoud plant would also be in shipments of 10,000 tons per ship.

b. In computing transportation savings for these commodities, the cost of such movements under improved conditions can be compared with the present cost for movements following the same procedure as set forth in paragraph 13.b. and shown in the following table:

TABLE 19

BULK FERTILIZER (DRY)
PRESENT COST OF MOVEMENT
(10,000 tons)

Barge operating costs/hour	$1.50			
Number of barges	5	$ 7.50		
Cost for tug/hour		25.00		
Total cost/hour		$32.50		
Required hours to load and move barges to ship		48	$1,560	
Cost to load 10,000 tons on barges @ $0.35/ton			3,500	
Total cost for loading and moving barges to ship			$5,060	
Total cost for loading ship and returning barges			5,060	$10,120
20% for contingencies				2,024
Total present costs				$12,144

With Improvements

With the ship channel in place the dry fertilizers, in bulk, could be loaded directly aboard the ship at the company's wharf in the Michoud Canal at a cost of $0.45 per ton for a total cost of $4,500.

Savings

Present transportation cost	$12,144
Cost with improvements in place	4,500
Total savings	$ 7,644 or $0.76/ton

23. NAVIGATION BENEFITS (OTHER FERTILIZERS)

The medium projections for the three types of fertilizer destined for foreign export by the industrial gas firm were combined, as shown in table 20 and figure 14, to compute the average annual benefits that could accrue over the 50-year period, 1970-2020. The average annual benefits, when brought to present worth and paid out over the 50-year period at an annual rate of 3-1/4 percent, amount to $131,000.

TABLE 20

COMBINED HIGH, MEDIUM, AND LOW PROJECTIONS OF FERTILIZER PRODUCTS EXPORTED FROM MICHOUD CANAL PLANT (EXCLUDING ANHYDROUS AMMONIA) 1970-2020

Year	Projected exports of fertilizer products (thousands of short tons)		
	High	Medium	Low
1970	182.4	96.4	57.5
1980	253.0	128.1	76.5
1990	347.4	165.3	97.6
2000	461.5	210.3	122.4
2010	598.7	262.2	149.9
2020	761.9	323.6	179.1

24. SUMMARY OF ALL NAVIGATION BENEFITS

The transportation savings accruing from foreign car imports, liquid fertilizer exports, and future dry fertilizer exports were based on their respective medium projections. The total average annual benefits, when brought to present worth and paid out over the period 1970-2020 at an annual rate of 3-1/4 percent are shown below:

Imported vehicles	$188,000
Anhydrous ammonia	176,000
Other fertilizers	131,000
Total average annual benefits	$495,000

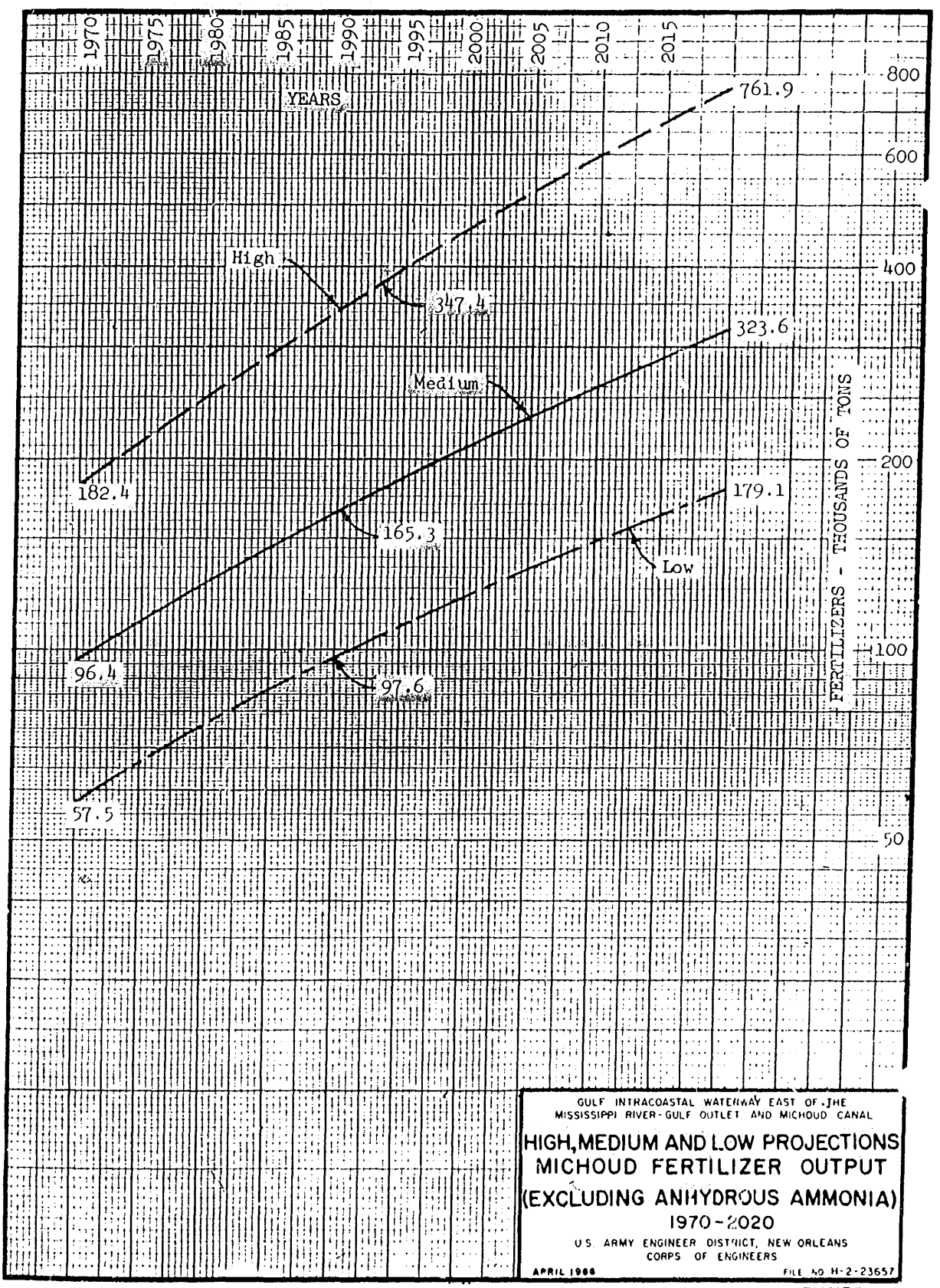

1970
1975
1980
1985
1990
1995
2000
2005
2010
2015
YEARS
800
600
400
200
100
50
FERTILIZERS - THOUSANDS OF TONS
761.9
High
347.4
323.6
Medium
182.4
165.3
179.1
Low
96.4
97.6
57.5
GULF INTRACOASTAL WATERWAY EAST OF THE
MISSISSIPPI RIVER-GULF OUTLET AND MICHOUD CANAL
HIGH, MEDIUM AND LOW PROJECTIONS
MICHOUD FERTILIZER OUTPUT
(EXCLUDING ANHYDROUS AMMONIA)
1970-2020
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
APRIL 1966
FILE NO. H-2-23657

FIGURE 14

REVIEW OF REPORTS
ON THE
GULF INTRACOASTAL WATERWAY EAST OF THE
MISSISSIPPI RIVER-GULF OUTLET AND MICHOUD CANAL, LOUISIANA

APPENDIX C

Comments of
Department of the Interior agencies
and the
Louisiana Wild Life and Fisheries Commission

APPENDIX C

REVIEW OF REPORTS
ON THE
GULF INTRACOASTAL WATERWAY EAST OF THE
MISSISSIPPI RIVER-GULF OUTLET AND MICHOUD CANAL, LOUISIANA

APPENDIX C

Comments of
Department of the Interior agencies
and the
Louisiana Wild Life and Fisheries Commission

TABLE OF CONTENTS

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE
PEACHTREE-SEVENTH BUILDING
ATLANTA, GEORGIA 30323

October 13, 1965

CE-LM-po

District Engineer
U. S. Army, Corps of Engineers
New Orleans, Louisiana

Dear Sir:

Pursuant to the Fish and Wildlife Coordination Act (48 Stat. 401, as amended, 16 U.S.C. 661 et seq.), the Bureau of Sport Fisheries and Wildlife, in cooperation with the Louisiana Wild Life and Fisheries Commission, has reviewed your proposed plan for navigation improvement of the Gulf Intracoastal Waterway east of the Mississippi River-Gulf Outlet and Michaud Canal in Orleans Parish, Louisiana. Your study of this project was undertaken in response to a resolution by the Senate Committee on Public Works, adopted June 9, 1964.

Information obtained from your letter of February 25, 1965, and subsequent conferences with members of your staff indicate that the plan being considered will involve enlargement of the Gulf Intracoastal Waterway eastward from its junction with the Mississippi River-Gulf Outlet for a distance of 6.4 miles, enlargement of the adjoining Michaud Canal, and the excavation of turning basins at the north end of Michaud Canal and at the east end of construction on the Intracoastal Waterway. New channel dimensions will be 36 by 250 feet, the depth being equal to that of the Mississippi River-Gulf Outlet.

Lands north of the reach of the Intracoastal Waterway to be enlarged and adjacent to the Michaud Canal are leveed for industrial development. Lands south of the Intracoastal Waterway, however, are undeveloped marshes extending to the shore of Lake Borgne. In these marshlands, important fish and wildlife values still exist. Waterfowl, in particular, make significant use of the wetland habitat.

Enlargement of the Intracoastal Waterway and Michaud Canal, as planned, is expected to have little effect on fish and wildlife provided that marshlands south of the Intracoastal Waterway are not utilized for spoil disposal. If spoil can be placed on or behind the existing levees in the industrial area, loss of wildlife habitat will be minimized and the problems created by spoil deposition on wetland sites avoided. The Bureau, therefore, recommends that spoil be deposited only on the north side of the waterway.

This report has been reviewed and concurred in by the Bureau of Commercial Fisheries and the Louisiana Wild Life and Fisheries Commission. A copy of Director Hair's letter is attached.

In the event your plans for this project are significantly modified from those considered herein, we request an opportunity for further review and study of the changes made.

Sincerely yours,

W. L. Towns

W. L. Towns
Acting Regional Director

Attachment

LOUISIANA WILD LIFE AND FISHERIES COMMISSION
CAPITOL STATION
BATON ROUGE, LOUISIANA 70804

October 4, 1965

Mr. W. L. Towns
Associate Regional Director
Bureau of Sport Fisheries and Wildlife
Peachtree-Seventh Building
Atlanta, Georgia 30323

Dear Mr. Towns:

Reference is made to your letter of September 30, 1965, and enclosed report concerning the Mississippi River-Gulf Outlet and Michoud Canal Project in Orleans Parish, Louisiana.

This report has been reviewed and is very similar to my letter written to the District Engineer on September 20, 1965, regarding this project. We do not have any further comments to make regarding this project and acknowledge and concur in the recommendations contained in your report.

Sincerely,

J. D. Hair, Jr.
Director

JDHJr/ds

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE
PEACHTREE-SEVENTH BUILDING
ATLANTA, GEORGIA 30323

November 17, 1967

District Engineer
U. S. Army, Corps of Engineers
P. O. Box 60267
New Orleans, Louisiana 70160

Dear Sir:

This is in reply to your letter of October 23, 1967, transmitting draft copies of the report on Gulf Intracoastal Waterway East of the Mississippi River-Gulf Outlet and Michoud Canal. We have reviewed the report draft and would like to offer the following comments.

Paragraph 16a(2) of the recommended plan of improvement of the draft report states, in part, that "The excavated materials can be placed in spoil areas south of the Gulf Intracoastal Waterway or other undeveloped areas provided by the local assuring agency. Additional costs would be required for handling waste waters if the material is placed in the presently protected areas."

Our Bureau's report of October 13, 1965, recommended that spoil be deposited only on the north side of the waterway. The reason for this proposal was to minimize or prevent damage to existing fish and wildlife resources in the industrially undeveloped marshes south of the Intracoastal Waterway. The Louisiana Wild Life and Fisheries Commission supported the recommendation, evidenced by their letter of concurrence, dated September 20, 1967, attached to our report, in which they specifically requested "...spoil material ... be placed on the north bank."

The Bureau, therefore, feels that some additional project cost of placing spoil in protected areas north of the waterway would be justified to avoid damage to fish and wildlife. The report does not indicate the amount of additional costs involved, but it is known that important fish and wildlife resources depend on the natural marsh south of the waterway. Any loss of habitat in this area would be irreplaceable. We hope that this feature can be given further consideration during future project planning.

We appreciate the opportunity to provide these comments on the draft of your report.

Sincerely yours,

C. Edward Carlson

C. Edward Carlson
Regional Director

UNITED STATES
DEPARTMENT OF THE INTERIOR
FEDERAL WATER POLLUTION CONTROL ADMINISTRATION
South Central Region
1114 Commerce Street
Dallas, Texas 75202

November 14, 1967

Your reference:
LMNED-PR

District Engineer
U.S. Army Engineer District, New Orleans
P. O. Box 60267
New Orleans, Louisiana 70160

Dear Sir:

Reference is made to your letter of October 23, 1967 concerning the "Gulf Intracoastal Waterway East of the Mississippi River-Gulf Outlet and the Michoud Canal."

The draft of this report has been reviewed by this office and since the proposed project is the enlargement of existing intracoastal waterways and canals, this office has no input in relation to water quality control storage. However, in the actual construction of these enlargements, care should be exercised in the disposal of spoil so that sediment in the existing waterways will be held to a minimum. It is pointed out that the provisions of Executive Order 11288 are to be complied with.

Sincerely yours,

William C. Galegar

WILLIAM C. GALEGAR
Regional Director

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF OUTDOOR RECREATION
SOUTHEAST REGIONAL OFFICE
810 NEW WALTON BUILDING
ATLANTA, GEORGIA 30303

IN REPLY REFER TO:

October 27, 1967

District Engineer
U.S. Army Engineer District, New Orleans
Post Office Box 60267
New Orleans, Louisiana 70160

Dear Sir:

We have reviewed your proposed plan for navigation improvement of the Gulf Intracoastal Waterway East of the Mississippi River-Gulf Outlet and Michoud Canal in Orleans Parish, Louisiana.

This project is of no significance to outdoor recreation; therefore, we have no comments to make concerning the project.

In the event your plans for this project are modified significantly, we request an opportunity for further review.

Sincerely yours,

Jerome F. Anderson
Regional Director

By

Acting

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

AREA IV
Mineral Resource Office

ROOM 206 FEDERAL BUILDING
BARTLESVILLE, OKLAHOMA 74001

November 27, 1967

Refer to: LMNED-PR

Colonel Thomas J. Bowen, District Engineer
U.S. Army Corps of Engineers
New Orleans District
Post Office Box 60267
New Orleans, Louisiana 70160

Dear Colonel Bowen:

We have reviewed the draft of the "Review of Reports on the Gulf Intracoastal Waterway East of the Mississippi River-Gulf Outlet and the Michoud Canal."

The project would have no adverse effect on the mineral industry of the area. Supplies of raw materials should be adequate to meet projected requirements of the plants producing nitrogenous, potash, and phosphate fertilizers.

The Bureau of Mines Area IV Mineral Resource Office has no objections to the proposed work. No field examination was made.

Sincerely yours,

F. D. Everett
Acting Area Director

IN REPLY REFER TO

UNITED STATES
DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY
Water Resources Division
6554 Florida Blvd.
Baton Rouge, Louisiana 70806

November 3, 1967

Mr. Thomas J. Bowen, Colonel, CE
Department of the Army
New Orleans District, Corps of Engineers
P. O. Box 60267
New Orleans, Louisiana 70160

Dear Mr. Bowen:

We have reviewed the draft of the report "Review of Reports on the Gulf Intracoastal Waterway East of the Mississippi River - Gulf Outlet and the Michoud Canal." This project will not affect our operations and we have no comments to offer. Thank you for the opportunity to make this review.

Sincerely,

FOR THE DISTRICT CHIEF

Vernon B. Sauer

Vernon B. Sauer
Hydrologist

cc: Regional Hydrologist
St. Louis, Missouri

VBS:bv

96-700 O-68-7

REVIEW OF REPORTS
ON THE
GULF INTRACOASTAL WATERWAY EAST OF THE
MISSISSIPPI RIVER-GULF OUTLET AND MICHOUD CANAL, LOUISIANA

APPENDIX D

Comments of the
Board of Commissioners of the
Port of New Orleans

BOARD OF COMMISSIONERS OF THE PORT OF NEW ORLEANS
(AN AGENCY OF THE STATE OF LOUISIANA)

W. J. AMOSS
DIRECTOR OF THE PORT

GEORGE S. DINWIDDIE, PRESIDENT
J. MELTON GARRETT, VICE PRESIDENT
ROBERT R. BARKERDING, SR., SECRETARY
JOSEPH S. D'ANTONI, M.D., TREASURER
HARRY X. KELLY, CHAIRMAN FINANCE COMMITTEE

POST OFFICE BOX 60046
NEW ORLEANS, LA. 70160

October 19, 1967

District Engineer
New Orleans District, Corps of Engineers
Department of the Army
P.O. Box 60267
New Orleans, La. 70160

Dear Sir:

Reference is made to your letter of April 7, 1966, File LMNED-PR, concerning proposed navigation improvements on the Gulf Intracoastal Waterway east of the Mississippi River-Gulf Outlet and the Michoud Canal, in accordance with the proposed plan of improvement and local cooperation therefor as shown on the drawings and statement enclosed with your letter.

You have requested that this Board review the proposed plan of improvement and local cooperation and furnish to your office, for attachment to your report as an appendix, a statement on the suitability of the proposed plan and on this Board's willingness to provide the local cooperation should a project be authorized by Congress. I am pleased to inform you that this Board, at its regular meeting held on Friday, October 13, 1967, considered this matter and adopted a resolution certified copies of which are enclosed herewith in triplicate.

In accordance with the resolution, this Board approves the suitability of the plan of improvement as shown on the drawings entitled "Gulf Intracoastal Waterway East of the Mississippi River-Gulf Outlet and the Michoud Canal," File No. H-2-23657, Plates 1 and 2, and further indicates its ability and willingness to provide the proposed local cooperation should a project be authorized by Congress. It is believed that the statement

of this Board by its resolution is entirely responsive to your requirements as set forth in the aforesaid letter of April 7, 1966. If such should not be the case, please advise this office of your additional requirements and we shall undertake to satisfy them.

It is regretted that a delay in furnishing the required statement of this Board has been necessary to coordinate details of the proposed project with other local interests. Your cooperation and indulgence in this matter are appreciated.

Very truly yours,

W. J. Amoss
Director of the Port

Encls. -
Resolution in triplicate

cc: Director
Department of Public Works
State of Louisiana
Baton Rouge, La.
(w/cy. encl.)

Mr. J. B. Ferguson, II
902 Whitney Building
New Orleans, La. 70112
(w/cy. encl.)

CERTIFICATION

I, EMERO S. STIEGMAN, Assistant Secretary of the BOARD OF COMMISSIONERS OF THE PORT OF NEW ORLEANS, do hereby certify that the following is a true and correct extract from the minutes of the Board adopted at a regular meeting held in the City of New Orleans, State of Louisiana, on October 13, 1967:

> "WHEREAS, the District Engineer, New Orleans District, Corps of Engineers, in accordance with a Resolution by the Committee on Public Works of the United States Senate, adopted June 9, 1964, has completed studies and is preparing a report recommending favorably certain proposed waterway improvements to provide ship channels in the Gulf Intracoastal Waterway east of the Mississippi River-Gulf Outlet and in the Michoud Canal, both of which are located in the Parish of Orleans, State of Louisiana, in accordance with a plan which will provide deepwater transportation to the lands and properties abutting said waterways, all as generally delineated on plats prepared by the Office of the District Engineer, New Orleans, entitled 'Gulf Intracoastal Waterway East of the Mississippi River-Gulf Outlet and the Michoud Canal,' File No. H-2-23657, consisting of two plates, Plate 1 being further entitled 'General Map,' and Plate 2 being further entitled 'Profile and Typical Sections,' respectively, annexed hereto and made a part hereof, marked for identification herewith EXHIBIT 'A', which undertaking is hereinafter sometimes referred to as 'project'; and
>
> "WHEREAS, favorable consideration by the Chief of Engineers, and ultimate authorization of the proposed waterway improvements and appropriation of funds for construction and maintenance thereof by the Congress of the United States, require that a responsible local agency pass on the suitability of the plan of waterway improvements and furnish a statement of willingness and ability to provide the following assurances of local cooperation:
>
> a. Provide without cost to the United States all lands, easements, and rights-of-way required for construction and subsequent maintenance of the project, including suitable areas determined by the Chief of Engineers to be required in the general public interest for initial and subsequent disposal of spoil.

b. Accomplish without cost to the United States such utility or other relocations or alterations as necessary for project purposes.

c. Hold and save the United States free from damages due to the construction and subsequent maintenance of the project, including any erosion beyond the right-of-way furnished.

d. Provide, maintain, and operate without cost to the United States adequate public wharf facilities on the Michoud Canal open to all on equal terms in accordance with plans approved by the Chief of Engineers; and

"WHEREAS, Board of Commissioners of the Port of New Orleans, an agency of the State of Louisiana, is authorized and empowered under the Laws of the State of Louisiana, to give the required assurances of local cooperation and is financially able to perform in accord with the requirements of such assurances; and

"WHEREAS, the plan for the construction of the proposed waterway improvements as delineated on the said plats of the Office of the District Engineer, New Orleans, is considered suitable to provide ship channels in the Gulf Intracoastal Waterway east of the Mississippi River-Gulf Outlet and in the Michoud Canal; and

"WHEREAS, the construction of said waterway improvements will be of great value to the State of Louisiana, the City and Port of New Orleans, other local interests and owners of the lands and properties abutting said waterways;

"NOW, THEREFORE, BE IT RESOLVED, by Board of Commissioners of the Port of New Orleans that Board of Commissioners of the Port of New Orleans, an agency of the State of Louisiana, is willing and able to provide the aforesaid assurances of local cooperation should the project be authorized by the Congress of the United States; and

"BE IT FURTHER RESOLVED, that the proposed plan of waterway improvements as generally delineated on said two plats prepared by the Office of the District Engineer, New Orleans, be and it is hereby approved by Board of Commissioners of the Port of New Orleans; and

"BE IT FURTHER RESOLVED, that W. J. Amoss, Director of the Port, be and he is hereby authorized to sign, execute and deliver to the Corps of Engineers a statement in such form and containing such provisions not inconsistent with the foregoing as in the sole discretion of said Director of the Port shall seem proper, evidencing the willingness and ability of the Board of Commissioners of the Port of New Orleans to provide the required assurances of local cooperation and indicating the suitability of the proposed plan of waterway improvements, this Board authorizing and ratifying, and agreeing to authorize and ratify, all that said Director of the Port has done or shall do to effectuate the intent of this resolution."

Witness my hand and the seal of this Board, on this 19th day of October, 1967.

Assistant Secretary
BOARD OF COMMISSIONERS OF THE
PORT OF NEW ORLEANS

REVIEW OF REPORTS
ON THE
GULF INTRACOASTAL WATERWAY EAST OF THE
MISSISSIPPI RIVER-GULF OUTLET AND THE MICHOUD CANAL

ATTACHMENT

Information Called for by
Senate Resolution 148, 85th Congress,
Adopted 28 January 1958

ATTACHMENT

REVIEW OF REPORTS
ON THE
GULF INTRACOASTAL WATERWAY EAST OF THE
MISSISSIPPI RIVER-GULF OUTLET AND THE MICHOUD CANAL

Information Called for by
Senate Resolution 148, 85th Congress
Adopted 28 January 1958

1. PROJECT DESCRIPTION AND ECONOMIC LIFE

The improvement under consideration consists of enlargement of the existing channels of the Gulf Intracoastal Waterway and Michoud Canal to provide a channel 36 feet deep over a bottom width of 250 feet from the Mississippi River-Gulf Outlet to the north end of the Michoud Canal. A project life of 50 years has been used for economic evaluation.

2. PROJECT COSTS AND ANNUAL CHARGES

a. First costs. The first costs of the improvement, based on 1967 prices for similar work, are $1,320,000 Federal (includes $20,000 for aids to navigation (U. S. Coast Guard)) and $43,000 non-Federal for a total first cost of $1,363,000. Details of the cost estimate are shown in paragraph 19 and appendix B of the report.

b. Annual charges. The estimated annual charges, based on a 3-1/4 percent interest rate, are (see paragraph 20 and appendix B of the report for details):

	Estimated annual charges		
	Federal[1]	Non-Federal	Total
50-year life	$68,100	$1,800	$69,900
100-year life	59,000	1,500	60,500

[1] Includes $1,500 for maintenance of navigation aids (U. S. Coast Guard).

3. BENEFITS

The estimated benefits consist of transportation savings which might accrue from the proposed improvement. The benefits on anhydrous ammonia and other fertilizers are considered as accruing uniformly throughout the 50- and 100-year lives of the project. The benefits from imported vehicles accrue uniformly until 1985, at which time the capacity of the facility is reached. From 1985 to the remaining years

in the 50- and 100-year lives, the annual savings remain constant. The estimated benefits are as follows:

Source of benefit	Average annual benefits 50 years	100 years
Imported vehicles	$188,000	$197,000
Anhydrous ammonia	176,000	252,000
Other fertilizers	131,000	171,000
Total average annual benefits	$495,000	$620,000

4. BENEFIT-COST RATIOS

The benefit-cost ratios calculated for a 50- and 100-year project life are 7.1 to 1 and 10.2 to 1, respectively.

5. PHYSICAL FEASIBILITY AND COST OF PROVIDING FOR FUTURE NEEDS

The proposed improvement will provide for all current and future uses that may reasonably be anticipated to develop on the improved channels during the useful life of the project works. The ship channel can be extended eastward along the Gulf Intracoastal Waterway at any time the need therefor develops.

6. APPORTIONMENT OF COSTS

All benefits to be derived from the proposed improvement are considered to be general in nature. The entire first cost of construction has been apportioned to the Federal Government.

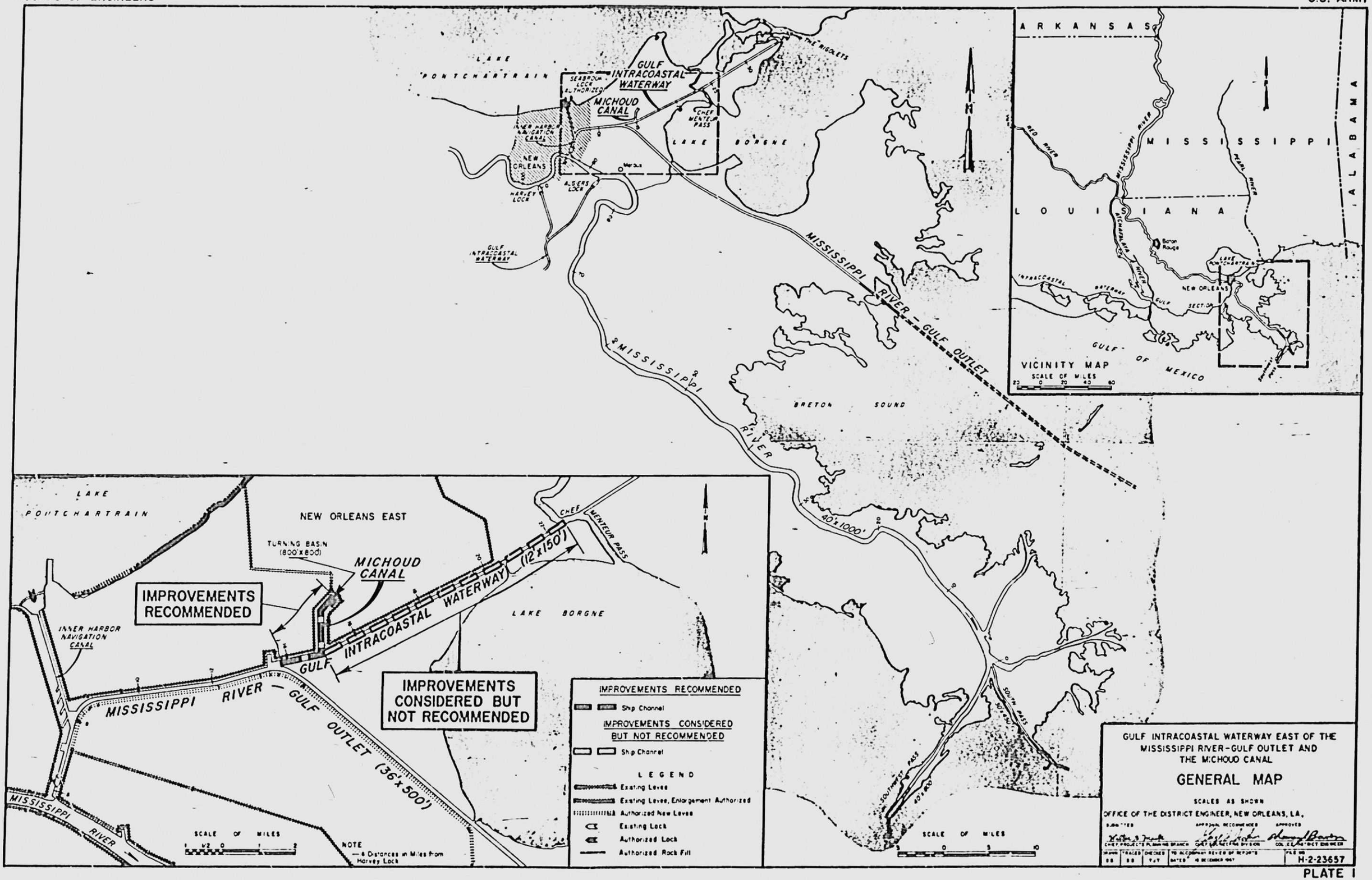
7. EXTENT OF INTEREST IN THE PROJECT

The proposed project has the support of industry on the Michoud Canal and the Board of Commissioners of the Port of New Orleans, a state agency administering port facilities in the New Orleans area. This agency has agreed to provide the local cooperation should a project be authorized. The U. S. Fish and Wildlife Service and the Louisiana Wild Life and Fisheries Commission are concerned about the possible loss to wildlife values if the spoil is not confined and from placement of spoil on the lands south of the Gulf Intracoastal Waterway. Plans have been reached in conferences with the sponsoring agency for spoil areas north of the Gulf Intracoastal Waterway and east of the Michoud Canal, and spoil areas previously used for the Mississippi River-Gulf Outlet. Comments of interested Federal agencies and the Louisiana Wild Life and Fisheries Commission are attached to the report in appendix C.

8. EFFECTS ON STATE AND LOCAL GOVERNMENTS

The increase in number of sites having deepwater frontage resulting from construction of the project will probably increase land values and

tax revenues in the area. The study area is already a rapidly growing one and a deepwater channel will attract additional industry as well as speed up residential and small business development in nearby areas. Such developments will require additional improvements, such as roads, sewerage, water, schools, and other service facilities.


LAKE PONTCHARTRAIN
GULF INTRACOASTAL WATERWAY
MICHOUD CANAL
SEABROOK LOCK AUTHORIZED
INNER HARBOR NAVIGATION CANAL
NEW ORLEANS
HARVEY LOCK
ALGIERS LOCK
GULF INTRACOASTAL WATERWAY
CHEF MENTEUR PASS
LAKE BORGNE
THE NIGOLETS
MISSISSIPPI RIVER - GULF OUTLET
MISSISSIPPI RIVER
BRETON SOUND
40'x1000'
SOUTH PASS
SOUTHWEST PASS
40'x800'
SCALE OF MILES
ARKANSAS
MISSISSIPPI
ALABAMA
LOUISIANA
RED RIVER
MISSISSIPPI RIVER
PEARL RIVER
Baton Rouge
NEW ORLEANS
GULF OF MEXICO
VICINITY MAP
SCALE OF MILES
NEW ORLEANS EAST
TURNING BASIN (800'x800')
MICHOUD CANAL
IMPROVEMENTS RECOMMENDED
INNER HARBOR NAVIGATION CANAL
GULF INTRACOASTAL WATERWAY (12'x150')
CHEF MENTEUR PASS
LAKE BORGNE
IMPROVEMENTS CONSIDERED BUT NOT RECOMMENDED
MISSISSIPPI RIVER - GULF OUTLET (36'x500')
MISSISSIPPI RIVER
SCALE OF MILES
NOTE — Distances in Miles from Harvey Lock
IMPROVEMENTS RECOMMENDED
Ship Channel
IMPROVEMENTS CONSIDERED BUT NOT RECOMMENDED
Ship Channel
LEGEND
Existing Levee
Existing Levee, Enlargement Authorized
Authorized New Levee
Existing Lock
Authorized Lock
Authorized Rock Fill
GULF INTRACOASTAL WATERWAY EAST OF THE MISSISSIPPI RIVER-GULF OUTLET AND THE MICHOUD CANAL
GENERAL MAP
SCALES AS SHOWN
OFFICE OF THE DISTRICT ENGINEER, NEW ORLEANS, LA.
SUBMITTED
APPROVAL RECOMMENDED
APPROVED
CHIEF PROJECTS PLANNING BRANCH
CHIEF ENGINEERING DIVISION
COL. C.E. DISTRICT ENGINEER
DRAWN
TRACED
CHECKED
TO ACCOMPANY REVISED REPORT DATED 16 DECEMBER 1967
FILE NO.
H-2-23657