

THE RELATIONSHIP OF WATER RESOURCES
TO
THE INDUSTRIAL DEVELOPMENT
OF
JACKSON COUNTY, MISSISSIPPI

by

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INTRODUCTION

Historically, the Pascagoula-Moss Point Area of Jackson County, Mississippi has been closely related to the sea. This is, of course, typical of coastal areas. For more than two centuries, shipbuilding has been a primary basic industry of the area. Forest products and fishing have also played a major role in the area's economy for many years.

The Shipyard at Pascagoula was one of the first Mississippi BAWI projects. The World War II demand for shallow draft vessels and landing ships, coupled with the Shipyard's advanced technology in the production of all welded ships, brought prosperity and a booming economy during the war years.

The increasing trend toward deeper draft ocean going vessels, which began immediately after World War II, left the Pascagoula Shipyard in a rather non-competitive position due to limitations imposed by the Pascagoula Ship Channel with its maintained depth of only 22 feet. Reacting to the resultant curtailment in the economy of the area, Jackson County and the State of Mississippi jointly appropriated funds in the amount of \$750,000 to enable deepening of the Pascagoula Channel to 30 feet below mean low water. This project was accomplished in 1949 by the U. S. Army Corps of Engineers, Mobile District.

Taking advantage of its new competitive position, the Shipyard was immediately successful in obtaining new contracts for the construction of deeper draft vessels. However, it was soon determined that efforts by local leaders to secure Federal maintenance of the newly deepened channel would not be successful, because, ironically, the Federal Government, in its conventional cost-benefit evaluations, did not consider newly constructed ships as beneficial tonnage or commerce.

Thus, in the early 1950's the future of Pascagoula as a Port and Industrial City looked rather dim. The primary foreign commerce through the Port consisted of approximately 30,000 tons (per year) of mahogany logs which were imported from South America by tramp steamers for the Pascagoula Veneer Company. The logs were dumped into the river south of the L & N Railroad Bridge, and rafted for towing upstream to the plant site.

Even though the Pascagoula Shipyard was at that time the largest single industry in the State, with an annual payroll of approximately

\$20,000,000, fluctuations in its contract type work load and its insecure future caused a rather unstable economy to exist in the Pascagoula area.

Moss Point, at that time as it does today, enjoyed a good economic base from the huge International Paper Mill. Fish meal and other menhaden industries also contributed to the economy of Moss Point; however, the area did not possess a base for major potential growth.

The unprecedented and somewhat paradoxical rush to the waterways by United States industry immediately after World War II, as reflected by the tremendous industrialization of the Mississippi River between New Orleans and Baton Rouge, accelerated the awareness of Jackson County leaders of the County's great potential for growth through industrial development. In the early 1950's, Jackson County conducted an aggressive industrial promotion campaign; however, such efforts were plagued by the "chicken or the egg" dilemma in that industry simply would not select the Port of Pascagoula as a new plant site based on a promise of deep water port facilities.

In a determined effort to provide the deep water harbor facilities vital to the development of the area, the Jackson County Board of Supervisors and the County Legislative Delegation succeeded in obtaining the passage of local and private legislation during the 1954 Session of the Mississippi Legislature which enabled Jackson County to appropriate and spend funds in the amount of \$2,000,000 for the development of the area known as Bayou Casotte. Pursuant to such legislation, the voters of Jackson County, Mississippi approved the \$2,000,000 bond issue by a 13 to 1 margin. Such action marked the end of the "Shallow Draft Era" of the Port of Pascagoula and the beginning of a dramatic Industrial Development Program, which is the subject of this paper.

It is considered most noteworthy that the basic natural resources on which Jackson County planned its development program were:

1. Close and economical proximity to the deep water shipping lanes of the Gulf of Mexico.
2. An abundant supply of fresh water to meet the needs of industry.
3. An abundant supply of vacant land area suitable for reclamation for industrial purposes.
4. Dedicated and enthusiastic leadership.

THE BAYOU CASOTTE HARBOR AND INDUSTRIAL AREA

In May, 1955, the Board of Supervisors of Jackson County, Mississippi entered into a contract with Michael Baker, Jr., Inc. for engineering services in connection with the master planning, promotion and development of the Bayou Casotte Harbor and Industrial Area. (Through subsequent contracts, this Owner-Engineer relationship continues to exist, fourteen years later.)

Bayou Casotte, which is located three miles east of the Pascagoula River, was at that time a sleepy bayou with a small channel approximately 20 feet in width, dredged to a depth of 3 or 4 feet to provide for navigation by shrimp boats and crab fishermen. Its close proximity to the existing Pascagoula Ship Channel and the thousands of acres of contiguous vacant land were evidence of the good judgment of the Board of Supervisors in selecting the area for development.

Planning and design criteria adopted for the project included a minimum depth of 30 feet below mean low water with enforced regulations to permit future deepening to 42 feet without costly modifications to waterside structures; and channel and turning basin widths which exceeded that of neighboring ports to facilitate operations by anticipated larger ships.

The Access Channel was planned as an almost straight extension of the existing North-South Pascagoula Channel from Horn Island Pass to afford efficient operations by ships at a minimum travel time. An angular entrance channel was planned in order to take maximum advantage of the natural protection against storms and hurricanes. The Master Plan also provides a widened inner channel to minimize adverse effects of ships' wake in the harbor.

Implementation of the Bayou Casotte Master Plan began in 1956 with the acquisition of approximately 7,000 acres of land by Jackson County. In 1957, approximately 12,000,000 cubic yards of earth were excavated by hydraulic dredging methods to create the harbor. To the extent feasible, spoils from the dredging operations were utilized to reclaim hundreds of acres of adjacent marsh lands for industrial purposes.

The basic increments and dimensions of the initial Bayou Casotte project were as follows:

Channels and Harbor

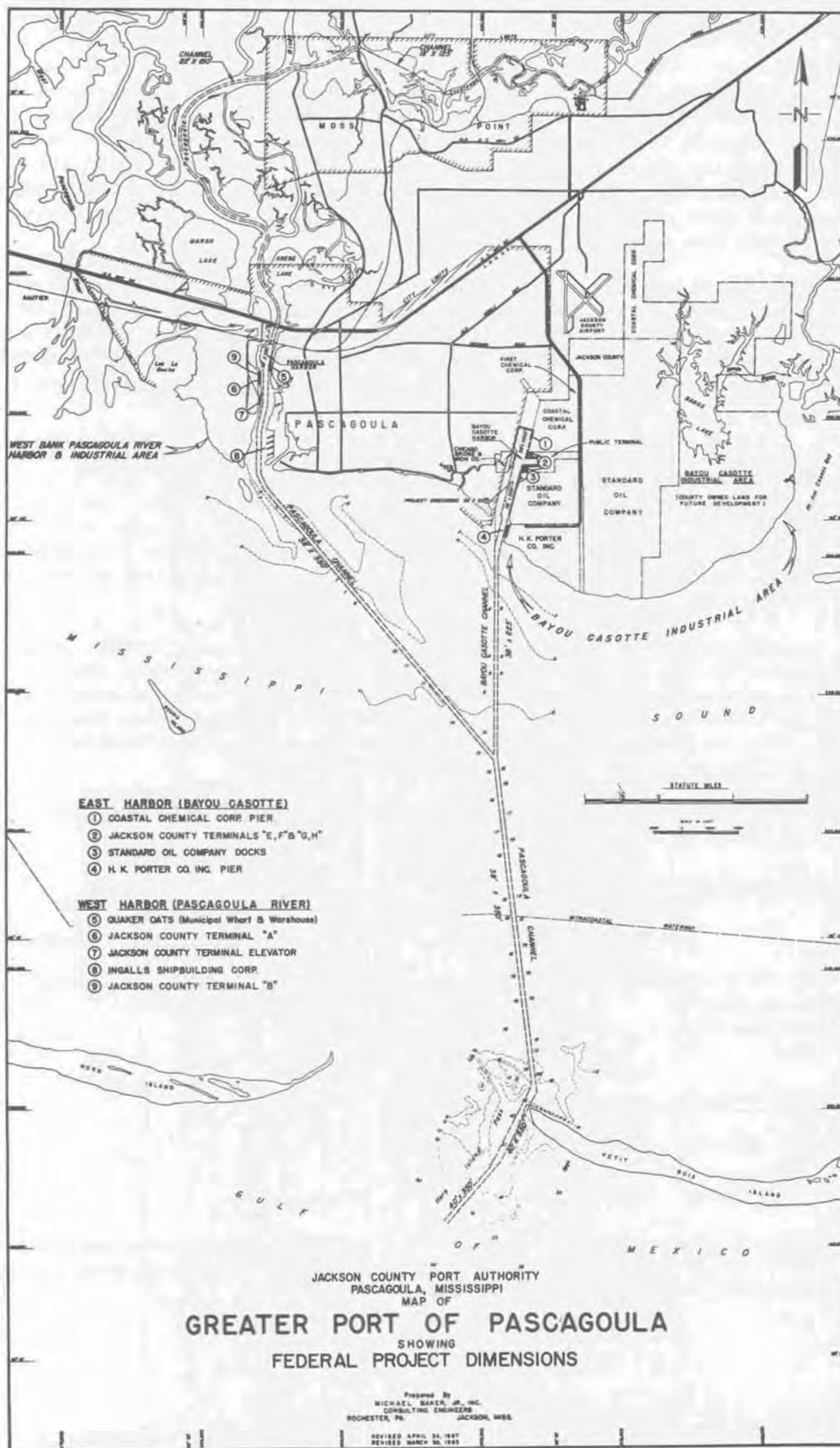
	<u>Bottom Width</u>	<u>Depth</u>	<u>Side Slope</u>	<u>Length</u>
Access Channel	225 ft.	30 ft. MSL	5:1	17,500 ft.
Inner Channel	400 ft.	30 ft. MSL	Composite	5,200 ft.
Turning Basin	1000 ft.	30 ft. MSL	3:1	1,400 ft.
Slip	400 ft.	30 ft. MSL	3:1	700 ft.

Land Area for Industrial Development: 5,000 Acres

Rail Spur: 7 Miles

Access Road: 7 Miles

Through 1962 a total of more than 5.5 million dollars were expended to provide the transportation facilities and utilities necessary to support the industrial development, as follows:



Jackson County Expenditures

Land Acquisition	\$ 501,000	
Harbor and Channel Dredging	2,000,000	
Grading and Drainage	<u>350,000</u>	
		\$2,851,000

Public Utilities and State Expenditures

Mississippi State Highway Department	248,000	
Mississippi Power Company	1,160,000	
United Gas Pipe Line Company	1,100,000	
L & N Railroad Company	245,000	
Southern Bell Telephone Company	<u>40,000</u>	
		2,793,000
Total		\$5,644,000

Response by Industry to the Bayou Casotte Harbor and Industrial Area was immediate and enthusiastic. The Coastal Chemical Corporation of Mississippi took options on several hundred acres of land prior to the award of the dredging contract. The H. K. Porter Company of Pittsburgh, Pennsylvania also recognized the unique advantages of the new industrial area with deep water frontage and commenced construction of its Refractory Plant on a 400 acre site prior to completion of the harbor dredging in 1957.

Fulfillment of the planning and development objectives and assurance of the unquestionable success of the development were achieved upon the announcement by Standard Oil Company of Kentucky in 1961 that it had selected Bayou Casotte as the site of its new \$125,000,000 refinery.

The availability of deep water transportation facilities was the dominant factor in the selection of Bayou Casotte by all of these initial industrial occupants. However, now that a Chemical-Petro-chemical-Petroleum Industrial Complex has been established, the availability of by-products and many other physical and economic factors will exert a strong positive influence on the continued growth of the Industrial Area.

In the early days of the Bayou Casotte Development, when the only inhabitants of the area were scrub cattle and mosquitoes, the slogan "Mississippi's Industrial Frontier" was adopted for promotional purposes. That the area is no longer a "Frontier," and is, indeed, an established industrial complex is evidenced by the following listing of industries in the Bayou Casotte Area and products which they manufacture.

IndustryProduct

Chevron Chemical Company

Para-xylene

Coastal Chemical Corporation

Sulphuric Acid
 Phosphoric Acid
 Chemical Fertilizer
 Anhydrous Ammonia

<u>Industry</u>	<u>Product</u>
First Chemical Corporation	Aniline and other Petro-chemicals
Standard Oil Company	Gasolines, Kerosene, Diesel Oil, Fuel Oil and Anhydrous Ammonia
H. K. Porter Company	Refractory Products
Chicago Bridge & Iron Company	Off-shore Drilling Equipment and Metal Fabricating
Lips, Inc.	Ship Propellers

The sale of land to industries has largely offset the County's investment of public funds in the Harbor and Industrial Area. Including the expansion to double the capacity of the Standard Oil Refinery and construction of the Lips, Inc. Propeller Plant which are presently under-way, it is conservatively estimated that more than \$300,000,000 has now been spent or allocated for expenditure in the area by Industry.

PUBLIC DOCK FACILITIES

A port cannot exist without channels and harbors of adequate depth to accommodate ocean going ships. Most of the ports in the United States, and particularly those along the Gulf Coast, are subject to shoaling and siltation, and require frequent maintenance dredging to maintain the project depth. Such maintenance dredging of approved channels and harbors is a function of the U. S. Army Corps of Engineers.

Public dock facilities are a basic prerequisite for a port to qualify for such Federal maintenance. Without a public terminal facility that would accommodate an ocean going vessel with draft of 30 feet, the Port of Pascagoula had little chance of securing Federal approval of a 30-foot deep channel to serve the Pascagoula River Harbor in the early 1950's.

Thus, confronted with another "chicken or egg" situation which is common to waterway development, Jackson County proceeded in 1956 to construct a deep water terminal facility on the West Bank of the Pascagoula River, even though the channel serving the harbor was at that time a shallow 22 feet in depth. This facility, designated as Terminal "A", was financed through the avails of 2 mills state ad valorem tax under the provisions of existing enabling legislation.

Subsequent to the passage of the State Port Act by the Mississippi Legislature in 1958, and after the Federal Government approved deepening and maintenance of the Pascagoula Harbor as hereinafter described, Jackson

County embarked on an ambitious program of Public Docks Facility Development. This development program, carried out under Section 8 of the State Port Act which permits the local port to retain port ownership, includes the following facilities:

<u>Facility</u>	<u>Cost</u>
<u>Terminal "A" (1956)</u>	
General Cargo Dock on Pascagoula River, One Berth - 500 ft., 80,000 SF Covered Storage	\$ 1,316,000
<u>Jackson County Terminal Elevator (1961)</u>	
2,100,000 Bushel Grain Elevator Throughput - 72,000,000 Bushels Per Year Located on West Bank - Pascagoula River	6,401,000
<u>Terminals "E" and "F" (1965)</u>	
General Cargo Facilities on Bayou Casotte Harbor, Two Berths - 520 ft. and 740 ft. long, 176,000 SF Covered Storage	2,701,000
<u>Grain Elevator Addition (1966)</u>	
Increased Capacity and Throughput to 120 Million Bushels Per Year	2,890,000
<u>Terminal "B" (1967)</u>	
General Cargo Facility on Pascagoula River, 86,000 SF of Covered Storage, One Berth - 544 ft.	1,150,000
<u>Terminal "B" Back-Up Warehouse (1969)</u>	
74,000 SF, General Cargo Warehouse	489,000
<u>Terminals "G" and "H" (1969)</u>	
General Cargo Facility, Located on Bayou Casotte Harbor, Two Berths, 175,000 SF Covered Storage	<u>2,750,000</u>
Total Cost	\$17,697,000

Detailed studies were accomplished to determine the economic feasibility of each of the above listed facilities prior to authorization of construction by Jackson County and the Mississippi A & I Board. To date

revenues from operations have been adequate to cover all amortization, operating and maintenance costs.

The Jackson County Public Dock Facilities have met or exceeded all basic development objectives, which are:

1. To provide service to the Port's hinterland through public facilities for export and import of grains and general cargoes.
2. To supplement the economy of the area through increased commerce, added payrolls and added service industries.
3. To insure the need and justification for adequate depth and maintenance of the Harbor Project by the Federal Government.

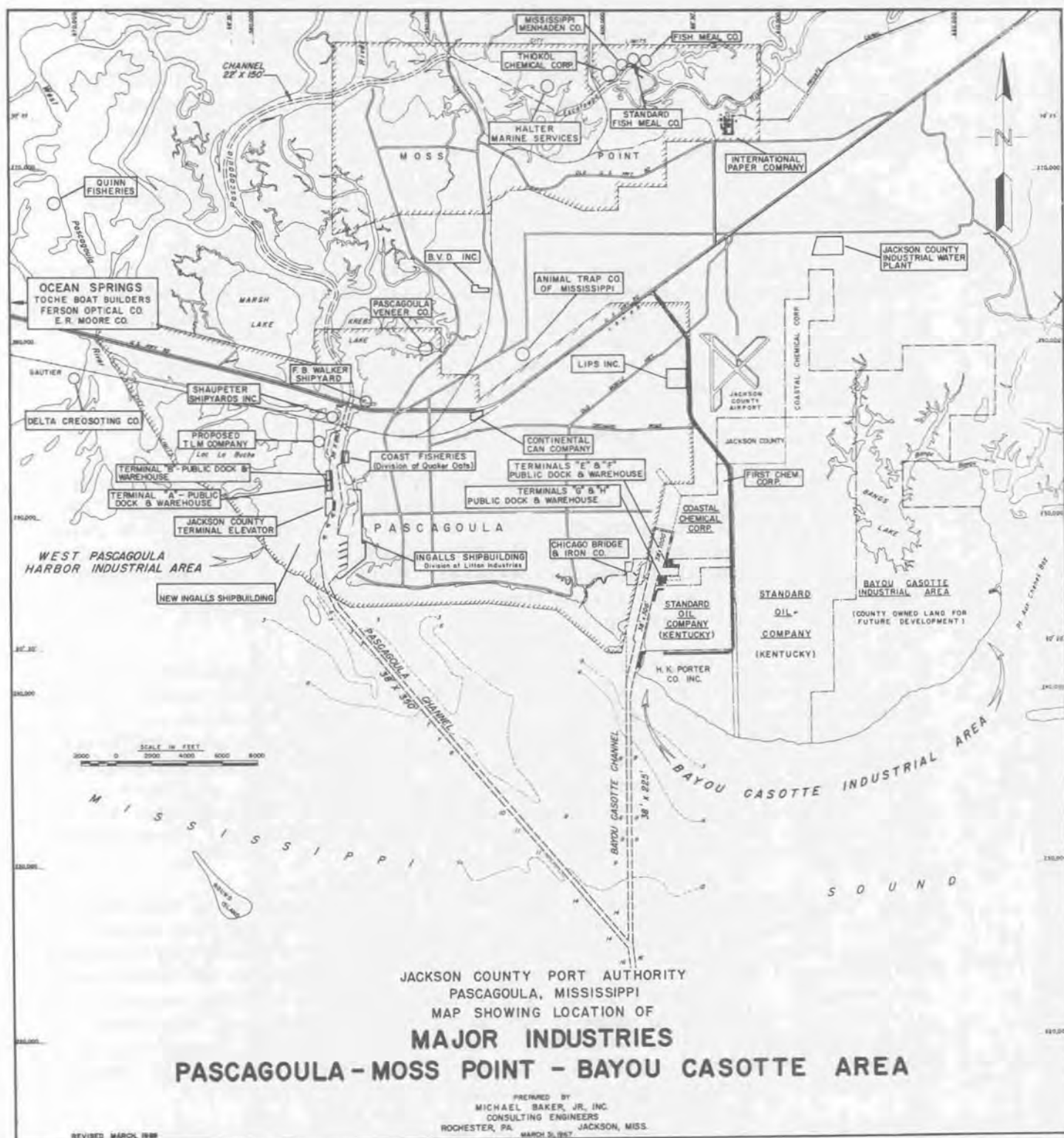
FEDERAL HARBOR PROJECT

According to the U. S. Army Corps of Engineers, Federal improvement of the Pascagoula River dates back to 1827; however, the first definite project was adopted by the River and Harbor Act of 1880. Prior to 1913, the authorized Pascagoula Harbor Project provided a depth of 17 feet from Horn Island Pass to Mile 4 on the Escatawpa River.

The 1913 River and Harbor Act (as subsequently modified in 1915 and 1950) provided a Federal Project for the Pascagoula Harbor to include a channel 25 feet deep and 300 feet wide across the outer bar at Horn Island Pass; a 22-foot by 225-foot channel across the Mississippi Sound and up the river to the L & N Railroad Bridge; a 22-foot by 150-foot channel upriver to State Highway 63; and a 12-foot by 125-foot channel to the International Paper Mill.

In 1957, after construction of the Bayou Casotte Harbor and Industrial Area and Terminal "A" on the Pascagoula River was underway, Jackson County officials again requested reconsideration of the Pascagoula Harbor through the Mississippi Congressional Delegation. Pursuant to a resolution adopted June 10, 1957 by the Committee on Public Works, U. S. Senate, the U. S. Corps of Engineers accomplished another survey of the Pascagoula Harbor. This survey report issued June 20, 1958 recommended modifying the Federal Project to a harbor and channel depth of 30 feet, including the New Bayou Casotte Channel and Harbor. It is interesting to note that the Corps of Engineers found the benefit-cost ratio for such improvements to the Pascagoula River Harbor to be 1.80:1; and for the Bayou Casotte Harbor, including all costs expended by local interests, the ratio was determined to be 4.45:1.

The recommendations of the survey report were adopted and implemented, and the "gate was open" for the continued development of the port area. However, it was soon determined that the depth of 30 feet was not adequate to facilitate efficient operations by the bulk carriers required by the newly completed grain elevator and the Standard Oil Company Refinery which was announced for construction in the Bayou Casotte Area.



In August, 1961, Congress again authorized a survey of the Pascagoula Harbor by the U. S. Corps of Engineers. Based on the extensive efforts and expenditures by local interests to improve the Port and the tremendously successful industrial development, the Corps of Engineers issued a report on June 18, 1962 recommending an expenditure of \$4,870,000 by the Federal Government to deepen the Pascagoula and Bayou Casotte Harbors and Channels to 38 feet. The report indicated the benefit-cost ratio to be an almost unprecedented 13.4:1.

Thus the Port of Pascagoula in Jackson County, Mississippi became one of the deepest harbors on the Gulf of Mexico.

The trend toward larger and deeper draft tankers has made it necessary that Jackson County again request modification of the Federal Harbor Project to a depth of 40 feet. A public hearing was held in connection with the current survey on April 27, 1967 and a favorable report is expected in the near future. This will enable the Port to maintain a competitive position with the major ports of North America.

INDUSTRIAL WATER SUPPLY

Fresh water for industrial usage is equally important as deep water transportation facilities to the industrialization of the port area. The International Paper Company Mill which has been in operation at Moss Point since 1904 requires approximately 60,000,000 gallons of fresh water daily. Such supply is obtained from the Escatawpa River and its tributaries and diverted to the paper mill site through an open channel constructed by International many years ago.

The initial Master Development Plan for the Bayou Casotte Harbor and Industrial Area (1956) recommended a 25 MGD Industrial Water Supply System with a planned ultimate capacity of at least 100 MGD. Pursuant to the recommendations of that report, Jackson County entered into a cooperative agreement with the U. S. Geological Survey in 1958 for an inventory of the water resources of the area. The Geological Survey Report, entitled "Water Resources of the Pascagoula Area, Mississippi," was released in 1965 and has served as the basis for planning and development of an industrial water supply.

The initial industries which located in the Bayou Casotte Area were able to fulfill their nominal water requirements from the ground water supply. However, the 1961 contract for the location of the world's largest automated oil refinery in the Bayou Casotte Industrial Area was made contingent upon the County furnishing an adequate supply of fresh water to the refinery site. Extensive ground water surveys indicated that such supply was inadequate to meet the demands of the refinery; therefore, the Pascagoula River was chosen as a source of supply for the initial increment of the Jackson County Industrial Water Supply System.

After obtaining a permit from the Mississippi Board of Water Commissioners to divert water from the Pascagoula River and its tributaries to the industrial complex, Jackson County authorized the preparation of plans

for the Industrial Water Supply System with an adequate capacity to serve not only Standard Oil but other industries within the area.

The initial increment of the Industrial Water System, which was constructed during 1962-63, had the capacity of diverting 25 MGD of water from the Pascagoula River at a point well above the limit of salt water intrusion. Standard Oil Company began purchasing approximately 7.2 MGD of untreated water from the Water Supply System on July 1, 1963.

With continuous expansion of the Bayou Casotte Industries, and the rapid depletion of the ground water supply, the area's demand for more and higher quality water rapidly increased. A 25 MGD Treatment Plant was recently added to the Jackson County Industrial Water System, and Standard Oil, Coastal Chemical Company and First Mississippi Corporation have now contracted for the entire 25 MGD capacity of the initial system.

The Water Supply System as it now exists was constructed by Jackson County to serve existing industries and enhance the potential for further industrial development at a cost to the County in excess of \$6,000,000. Contracts with the industries located in the Bayou Casotte Industrial Area for such water service provide adequate revenues to the County to pay all amortization, operation and maintenance costs.

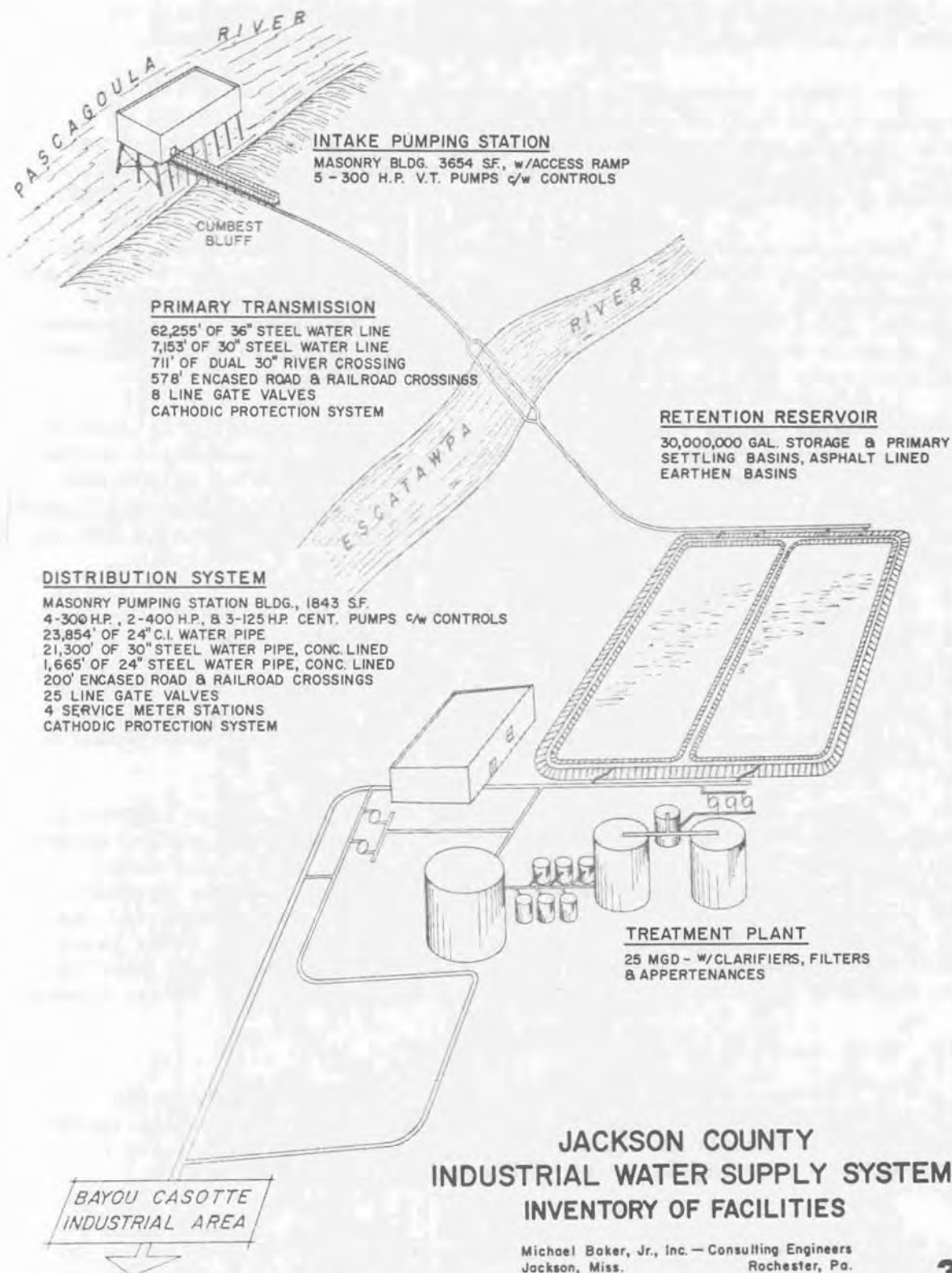
Presuming the continued industrialization of the port area, it is estimated that the need for fresh water will exceed the capacity of the existing facilities in the County by 30 MGD in 1974; by 66 MGD in 1980; and by 100 MGD in 1985. Such estimates may appear unrealistic; however, the phenomenal industrial growth that has taken place in Jackson County during the past ten years has proven most forecasts and advance planning to be entirely too conservative.

To insure the supply of fresh water which will be needed to provide continuity in the industrial development of the port area, Jackson County has authorized the preparation of preliminary plans for a long range industrial water system capable of diverting 100 MGD from the northern most part of the County to the industrial complex. It is estimated that the 100 MGD Water Supply System will require an expenditure of at least \$10,000,000; however, the County has reason to expect that such development can also be accomplished without cost to the taxpayers of the County.

GOVERNMENT

The importance of Government to the successful utilization and development of water resources for economic growth is illustrated by the Jackson County Industrial Development Program, which is an example of extraordinary cooperation on Local, State and National levels.

The Jackson County Board of Supervisors provided the initiative to get the program moving and has continued to provide bold and farsighted leadership for the area's development.



The Jackson County Port Authority, created under Chapter 199, Mississippi Laws of 1956, consists of five members appointed by the Board of Supervisors and four appointed by the Governor of the State. The Port Authority, with the responsibility of administering the operations of the Port and assisting in the location of new industries, is the agency most involved with the details of the development. The business and professional men who have served on the Authority have devoted long hours to the many deliberations and decisions.

The dynamic Port Director, who served the County from 1954 until his death in 1969, made major contributions to the success of the many undertakings by the Port Authority, and functioned as coordinator with industries, governmental agencies, utilities, transportation companies, service industries and the many others connected with the port operations and industrial development.

The Mississippi Legislature played a key role by enacting required legislation at almost every session between 1954 and 1968. After passage of the State Port Act in 1958, the Mississippi A & I Board governed the expenditure of funds for Public Dock Facilities.

The entire State of Mississippi participated in the success of the program by voting an amendment to the State Constitution which was required to enable the location of Standard Oil Company at Bayou Casotte.

The most significant contributions of the Congress and the U. S. Army Corps of Engineers have been mentioned.

To enlist such assistance and cooperation from within and without the County required able and dedicated leadership; and, it can be noted that its tremendous water natural resources notwithstanding, one of the greatest assets of Jackson County has been the character of the men who have guided its destinies.

INFLUENCE OF WATER RESOURCES

The following analysis of water resource requirements of three industries in Bayou Casotte illustrates the significance of water to the Port Industrial Development.

Water Transportation

Standard Oil Company imports approximately 700,000 tons of crude oil, and ships approximately 5,000,000 tons of refined products by tankers annually.

Coastal Chemical Corporation imports phosphate rock, sulphuric acid, sulphur and potash from domestic ports; and ships bagged fertilizer to domestic and foreign ports.

H. K. Porter Company imports approximately 35,000 tons of chrome ore from the Philippine Islands and Rhodesia.

Industrial Water

Standard Oil Company presently uses 10 MGD from the Jackson County Industrial Water System, and will use 19 MGD by 1970.

Coastal Chemical Corporation presently uses 1.5 MGD from the County Water System, and expects to use 4 MGD by 1970.

H. K. Porter Company obtains 800,000 gallons of fresh water per day from ground water supplies.

Water for Raw Material

H. K. Porter Company extracts magnesia from sea water as one of the basic raw materials for its refractory (fire brick) product. The plant pumps 15 MGD of sea water through its chemical treatment plant for processing before introduction into the production equipment.

THE NEW SHIPYARD

Without the deep water harbor which resulted from the County's Port and Industrial Development Program, it is questionable whether the Port of Pascagoula would have been selected for the site of the new Ingalls Shipyard.

However, public financing was obviously the paramount factor in this plant location and, therefore, this facility and its influence on the economy of the area are not considered appropriate for this analysis.

ECONOMIC IMPACT

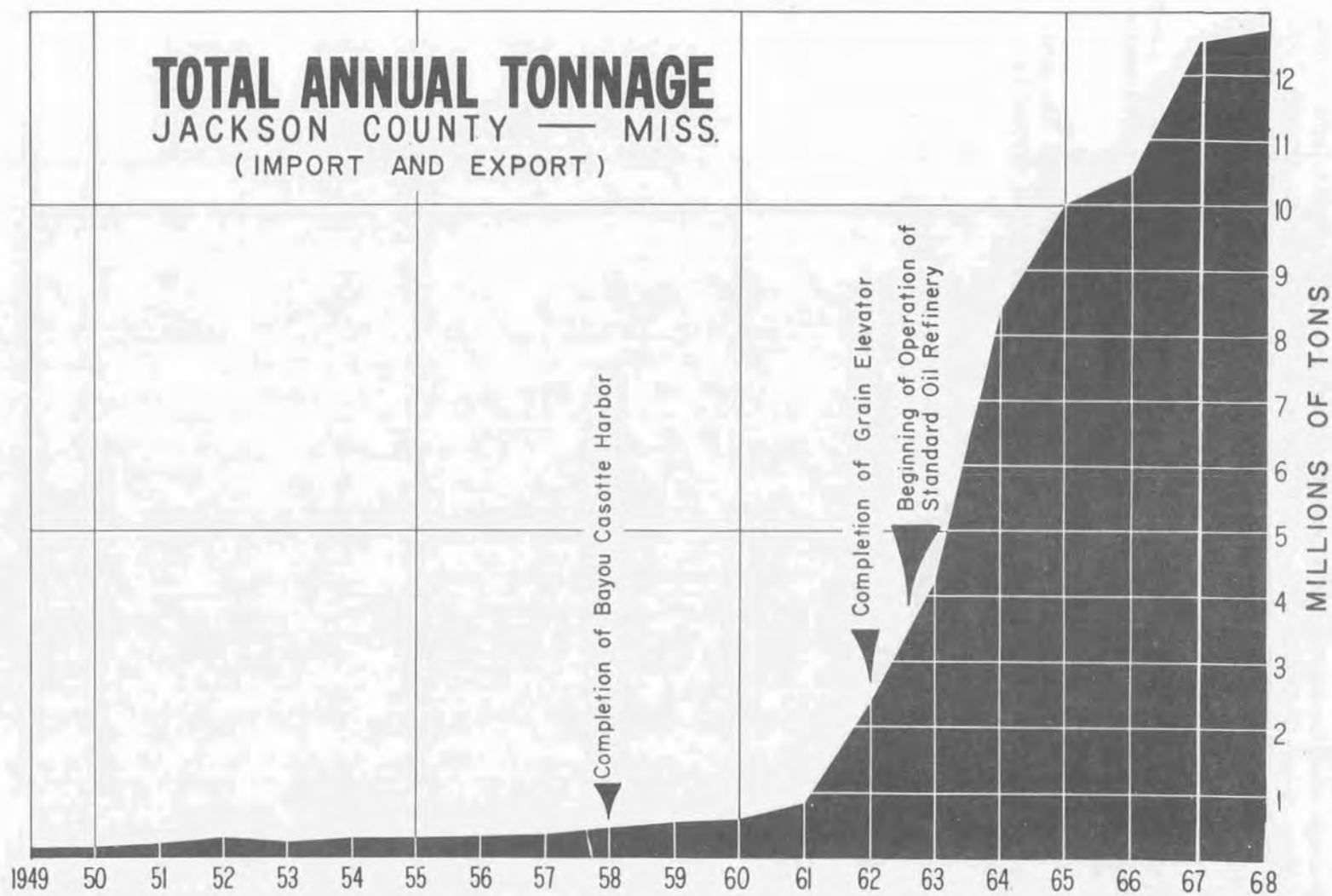
By what yardstick is the influence of Port and Industrial Development on the economy of an area properly measured? The approaches are numerous; however, proven success needs neither elaboration nor sophistication to tell its story as can be noted by the following significant indicators.

	<u>1957</u>	<u>1967</u>	<u>Increase %</u>	<u>Fig. No.</u>
1. Port Commerce (Tons)	350,000	12,617,500	3500%	(4)
2. Employment	14,500	27,300	88%	(5)
3. Payrolls	\$58,000,000	\$130,667,000	125%	(6)
4. Bank Deposits	\$27,000,000	\$ 60,672,000	125%	(7)
5. Assessed Valuation	\$54,000,000	\$115,393,000	114%	(8)
6. Population	42,800	75,000	75%	(9)

The rapid growth which Jackson County has enjoyed during the past decade through development of its water resources has also brought added and expensive responsibilities. For example, the population growth from 42,800 in 1957 to 75,000 in 1967 created demands for more school rooms, hospital beds, new and improved streets and major thoroughfares, utility expansions, recreational facilities, etc.

Additional industrial payrolls and added tax base are needed to create tax revenues to pay for these community facilities. Thus the development spiral continues.

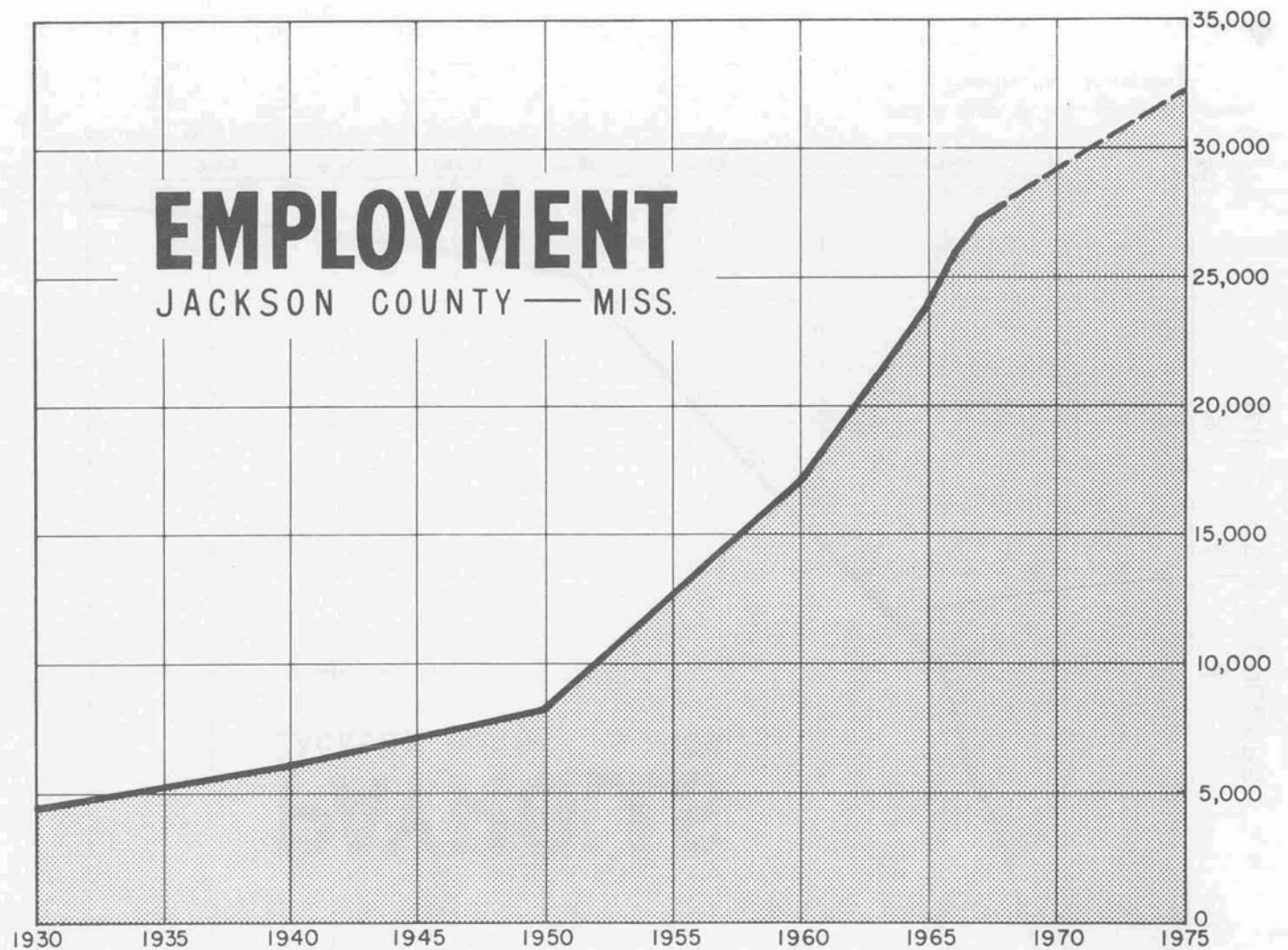
With its deep water port, abundant fresh water supply, and the new technology which will be developed through oceanography, the potential for Jackson County, Mississippi appears unlimited.



Source: U.S. Army Corps of Engineers &
Jackson County Port Authority

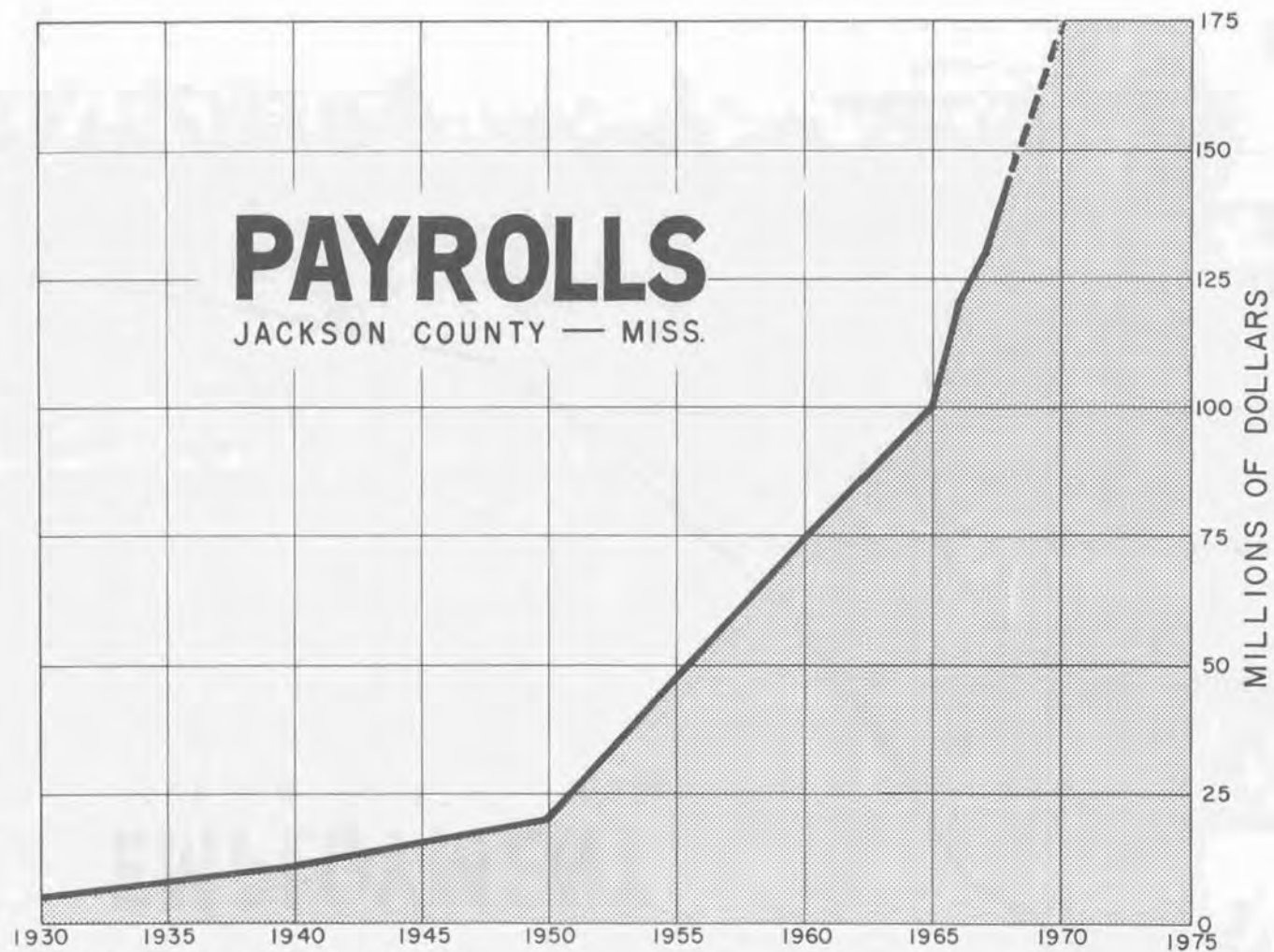
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MICHAEL BAKER, JR., INC.
Consulting Engineers
Rochester, Pa. - Jackson, Miss.



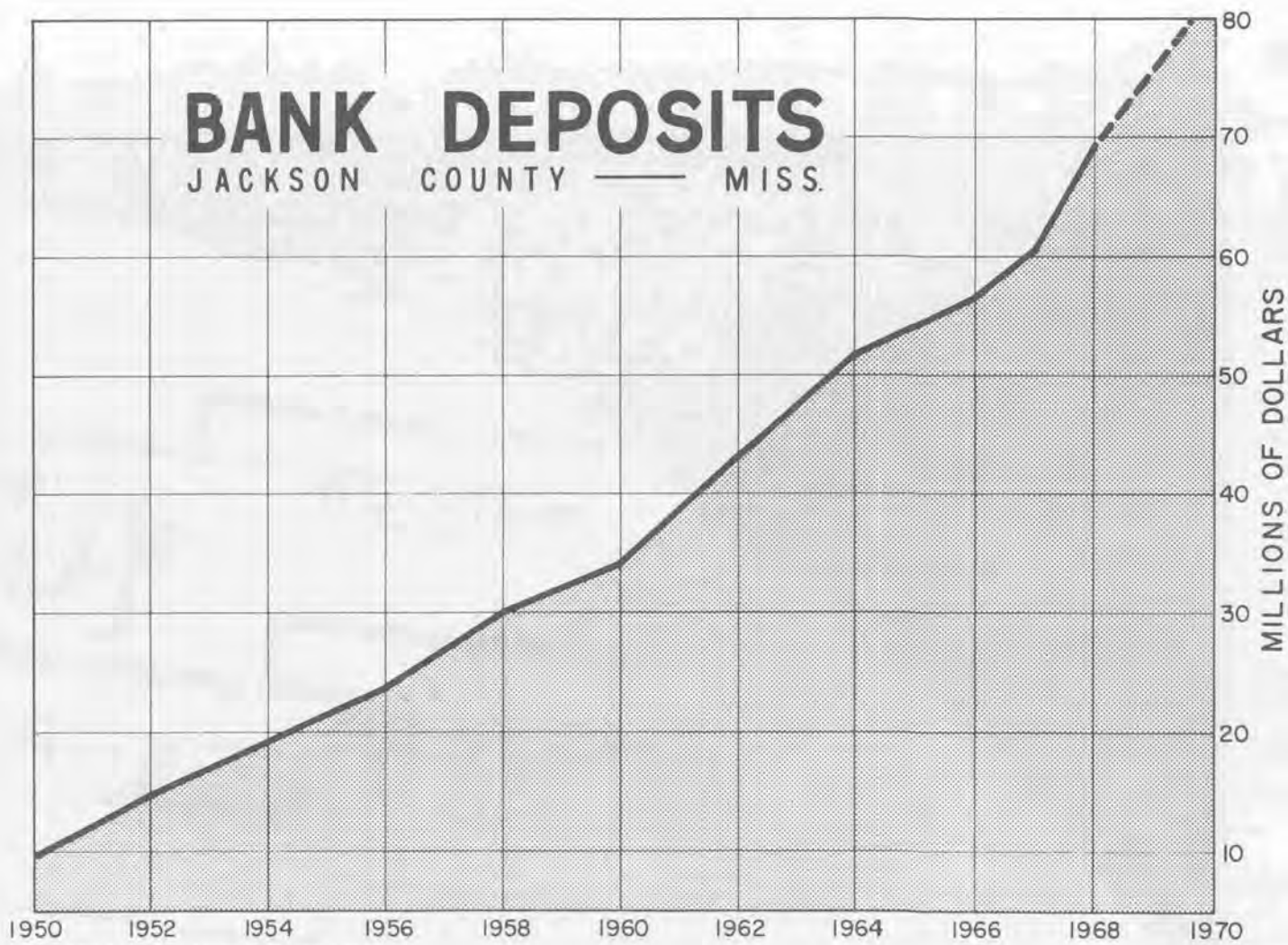
SOURCE: Miss. Employment Security Commission

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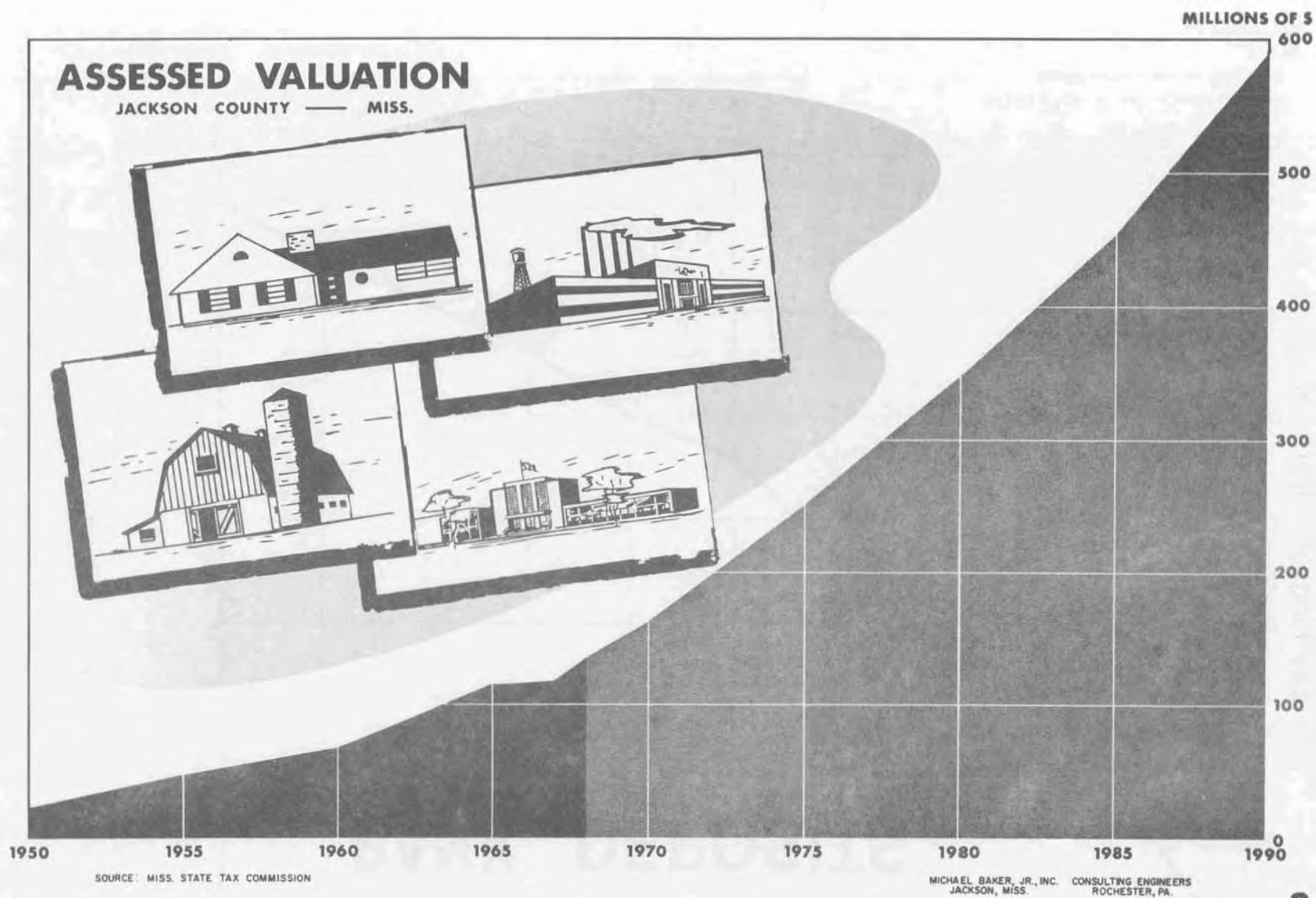
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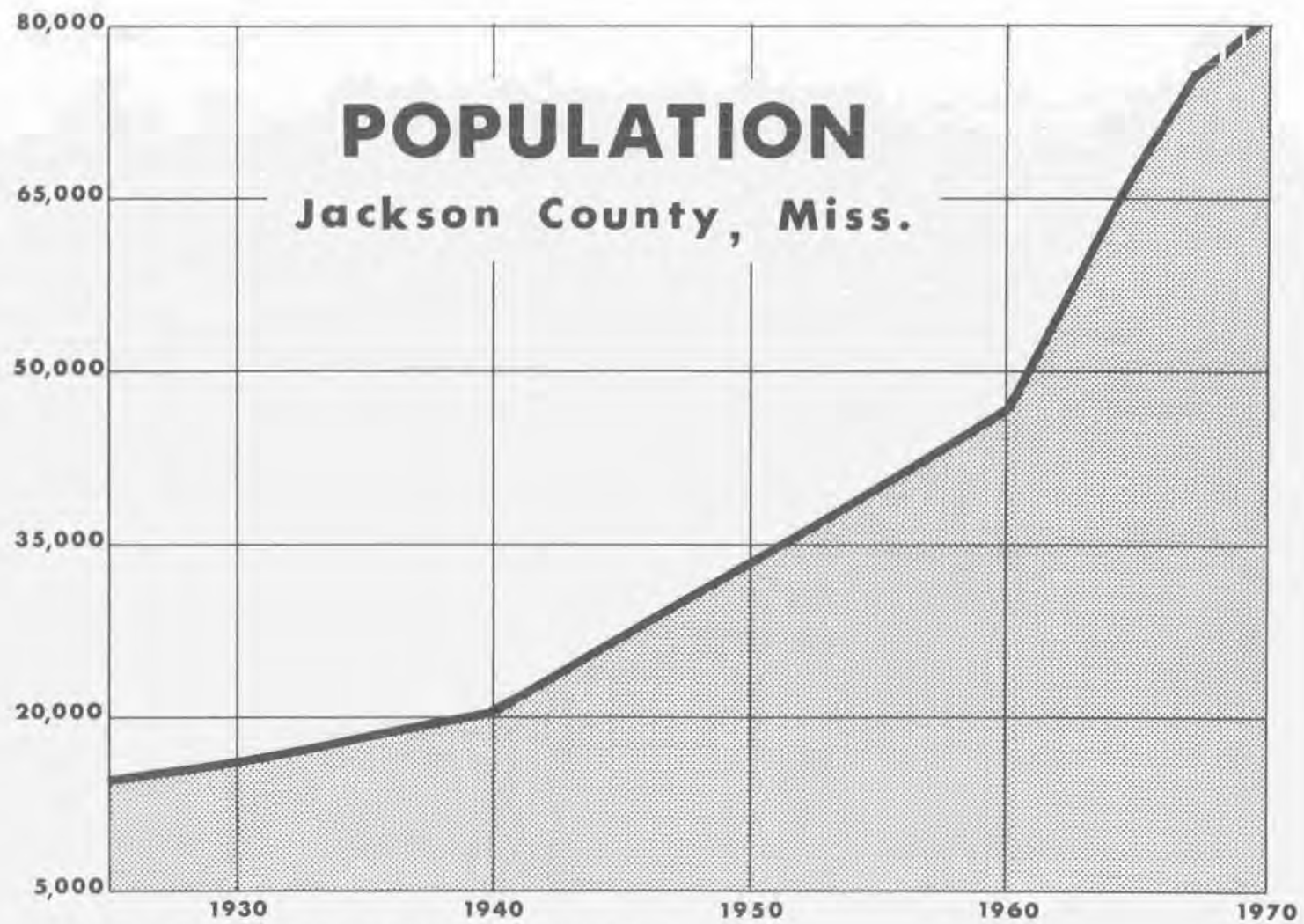
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SOURCE: Miss. State Banking Dept.

MICHAEL BAKER, JR., INC. — Consulting Engineers
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SOURCE: Miss. Dept. of Agriculture - Bureau of Agricultural Statistics

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