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the impacts of outer continental shelf development on lafourche parish

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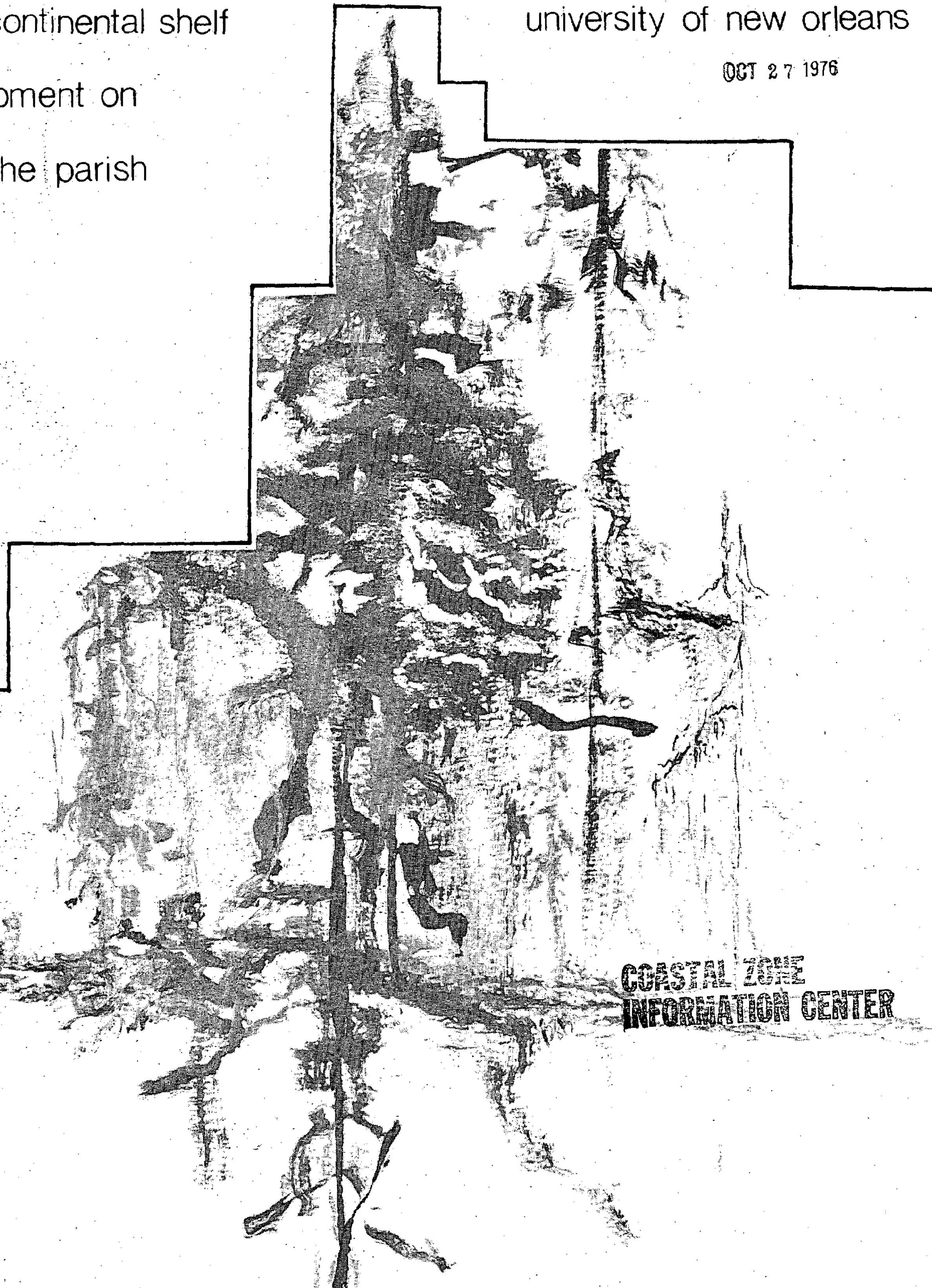

Louisiana State Planning Office

The Impacts of Outer Continental Shelf Development on Lafourche Parish

by

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ABSTRACT

Lafourche Parish is one of the areas along the Louisiana coast which is heavily affected by Outer Continental Shelf oil and gas development. This study attempts to survey the impacts of OCS mining activity on Lafourche in terms of employment, income, job types, environmental effects, and required supporting facilities and services.

In Chapter 1, information on population, employment, and income in Lafourche Parish is presented. A sketch of mining resource development and detailed statistics on mining-related employment by sector for Lafourche are also provided. There are at least two impressions that one derives from the information in Chapter 1. The first is that oil and gas activity, in terms of employment, has declined from the highs of the 1960's and is now leveling off. The other is that the impacts of oil and gas/OCS activity are mainly on the southern portion of the parish (below Highway 90--especially Ward 10).

An elaboration and description of the various job types involved in mining--exploration, drilling, production, and pipe laying--and in related industries--water transportation, boat building and heavy construction--are given in Chapter 2. The educational and vocational requirements for each of the job types are also presented, along with statistics on the number of people per job type required

in exploration, drilling, etc.

The mining industry has had uneven impacts, both positive and negative, on seafood, fur, and recreation in Lafourche Parish. A discussion of these industries and the ecological effects of oil and gas activity on them is given in Chapter 3. The tax base of Lafourche Parish, which is heavily based on the oil and gas industry, is discussed in Chapter 4. About 50 percent of the assessed valuation and property taxes for Lafourche Parish are provided by oil and gas related industries. Ward 10 alone provides over 25 percent of the parish's assessed valuation and property taxes.

Chapter 5 discusses the infrastructure of Lafourche Parish, both existing and planned--highways, canals, airports, electrical power facilities, pipelines, vocational schools, and port facilities. One dominant impression derived from Chapter 5 is that for all facilities except electrical power and pipelines, supply has not caught up with demand generated over time by oil and gas activity. In many areas, however, plans to close the supply-demand gap are underway.

Hopefully, the information presented in this study will be useful in planning so that full advantage may be taken of the benefits associated with OCS activity, while mitigating the related costs.

PREFACE

This study was undertaken to identify various impacts of outer continental shelf oil and gas mining activity on Lafourche Parish, a heavily affected area. It is presented as a step toward complete impact identification and measurement, and comprehensive planning to take fullest advantage of OCS activity.

Persons who assisted in this study are presented in the references throughout the text. They include various public officials in Lafourche Parish; employees of the Louisiana Department of Employment Security; other state and local officials; and mining, water transportation, utilities, and boat building industries' personnel. James Renner of the State Planning Office provided technical and administrative coordination between the SPO and the Urban Studies Institute. For all of this valuable help, the authors wish to express their appreciation.

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CHAPTER 1

HISTORICAL SKETCH OF LAFOURCHE PARISH

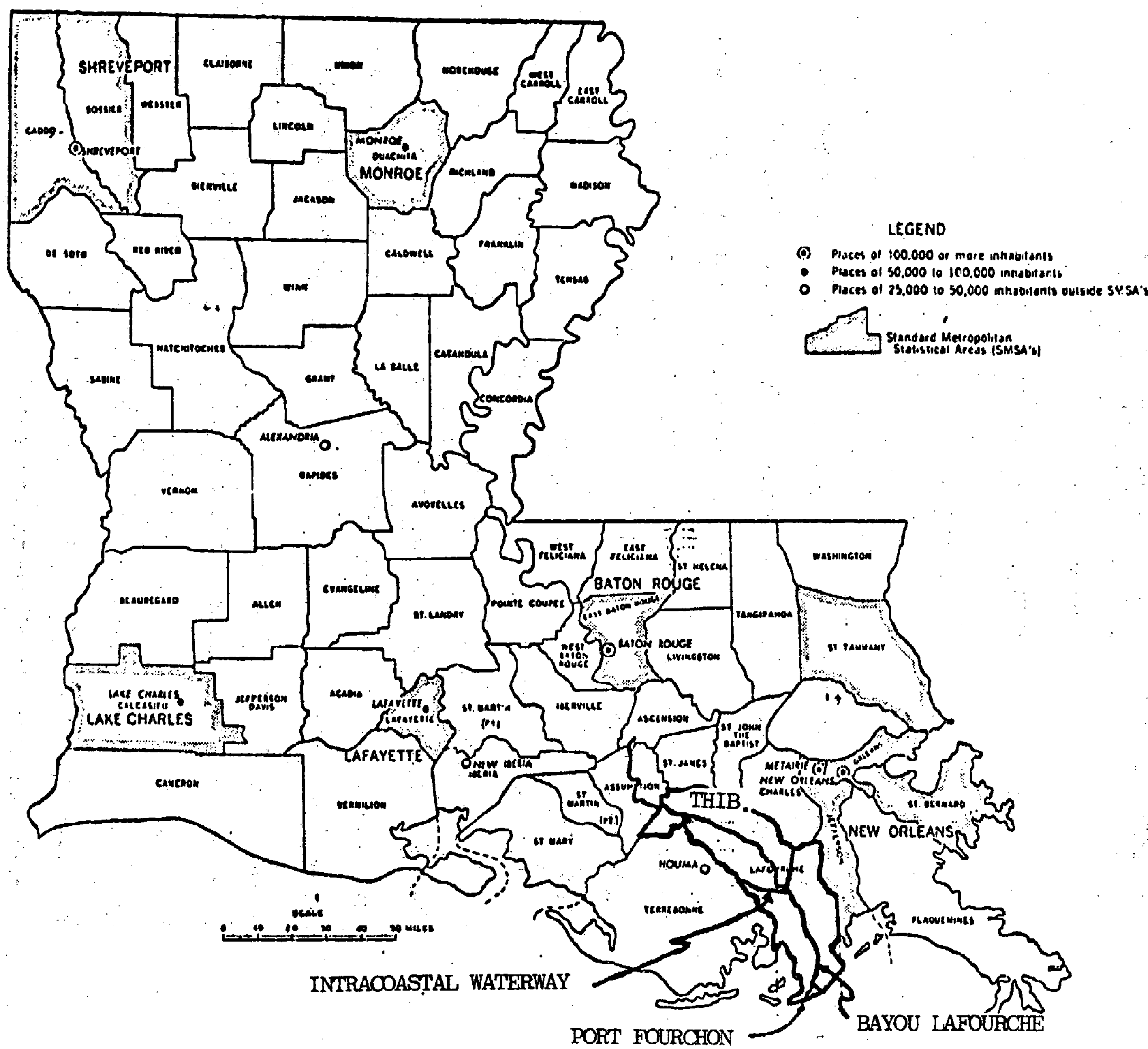
INTRODUCTION

Settlers were first attracted to Lafourche (which originally included what are now Assumption and Terrebonne Parishes) in the early 18th century by the fertility of the soil (Figure 1.1). Most of these first settlers were French and Spanish from New Orleans. They were joined by many Acadians in the middle of the century (Louisiana Almanac, 1969: 127).

Lafourche, which means fork, was named after Bayou Lafourche (a fork of the Mississippi River) (Louisiana Almanac, 1969: 127). It was among the original twelve counties organized in Louisiana in 1805. In 1807, the state legislature abolished the twelve counties and established nineteen parishes in their place. It was at this time that Assumption Parih separated from Lafourche. In 1822, Terrebonne Parish was also formed from Lafourche (Fortier, 1914: 25). In this chapter, information on population, employment, and income in Lafourche Parish is presented. A sketch of mining resource development and detailed statistics on mining-related employment by sector for Lafourche is also provided.

FIGURE 1.1

LOCATION, LAFOURCHE PARISH, LOUISIANA



Source: Bureau of the Census, 1972

Today, the area on both sides of Bayou Lafourche from Thibodaux, the parish seat, to Leeville (a distance of 75 miles) is one of the most densely settled rural areas in the United States (Louisiana Almanac, 1969: 128). Lafourche Parish has an area of 1399 square miles of which water covers 640 square miles. Major towns and their 1970 populations are Thibodaux (14,925), Raceland (4,880), Larose (4,267), Golden Meadow (2,681), and Lockport (1,995). The total 1970 population of Lafourche was 68,941, an increase of 24.5% from the 1960 population (see Table 1.1) (Bureau of the Census, 1971a: 39-40, 94). Of this 1970 population, 11.5% was nonwhite, 38.8% was urban, 54.6% was nonfarm rural, and 6.3% was farm rural (Bobo and Charlton, 1974: 18-21). The preliminary population estimate for the parish in 1975 was 72,028 (Jones and Denton, 1976: 4).

Table 1.1 shows historic and projected population for Lafourche.[1] In the 30 years between 1940 and 1970, population

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[1]This table lists the population of Lafourche for the years 1940-1970 and then lists the projections of the population at 5 year intervals from 1975-2000. The projections presented here are considered the most realistic ones of a set of 3 projections done by Segal, et al. (1976). Of the other two, one was based on a constant migration rate and the other assumed a zero migration rate. The projection presented here is based on subjectively determined migration rates with the following underlying assumptions:

The nation shall be moving into periods of continuing high priced fuel.

Rural-to-urban and inner-urban-to-suburban migrations will contine, but at reduced rates. Slowing rural-to-urban

TABLE 1.1

POPULATION OF LAFOURCHE PARISH 1940-1970[1]

AND PROJECTED FOR THE YEARS 1975-2000[2]

Year	Population
1940	38,615
1950	43,209
1960	55,381
1970	68,941
1975	72,715
1980	76,527
1985	80,731
1990	84,759
1995	87,751
2000	89,859

Sources: [1]Bureau of the Census, 1943, 1953, 1963, 1973.
[2]Segal *et al*., 1976: 138-139.

increased by 79%. However, between 1970 and 2000 an increase of only 30% is expected. This, of course, correlates rather well with the growth of the mining industry in Lafourche in those periods.

In the last 30 years, social conditions in Lafourche Parish have improved considerably. In 1949, the median family income in the parish was $2,067 and 48.6% of the families had incomes below $2,000. In addition, in 1950 only 11.3% of Lafourche residents 25 years and older had

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[1] (cont'd)is the fact that large-scale mechanization of agriculture has already occurred; slowing inner-urban-to suburban is the increasing cost of travel.

Net outmigration rates of blacks will be lowered, as they look more closely at nearby locations rather than rush out of the state.

Stabilizing is expected to occur in most university enrollments, with an increase in the percentage in graduate school. More students are expected to register nearer to their homes.

The trend of growth of medium-sized towns will continue.

A superport will be built and in operation some time in the 1980s.

With the exception of I-410, planned interstates are expected to be completed and open by 1980. In addition, a major north-south roadway will be built by the early 1980s, connecting Shreveport and Monroe with Alexandria and Lafayette. It was not assumed that any of I-410 will be built.

The federal flood insurance regulations will be relaxed in the short run, but will then grow stronger over time (Segal et al., 1976).

graduated from high school and 52% had fewer than 5 years of formal education. Also, only 17.5% of the housing was classified in the category "with hot running water, private toilet and bath, and not dilapidated" (Bureau of the Census, 1952). By 1959, the median family income had risen to $4,330 and only 31.1% had incomes below $3,000. Also, 20.3% had graduated from high school, with 37.3% having fewer than 5 years education (Persons 25 and older). And the housing classified as "sound, with all plumbing" had risen to 61.3% (Bureau of the Census, 1962). The 1970 median family income was $7,852 with 13.1% below $3000. Also, of persons 25 and older, 31.3% had graduated from high school and 22.3% had fewer than 5 years education. And, 9.3% of the housing was classified as "lacking some or all plumbing facilities" (Bureau of the Census, 1972).

Table 1.2 presents data for Lafourche. Between 1940 and 1970 employment, personal income, and per capita personal income increased respectively by 2.1, 21.5, and 12 times (Table 1.2). Population during this time period increased by 1.8 times. Again, this improvement in social conditions correlates very well with the growth of mining and the secondary industries associated with mining.

Economically, Lafourche Parish can be divided into two parts with the crude dividing line being U.S. Highway 90.

TABLE 1.2

POPULATION, EMPLOYMENT, PERSONAL INCOME,

AND PER CAPITA INCOME FOR SELECTED YEARS 1929-1974[1]

IN LAFOURCHE PARISH

Year	Population (1000s)	Employment	Personal Income (millions)	Per Capita Personal Income ($)
1929	32.2			197
1940	38.7	11,086[2]	8.6	223
1950	42.4	12,492[3]	34.6	814
1959	54.5		82.7	1,516
1960	--	16,598[4]	--	--
1962	56.6		93.5	1,652
1965	63.4		119.4	1,884
1966	64.5		133.6	2,070
1967	65.8		147.3	2,239
1968	67.5		162.4	2,407
1969	68.1		170.2	2,498
1970	69.1	23,125[5]	184.8	2,674
1971	70.8	23,650[5]	203.4	2,871
1972	72.0	24,125[5]	227.5	3,159
1973	71.5	24,725[5]	252.6	3,531
1974	71.4	26,550[5]	293.9	4,114

Sources: [1]Bureau of Economic Analysis, n. d. (1976?).

[2]Bureau of the Census, 1943: 382.

[3]Bureau of the Census, 1953: 85.

[4]Bureau of the Census, 1963: 195.

[5]Thomas, 1976. Does not include self-employed persons. By place of residence.

The northern part is agriculturally based with a specific orientation toward sugar cane. The southern economy of the parish is primarily based on petroleum extraction and fishing activities which occur offshore in the Gulf of Mexico (Brubacher and Strasser, 1976). In the southern part, about 75 percent of employment is petroleum based, 25 percent fishing based, and less than 1 percent based on tourism (Melancon, 1976). Table 1.3 is a listing of manufacturing by Standard Industrial Classification (SIC) and reflects the economic division.

RESOURCE DEVELOPMENT IN LAFOURCHE PARISH

The landmarks of resource development are shown in Table 1.4. Outer continental shelf development had its first impact on Lafourche in 1947 and 1949 for oil, 1948 for gas, and 1960 for sulphur.

MINING AND RELATED INDUSTRY IN LAFOURCHE

Mining activity in Lafourche Parish has consisted of virtually only oil and gas operations. Both the primary and secondary industries related to mining have had a significant effect on employment in the parish. For the purposes of this study, the primary industries have been defined as those activities typically conducted by the oil companies and their vendors in order to discover, produce, and bring crude oil and gas to processing locations (Division of Advanced Environmental Research and Technology, 1976: 5).

TABLE 1.3

MANUFACTURERS IN LAFOURCHE PARISH (1972)

SIC Code	Location	Product Description	Number of Employees
2036	Leeville	fresh and frozen shrimp	20-49
2036	Golden Meadow	fresh and frozen shrimp	90-197
2042	Golden Meadow	animal foods	40-98
2051	Golden Meadow	bread and pastries	20-49
2499	Golden Meadow	travel boats	1-7
3599	Golden Meadow	machine shop, jobbing and repair	20-49
3732	Golden Meadow	boat repairs	8-19
3711	Cut Off	amphibious tractors	20-49
3731	Larose	steel tugs, barges, push boats, shrimp boat building and repair	40-98
2061	Lockport	sugar and molasses	50-99
2086	Lockport	soft drinks	8-19
2621	Lockport	plup and paper	250-499
3731	Lockport	tugs, push boats, barges, offshore support vessels, marine repair	200-498
2061, 2	Matthews & Raceland	raw sugar, refined sugar black strap molasses	200-498
2329	Matthews & Raceland	sports clothing	50-99
2013	Thibodaux	slaughtering plant, sausages	50-99
2026	Thibodaux	milk products	20-49
2061	Thibodaux	raw sugar, molasses	200-447
2071	Thibodaux	candy	50-99
2086	Thibodaux	soft drinks	50-99
2751	Thibodaux	commercial printing	20-49
3443	Thibodaux	pressure vessles, storage tank	100-249
3522	Thibodaux	tractors, side hoe ditches	200-498
3599	Thibodaux	machine shop service for oil and sugar industries	50-99
3711	Thibodaux	draglines, personnel carriers, drill rigs	50-99
3732	Thibodaux	small boats	20-49

Source: Gulf South Research Institute, 1974: 32.

TABLE 1.4

LANDMARKS OF RESOURCE DEVELOPMENT

IN LAFOURCHE PARISH

OIL

1902	First oil field in Louisiana began production at Jennings salt dome in Acadia Parish[1].
1922	First permit for exploratory drilling in Lafourche Parish issued by Minerals Division, Louisiana Department of Conservation[2].
1928	Leeville Dome discovered by seismograph[3].
1931	First commercial production of oil in Lafourche Parish at Leeville Dome began in February when Texas Company completed their first producing well. It produced 157,675 barrels for the year[3].
1932	A second well (by Pop Oil Company) began producing 90 barrels daily, for a total production by the Leeville field of 267,962 barrels for the year[4].
1933	Eight producing wells were completed at Leeville for a total production of 361,000 barrels[4].
1934	Fifty-two (52) producing wells were completed at Leeville Field. Total production was 4,329,572 barrels[4].
1935	Nine (9) new producing wells were completed at Leeville, increasing yearly production to 4,820,093 barrels[4].
1936	Oil production declined somewhat to 4,596,027 barrels[5].
1937	Producing wells were established at Harang Field and Lake Long Field. Total production:

Harang	977,862 barrels
Lake Long	83,231 barrels
Leeville	2,651,187 barrels
TOTAL	3,712,280 barrels

TABLE 1.4 CONTINUED

1940	Lafourche Parish produced a total of 7,926,467 barrels (including condensate)[6].
1941	Lafourche Parish produced 8,958,960 barrels[6].
1947	First offshore well in Louisiana started and completed by Kerr-McGee Oil Company in Ship Shoal Area off Terrebonne Parish[7].
1949	First offshore well off Lafourche Parish, discovered by the California Company in Bay Marchand Field, was completed on March 3rd[7].
1970	Production of oil in Lafourche and offshore Lafourche was 117,674,244 barrels[8].
1971*	Production in Lafourche and smaller offshore area was 89,676,024 barrels[8].
1972*	Production in Lafourche and still smaller offshore area was 58,548,420 barrels[8].
1973*	Production decreased in same area as 1972 to 53,022,060 barrels[8].

*Offshore area decreased because of increasing Federal jurisdiction offshore. These statistics were collected by the Louisiana Department of Conservation in its jurisdictional area.

NATURAL GAS

1909	Gas was discovered at the Monroe Gas Field in Ouachita, Morehouse, and Union Parishes, but the first commercial gas was not produced until 1916[3].
1916	The 1914-1916 Report of the Department of Conservation states that, "The total production of gas for the year 1915, as nearly as can be estimated, is 27,261,260,000 cubic feet . . . Formerly, no accurate records have been kept on the gas production and it is impossible to obtain positive information, except from the producers who have kept records of their production." In light of this, the earliest record of gas production in Louisiana that could be found was in 1912 from the Bull Bayou Field in DeSoto Parish[9].

TABLE 1.4 CONTINUED

1938	First natural gas to be produced in Lafourche Parish was at Leeville[10].
1939	Gas was also produced from fields at Raceland and Valentine (Harang) for a total production as follows:

Leeville	131,290 M.C.F.
Raceland	351,022 M.C.F.
Valentine	92,794 M.C.F.
TOTAL	575,105 M.C.F.

1940–1950	Production fluctuated, averaging approximately 16,600,000 M.C.F. for the period[11].
1948	First offshore gas discovered in the Grand Isle area.
1951–1968	Production increased steadily[12].
1969	Production of natural gas reached its peak of 318,800,130 M.C.F. for the year[8].
1970–1973	Production dropped to 275,434,479 M.C.F. as offshore area for which data was provided gradually decreased*.

*For the same reason as above for oil

SULPHUR

1927	Sulphur discovered at Chacahoula Salt Dome by Gulf Refining Company[14].
1955	First commercial sulphur production in Lafourche began on March 10 by the Freeport Sulphur Company.
1960	The world's first offshore sulphur mine began production in the Grand Isle area.
1962	Commercial production at Chacahoula ended in September.
1967	Sulphur production began again at Chacahoula.
1968	Production began at Bully Camp Dome by Texas Gulf Sulphur Company.

TABLE 1.4 CONTINUED

1970	Production stopped at Chacahoula, but continues at Bully Camp.
1973	Natual gas shortage and oversupply of sulphur results in reduced production at Bully Camp.

Sources: [1]Landes, 1970: 188.

[2]Louisiana Department of Conservation, 1930: 166.

[3]Louisiana Department of Conservation, 1932: 416, 422.

[4]Louisiana Department of Conservation, 1936: 445, 464.

[5]Louisiana Department of Conservation, 1938: 288-289.

[6]Louisiana Department of Conservation, 1942: 232.

[7]Louisiana Department of Conservation, 1952: 1, 3.

[8]Louisiana Department of Conservation, 1970-1974.

[9]Conservation Commission of Louisiana, 1917: 74.

[10]Louisiana Department of Conservation, 1940: 195.

[11]Louisiana Department of Conservation, 1942, 1944, 1946, 1948, 1950, 1952.

[12]Louisiana Department of Conservation, 1952, 1954, 1955-1969.

[13]U. S. Department of the Interior, 1955-1972.

[14]Louisiana Department of Conservation, 1934.

This includes activities such as exploration, drilling, mud service, other oil and gas field services, and water transportation (see Table 1.5 and Appendix for specific lists).

Secondary, or induced, activities are those that provide general support to the oil companies and their vendors, but not necessarily specialized to the petroleum industry, as well as those that further process or distribute oil and gas, such as boat and platform building, refining, and petrochemical processing (Division of Advanced Environmental Research and Technology, 1976: 5).

Table 1.5 presents employment in primary and secondary mining industries in Lafourche Parish by place of residence. In 1973, approximately 17% of total employment in Lafourche was in primary and secondary mining employment, up from 15% in 1970. Other primary and secondary activities needed by the mining industry and not shown in Table 1.5 are supplied from outside of Lafourche Parish. For instance, food catering is handled mainly in Houma (Terrebonne Parish). As can be seen from this table, mining activity reached its peak, in terms of employment, in 1966 when over 2,200 workers were directly employed in oil and gas operations. Mining employment then declined through 1971. However, it increased substantially (by 21.7%) in 1972, then declined somewhat in 1973. The bulk of this employment was in Standard Industrial Classification (SIC) category 138, "Oil and Gas Field Services," which includes exploration activities, drilling, acidizing

TABLE 1.5

EMPLOYMENT IN OIL AND GAS RELATED

PRIMARY AND SECONDARY INDUSTRIES IN LAFOURCHE PARISH

SIC Code	Industry	1953	1956	1959	1964	1965	1966	1968	1969	1970	1971	1972	1973
PRIMARY INDUSTRIES													
	Mining (total)												
	Employees	1602	1206	784	2149	1916	2207	1630	1146	1183	1070	1302	1245
	Payroll ($1000)	1664	1672	1277	3208	3128	3505	3384	2314	2600	2709	2455	3169
	Establishments	36	34	18	51	41	50	44	37	38	35	38	38
13	Crude Petroleum and Natural Gas												
	Employees		1206	D[2]	2149	1916	2207	D	D	1183	1070	1302	1245
	Payroll ($1000)		1672	D	3208	3128	3505	D	D	2600	2709	2455	3169
	Establishments		34	16	51	41	50	43	36	38	35	38	38
131	Crude Petroleum and Natural Gas												
	Employees		467	447	D	D	D	D	D	D	D	501	483
	Payroll ($1000)		713	806	D	D	D	D	D	D	D	1417	1456
	Establishments		10	10	16	12	20	10	8	11	10	9	9
132	Natural Gas Liquids												
	Employees				D	D	D	D	D	--	--	--	--
	Payroll ($1000)				D	D	D	D	D	--	--	--	--
	Establishments				2	1	1	2	2	--	--	--	--

TABLE 1.5 CONTINUED

SIC Code	Industry	1953	1956	1959	1964	1965	1966	1968	1969	1970	1971	1972	1973
138	Oil and Gas Field Services												
	Employees		739	D	1545	1354	1635	1116	621	678	562	801	755
	Payroll ($1000)		959	D	1990	2035	2311	2211	1068	1346	1315	1538	1702
	Establishments		24	6	33	28	29	31	26	26	24	29	28
1381	Drilling Oil and Gas Wells												
	Employees			D	765	D	871	750	312	307	228	321	299
	Payroll ($1000)			D	1346	D	1354	1618	559	566	522	528	665
	Establishments			5	16	12	14	11	9	7	7	8	7
1382	Oil and Gas Exploration Services												
	Employees					D							
	Payroll ($1000)					D							
	Establishments					2							
1389	Oil and Gas Field Services, n.e.c. (not elsewhere covered)												
	Employees				D	647	D	290	264	297	307	408	378
	Payroll ($1000)				D	861	D	522	461	708	775	954	954
	Establishments				15	14	13	15	13	14	14	18	17
44	Water Transportation												
	Employees		672	655	933	1100	1455	1557	1585	1869	1871	2076	2401
	Payroll ($1000)		507	587	971	1175	1707	2155	2271	2759	2893	3234	3746
	Establishments		98	123	130	132	152	146	141	157	166	181	192

TABLE 1.5 CONTINUED

SIC Code	Industry	1953	1956	1959	1964	1965	1966	1968	1969	1970	1971	1972	1973
445	Local Water Transportation												
	Employees			524	844	992	1335	1395	1412	1707	1764	1916	2137
	Payroll ($1000)			484	871	1049	1556	1935	2060	2528	2703	3001	3393
	Establishments			117	112	115	113	130	126	140	151	163	165
446	Water Transportation Services												
	Employees				74	D	D	D	D	D	D	148	202
	Payroll ($1000)				84	D	D	D	D	D	D	211	272
	Establishments				14	14	17	14	14	16	14	15	18
4469	Water Transportation Services, n.e.c. (not elsewhere covered)												
	Employees				74	D		D	D	D	D	148	202
	Payroll ($1000)				84	D		D	D	D	D	211	272
	Establishments				14	14		14	14	16	14	15	18
SECONDARY INDUSTRIES													
162	Heavy Construction, n.e.c. (not elsewhere covered)												
	Employees			D	D	221	226	463	108	199	171	212	111
	Payroll ($1000)			D	D	248	290	688	158	306	320	441	211
	Establishments			9	14	13	12	18	11	10	12	10	9

TABLE 1.5 CONTINUED

SIC Code	Industry	1953	1956	1959	1964	1965	1966	1968	1969	1970	1971	1972	1973
35	Machinery, Except Electrical (Manufacturing)												
	Employees		137	154	D	D	D		259	231	209	213	238
	Payroll ($1000)		135	150	D	D	D		399	366	359	376	444
	Establishments		3	5	2	4	4		5	6	6	7	8
37	Transportation Equipment												
	Employees				254	311	268	258	233	220	221	241	328
	Payroll ($1000)				273	338	403	402	399	367	428	518	617
	Establishments				14	12	10	11	12	9	10	10	11
373	Ships and Boats												
	Employees				D	D	D	D	D	D	D	D	160
	Payroll ($1000)				D	D	D	D	D	D	D	D	506
	Establishments				13	11	9	10	11	8	9	9	9
3731	Ship Building and Repairing												
	Employees							108	169	D	142	D	D
	Payroll ($1000)							136	298	D	306	D	D
	Establishments							4	5	3	3	3	4

TABLE 1.5 CONTINUED

SIC Code	Industry	1953	1956	1959	1964	1965	1966	1968	1969	1970	1971	1972	1973
3732	Boat Building and Repairing												
	Employees				156	193	191	D					
	Payroll ($1000)				177	218	262	D					
	Establishments				10	8	7	6					
508	Machinery, Equipment and Supplies (Wholesale Trade)												
	Employees											133	121
	Payroll ($1000)											203	244
	Establishments											11	11

NOTE: [1]These data are taken from County Business Patterns for the years indicated. The employment data from this publication does not include government employees, self-employed persons, farm workers, and domestic service workers. Also, railroad employment subject to the Railroad Retirement Act and employment on oceanborne vessels are not included (Bureau of the Census, 1973: 1). While these exclusions are not considered to seriously affect the figures for the industries, the exclusion of self-employed persons may cause these figures to be slight understatement of the actual employment. Also, the exclusion of government employees has resulted in a failure to note the effect of OCS development on relevant government agencies, such as the U.S. Geological Survey and the U. S. Army Corps of Engineers.

[2]Figures withheld to avoid disclosure of operations of individual units.

Source: Bureau of the Census, 1954, 1957, 1965-1967, 1969-1974.

and chemically treating wells, impounding and storing salt water, mud service, and other services performed on a contract or fee basis (see Appendix for descriptions of SIC codes). At the peak of mining in 1966, this category accounted for 74% of the total mining employment in Lafourche. By 1973, this percentage had dropped to 61%.

The secondary mining industries include SIC category 37, "Transportation Equipment" (in Lafourche in 1973, 80% of this category was concerned with ship and boat building and repairing) and "Heavy Construction, except highway and street construction" (SIC 162).[2] The employment pattern of these two industries closely approximates that of the oil and gas industries. That is, they also reached their peak in the mid-sixties, then declined through 1971 (see Table 1.5). However, transportation equipment increased in 1972 and continued its increase in 1973. The "Heavy Construction" pattern is interesting in that it increased substantially to 463 employees in 1968, then abruptly dropped to 108 in 1969. It, too, rose in 1972, but fell in 1973. While an outside factor may be influencing all these industries, the fortunes of the secondary industries seem to be dependent on the fortunes of oil and gas industries.

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[2]Heavy construction is included as a secondary industry in support of mining, even though it includes pipeline construction which would fall under primary industry by the definition presented here. Data on persons working in pipeline construction are unavailable.

Table 1.6 presents recent mining related primary and secondary employment data. Data on some of these categories are not included in County Business Patterns (the source of Table 1.5). Descriptions of SIC numbers are found in the Appendix to this chapter.

Although statistics showing the exact percentages of oil and gas employment in Lafourche that is due to offshore operations are not available, statistics have been compiled showing the percentage of offshore production for 1958 and 1959 in the South Louisiana region and for the years 1964-1970 in the Houma district (of which Lafourche is a part) of the Louisiana Department of Conservation. While it is acknowledged that these statistics may not provide a completely accurate picture of the offshore employment since the Lafourche production may vary from the Houma district average and the number of employees per unit of production may differ between onshore and offshore operations, they provide a good indication of the rising importance of offshore operations. For example, in 1958, 21% of the crude oil and condensate[3] and 10% of the casinghead[4] and natural

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[3]Condensate is petroleum that is dissolved in natural gas in the reservoir. Upon a reduction of pressure, but not of temperature, it condenses into hydrocarbon liquids (Levorsen, 1967: 485).

[4]Casinghead gas is gas produced during the normal operation of oil fields. It is dissolved in the oil, but expands into free gas when the reservoir pressure declines. Upon reaching the surface, it is separated from the oil in a separator and then processed for recovery of its natural gasoline content or for production of liquefied gas products such as propane, butane, and pentane (Levorsen, 1967: 484).

TABLE 1.6

EMPLOYMENT IN OIL AND GAS RELATED PRIMARY AND SECONDARY INDUSTRIES

IN LAFOURCHE PARISH FOR 1975 and 1976 (FIRST QUARTER ONLY)*

SIC Code	Industry	1975 1st qtr.	1975 2nd qtr.	1975 3rd qtr.	1975 4th qtr.	1976 1st qtr.
PRIMARY INDUSTRIES						
1310**	Crude Petroleum and Natural Gas	52	50	50	47	51
1830**	Oil and Gas Field Services	869	825	781	658	701
1381	Drilling Oil and Gas Wells	7	6	6	8	7
1382	Oil and Gas Exploration Services	1	2	3	4	5
1389	Oil and Gas Field Services, n.e.c. (not elsewhere covered)	45	58	18	17	15
4450**	Local Water Transportation	1321	1318	1244	1308	1217
4453	Lighterage	60	25	24	25	19
4454	Towing and Tugboat Service	233	288	260	287	227
4460**	Water Transportation Services	226	246	249	221	196
4463	Marine Cargo Handling	2	2	2	2	2
4469	Water Transportation Services, n.e.c. (not elsewhere covered)	309	437	469	638	435
SECONDARY INDUSTRIES						
1620**	Heavy Construction, n.e.c. (not elsewhere covered)	44	42	68	93	14
1621	Heavy Construction, Except Highway or Street Construction	49	45	40	29	20
2911	Petroleum Refining	0	0	2	1	2
3441	Fabricated Structural Steel	15	16	17	16	18
3533	Oil Field Machinery and Equipment	0	0	1	0	1
3599	Miscellaneous Machinery, Except Electrical	455	446	530	415	495

TABLE 1.6 CONTINUED

SIC Code	Industry	1975 1st qtr.	1975 2nd qtr.	1975 3rd qtr.	1975 4th qtr.	1976 1st qtr.
3731	Ship Building and Repairing	245	255	277	284	259
3732	Boat Building and Repairing	319	309	322	297	319
5084	Industrial Machinery and Equipment	163	176	194	190	178

*Because of disclosure problems relating to single-firm-industries, Table 1.6 should not be further reproduced without the permission of its source.

**These four-digit categories are not strictly comparable with the three-digit SIC Codes that appear in Table 1.4. For example, 1310 and 131 are not equivalent. SIC 131 is the total of all four-digit codes that begin with 131, whereas SIC 1310 is not. The same is true for the other designated SICs.

Source: Louisiana Department of Employment Security, n.d.

gas in South Louisiana were produced offshore compared to 54.4% and 30.5% in the Houma district in 1970 (see Table 1.7).

Probably the most noticeable indication and the significant effect (in terms of employment) of this rising importance of offshore operations is seen in the rise of employment in the SIC 44 "Water Transportation" category (Table 1.5). While mining employment has declined, employment in water transportation has increased steadily. There were 672 employed in this category in Lafourche Parish in 1956, and this figure rose steadily to 2,401 in 1973. It seems that the major portion of this rise is due to the increasing oil and gas activity offshore.

Table 1.8 presents employment data for SIC codes 13, 131, and 138. It is noted that there seems to be a discrepancy between the figures in Table 1.5 (from <u>County Business Patterns</u>) and those in Table 1.8 (from the <u>Census of Mineral Industries</u>). More specifically, even though the <u>Census of Mineral Industries</u> seems to indicate the same pattern of growth and decline of the oil and gas industries, its figures for number of establishments are substantially larger than those in <u>County Business Patterns</u> and its figures for number of employees are substantially lower.

This can be accounted for, first, by the fact that in determining the number of establishments, <u>County Business Patterns</u> counts each firm once in each county for each industry in which it operates, regardless of the number

TABLE 1.7

PERCENT OF OFFSHORE OIL AND GAS PRODUCTION IN THE HOUMA DISTRICT[1]

	1958	1959	1964	1965	1966	1967	1968	1969	1970
Crude Oil and Condensate	21.0%	18.6%	37.6%	39.1%	42.9%	44.1%	48.0%	52.3%	54.4%
Casinghead and Natural Gas	10.0%	13.1%	12.6%	14.1%	17.3%	18.8%	21.6%	24.6%	30.5%

[1]This table indicates the increasing importance of offshore production. The percentages were computed from the production statistics of the Louisiana Department of Conservation. The 1958 and 1959 figures refer to offshore production in the South Louisiana area, while the 1964-1970 figures are for the offshore production in the Houma district, which includes the parishes of Terrebonne, Lafourche, Assumption, St. Charles, St. John the Baptist, St. James, and parts of St. Martin, Iberia, Iberville, and Ascension parishes. It also includes the offshore areas of Ship Shoal, South Pelto, South Timbalier, Bay Marchand, and Grand Isle.

After 1970, the federal government assumed jurisdiction for a portion of the Houma District. The Department of Conservation figures for offshore production after 1970 include only a portion of the total offshore production and it was decided not to include them in this table.

Source: Louisiana Department of Conservation, 1959, 1960, 1965-1971.

TABLE 1.8

MINERAL INDUSTRIES EMPLOYMENT IN LAFOURCHE PARISH

SIC Code	Industry	1954	1958	1963	1967	1972
13	Oil and Gas Extraction					
	Employees	817		1695	GG	1100
	Payroll ($1000)	NA		11877	D	10900
	Establishments	38		153	106	112
131	Crude Petroleum and Natural Gas					
	Employees		1445	698	FF	400
	Payroll ($1000)		9070	5583	D	5000
	Establishments		38	56	43	41
138	Oil and Gas Field Services					
	Employees			997	900	700
	Payroll ($1000)			6294	7000	5800
	Establishments			97	62	69
14	Non-metallic Minerals (except fuels)					
	Employees				NA	NA
	Payroll ($1000)				NA	NA
	Establishments				2	1

D -- Figures withhold to avoid disclosure of operations of individual reporting units.

FF -- 500-999 employees GG -- 1000-2499 employees NA -- not available

Source: Bureau of the Census, 1958, 1961, 1967, 1971b, 1974.

of establishments the firm operates. In the Census of Mineral Industries, a mineral "establishment" is defined as a single physical location where mineral operations are conducted. Therefore, a firm with three locations would be counted once for County Business Patterns and three times for Census of Mineral Industries.

Also, the difference in number of employees and part of the difference in number of establishments can be accounted for by the fact that the Census of Mineral Industries has a distinct category for the total Louisiana "Offshore" employment in addition to the parishes. Since County Business Patterns has no such distinct category for "Offshore," it apparently distributes this employment to the respective parishes of worker residence, thus accounting for its higher employment figures.

Assuming this to be the case, it would appear that one could subtract the employment figures of the Census of Mineral Industries from that of County Business Patterns for the same year, to determine the number of oil and gas employees that live in Lafourche and work offshore. Applying this to the year 1972 (which is the only year the two publications have in common), it can be seen that approximately 202 out of a total of 1,302 work offshore. Since this represents only 15.5% of the total oil and gas employment, while offshore production accounts for over 50% of total production, it appears that offshore production is much more capital intensive than onshore production or that many offshore employees are supplied from outside of Lafourche Parish.

One final observation to be noted in Table 1.8 is that the <u>Census of Mineral Industries</u> accounts for the sulphur production in Lafourche Parish (under the heading "Non-Metallic minerals (except fuels)"). <u>County Business Patterns</u> does not have this category for Lafourche Parish.

APPENDIX

SELECTED SIC CATEGORY DESCRIPTIONS

The following is a description of the primary and secondary industries identified in Table 4. Each SIC category is explained with a list of the activities included under each one (Bureau of the Budget, 1967).

PRIMARY INDUSTRIES

MAJOR GROUP 13 -- CRUDE PETROLEUM AND NATURAL GAS

The Major Group as a Whole

This major group includes establishments primarily engaged in: (1) producing crude petroleum and natural gas, (2) recovering oil from oil sands and oil shale, and (3) producing natural gasoline and cycle condensate. Types of activities included are exploration, drilling, oil and gas well operation and maintenance, the operation of natural gasoline and cycle plants, and the mining and extraction of oil from oil sands and oil shale. This major group also includes such basic activities as emulsion breaking and desilting of crude petroleum to render the oil marketable. Pipe line transportation of petroleum, gasoline, and other petroleum products (except gathering lines) is classified in Major Group 46 -- Pipe Line Transportation, and of natural gas in Major Group 49 -- Electric, Gas, and Sanitary Services. (In Lafourche Parish, no resident employees work in SICs 46 and 49.) Establishments engaged in petroleum refining and in the production of lubricating oils and greases are classified in Major Group 29.

GROUP NO.	INDUSTRY NO.	
131		CRUDE PETROLEUM AND NATURAL GAS
	1311	Crude Petroleum and Natural Gas

Establishments primarily engaged in operating oil and gas field properties. Such activities include exploration for crude petroleum and natural gas; drilling, completing, and equipping wells; operation of separators, emulsion breakers, desilting equipment; and all other activities incident to making oil and gas marketable up to the point of shipment from the producing property. This industry also includes the production of oil through the mining and extraction of oil from oil shale and oil sands. Establishments primarily engaged

GROUP NO.	INDUSTRY NO.	
		in performing oil field services for operators on a contract, fee, or other basis are classified in Group 138.
		Crude oil production Crude petroleum production Natural gas production Oil sand mining Oil shale mining Sulfur extraction from sour natural gas
132		NATURAL GAS LIQUIDS
	1321	Natural Gas Liquids
		Establishments primarily engaged in producing liquid hydrocarbons from oil and gas field gases. Establishments recovering liquefied petroleum gases incident to petroleum refining or to the manufacturing of chemicals are classified in Major Groups 28 or 29.
		Butane (natural) production Casing-head butane and propane production Cycle condensate production Isobutane production Liquefied petroleum gases (natural) production Natural gasoline production Propane (natural) production
138		OIL AND GAS FIELD SERVICES
	1381	Drilling Oil and Gas Wells
		Establishments primarily engaged in drilling wells for oil or gas for others on a contract, fee, or other basis. This

GROUP NO.	INDUSTRY NO.	
		industry includes contractors that specialize in "spudding in," "drilling in," redrilling, and directional drilling.

Directional drilling of oil and gas wells: on a contract, fee, or other basis
Dry hole drilling: on a contract, fee, or other basis
Redrilling oil and gas wells: on a contract, fee, or other basis
"Spudding in" oil and gas wells: on a contract, fee, or other basis
Well drilling--gas, oil, service, and water intake: on a contract, fee, or other basis

1382 Oil and Gas Field Exploration Services

Establishments primarily engaged in geophysical, geological, and other exploration work for oil and gas on a contract, fee, or other basis.

Aerial geophysical exploration, oil and gas field: on a contract, fee, or other basis
Exploration, oil and gas field: on a contract, fee, or other basis
Geological exploration, oil and gas field: on a contract, fee, or other basis
Geophysical exploration, oil and gas field: on a contract, fee, or other basis
Seismograph surveys

1389 Oil and Gas Field Services, Not Elsewhere Classified

Establishments primarily engaged in performing, for others on a contract, fee, or other basis, oil and gas field services, not elsewhere classified, such as exca-

GROUP NO.	INDUSTRY NO.	
		vating slush pits and cellars; grading, and building of foundations at well locations; well surveying; running, cutting, and pulling casings, tubes, and rod; cementing wells; shooting wells; perforating well casing; acidizing and chemically treating wells; and cleaning out, bailing, and swabbing wells.

Acidizing wells: on a contract, fee, or other basis
Bailing wells: on a contract, fee, or other basis
Building well foundations at well locations: on a contract, fee, or other basis
Cementing well casings: on a contract, fee, or other basis
Chemically treating wells: on a contract, fee, or other basis
Cleaning wells: on a contract, fee, or other basis
Derrick building, repairing, and dismantling: oil well and gas well: on a contract, fee, or other basis
Excavating slush pits and cellars: on a contract, fee, or other basis
Gas compressing (natural gas) at the fields: on a contract, fee, or other basis
Impounding and storing salt water in connection with petroleum production: on a contract, fee, or other basis
Lease tanks, oil field: erecting, cleaning, and repairing: on a contract, fee, or other basis
Logging wells: on a contract, fee, or other basis
Mud service, oil field drilling: on a contract, fee, or other basis
Oil sampling service for oil companies: on a contract, fee, or other basis
Perforating well casings: on a contract, fee, or other basis
Pipe testing--oil field service

GROUP NO.	INDUSTRY NO.	
		Plugging and abandoning wells Pumping of wells: on a contract, fee, or other basis Removal of condensate gasoline from pipelines, on a contract or fee basis Rig building, repairing, and dismantling: oil well and gas well: on a contract, fee, or other basis Running, cutting, and pulling casings, tubes, and rods: oil well and gas well: on a contract, fee, or other basis Shooting wells: on a contract, fee, or other basis Shot-hole drilling service (oil field): on a contract, fee, or other basis Surveying wells: on a contract, fee, or other basis Swabbing wells: on a contract, fee, or other basis Well foundation grading: on a contract, fee, or other basis Well servicing: on a contract, fee, or other basis.

MAJOR GROUP 44 -- WATER TRANSPORTATION

444 TRANSPORTATION ON RIVERS AND CANALS

4441 Transportation on Rivers and Canals

Companies primarily engaged in transporting freight or passengers on all inland waterways, including the intracoastal waterway on the Atlantic and Gulf Coasts. Transportation on the Great Lakes-St. Lawrence Seaway is classified in Industry 4431; local water transportation including intraport transportation in Group 445; and the maintenance and operation of canals

GROUP NO.	INDUSTRY NO.	

primarily for use by the vessels of others in Industry 4464.

Canal barge operation
Canal transportation
Intracoastal transportation
Lake transportation, other
Log rafting and towing
River transportation, other than on the St. Lawrence Seaway
Transportation on bays and sounds of the ocean

445 LOCAL WATER TRANSPORTATION

4452 Ferries

Companies primarily engaged in operating ferries across rivers or within harbors. Companies operating ferries across the Great Lakes are classified in Industry 4431.

Car lighters (ferries), separately incorporated or oganized
Ferries operating across rivers or within harbors
Intraport transportation
Railroad ferries, separately incorporated or organized

4453 Lighterage

Companies primarily engaged in operating lighters and other harbor vessels for transferring goods and passengers between ship and shore or from one ship to another.

Lighterage

GROUP NO.	INDUSTRY NO.	
	4454	Towing and Tugboat Service

Companies primarily engaged in furnishing marine towing and tugboat services in the performance of auxiliary or terminal services in harbor areas. The vessels used in performing these services do not carry cargo or passengers.

Docking of ocean vessels
Shifting of floating equipment within harbors
Towing, marine
Tugboat service
Undocking of ocean vessels

4459 Local Water Transportation, Not Elsewhere Classified

Companies primarily engaged in furnishing local water transportation, not elsewhere classified, such as excursion boats, sight-seeing boats, and water taxis.

Airboats (swamp buggy rides)
Excursion boats
Sight-seeing boats
Water taxis

446 SERVICES INCIDENTAL TO WATER TRANSPORTATION

4463 Marine Cargo Handling

Establishments primarily engaged in activities directly related to marine cargo handling from the time cargo, for or from a vessel, arrives at shipside,

GROUP NO.	INDUSTRY NO.	
		dock, pier, terminal, staging area, or intransit area until cargo loading or unloading operations are completed. Cargo handling operations carried on by transportation companies and separately reported are classified here. This industry includes the operation and maintenance of piers, docks, and associated buildings and facilities; but lessors of such facilities are classified in Industry 6512.

Docks, including buildings and facilities: operation and maintenance
Loading vessels
Marine cargo handling
Piers, including buildings, and facilities: operation and maintenance
Ship hold cleaning
Stevedoring
Terminal operation, waterfront
Unloading vessels
Waterfront terminal operation

4469 Water Transportation Services, Not Elsewhere Classified

Companies primarily engaged in furnishing miscellaneous services incidental to water transportation, not elsewhere classified, such as boat hiring, except for pleasure; chartering of vessels; ship cleaning, except hold cleaning (Industry 4463); and steamship

GROUP NO.	INDUSTRY NO.	

leasing.

Boat hiring, except pleasure
Boat livery, except pleasure
Boat yards, storage and incidental repair
Boathouses
Dismantling ships
Ship registers: survey and classification of ships, engines, and marine equipment; and publication of a register
Marinas
Marine basins, renting and operating
Marine salvaging
Marine surveyors
Marine wrecking: salvaging from sunken craft, removal of underwater hazards by divers, wrecking ships for scrap
Piloting vessels in and out of harbors
Rental or charter of commercial boats
Salvaging of distressed vessels and their cargoes
Ship cleaning, except hold cleaning
Steamship leasing
Yacht basins

SECONDARY INDUSTRIES

MAJOR GROUP 16 -- CONSTRUCTION OTHER THAN BUILDING

CONSTRUCTION -- GENERAL CONTRACTORS

162 HEAVY CONSTRUCTION, EXCEPT HIGHWAY AND STREET CONSTRUCTION

1621 Heavy Construction, Except Highway and Street Construction

General contractors primarily engaged in the construction of heavy projects, such as railroad construction, heavy construction sewers and water mains, heavy foundations (except for buildings),

GROUP NO.	INDUSTRY NO.	
		abutments, tunnels, subways, elevated highways, viaducts, dams, reservoirs, drainage projects, sanitation projects, gas mains, hydroelectric projects, pipelines, water power projects, transmission lines, telephone lines, radio towers, mining appurtenances (such as tipples and washeries), and ovens, furnaces, kilns, silos, and similar appurtenances of industrial plants which are constructed at the site. This industry also includes general contractors primarily engaged in marine construction operations, such as dredging, underwater rock removal, pile driving, land reclamation; and harbor and waterways construction, such as breakwaters, channels, cofferdams, dikes, docks, jetties, levees, locks, piers, watermarks, and wharves.

Abutments, construction: general contractors
Aqueduct construction: general contractors
Blasting contractors, except building demolition
Breakwater construction: general contractors
Bridge construction, heavy: general contractors
Brush clearing or cutting: general contractors
Cable laying construction
Caisson drilling: general contractors

GROUP NO.	INDUSTRY NO.	

Canal construction
Channel construction: general contractors
Channel cutoff construction: general contractors
Cofferdam construction: general contractors
Conduit construction: general contractors
Construction, heavy (except highway and street construction): general contractors
Cutting right-of-way: general contractors
Dam construction: general contractors
Dike construction: general contractors
Distribution lines (oil and gas field) construction
Dock construction: general contractors
Drainage project construction: general contractors
Dredging: general contractors
Driving piling: general contractors
Earthmoving, not connected with building construction: general contractors
Electric powerline construction: general contractors
Flood control project construction: general contractors
Furnace construction for industrial plants: general contractors
Gas main construction: general contractors
Harbor construction: general contractors
Highway (elevated) construction: general contractors
Hydroelectric plant construction: general contractors
Industrial incinerator construction: general contractors
Industrial plant appurtenances construction: bakers' ovens, silos, tipples, washeries, coke ovens, etc.: general contractors
Installation and maintenance of electrical and electronic equipment at missile and aircraft command sites: contractors
Irrigation projects construction: general contractors
Jetty construction: general contractors
Kiln construction: general contractors
Land clearing: general contractors
Land leveling (irrigation): general contractors

GROUP NO.	INDUSTRY NO.	
		Land reclamation: general contractors
		Levee construction: general contractors
		Locks, waterways, construction: general contractors
		Marine construction: general contractors
		Mine loading and discharging station construction: general contractors
		Mining appurtenance construction: general contractors
		Missile facilities construction and/or maintenance: general contractors
		Oven construction, for industrial plants: steel and iron: general contractors
		Pier construction: general contractors
		Pile driving: general contractors
		Pipe laying: general contractors
		Pipe line construction: general contractors
		Pipe line wrapping: general contractors
		Pole line construction: general contractors
		Pond construction: general contractors
		Power line construction: general contractors
		Radio transmitting tower construction: general contractors
		Railroad construction: general contractors
		Railway roadbed construction: general contractors
		Reclamation projects construction: general contractors
		Reservoir construction: general contractors
		Revetment construction: general contractors
		Rock removal, underwater: general contractors
		Sanitation system construction: general contractors
		Sewer construction: general contractors
		Silo construction except farm silos: general contractors
		Soil compacting services: general contractors
		Submarine rock removal: general contractors
		Subway construction: general contractors
		Telephone line construction: general contractors
		Television transmitting tower construction
		Timber removal underwater: general contractors
		Transmission line construction: general contractors
		Trenching: general contractors
		Tunnel construction: general contractors
		Viaduct construction: general contractors

GROUP NO.	INDUSTRY NO.	
		Water main construction: general contractors Water power projects construction: general contractors Water supply systems construction: general contractors Watermark construction: general contractors Waterways construction: general contractors Wharf construction: general contractors
291		PETROLEUM REFINING
	2911	Petroleum Refining

Establishments primarily engaged in producing gasoline, kerosene, distillate fuel oils, residual fuel oils, lubricants and other products from crude petroleum and its fractionation products, through straight distillation of crude oil, redistillation of unfinished petroleum derivatives, cracking or other processes. Establishments primarily engaged in producing natural gasoline from natural gas are classified in mining industries. Those manufacturing lubricating oils and greases by blending and compounding purchased materials are included in Industry 2992.

Acid oil
Alkylates
Aromatic chemicals, made in petroleum refineries

GROUP NO.	INDUSTRY NO.	

Asphalt and asphaltic materials: liquid, semisolid and solid--produced in petroleum refineries
Benzene, produced in petroleum refineries
Benzol, produced in petroleum refineries
Butadiene, from petroleum
Coke, petroleum: produced in petroleum refineries
Fractionation productions of crude petroleum produced in petroleum refineries
Gas, refinery or still oil: produced in petroleum refineries
Gases, liquefied petroleum
Gasoline blending plants
Gasoline, except natural gasoline
Greases: petrolatum, mineral jelly, lubricating, etc.--produced in petroleum refineries
Hydrocarbon fluid, made in petroleum refineries
Illuminating oil, produced in petroleum refineries
Jet fuels
Kerosene
Mineral oils, natural
Mineral waxes, natural
Naphtha, produced in petroleum refineries
Naphthenic acids
Oils, partly refined: sold for rerunning--produced in petroleum refineries
Paraffin wax, produced in petroleum refineries
Petrolatums, nonmedicinal
Petroleum refining
Petroleum re-refining
Road materials, bituminous: produced in petroleum refineries
Road oils, produced in petroleum refineries
Solvents, produced in petroleum refineries
Tar or residium, produced in petroleum refineries

344 FABRICATED STRUCTURAL METAL PRODUCTS

3441 Fabricated Structural Steel

Establishments primarily engaged in manufacturing fabricated iron and steel or other metal for structural purposes, for bridges, buildings; and sections for

GROUP NO.	INDUSTRY NO.	

ships, boats and barges. Establishments primarily engaged in manufacturing metal doors, sash, frames, molding and trim are classified in Industry 3442; and fabrication work done by construction contractors at the site of construction is classified in construction industries.

Barge sections, prefabricated metal: not made in rolling mills
Bridge sections, railway and highway: prefabricated/not made in rolling mills
Expansion joints: iron, steel, and monel
Floor jacks, metal: not made in rolling mills
Highway bridge sections, prefabricated: not made in rolling mills
Joists, open web steel; long-span series--not made in rolling mills
Radio and television towers
Railway bridge sections, prefabricated: not made in rolling mills
Ship sections, prefabricated metal
Steel joists, open web: long-span series--not made in rolling mills
Steel tri-level railroad car racks (for transporting motor vehicles, etc.)
Structural steel, fabricated: not made in rolling mills
Television towers, not made in rolling mills
Towers, transmission

MAJOR GROUP 35 -- MACHINERY, EXCEPT ELECTRICAL

3533 Oil Field Machinery and Equipment

Establishments primarily engaged in manufacturing machinery and equipment for use in oil and gas fields or for drilling

GROUP NO.	INDUSTRY NO.	
		water wells.

Bits, rock: oil field tools
Derricks, oil and gas field
Drill rigs, all types
Drilling tools for gas, oil, or water wells
Gas well machinery and equipment
Oil field machinery and equipment
Water well drilling machinery
Wellpoint systems

359 MISCELLANEOUS MACHINERY, EXCEPT ELECTRICAL

3599 Miscellaneous Machinery, Except Electrical

Establishments primarily engaged in manufacturing machinery and parts except electrical, not elsewhere classified, such as pistons and piston rings, carbueretors, metallic packing, and amusement park equipment. This industry also includes establishments primarily engaged in producing or repairing machine and equipment parts, not elsewhere classified, on a job or order basis for others.

Amusement machines and equipment for carnivals, etc.--ferris wheels, merry-go-rounds, whips, etc.
Automobile machine shops
Bellows, industrial: metal
Boiler tube cleaners
Carburetors, all types
Carousels (merry-go-rounds)
Catapults
Check valves, motor vehicles
Chemical milling job shops
Cleaners, boiler tube
Column clamps and shores

GROUP NO.	INDUSTRY NO.	

Control systems, hydraulic and air
Crankshafts and camshafts, machining
Cups, oil and grease: metal
Cylinders, hydraulic
Fan forges
Ferris wheels
Filters, internal combustion engine: oil, gasoline, air intake
Flasks, iron
Grinding castings for the trade
Hose, flexible metallic
Leak detectors, water
Machine shops, jobbing and repair
Packing, metallic
Pistons and piston rings
Pump governors, for gas machines
Riddles, sand (hand sifting or screening apparatus)
Sludge tables
Swage blocks
Ties, form: metal
Tubing: flexible metallic
Valve housings, internal combustion engine
Valve lifters, internal combustion engine
Valves, aircraft
Valves, engine
Valves, motor vehicle
Weather vanes

MAJOR GROUP 37 -- MANUFACTURING

373 SHIP AND BOAT BUILDING AND REPAIRING

3731 Ship Building and Repairing

Establishments primarily engaged in building and repairing all types of ships, barges, and lighters, whether propelled by sail or motor power or towed by other craft. This industry also includes the conversion and alteration of ships. Establishments primarily engaged in fabri-

GROUP NO.	INDUSTRY NO.	

cating structural assemblies or components for ships, or subcontractors engaged in ship painting, joinery, carpentry work, electrical wiring installation, etc. are not classified in this industry

Barges, building and repairing
Cargo vessels, building and repairing
Combat ships, building and repairing
Destroyer tenders, building and repairing
Dredges, building and repairing
Drydocks, floating
Ferryboats, building and repairing
Fireboats, building and repairing
Fishing vessels, large: such as seiners and trawlers--building and repairing
Hydrofoil vessels
Landing ships, building and repairing
Lighters, marine: building and repairing
Lighthouse tenders, building and repairing
Marine rigging
Naval ships, building and repairing
Passenger-cargo vessels, building and repairing
Radar towers, floating
Sailing vessles, commercial: building and repairing
Scows, building and repairing
Seiners, building and repairing
Ship building and repairing
Submarine tenders, building and repairing
Tankers (large craft), building and repairing
Tenders: large craft, such as lighthouse, destroyers, and submarine tenders--building and repairing
Towboats, building and repairing
Transport vessels, passenger and troop: building and repairing
Trawlers, building and repairing
Tugboats, building and repairing

3732 Boat Building and Repairing

Establishments primarily engaged in building and repairing all types of boats,

GROUP NO.	INDUSTRY NO.	

except rubber boats (Industry 3069). Establishments primarily engaged in cleaning and storing boats and in the rental of dock space, and yacht clubs are classified in nonmanufacturing industries.

Boat kits, wooden (not a model)
Boats, fiber glass, building and repairing
Boats: motorboats, sailboats, rowboats, and canoes--building and repairing
Boats, rigid: plastic
Dinghies, building and repairing
Dories, building and repairing
Fishing boats, small: such as lobster boats, crab boats, and oyster boats--building and repairing
Houseboats, building and repairing
Kayaks, building and repairing
Life rafts, except inflatable (rubber and plastic)
Lifeboats, building and repairing
Motorboats, inboard and outboard: building and repairing
Pontoons, except aircraft and inflatable (rubber and plastic)
Skiffs, building and repairing
Tenders (small motor craft), building and repairing

MAJOR GROUP 50 -- WHOLE TRADE--DURABLE GOODS

508 MACHINERY, EQUIPMENT, AND SUPPLIES

5084 Industrial Machinery and Equipment

Establishments primarily engaged in marketing industrial machinery and equipment such as metal working tools, food industries machinery, oil well and oil refining machinery, industrial trucks and tractors

GROUP NO.	INDUSTRY NO

(except over-the-road types), printing machinery, and machinery and equipment for other manufacturing industries.

Cement making machinery--wholesale
Chainsaws--wholesale
Citrus processing machinery--wholesale
Compressors, except air conditioning--wholesale
Controlling instruments and accessories--wholesale
Conveyor systems--wholesale
Cranes, industrial--wholesale
Cream separators, except farm--wholesale
Crushing machinery and equipment--wholesale
Dairy products manufacturing machinery--wholesale
Derricks--wholesale
Diesel engines and parts--wholesale
Drilling bits--wholesale
Elevators, including repair--wholesale
Fans, industrial--wholesale
Food product manufacturing machinery--wholesale
Heat exchange equipment, industrial--wholesale
Hoists--wholesale
Indicating instruments and accessories--wholesale
Ladders--wholesale
Lift trucks--wholesale
Machine tool accessories--wholesale
Machine tools--wholesale
Machinists' precision tools--wholesale
Materials handling equipment--wholesale
Metal refining machinery and equipment--wholesale
Metalworking machinery--wholesale
Metalworking tools: drills, reamers, taps, dies, grinding wheels, files--wholesale
Milk products manufacturing machinery and equipment--wholesale
Oil refining machinery, equipment, and supplies--wholesale
Oil well machinery, equipment, and supplies--wholesale

GROUP NO.	INDUSTRY NO.	
		Oil well supply houses--wholesale
		Paint spray equipment--wholesale
		Paper manufacturing machinery--wholesale
		Power plant machinery, except electrical--wholesale
		Printing trades machinery equipment and supplies--wholesale
		Pulp (wood) manufacturing machinery--wholesale
		Pulverizing machinery and equipment--wholesale
		Pumps and pumping equipment--wholesale
		Rebuilding and sale of oil field tool joints--wholesale
		Recapping, tire, machinery--wholesale
		Recording instruments and accessories--wholesale
		Rental of industrial machinery and equipment, through sales offices of manufacturing companies
		Screening machinery and equipment--wholesale
		Sewing machines, industrial--wholesale
		Shoe manufacturing and repairing machinery--wholesale
		Smelting machinery and equipment--wholesale
		Stackers, industrial-- wholesale
		Tapping attachments--wholesale
		Textile machinery and equipment--wholesale
		Tractors, industrial--wholesale
		Trailers, industrial--wholesale
		Trucks, industrial--wholesale
		Water pumps--wholesale
		Welding machinery and equipment--wholesale
		Well points (drilling equipment)--wholesale
		Winches--wholesale
		Woodworking machinery--wholesale

Source: Bureau of the Budget, 1967.

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CHAPTER 2

OCS OIL AND GAS RELATED EMPLOYMENT

INTRODUCTION

This chapter focuses on the primary and secondary industries that are located in Lafourche Parish as a result of petroleum extraction activities occurring on the Outer Continental Shelf. The primary industries are those activities relating to oil companies and their vendors to discover, produce, and transport crude oil and natural gas to processing locations. Secondary industries are defined as those activities which provide general support to oil companies or their vendors, but not necessarily specialized to the petroleum industry, as well as those that further process or distribute oil and gas (Division of Advanced Environmental Research and Technology, 1976: 5). See Chapter 1.

The chapter is divided into two major sectors dealing with the employment in primary industries and secondary industries. The primary section is further subdivided into five subsections--exploration, drilling, production, pipe laying, and water transportation; while the secondary section focuses on boat building and heavy construction.

Each subdivision is broadly described; a brief description, along with the educational and vocational requirements for each of the job types in each subsection is given; and finally, the number of employees per job type per crew, platform, etc. is presented.[1]

Unless specifically noted, all the information concerning the job type descriptions, educational requirements, and vocational requirements was obtained from The Dictionary of Occupational Titles, Third Edition, Volumes I and II, 1965 and Supplement (1966) by the U.S. Employment Service of the Department of Labor.

PRIMARY INDUSTRIES

Exploration

The exploration segment of the oil and gas industry can be broken down into three distinct phases:

1. regional surveys to identify promising geological formations;
2. detailed surveys upon which to base the evaluation of specific tracts; and
3. exploratory drilling to determine whether oil or gas are actually present (Kash, 1973: 26).

Phase 1 of exploration is generally passive in nature and includes looking for natural oil seeps, local variations in the earth's gravity, and various methods of detecting changes in the earth's magnetic field, all of which may indicate the presence of oil. Salt domes, a prime location

[1]Due to a lack of total employment data for each specific job type (LaPlace, 1976: S1, p. 10), it was necessary to compile an average number of employment types per platform, crew, etc.

for oil deposits along Louisiana's Gulf Coast, are located primarily by detecting variations of gravity readings (Kash, 1973: 27).

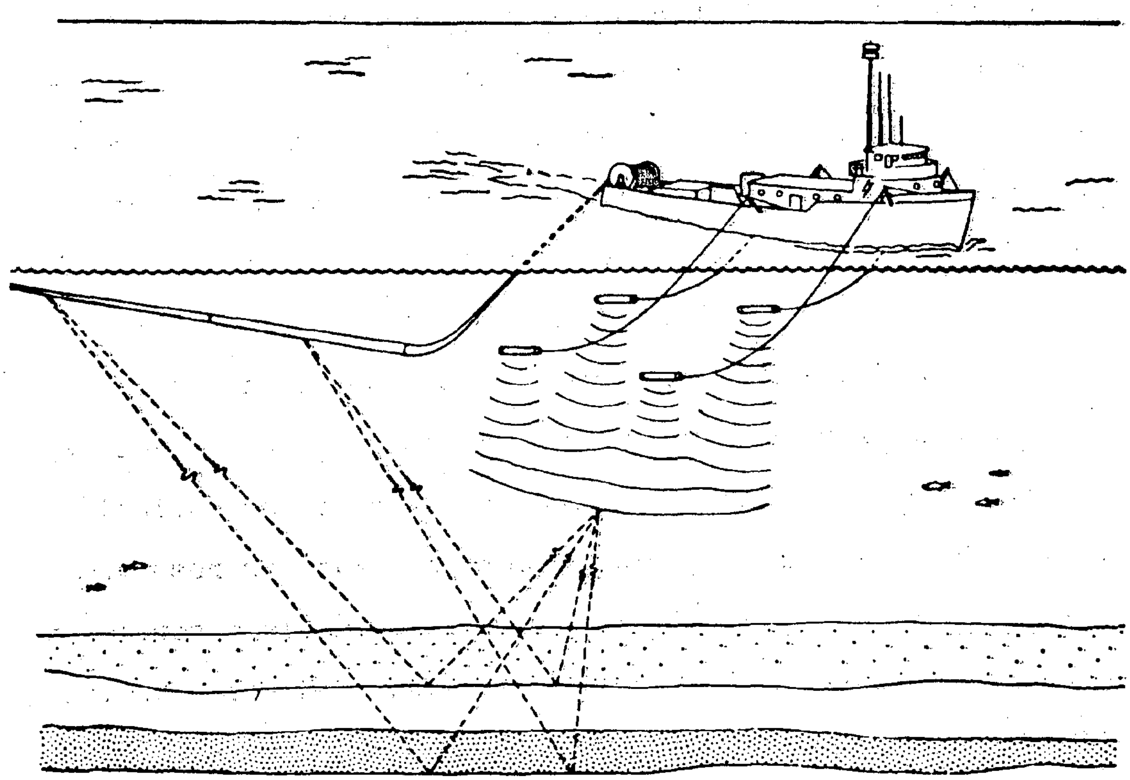
Phase 2 involves a more detailed analysis of specific tracts of land, primarily by two techniques: seismic surveying, and direct hydrocarbon detection. Basically, seismic detection, as shown in Figure 2.1, involves the transmission of pulses to the ocean floor and then recording them on a seismograph as they bounce back to the surface. The time it takes (intervals) for the waves to go down and come back reveals whether the formation is hard or soft (soft being a crude indication of the presence of oil or gas) and the actual depth of the formation (Shell, 1975: 8). Direct hydrocarbon detection is the latest technological advance in the effort to locate more oil and gas reserves (Offshore, January 1976a: 100). It is actually a series of new and different techniques which measure physico-chemical phenomena (generation of an electric current) in rocks associated with the presence of underground pooled hydrocarbons (Pirson, 1973: 63-66). Recent gains in successfully pinpointing probable deposits have been indirectly attributed to these new techniques.

Phase 3 is centered around the drilling of exploratory wells by one of the four basic types of mobile platforms: drill ships, jack-ups, semi-submersibles, or barges.[2] Each type is designated for and limited by the depth of the

[2] A more detailed description of each type will be given in the upcoming analysis of drilling platforms.

FIGURE 2.1

SEISMIC SURVEYING



Source: Council on Environmental Quality, 1974-I: 57.

water in which it will be operating and the average adverse weather conditions that can be expected to be encountered (Council on Environmental Quality, 1974-III: A-3).

Due to the similarity of exploration drilling personnel and drilling platform personnel, those job types which are normally associated with either kind of drilling will be described and their requirements given in the subsection concerning platform employment. Exploration employment focuses on the job types associated with seismic crews and their support personnel.

Exploration Job Types with Educational and Vocational Requirements

Job types listed in this subsection are included in the SIC Classification Codes under Major Group 13--Crude Petroleum and Natural Gas. They are found under two different industry numbers; 1311--Crude Petroleum and Natural Gas, and 1382--Oil and Gas Field Exploration Services, which are described in Chapter 1. Industry Number 1311 represents those oil companies which do their own exploratory work while Industry Number 1382 represents those companies engaged in exploration work for oil and gas on a contract, fee, or other basis.

Computer Chief, Seismograph. Supervises Computers, Seismograph in computation of depths of subsurface rock strata from seismograph recordings.

Educational Requirements: Bachelor's degree in occupational specialty.

Vocational Requirements: 2 to 4 years experience.

Computer, Electrical Prospecting. Computes and interprets data on variations in gravity pull, resistivity to electrical charges, or magnetic attraction of different earth formations for use in determining location of petroleum deposits.

Educational Requirements: Bachelor's degree in occupational specialty.

Vocational Requirements: Survey technical training.

Computer, Seismograph (seismic coordinator). Analyzes seismograph recordings to provide data for delineating contours of subsurface stratigraphy which may reveal earth formations favorable to petroleum deposition.

Same Educational and Vocational Requirements as listed for Computer, Electrical Prospecting.

Core Analyst (core analyst engineer). Analyzes cores taken from subsurface earth formations for porosity, permeability, oil or water saturation, combustible gas content, and amount of gas by volume to determine productivity of oil or gas bearing formations.

Educational Requirements: Bachelor's degree in Geology.

Vocational Requirements: 1 to 2 years experience.

Draftsman, Directional Survey. Specializes in plotting oil-or-gas-well boreholes from photographic subsurface survey recordings and other data.

Educational Requirements: High school diploma with some course work in mathematics.

Vocational Requirements: Course work in drafting methods and procedures.

Draftsman, Geological. Specializes in making maps, diagrams, profiles, and cross-sections to represent geological stratigraphy and locations of oil and gas deposits by correlating and interpreting data obtained from topographical surveys, from well logs, and from geophysical prospecting.

Same requirements as found under Draftsman, Directional Survey with some experience in specialization helpful.

Draftsman, Geophysical. Specializes in drawing subsurface contours in rock formations from data obtained by geophysical prospecting party.

Same requirements as found under Draftsman, Directional Survey with some experience in specialization helpful.

Electrical-Line Splicer (cable splicer). Splices conductor cables used to lower electrical testing or surveying instruments into oil or gas wells or boreholes, using handtools.

Vocational Requirements: Graduate of an approved apprenticeship program or sufficient on-the-job training.

Electrical-Prospecting Engineer (electrical engineer, geophysical prospecting). Designs and develops electrical and electronic instruments and equipment used in petroleum prospecting with the seismograph, magnetometer, and other instruments which detect and measure various physical properties of the earth's crust.

Educational Requirements: Bachelor's degree in engineering with many employers now requiring advanced graduate degrees when there is a lack of significant work experience.

Vocational Requirements: Minimum of 4 years experience.

Electrical Prospector (geophysical prospector). Studies structure of subsurface rock formations to locate petroleum deposits, using such physical and electrical testing instruments as seismograph, gravimeter, torsion balance, magnetometer, pendulum devices, and electrical-resistivity appartus to measure various characteristics of the earth.

Educational Requirements: Bachelor's degree in Electrical Engineering.

Vocational Requirements: Minimum of 4 years experience.

File Clerk, Geological Records. Files geological records, performs clerical work in searching and investigating information contained in files.

Educational Requirements: High school diploma.

Vocational Requirements: Some training in elementary clerical skills.

Geologist, Petroleum. Explores and charts stratigraphic arrangement and composition of earth to locate gas and oil deposits: studies well logs, analyzes cores and cuttings from well drillings, and interprets data obtained by electrical or radioactive well logging and other subsurface surveys to identify each strata.

Educational Requirements: Bachelor's degree in geology with specialization in petroleum field.

Vocational Requirements: Minimum of 4 years experience.

Geophysical-Laboratory Supervisor (director, geophysical laboratory; engineer, chief, geophysical laboratory; research engineer, geophysical laboratory; superintendent, geophysical laboratory). Plans and coordinates research activities of geophysical laboratory to develop new or improved instruments and methods for measuring physical characteristics of earth's crust which provide data for petroleum exploration.

Educational Requirements: Most employers require a Master's degree in Geology.

Vocational Requirements: Minimum of 10 years work experience.

Gravity-Meter Observer (gravity-prospecting operator; recorder, gravity prospecting). Records readings of gravity meter, torsion balance, and other gravity-measuring instruments at various points in terrain to obtain data regarding gravity characteristics indicating potential source of petroleum deposits.

Educational Requirements: High school diploma.

Vocational Requirements: Course work in surveying at technical or vocational school.

Gravity Prospector (geophysical prospector). Studies structure of subsurface rock formations to locate petroleum deposits, using such physical and electrical testing instruments as seismograph, gravimeter, torsion balance, magnetometer, pendulum devices, and electrical-resistivity apparatus to measure various characteristics of the earth.

Educational Requirements: Bachelor's degree in Geology.

Vocational Requirements: Minimum of 4 years experience.

Instrument-Maker-and-Repairman. Sets up and operates variety of machines to remodel electrical and electronic instruments used in electrical logging, gun perforating, sub-surface surveying, and other oil well, gas well, or borehole prospecting, testing, and servicing operations.

Educational Requirements: High school diploma.
Vocational Requirements: Basic electronic course work.

Manager, Field Party, Geophysical Prospecting. Directs activities in petroleum company concerned with providing transportation, supplies, housing, and other requirements for field party prospecting for petroleum reserves.

Educational Requirements: Master's degree in Geology. Also, extensive experience in field work.

Observer, Electrical Prospecting (electrical-logging engineer; electrical-prospecting operator). Measures resistance of earth formations to electrical charges, using electrical apparatus, to obtain data for locating rock strata favorable to further petroleum exploration activities.

Educational Requirements: High school diploma.
Vocational Requirements: Basic electronic course work.

Observer Helper, Gravity Prospecting (gravity-prospecting-operator helper; recorder helper, gravity prospecting). Assists Observer, Electrical Prospecting in measuring the resistance of earth formations to electrical charges, using electrical apparatus, to obtain data for locating rock strata favorable to further petroleum exploration activities.

Entry is usually by interest and possession of necessary physical abilities. Proficiency is acquired through on-the-job training methods.

Observer Helper, Seismic Prospecting (observer helper; recorder helper, seismograph; seismograph-operator helper). Performs any routine tasks in seismic prospecting for petroleum-bearing rock strata.

Entry is usually by interest and possession of necessary physical abilities. Proficiency is acquired through on-the-job training methods.

Observer, Seismic Prospecting (field seismologist; geophysical operator; section-plotter operator). Supervises and coordinates activities of workers engaged in setting up, operating, and maintaining electrical, photographic, and sound apparatus to produce seismic waves by regulated explosions and to record waves as they are reflected or refracted from subsurface strata, to obtain data for subsequent analysis of rock formations.

Educational Requirements:	Bachelor's degree in either Petroleum Egnineering, Electrical Engineering, or Geology.
Vocational Requirements:	Minimum of 2 to 4 years experience.

Paleontological Helper (laboratory assistant II). Performs duties associated with analyzing and classifying rock and fossil specimens.

Educational Requirements: High school diploma plus some geology courses providing laboratory experience.

Vocational Requirements: 3 to 6 months experience.

Permit Agent, Geophysical Prospecting. Negotiates permit with property owners to allow prospecting, surveying, and testing for petroleum deposits.

Educational Requirements: Law degree with extensive undergraduate course work in geology.

Vocational Requirements: 1 to 2 years experience.

Prospecting Driller (core driller; driller; rotary driller, prospecting; shothole driller). Operates portable rotary drilling rig to drill shallow boreholes to obtain samples of earth formations, for placement of explosives in seismic prospecting, or for other prospecting tests to discover petroleum.

Vocational Requirements: 1 to 2 years experience.

Prospect-Driller Helper. Performs same tasks as described under Observer Helper, Seismic Prospecting.

Vocational Requirements: 3 to 6 months experience.

Radioactivity-Instrument-Maintenance Technician (radioactivity technician). Repairs and services electrical radioactivity-detecting instruments used to locate radioactive formations in oil or gas well boreholes, using special testing apparatus.

Vocational Requirements: Training in basic electronic courses. Military electronics training and experience considered an asset.

Scout. Investigates and collects information concerning oil well drilling operations, geological and geophysical prospecting, and land and lease contracts from other oilfields, the press, lease brokers, individuals, and organizations leading to possible discovery of new oilfields.

Educational Requirements: Bachelor's degree in Geology with some legal training.

Vocational Requirements: Minimum of 2 to 4 years experience.

Scout, Chief (scout, senior). Coordinates activities of Scouts in obtaining data concerning exploration for and development of oil and gas fields by competitive petroleum companies or individuals.

Educational Requirements: Bachelor's degree in Geology with some legal training.

Vocational Requirements: 2 to 4 years experience.

Section-Plotter Operator I. Operates electronically controlled sound reproducing and photographic equipment (section plotter) to record seismic waves from magnetic tape recordings of explosions reflected or refracted from subsurface strata.

Educational Requirements: High school diploma.

Vocational Requirements: Training in basic electronic courses.

Shooter, Seismograph (shot-hole shooter). Detonates dynamite or other explosive charges in shallow boreholes to set up seismic waves that are recorded by seismic instruments and interpreted to reveal subsurface rock formations likely to contain petroleum deposits.

Vocational Requirements: Working knowledge of electronics and explosives. Must be licensed by Federal Government to handle explosives.

Shop Foreman (electronics supervisor; research-shop foreman). Supervises and coordinates activities of Instrument-Maker and Repairman in constructing, maintaining, and repairing mechanical and electronic instruments and equipment used in petroleum prospecting and oil and gas well surveying and servicing.

Educational Requirements: High school diploma.

Vocational Requirements: Basic electronic course work. Extensive experience in directly related field.

Surveyor, Geophysical Prospecting. Locates and marks sites selected for conducting geophysical prospecting activities concerned with locating subsurface earth formations likely to contain petroleum deposits.

Educational Requirements: High school diploma.

Vocational Requirements: Graduate of a comprehensive program in surveying.

Tool Pusher, Shallow-Exploratory Drilling. Supervises Prospecting Drillers drilling shallow boreholes for use in seismic prospecting or to obtain core samples.

Educational Requirements: High school diploma.

Vocational Requirements: Minimum of 4 to 10 years experience.

Table 2.1 is a list of exploratory job types which can be found at any given time operating in the Gulf of Mexico as a seismic crew. In order to include all the types, it was necessary to compile a comprehensive listing rather than an average crew make-up which may contain only some of these persons.

TABLE 2.1

COMPREHENSIVE LISTING OF JOB TYPES

AND AVERAGE NUMBER PER TYPE

FOUND ON ONE EXPLORATORY SEISMIC VESSEL[1]

Job Type	Number
Computer Chief, Seismograph	1
Computer, Electrical Prospecting	1
Computer, Seismograph	1
Core Analyst	1
Electrical-Prospecting Engineer	1
Electrical Prospector	1
Geologist, Petroleum	1
Gravity-Meter Observer	1
Gravity Prospector	1
Manager, Field Party, Geophysical Prospecting	1
Observer, Electrical Prospecting	1
Observer Helper, Gravity Prospecting	1
Observer Helper, Seismic Prospecting	1
Observer, Seismic Prospecting	1
Section-Plotter Operator I	1
Shooter, Seismograph	1
Surveyor, Geophysical Prospecting	1

[1]Does not include personnel who are involved with the operation and maintenance of vessel. There is one crew per vessel.

Source: Cate, 1976.

Drilling Platforms

There are five basic types of drilling platforms found on Louisiana's Outer Continental Shelf. They are: barges, semi-submersibles, drill-ships, jack-ups, and fixed. Four of these types--barges, semi-submersibles, drill-ships, and jack-ups--are primarily used in the exploration facet of the oil industry, but may also be used, after oil or gas discovery, when drilling production wells.

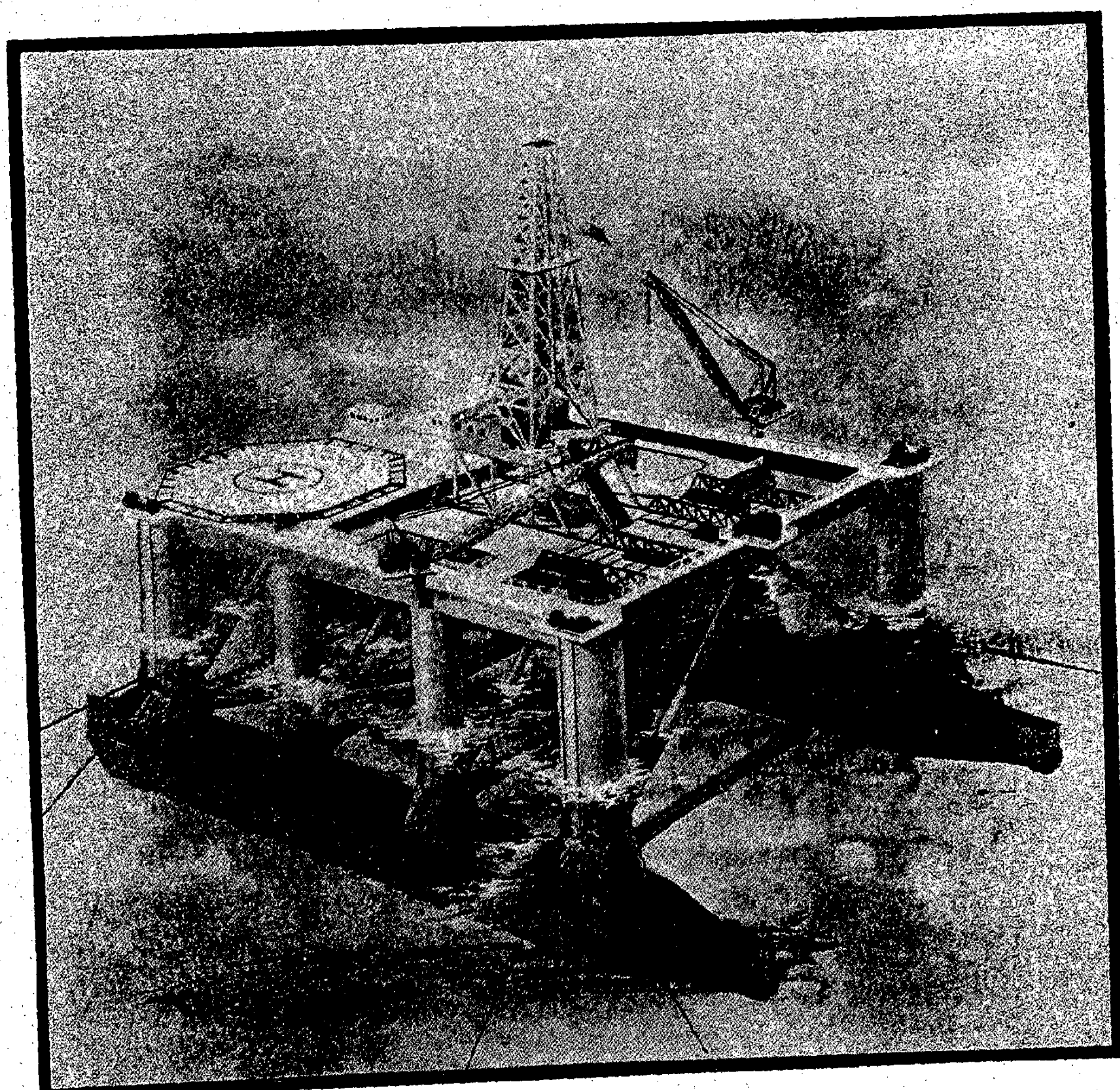
Barges are used to drill in water depths of up to 600 feet. This depth limitation is primarily imposed by the anchor and chain systems used for maintaining position. Other disadvantages are that they are easily affected by adverse weather conditions and a lack of self-propulsion (Kash, 1973: 37).

Semi-submersibles are self-contained and supported by either lower displacement type hulls or by large caissons (Figure 2.2). After towing to the drilling site, the caissons are then flooded, causing a portion of the rig to be below the sea level. This procedure causes the rig to be virtually unaffected by wave action and generally more stable than a drill ship. Another advantage is that they act as fixed platforms when drilling in shallow water (Jenner et al., 1973: 127).

Jack-ups are platforms with legs that can be extended up or down, depending upon the desired depth of water at which the drilling will take place (Figure 2.3). With the

FIGURE 2.2

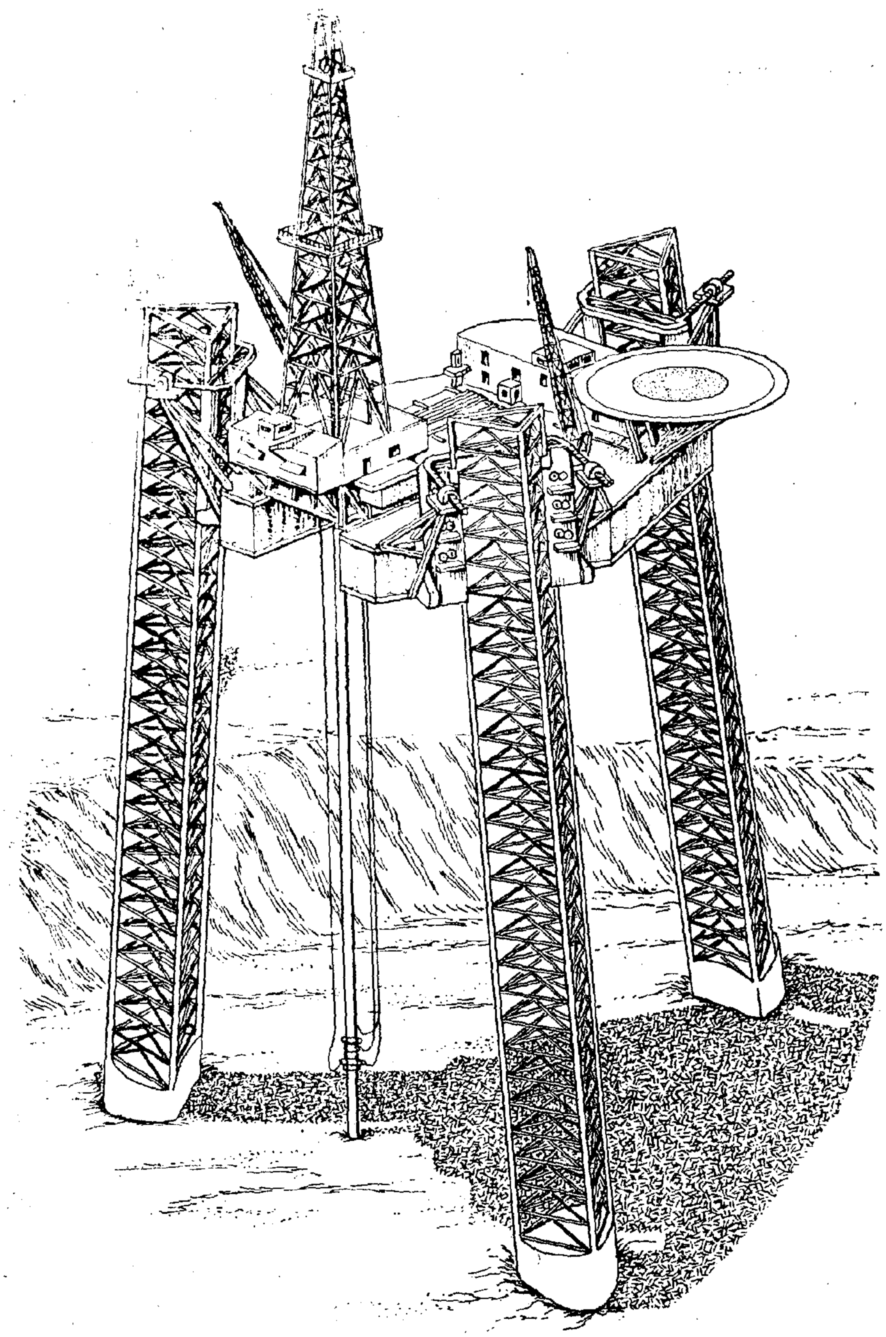
SEMI-SUBMERSIBLE DRILLING PLATFORM



Source: Council on Environmental Quality, 1974-I: 59.

FIGURE 2.3

A JACK-UP DRILLING PLATFORM



Source: Fortune, February 1965: 133.

legs retracted, it becomes a floating platform, thus allowing it to be moved to other sections of the field. It can be used either for exploratory drilling when only one well is desired or for multiwell production platform drilling. Its advantages are its economy of operation, stability, and the speed with which it can begin operation after arrival upon the drilling site (Jenner et al., 1973: 121-125).

Drill ships (Figure 2.4) are self-propelled and therefore capable of moving from one drilling location to another without the assistance of ocean tugs or other propulsion units. Two methods, a mooring system with anchors and chains or a dynamic positioning system, are used to keep the vessel stable during drilling operations (Kash, 1973: 39).

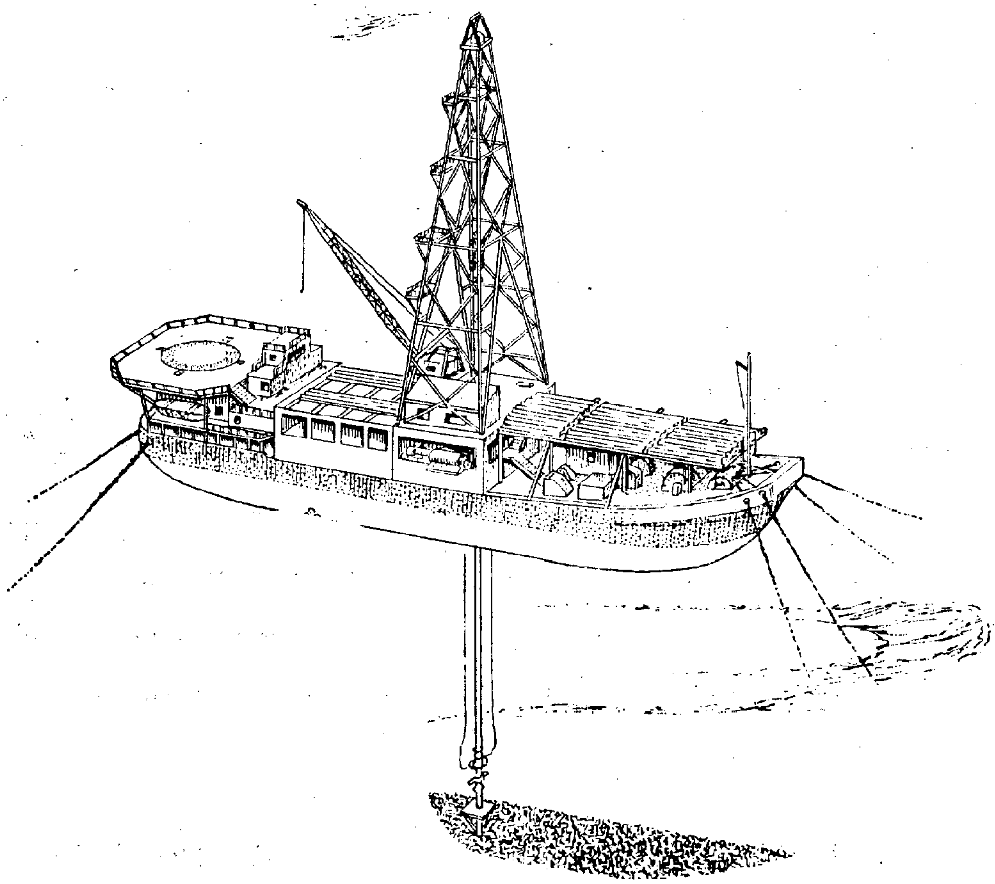
Fixed platforms (Figure 2.5) are employed after the initial discovery, normally by one of the other four types of rigs. They are used in the developmental stage of a field when it becomes necessary to drill from 10 to 40 individual wells directionally for production (Jenner, et al., 1973: 121).

Drilling Job Types with Educational and Vocational Requirements

Job types listed in this subsection are included in the SIC classification codes under Major Group 13--Crude Petroleum and Natural Gas. They are found under two different industry numbers: 1311--Crude Petroleum and Natural Gas,

FIGURE 2.4

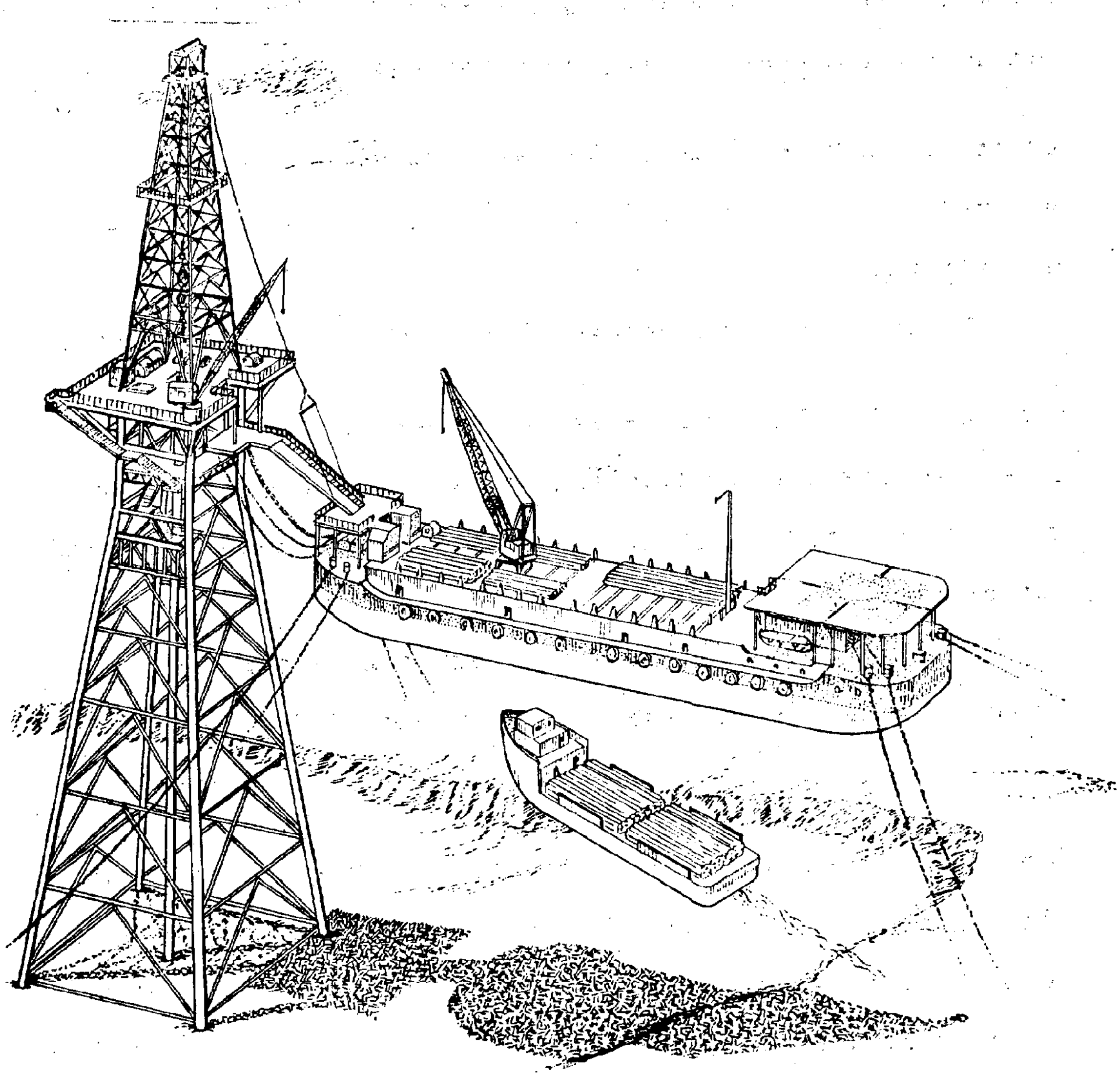
DRILL SHIP



Source: Fortune, February 1965: 134.

FIGURE 2.5

FIXED DRILLING PLATFORM



Source: Fortune, February 1965: 132.

and 1381--Drilling Oil and Gas Wells (described in Chapter 1). Number 1311 represents those oil companies which do their own drilling while Industry Number 1381 represents those companies engaged in drilling wells for oil or gas for others on a contract, fee, or other basis.

Caser (casing-crew man). Installs steel casing in oil and gas wells to prevent collapse of wells during drilling operations.

Vocational Requirements: 3 to 6 months experience.

Cementer, Oil Well (oil-well-tool-operator). Controls cement mixing and pumping equipment to calk openings in walls or casings of gas or oil wells and in permeable rock formations.

Educational Requirements: High school diploma.

Vocational Requirements: Minimum of 4 to 6 years on-the-job training.

Cementer Helper, Oil Well. Assists Oil Well Cementer in the mixing of cement and the operation of pumping equipment to calk openings in walls or casings of gas or oil wells and in permeable rock formations.

Vocational Requirements: 6 months to 1 year experience.

Derrickman (rotary derrickman). Rigs derrick equipment and operates pumps to circulate mud through drill hole: sets and bolts down block to posts at top of derrick.

Vocational Requirements: 6 months to 1 year experience.

Derrickman Helper. Assists Derrickman in the rigging of derrick equipment and operating pumps to circulate mud through drill holes.

Vocational Requirements: 3 to 6 months experience.

Directional, Drilling Engineer (drilling engineer). Plans use of special oil well drilling techniques and tools to control direction of drilling and thereby overcomes certain production problems.

Educational Requirements: Master's degree in Petroleum Engineering or a bachelor's degree with a significant amount of experience.

Vocational Requirements: Minimum of 4 years experience.

Dispatcher, Oil Well. Dispatches oil well servicing crews to service assignments and relays communications to crew and other field personnel, using telephone and radio communication equipment.

Educational Requirements: High school diploma.

Vocational Requirements: 6 months to 1 years work experience.

District Supervisor, Mud Analysis Well Logging (mud-analysis-well-logging supervisor, district; mud-engineer; mud-logging superintendent). Plans mud-sample testing operations and interprets mud analysis logs.

Educational Requirements: Bachelor's degree in Petroleum Engineering.

Vocational Requirements: Minimum of 4 to 10 years work experience.

Draftsman, Oil and Gas. Drafts plans and drawings for layout, construction, and operation of oil fields, refineries, and pipeline systems from field notes, rough or detailed sketches, and specifications.

Educational Requirements: Preferably a graduate of a technical or trade school with a two-year drafting program.

Vocational Requirements: 2 to 4 years experience.

Dumper-Bailer Operator. Dumps sand and cement over shot of nitroglycerine in oil or gas wells to provide tap and bridge over area to be shot, using special bailer and hoist.

No specific educational or vocational requirements.

Electrical Foreman. Supervises and coordinates activities of workers installing, repairing, and inspecting oilfield electrical equipment, such as primary and secondary power-lines, transformers, submarine cables to offshore well sites, and electric motors.

Vocational Requirements: Journeyman Electrician status.

Field Engineer. Oversees civil, electrical, and mechanical engineering activities concerned with production and transmission of natural gas and oil, and with provision of utilities at oil or gas field, or in pipeline system.

Educational Requirements: Bachelor's degree in Petroleum Engineering.

Vocational Requirements: Minimum of 4 to 10 years experience.

Foreman, Rig Building. Supervises and coordinates activities of rig-building crews engaged in constructing, repairing, and dismantling steel rigs used for drilling oil or gas wells.

Educational Requirements: High school diploma.

Vocational Requirements: Minimum of 2 to 4 years experience.

Lead-Tong Man (driller helper; floorman; rotary helper; roughneck). Assists Rotary Driller in operating machinery to drill oil or gas well, using handtools and power tongs and wrenches.

Vocational Requirements: 3 to 6 months experience.

Mining Investigator. Investigates earth subsidence in oil fields, caused by mining, to formulate drilling procedures; analyzes maps and records of mining companies to determine location and extent of mines and mining veins.

Educational Requirements: Master's degree in Petroleum Engineering or Geology.

Vocational Requirements: 2 to 4 years experience.

Mud-Cleaning-Machine Operator. Tends mud-cleaning machine that separates drillings from mud (slush circulated through well to cool drill bit, to wash up drillings, and to seal walls of borehole).

Vocational Requirements: Some machine shop courses in high school or trade school.

Mud Plant Operator (mud-mixing-plant operator). Tends machine that mixes mud for use in drilling oil and gas wells.

Vocational Requirements: Some machine shop courses in high school or trade school.

Petroleum Engineer. Devises methods to improve oil or gas well production and determines need for new or modified tool designs.

Educational Requirements: Bachelor's degree in Petroleum Engineering.

Vocational Requirements: Minimum of 4 years experience.

Pipe Racker. Performs specific task of pipe racking and other duties as previously listed under Rotary-Driller Helper.

Vocational Requirements: 3 to 6 months experience.

Pneumatic-Jack Operator (DeLong jack operator). Operates pneumatic jack on offshore oil drilling rigs.

Vocational Requirements: Some machine shop courses in high school or trade school.

Rotary Driller (core driller; driller; well driller). Operates gasoline, diesel, electric, or steam draw works to drill oil or gas wells.

Vocational Requirements: 1 to 2 years work experience.

Rotary-Driller Helper (driller helper; floorman; rotary helper; roughneck). Assists Rotary Driller in operating machinery to drill oil or gas well, using handtools, power tongs, and wrenches.

Vocational Requirements: 3 to 6 months experience.

Rotary-Rig Engineman (diesel- or gas-engine engineer; engineman; gas- or diesel-engine engineer). Operates gasoline, natural gas, or diesel engines to supply power for rotary oil well drilling machinery.

Vocational Requirements: Diesel and/or gasoline engine courses in high school or trade school.

Roustabout (connection man; gang man; roughneck). Assembles and repairs oilfield equipment, using handtools and power tools.

Vocational Requirements: Minimum of 3 months experience.

Serviceman, Oil Well (oil-well-electrical-wall-sampling-device operator; rigman, electric well-services; sample-taker operator). Obtains sample of earth formations in side walls of oil well boreholes, using electrically exploding device.

Vocational Requirements: Basic electronic courses in trade or vocational school. May be required to have license for the handling of explosives.

Steward. Supervises and coordinates activities of Steward Helpers in the preparation of meals for various crews and personnel and the general maintenance of all the quarters on the platform.

Vocational Requirements: 2 to 4 years work experience.

Steward Helper. Prepares meals for various crews and personnel and responsible for general maintenance of crew's quarters on the platform.

No specific educational or vocational requirements.

Superintendent, Oilfield Drilling (district superintendent; division superintendent). Directs activities concerned with exploratory drilling, and in drilling oil wells and producing oil and gas from wells within one or more oilfields: plans erection of drilling rigs, and installation and maintenance of equipment, such as pumping units and compressors stations.

Educational Requirements: Master's degree in Petroleum Engineering.

Vocational Requirements: Minimum of 4 to 10 years experience.

Superintendent, Oil Well Services (manager, oil-well services). Directs activities concerned with providing technical services, such as electrical well logging, gun perforating, and directional or caliper surveying, to assist in solving special oil well drilling and production problems.

Educational Requirements: Master's degree in Petroleum Engineering.

Vocational Requirements: Minimum of 4 to 10 years experience.

Tool Pusher (drilling foreman; drilling-tool foreman; lease foreman; superintendent, drilling). Supervises and coordinates activities of workers engaged in drilling oil and gas wells in area consisting of one or more well sites.

Vocational Requirements: Minimum of 4 to 10 years experience.

Table 2.2 shows a comprehensive listing of the various job types and numbers which can be found on a drilling platform. A comprehensive list was compiled because of the fluctuations in actual numbers as a result of the various services being provided at any given moment by numerous contractors. The listing is for one crew, while there are normally two crews

TABLE 2.2

COMPREHENSIVE LISTING OF JOB TYPES

AND AVERAGE NUMBER PER TYPE FOUND

PER CREW ON ONE DRILLING PLATFORM*

Job Type	Number
Caser	1
Cementer	1
Cementer Helper	1
Derrickman	1
Derrickman Helper	1
Directional Drilling Engineer	1
Dispatcher, Oil Well	1
District Supervisor, Mud-Analysis Well Logging	1
Draftsman, Oil and Gas	1
Dumper-Bailer Operator	1
Electrical Foreman	1
Field Engineer	1
Fishing-Tool Technician	1
Foreman, Rig Building	1
Lead-Tong Man	1
Mining Investigator	1
Mud-Cleaning Machine Operator	1
Mud Plant Operator	1
Petroleum Engineer	1
Pipe Racker	1
Pneumatic-Jack Operator	1
Rotary Driller	1
Rotary-Driller Helper	1
Rotary-Rig Engineman	1
Roustabout	36
Serviceman, Oil Well	1
Steward	1
Steward Helper	1
Superintendent, Oilfield Drilling	1
Superintendent, Oil Well Services	1
Toolpusher	6
Welder	1
TOTAL	80

*Normally two crews per platform, each serving a shift of 7 days off-7 days on.

Source: Henry and Perlander, 1976.

per rig.[3]

The figures compiled in Table 2.2 compare favorably with those tabulated for the environmental assessment studies concerning petroleum development off the Atlantic and Gulf of Alaska Outer Continental Shelves (Counil on Environmental Quality, 1974-IV: I-11). The estimates were 175 average employment per rig in the Atlantic and 150 persons per rig in Alaska, while the average employment per rig off the coast of Lafourche Parish is 160 persons.

Table 2.3 gives the number of fixed and mobile drilling rigs operating off the coast of Louisiana as of January, 1976. The term "mobile" is used to refer to various mobile drilling vessels or rigs such as barges, semi-submersibles, drill-ships, and jack-ups.

Production Platforms

Once exploratory drilling has located sufficient quantities of oil or natural gas, efforts must then be made to develop the field for production. Due to the complexity of the entire operation, many exploration and field development activities may overlap. Figure 2.6 gives a general breakdown of the overlapping which can occur, beginning before the lease sale and carrying through

[3] Each crew is responsible for the work load during its respective 7-day period (7 days on, 7 days off). Division of the crew is normally necessary to sustain round-the-clock operations (Sykes, 1976).

TABLE 2.3

ACTIVE PLATFORM RIGS, LOUISIANA 1976, BY AREA AND NUMBER

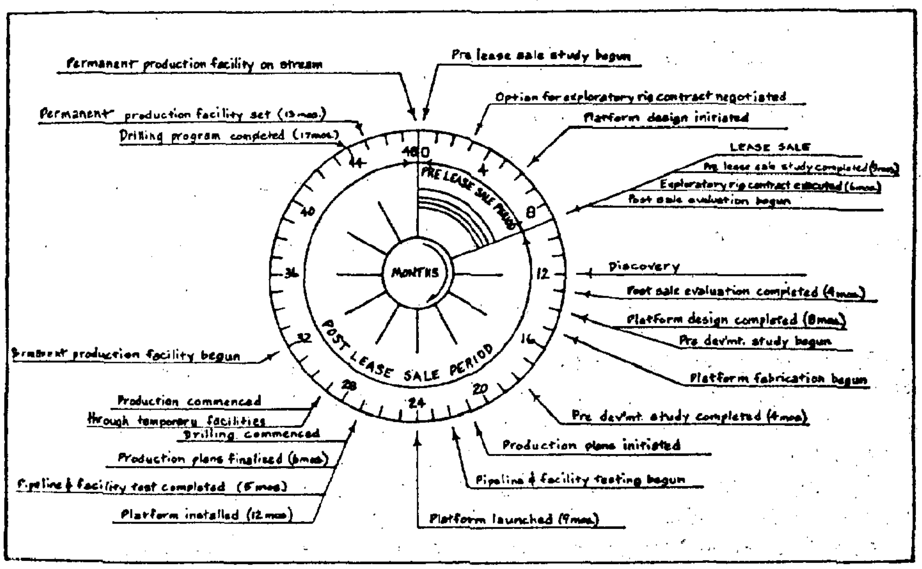
Area	Fixed Rigs	Mobile Rigs
Bay Marchand	2	0
Bayou Boeuf	1	0
Chandeleur Sound	0	1
East Cameron	7	3
Eugene Island	14	5
Grand Isle	5	1
High Island	4	0
Main Pass	7	2
Mobile South	0	4
St. Mary Parish	1	0
Ship Shoal	6	3
South Marsh Island	6	4
South Pass	5	5
South Pelto	1	0
South Timbalier	3	5
Vermilion	5	7
West Cameron	4	8
West Delta	10	1
TOTAL	81	49

Source: Offshore, January 1976b: 119-122; April, 1976: 170-175.

FIGURE 2.6

A HYPOTHETICAL FOUR-YEAR

OFFSHORE PLANNING AND FIELD DEVELOPMENT PROGRAM



Source: Kash, 1973: 49.

the installation of permanent production facilities (Kash, 1973: 49-50).

If the field is considered ready for development, a fixed platform is then installed. From this platform as many as twenty to thirty wells may be drilled. When the drilling phase has ceased, the drilling rig is disassembled and production equipment is installed on the platform (Council on Environmental Quality, 1974-I: 60). Directional drilling, as shown in Figure 2.7, is a drilling procedure used by many companies to reach remote areas of a reservoir from a single fixed platform.

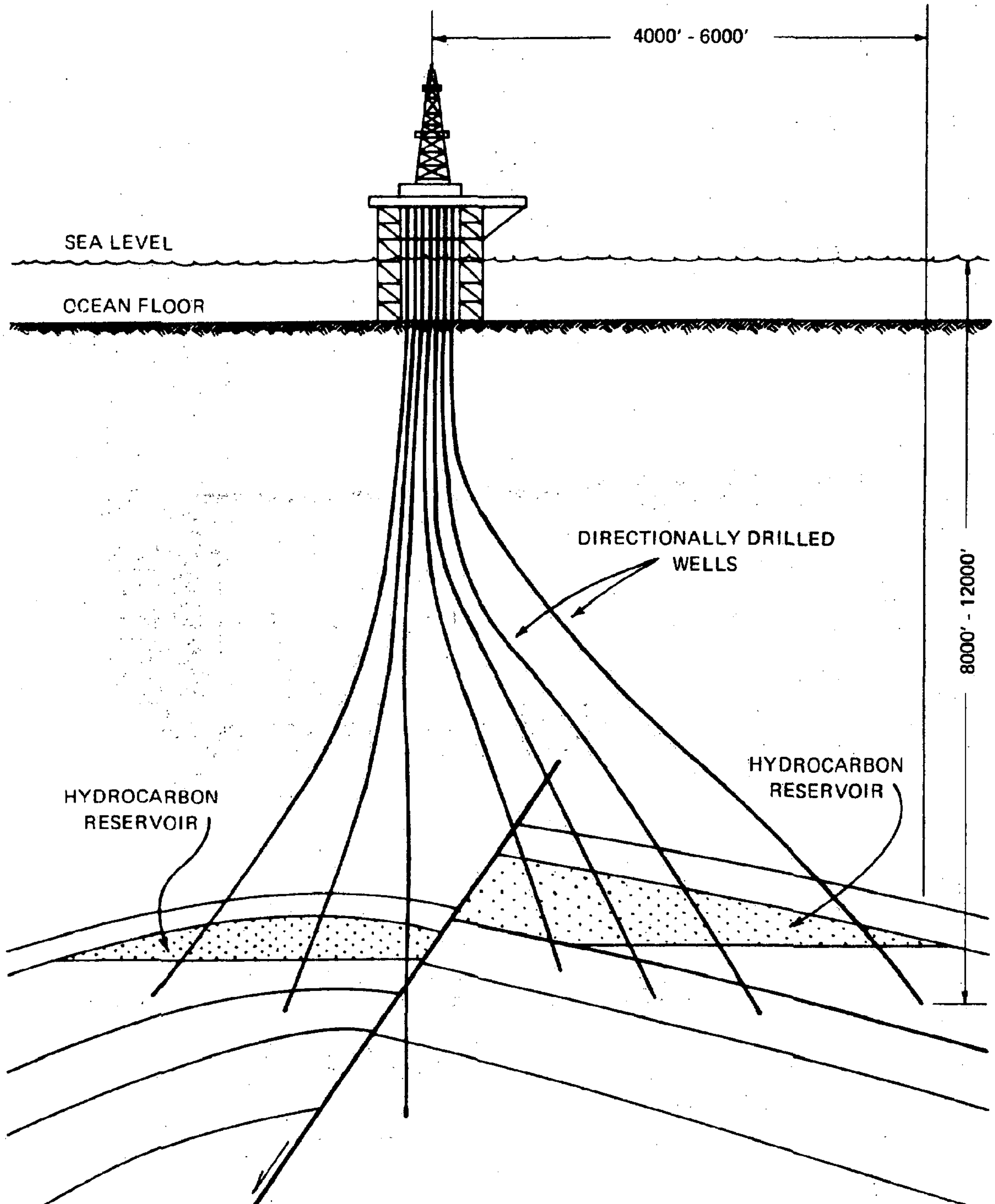
If the quantity of oil found in a reservoir is considered sufficient for commercial development, production results only after completion of the well:

> Completion can include setting and cementing casing, perforating (cutting holes in the casing which will permit oil or gas to flow from the formation into the well hole), fracturing (applying pressure or using explosives to increase permeability), acidizing (using acid to enlarge openings in the formation), consolidating sand (to keep sand from entering the well bore), setting tubing (conduit for routing the oil or gas to the surface), and installing downhole safety devices (values installed to prevent blowouts during production). Several of these completion activities are aimed at increasing production rate. If performed after initial completion, they are considered servicing or workover operations (Kash, 1973: 59-60).

Equipment on production platforms is used in a variety of ways to alter the crude oil and make it ready for shipment to onshore facilities for refining. Figure 2.8 shows the equipment used on a typical production platform to separate

FIGURE 2.7

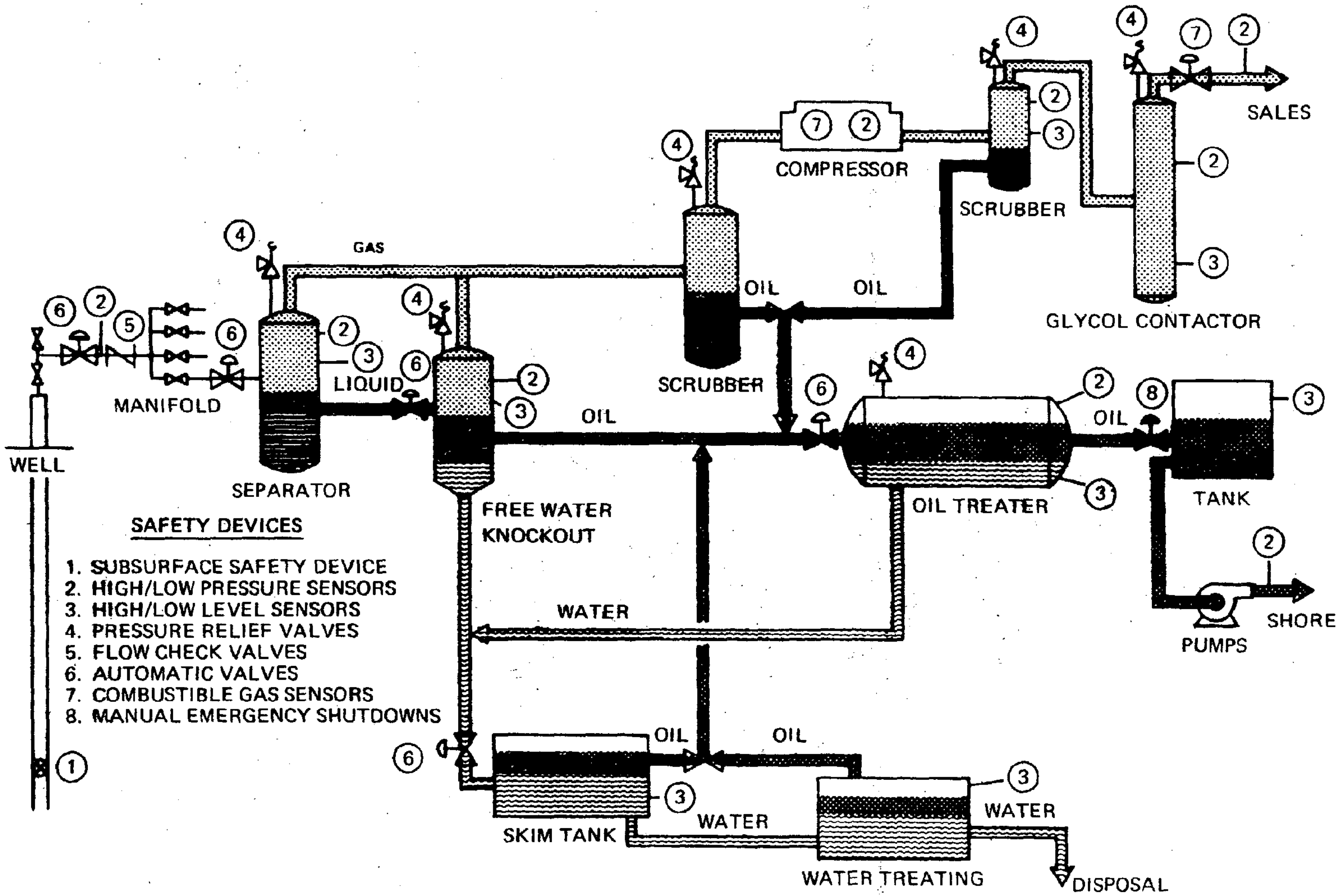
TYPICAL DIRECTIONALLY DRILLED WELLS



Source: Council on Environmental Quality, 1974-I: 64.

FIGURE 2.8

A TYPICAL PRODUCTION FACILITY WITH SAFETY EQUIPMENT



Source: Council on Environmental Quality, 1974-I: 66.

the crude into oil, gas, water, and solid impurities (Council on Environmental Quality, 1974-I: 65).

Production Job Types with Educational and Vocational Requirements

Job types listed in this subsection are included in the SIC classification codes under Major Group 13--Crude Petroleum and Natural Gas. They are found under two different industry numbers (which are described in Chapter 1), 1311--Crude Petroleum and Natural Gas, and 1389--Oil and Gas Field Services, Not Elsewhere Classified. Industry Number 1311 represents those oil companies which do their own production work while Industry Number 1389 represents those companies engaged in production services for others on a contract, fee, or other basis).

Acidizer (acid treater, oil well; oil-well-acidizing treater; oil-well-service operator). Controls blending and pumping equipment to treat oil or gas wells with acid to increase their production.

Vocational Requirements: 1 to 2 years work experience.

Acidizer Helper (acid-treater assistant, oil well; oil-well acidizing-treater assistant; oil-well-service operator helper). Assists acidizer in controlling, blending, and pumping equipment to treat oil or gas wells with acid.

No specific educational or vocational requirements.

Bottom-Hole-Pressure-Recording Operator. Sets up recording equipment at well site for use in determing pressure in oil or gas wells.

Vocational Requirements: Basic electronic courses in trade or vocational school.

Crude Oil Treater (dehydrator operator; dehydrator-plant operator; production operator; pumper; treater). Operates chemical, electrical, and centrifugal oil-treatment units to remove sediment and water from crude oil before it moves by pipeline to refineries.

Vocational Requirements: 6 months to 1 year work experience.

Fishing-Tool Technician, Oil Well. Analyzes conditions of unserviceable oil or gas wells and directs the use of special well-fishing tools and techniques to recover lost equipment and other obstacles from bore-holes of wells.

Vocational Requirements: Minimum of 2 to 4 years experience.

Foreman, Production (lease foreman; production foreman). Supervises and coordinates activities of workers engaged in pumping, gaging, and treating oil from wells within specified oilfield areas.

Educational Requirements: High school diploma.

Vocational Requirements: 4 to 10 years work experience.

Formation-Fracturing Operator (hydrafrac operator; oil-well-service operator). Operates high pressure hydraulic equipment to pump gel into wells to fracture gas- or oil-bearing rock formations.

Vocational Requirements: 1 to 2 years work experience.

Formation-Testing Operator (oil-well formation tester; testing-tool operator). Analyzes samples of fluids from specified formations in oil well to determine productivity of strata, using special testing equipment.

Vocational Requirements: 1 to 2 years work experience.

Formation-Fracturing-Operator Helper (hydrafrac-operator helper; oil-well service-operator helper). Assists Formation-Fracturing Operator in the pumping of gel into wells.

No specific educational or vocational requirements.

Gas Engineer. Devises methods to improve gas well production and determines need for new or modified tool designs.

Educational Requirements: Bachelor's degree in Petroleum Engineering.

Vocational Requirements: 4 to 10 years work experience.

Gun-Perforator Loader. Loads explosive powder or chemicals into gun perforators and carriers used in shooting or burning holes through tubing, casings, and earth formations.

Vocational Requirements: 6 months to 1 year of experience in the handling of explosives.

Hoist Operator (winch operator). Operates hoist to lower and raise instruments and tools into and out of oil or gas wells on electric conductor cable used to perform well services and surveys, such as directional drilling, electric well logging, perforating, side-wall sample taking, and free-point shooting.

Vocational Requirements: 6 months to 1 year experience.

Hydraulic Oil-Tool Operator (wall puller; casing puller; clutchman; pipe puller; pulling-machine operator; rig operator; rodman; tube puller; work-over rig operator). Controls power hoisting equipment to pull casing, tubing, and pumping rods from oil and gas wells for repair and to lower repaired equipment, testing devices, and servicing tools into well.

Vocational Requirements: 6 months to 1 year experience.

Nuclear Logging Engineer (surveyor, oil-well directional; oil-well-logging engineer). Measures sonar, electrical, or radioactive characteristics of earth formations in oil- or gas-bearing reservoirs, using sonic, electronic, or nuclear measuring instruments.

Educational Requirements: Bachelor's degree in either Geology or Petroleum Engineering.

Vocational Requirements: 2 to 4 years work experience.

Oil Pumper (oil-well pumper; pumper). Operates steam, gas, gasoline, electrical, or diesel pumps and auxiliary equipment to restore and control flow of oil from wells.

Vocational Requirements: 1 to 2 years work experience.

Perforation Operator, Oil Well (gun perforator; oil-well gun-perforator operator). Operates hoisting equipment and electrical control panel to position and explode charges in oil or gas wells to pierce drill pipes, casings, tubings, and fracture earth formations.

Vocational Requirements: 1 to 2 years work experience.

Pipe Tester. Operates hydraulic pump and auxiliary equipment to test oil well tubing or casing for high-pressure leaks.

Vocational Requirements: 6 months to 1 year work experience.

Service-Unit Operator, Oil Well (electric-well-service rigman; oil-well-sounding device operator). Operates equipment to increase oil flow from producing wells, or to remove stuck pipe, casing, tools, or other obstructions from drilling wells, using specialized subsurface tools and instruments.

Vocational Requirements: 2 to 4 years work experience.

Shooter (nitro man; oil-well shooter; torpedo shooter; well-shooter). Detonates torpedoes in bored oil wells to start or renew flow of oil in wells.

Vocational Requirements: Extensive experience with and licensed for the handling of explosives.

Superintendent, Oil Well Services (manager, oil-well services). Directs activities concerned with providing technical services, such as electrical well logging, gun perforating, and directional or caliper surveying, to assist in solving special oil well drilling and production problems.

Educational Requirements: Master's degree in Petroleum Engineering.

Vocational Requirements: Minimum of 4 to 10 years work experience.

Tank Setter (tank builder). Erects metal tanks for storing crude oil on production rigs.

Vocational Requirements: 1 to 2 years work experience.

Tank Setter Helper (tank-builder helper). Assists Tank Setter in the erection of metal tanks used to store crude oil.

No specific educational or vocational requirements.

Technical Operator (directional man; drilling inspector). Charts pressure, temperature, and other characteristics of oil and gas well boreholes or producing wells, using special subsurface instruments, and interprets findings for use in determining further drilling or producing procedures.

Vocational Requirements: Basic electronic course work in vocational or trade school helpful.

Well Puller (casing puller; clutchman; pipe puller; pulling-machine operator; rig operator, rodman; tube puller; work-over rig operator). Controls power hoisting equipment to pull casing tubing, and pumping rods from oil and gas wells for repair and to lower repaired equipment, testing devices, and servicing tools into well.

Vocational Requirements: 6 months to 1 year work experience.

Well Puller, Head. Supervises and coordinates activities of Well Puller in cleaning and servicing producing oil and gas wells, and in pulling pumping rods, casing, and tubing from wells, for repair or replacement.

Vocational Requirements: 2 to 4 years work experience.

Table 2.4 shows a comprehensive listing of the various job types and numbers which can be found on one production platform. A comprehensive listing was compiled because of the fluctuations in actual numbers as a result of the various services being provided at any given moment by numerous contractors.

Figure 2.9 shows the major oil and gas production fields located within forty miles of the southern tip of

TABLE 2.4

COMPREHENSIVE LISTING OF JOB TYPES

AND AVERAGE NUMBER PER TYPE

FOUND ON ONE PRODUCTION PLATFORM*

Job Type	Number
Acidizer	1
Acidizer Helper	1
Bottom-Hole-Pressure-Recording Operator	1
Crude Oil Treater	1
Electrician	1
Fishing-Tool Technician	1
Foreman, Production	1
Formation-Fracturing Operator	1
Formation-Testing Operator	1
Formation-Fracturing Operator Helper	1
Gas Engineer	1
Gun Perforator Loader	1
Hoist Operator	1
Hydraulic Oil-Tool Operator	1
Lease Operator	1
Nuclear Logging Engineer	1
Oil Pumper	1
Perforation Operator, Oil Well	1
Pipe Tester	1
Roustabouts	12
Service-Unit Operator	1
Shooter	1
Steward	1
Steward Helper	1
Superintendent, Oil Well Services	1
Tank Setter	1
Tank Setter Helper	1
Technical Operator	1
Toolpusher	2
Well Puller	1
Well Puller, Head	1
TOTAL	45

*Normally two crews per platform, each serving a shift of 7 days off-7 days on. See footnote 3.

Source: Henry and Perlander, 1976.

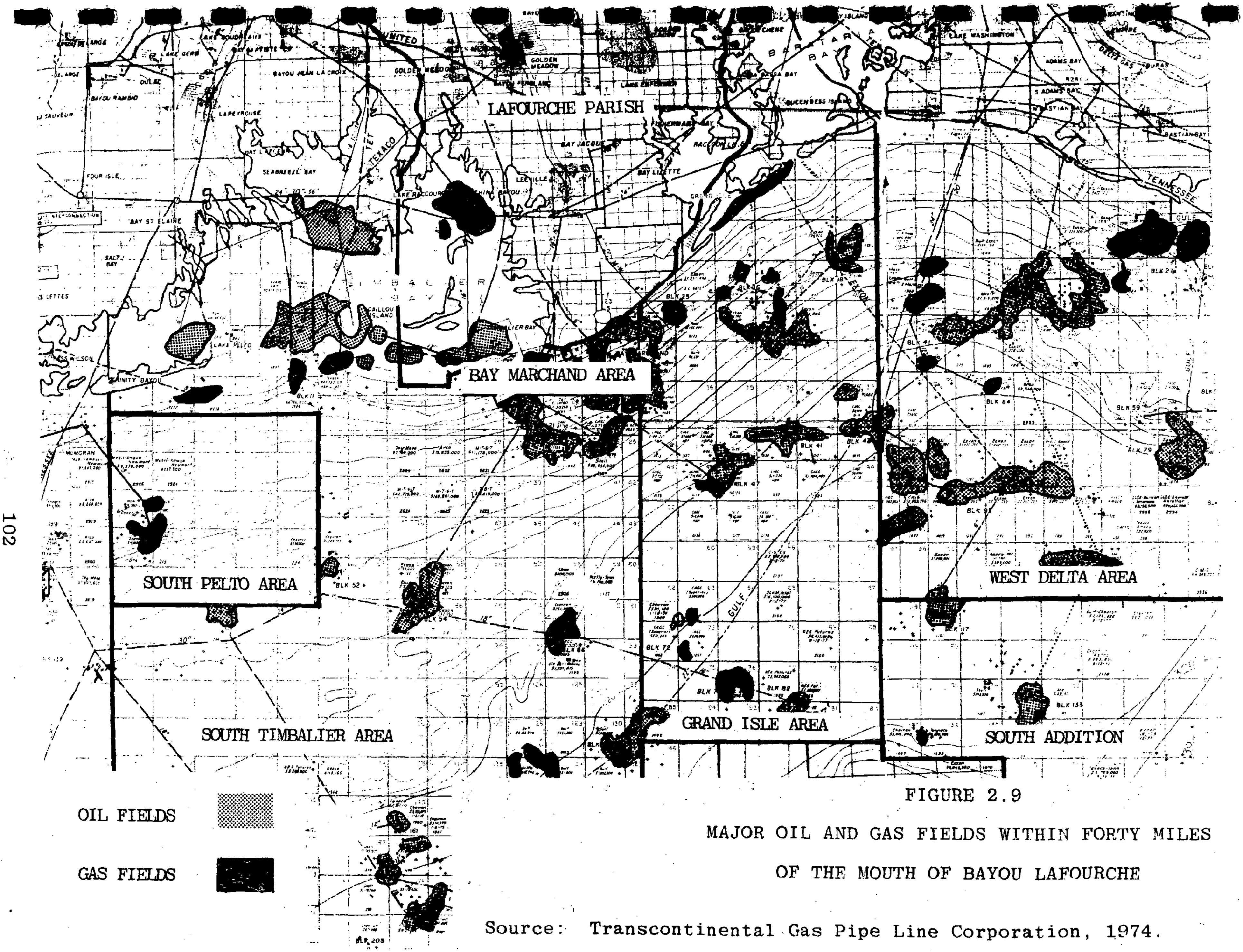


FIGURE 2.9

MAJOR OIL AND GAS FIELDS WITHIN FORTY MILES OF THE MOUTH OF BAYOU LAFOURCHE

Source: Transcontinental Gas Pipe Line Corporation, 1974.

Lafourche Parish. Concentrations of fields can be seen in the following areas: Bay Marchand, South Timbalier, Grand Isle, West Delta, and South Addition.

Pipelaying

The construction of pipelines for the collection or transmission of oil and natural gas from platforms on Lafourche's portion of the outer continental shelf entails laying pipe in offshore areas, marsh areas, and on firm ground. Each locale dictates the different methods, equipment, and personnel necessary to execute the operation, and, in many cases, all are necessary for the construction of one continuous pipeline through the parish.

Offshore Pipe Laying

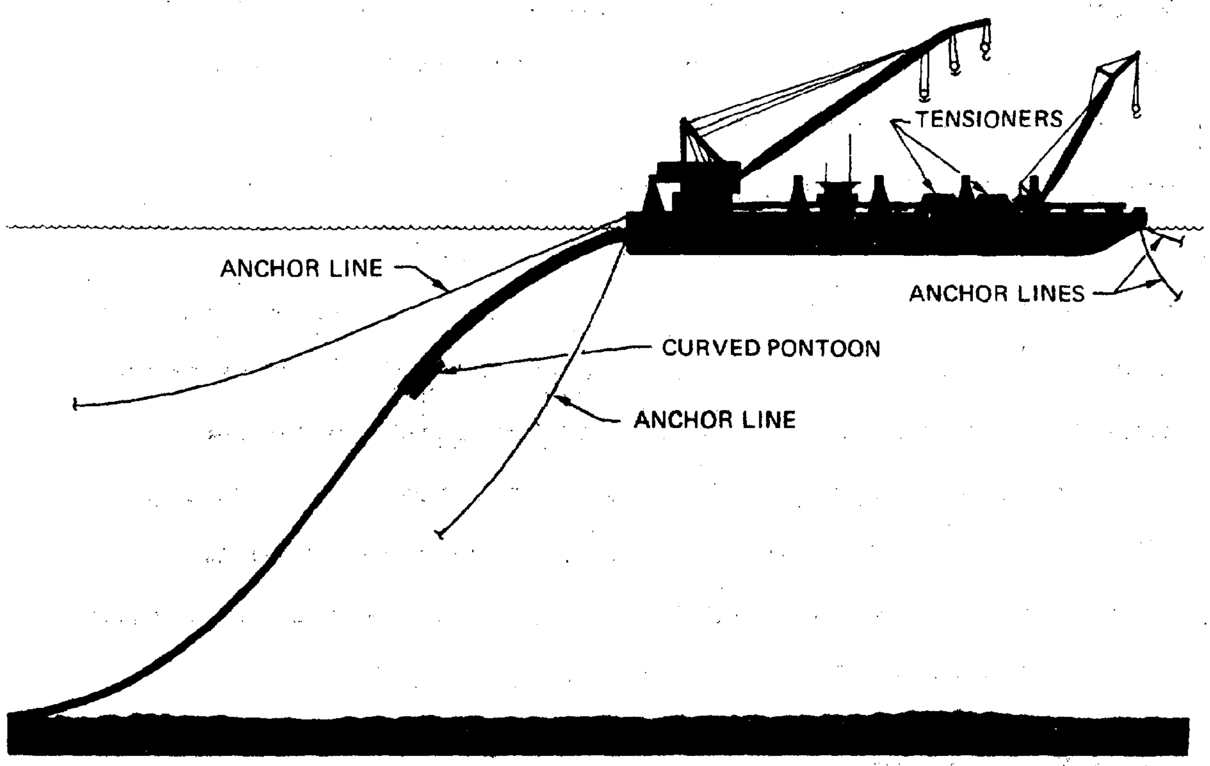
There are four basic methods of constructing a pipeline on the OCS. They are: lay-barge method, reel barge method, bottom pull method, and floating string method.

Lay-Barge Method

A typical lay-barge is shown in Figure 2.10. Here, sections of pipe, usually coasted with concrete, are welded together and then lowered into the water as the barge pulls itself forward against its own anchors. This is the most common method used, primarily because of its ability to handle sizes of pipe ranging in diameter from four inches to fifty-six inches (U.S. Coast Guard, 1976: 1.3-46).

FIGURE 2.10

A LAY BARGE WITH CURVED PONTOON



Source: Council on Environmental Quality, 1974-I: 67.

Reel Barge Method

The second method, reel barge, is similar to the lay-barge, except that the welding stations are replaced by a reel. It involves welding the sections of pipe onshore and then winding the completed string onto a large reel on the barge. This method is more economical than the lay-barge method, but its biggest drawback is that it cannot handle pipe with a diameter larger than twelve inches (Council on Environmental Quality, 1974-I: 67).

Bottom Pull and Floating String Methods

The last two methods, bottom pull and floating string, are similar in that they are both welded onshore as completed units. With the bottom pull method, the unit is then towed into the water supported by rollers onshore. With the floating string method, floats are attached to the string of pipe to provide buoyancy. It is then floated to its predetermined position and the floats systematically released to sink the pipe (Small, 1970: I-736).

Marsh Pipe Laying

There are two basic methods--push or shove and flotation--for laying pipe in marshland areas.

Push Method

The push method can be used only where the marsh area is firm enough to support heavy equipment. Small canals, usually no more than six feet deep and ten feet wide, are dredged. The pipe is welded together on the canal side as a single unit, sometimes as long as fifteen miles; floats are attached to give it temporary buoyancy; and then it is simply shoved into the canal where the floats are cut loose and the pipe is allowed to sink to the bottom (McGinnis et al., 1972: 2.3).

Flotation Method

The flotation method utilizes the lay barge (Figure 2.10). It requires dredging of a much wider canal, from forty to fifty feet, than the push method to accomodate pipelaying equipment. The depth is normally six to eight feet with an additional four foot trench for the pipe (McGinnis et al., 1972: 2.3).

Conventional Pipe Laying

Conventional pipe laying is only suitable when the earth is firm and solid. Large amounts of heavy equipment are necessary to complete the project. With large diameter pipe, twelve inches and up, there will normally be eight major steps from the time the right-of-way is bought until the line is suitable for use. These steps are: clearing and grading, stringing, bending, ditching, welding, coating and wrapping, backfilling, and clean-up. See Jenner et al., 1973: 921-923.

Clearing and Grading

These entail the removal of debris, trees and undergrowth, and preparation of the contour of the land for eventual digging.

Stringing

This consists of placing the individual sections of pipe in a continuous line approximately in the position it will eventually occupy.

Bending

Once the sections of pipe have been strung, it becomes necessary to bend the pipe to fit the contour of the land. For this particular job, a structurally large piece of bending equipment is required. The natural flexibility of the pipe is used to accommodate for the gentle curvature of the land.

Ditching

The size and depth of the ditch will logically depend upon the size of the pipe being installed. Also, in areas of unstable soil, to lessen the possibility of cave-ins, the ditching segment of construction may be delayed until the sections have been welded.

Welding

The welding segment of construction is divided into two phases. The first phase involves the initial welding of pipe sections. The second phase consists of a crew of welders applying subsequent layers of welds.

Coating and Wrapping

Steel pipe that is buried in the earth is subject to rapid corrosion. To prevent this, a protective coating of coal tar is applied followed by a wrapping of paper. Small diameter pipe is normally wrapped at at coating yard while the larger pipe is coated and wrapped by line-traveling machines at the construction site. For those sections of pipe which are used offshore, a coating of reinforced concrete is applied onshore, instead of tar and paper. The concrete wrapping increases the weight of a standard forty feet section, weighing 8,000 pounds to about 34,000 pounds (McGinnis et al., 1972: 2.3.

Backfilling

Once the pipe has been welded, coated, and wrapped, it is then lowered into the ditch by a series of side-boom tractors. Excavated earth is then used as covering.

Cleanup

This involves returning the right-of-way to as close to its natural condition as possible by rebuilding fences, planting cover, and redevelopment of natural drainage patterns.

Pipeline Job Types with Educational and Vocational Requirements

Job types listed in this subsection include the SIC classification Major Group 16--Construction Other Than Building and Construction--General Contractors. They are found under Industry Number 1621--Heavy Construction, Except Highway and Street Construction--which includes all aspects of pipeline construction (Chapter 1).

Chief Clerk, Measurement Department. Supervises and coordinates activities of workers engaged in compiling and recording reports concerning quality and quantity of oil or natural gas produced, purchased, transported, and sold.

Educational Requirements: High school diploma.

Vocational Requirements: 2 to 4 years work experience.

Coating Inspector, Pipe Line (dope inspector). Inspects cleaning, coating, and wrapping of pipeline for conformity to contract specifications.

Educational Requirements: High school diploma.

Vocational Requirements: 2 to 4 years work experience.

Dispatcher, Chief I. Plans schedules and prepares operating procedures to direct movement of gas, crude oil, or petroleum products through pipelines from point of origin to distribution points or destinations.

Educational Requirements: Bachelor's degree in Petroleum Engineering.

Vocational Requirements: 4 to 10 years work experience.

Dopeman (dope pourer; mastic man; pipe tarman). Coats joints of yard-wrapped (pre-wrapped) sections of oil and gas pipelines with tar or other corrosion-resisting material (dope) and wraps joints with glass cloth and felt paper to form protective coating to prevent electrolytic decomposition of metal.

No special educational or vocational requirements.

Dope Foreman (joint foreman). Supervises and coordinates activities of workers engaged in coating pipeline with protective covering.

Educational Requirements: High school diploma.

Vocational Requirements: 2 to 4 years work experience.

Dredge Pipeman. Installs and removes length of pipe through which material dug from river or harbor bottom by suction dredge is discharged on shore.

No specific educational or vocational requirements.

Fitter (spacer). Aligns pipeline sections preparatory to welding. When concerned with holding and aligning far end of pipe sections, is designated Stabber.

Vocational Requirements: Journeyman status as a Fitter.

Foreman, Pipe Lines (gang supervisor, pipe lines; roustabout, head). Supervises and coordinates activities of crews of workers engaged in operating digging and pipe laying machines and in the installation of pipe, pumps, valves, and meters to construct and maintain pipelines.

Vocational Requirements: Journeyman status as a Pipe Line Foreman plus 4 to 10 years work experience.

Gager (field gager; pipe-line gager; tank-farm gager; terminal gager). Gages amount of and tests oil in storage tanks, and regulates flow of oil into pipelines at wells, tank farms, refineries, and marine and rail terminals, following prescribed standards and regulations.

Educational Requirements: High school diploma.

Vocational Requirements: 2 to 4 years work experience.

Gager, Chief (district gager). Supervises and coordinates activities of Gagers controlling flow of oil into pipe lines and gaging amount of oil stored in tanks or railroad cars.

Educational Requirements: High school diploma.

Vocational Requirements: 2 to 4 years experience.

Gas Dispatcher (load dispatcher). Coordinates flow of gas throughout natural gas pipeline or distribution system to insure adequate volume and pressure of gas entering dispersing systems.

Educational Requirements: High school diploma.

Vocational Requirements: 4 to 10 years work experience.

Gasman. Operates automatically controlled natural gas treating unit in oilfield to render gas suitable for fuel and for pipeline transportation.

Educational Requirements: High school diploma.

Vocational Requirements: 1 to 2 years work experience.

Gasman, Head. Supervises and coordinates activities of workers engaged in sampling and testing natural gas, and controlling processing equipment at oilfield installations.

Educational Requirements: High school diploma.

Vocational Requirements: 2 to 4 years work experience.

Holiday-Detector Operator (electric-detector operator; jeeper operator; pipe jeeper). Tests coating and wrapping of pipelines for holidays (inadequately coated areas), using electric detecting machine.

No specific educational or vocational requirements.

Horizontal-Earth-Boring-Machine Operator (boring-machine operator; tunneling-machine operator). Sets up and operates boring machine to drill horizontal holes through earth banks for installation of pipelines under highways, railroads, canals, and other obstructions.

Vocational Requirements: Heavy equipment operator's license normally required plus some experience.

Horizontal-Earth-Boring-Machine Operator Helper (boring-machine-operator helper). Assists Horizontal-Earth-Boring-Machine Operator in the drilling of horizontal holes for the installation of pipelines under highways, railroads, canals, and other obstructions.

No specific educational or vocational requirements.

Kettleman (burner man; dope fireman; dope heater; furnaceman; heater man; hot man; pot man). Tends portable kettle that heats tar, asphalt, lead, or sealing compound for use as protective coating for pipelines.

No specific educational or vocational requirements.

Labor-Crew Foreman. Supervises and coordinates activities of workers engaged in the construction of gas and oil lines.

Educational Requirements: High school diploma.

Vocational Requirements: 4 to 10 years work experience.

Laborer, Pipe Lines. Assists Pipe Line Worker in laying oil and gas pipelines and maintains area around pump stations and pipelines.

No specific educational or vocational requirements.

Line Walker (line rider; troubleshooter). Patrols oil and gas pipelines and communication systems to locate and repair leaks, breaks, washouts, and damaged utility wires and poles.

Vocational Requirements: Brief period of on-the-job training.

Manager, Contracts (supply representative; petroleum products). Engages in negotiations involving representatives of oil producers, refineries, and pipeline carriers to draw up contracts for purchase, sale, or delivery of crude oil, petroleum distillates, and natural gas.

Educational Requirements: Bachelor's degree in Business Administration.

Vocational Requirements: 4 to 10 years directly related work experience.

Paperhanger, Pipe. Wraps strips of tar paper around sections of oil or gas pipelines that are ready to be laid in ditch, after application of hot tar or some corrosion-resisting material (dope).

No specific educational or vocational requirements.

Pipe-and-Test Foreman. Directs activities of workers engaged in inspecting pipe for deficiencies by use of X-ray equipment or by means of high pressure air tests, of workers engaged in removing rust and applying protective coating to pipe, of workers engaged in performing dredging, underwater blasting and backfilling activities, and of workers engaged in digging up and removing pipelines.

Educational Requirements: High school diploma.

Vocational Requirements: 4 to 10 years work experience.

Pipe-Bending-Machine Operator. Sets up and operates machine to bend metal pipes to angle or contour specified by layout.

Vocational Requirements: Must possess heavy equipment operator's license.

Pipe Calker (joint man; joint runner; leak repairman; pipe-joiner sealer; pipe-leak repairman; pipeman, calking; slip-joint pourer). Water-proofs pipe joints by pouring melted calking material and hammering lead sealer into them: wraps concrete, vitrified clay, or cast iron pipe joint with joint runner (asbestos strip).

No specific educational or vocational requirements.

Pipe-Cleaning-And-Priming-Machine Operator. Operates pipe cleaning and priming machine to clean rust, scale, and dirt from pipelines, and to apply prime coating of hot asphalt.

Vocational Requirements: 2 to 4 years directly related work experience.

Pipe-Cleaning-Machine Operator. Operates machine equipped with cleaning head to remove deposits of scale, rust, or other foreign matter from heavily encrusted used or weathered steel pipe.

Vocational Requirements: 2 to 4 years directly related work experience.

Pipe Fitter, Welding. Assembles and installs piping and fittings, and fuse joints, using acetylene, arc, atomic, and oxyhydrogen welding equipment. May be required to pass performance test for welding on pressure pipe, in accordance with American Standard Code for Pressure Piping. May be designed according to type of welding equipment used as Pipe Fitter, Acetylene, Welding; Pipe Fitter, Electric Arc Welding.

Vocational Requirements: Normally required by employer to pass rigid welding test.

Pipe-Line-Construction Inspector. Inspects materials and workmanship of pipeline construction for conformity to specifications of plans and contract.

Vocational Requirements: 4 to 10 years work experience.

Pipe-Wrapping Machine Operator. Operates pipe-wrapping machine to coat pipelines with asphalt or other corrosion-resisting compounds and wrap them spirally with fabrics, such as glass cloth and felt paper, to form protective coating that prevents electrolytic decomposition of oil and gas pipelines.

Vocational Requirements: Heavy equipment operator's license plus 6 months to 1 year work experience.

Superintendent, Measurement. Directs activities of departments concerned with design, construction, maintenance- and operation of control stations and installations used to regulate, measure, and direct flow of crude oil and natural gas.

Educational Requirements: Master's degree in Petroleum Engineering.

Vocational Requirements: 4 to 10 years work experience.

Superintendent, Pipe-Line Construction. Directs activities of workers concerned with the construction of pipelines.

Educational Requirements: Master's degree in Civil Engineering or related degree.

Vocational Requirements: 4 to 10 years work experience.

Trench-Digging-Machine Operator (ditch-machine operator; rotary-trencher operator; trencher operator; trenching-machine operator). Operates machine, consisting of an endless chain or wheel of buckets mounted on tractor chassis, that digs trenches for pipelines.

Vocational Requirements: Heavy equipment operator's license plus 2 to 4 years experience.

Welder Foreman, Pipe Line. Supervises and coordinates activities of workers engaged in welding sections of pipe to form gas and oil pipelines systems. Examines X-rays to detect defects in welds.

Vocational Requirements: Must be able to pass rigid welding test plus 4 to 10 years work experience.

Table 2.5 lists those barges which are associated with one or more of the phases of pipeline construction operating in the Gulf of Mexico as of November, 1975. The last two columns of the table show the purpose of the barge and the maximum number of personnel for which it has quarters.

The number of personnel needed to complete the construction of a pipeline in the conventional manner can vary according to the size of the pipe (diameter) being installed and the amount of work taking place at the pipe yard (coating and wrapping). Table 2.6 provides a comprehensive listing of the job types and number per type necessary to construct one of the larger diameter (36 inches) pipelines.

TABLE 2.5

BARGES ASSOCIATED WITH PIPELINE CONSTRUCTION

OPERATING IN THE GULF OF MEXICO

AS OF NOVEMBER, 1975

Barge No.	Owner or Lesee	Purpose	Personnel
BAR-159	Brown & Root, Inc.	Bury	---
BAR-211	Brown & Root, Inc.	Lay	168
BAR-228	Brown & Root, Inc.	Bury	61
BAR-263	Brown & Root, Inc.	Bury	8
BAR-266	Brown & Root, Inc.	Bury	61
BAR-278	Brown & Root, Inc.	Lay/Bury	120
BAR-282	Brown & Root, Inc.	Lay	168
BAR-289	Brown & Root, Inc.	Lay	168
CEE BEE 20	Cobb Offshore Const.	Lay/Derrick/ Salvage	20
CHICKASAW	Santa Fe	Lay (Reel Type)	72
HCC-101	Brown & Root, Inc.	Lay	200
HCC-103	Brown & Root, Inc.	Bury	44
JET BARGE # 2	J. Ray McDermott	Bury	50
JIRAFA	J. Ray McDermott	Bury	45
LAY BARGE # 20	J. Ray McDermott	Lay	52
LAY BARGE # 21	J. Ray McDermott	Lay	96
LAY BARGE # 22	J. Ray McDermott	Lay	222
PIPELINER 7	Norman Industries, Inc.	Jetting/Derrick	40
PIPELINER 3	Norman Industries, Inc.	Jetting/Lay	38
SEA RIGGER 1	Cobb Offshore Const.	Lay/Derrick/ Salvage	33
SIOUX	Santa Fe	Bury	---
TONKAWA	Santa Fe	Bury/Derrick	65

Source: Offshore, November, 1975: 69-70.

TABLE 2.6

COMPREHENSIVE LISTING OF JOB TYPES

AND AVERAGE NUMBER PER TYPE NECESSARY

FOR THE CONSTRUCTION OF A CONVENTIONAL PIPELINE

Job Type	Number
Coating Inspector	1
Dopeman	5
Dope Foreman	1
Dredge Pipeman	1
Fitter	2
Stabber	2
Foreman, Pipe Lines	3
Holiday Detector Operator	1
Horizontal-Earth-Boring-Machine Operator	1
Horizontal-Earth-Boring-Machine Operator Helper	1
Kettleman	1
Labor Crew Foreman	1
Laborer, Pipe Lines	45
Paperhanger, Pipe	1
Pipe-and-Test Foreman	1
Pipe Bending Machine Operator	1
Pipe Calker	1
Pipe-Cleaning-And-Priming-Machine Operator	1
Pipe Fitter, Welding	20
Pipe-Line Construction Inspector	1
Pipe-Machine Operator	1
Pipe-Wrapping-Machine Operator	1
Superintendent, Pipe-Line Construction	1
Trench-Digging Machine Operator	1
Welder Foreman, Pipe Line	1

Source: authors.

Water Transportation

The water transportation industry is a vital element in the offshore oil and gas industry. Virtually no activity of any kind relating to the industry on the outer continental shelf occurs without either direct or indirect support from the many and varied types of vessels used. These vessels are utilized throughout the oil and gas spectrum, from those which are used for exploration activity to the ones which supply the pipe-laying barges. In between can be found ocean-going tugs pulling platforms to remove production areas, crew and supply boats shuttling men and equipment from supply bases to the rigs, and barges being used for activities such as building rigs.

There are three major types of vessels--tugs, supply, and crew--used in support of OCS oil and gas development. Tugs account for more than fifty percent of the total number of vessels in operation while supply and crew boats each account for approximately fifteen percent. The remaining twenty percent are classified either as dual or specialized purposes (*Offshore*, March, 1976: 70-71).

Water Transportation Job Types with Educational and Vocational Requirements

Job types listed in this subsection are included in the SIC classification codes under Major Group 44--Water Transportation. They are found under three different Industry

Numbers (which are described in Chapter 1): 4453--Lighterage; 4454--Towing and Tugboat Service; and 4469--Water Transportation Services, Not Elsewhere Classified. Industry Number 4453 represents those companies primarily engaged in operating crew and supply boats transferring material and workmen between shore terminals and offshore platforms. Industry Number 4454 represents those companies engaged in furnishing marine towing and tugboat services, primarily in the movement of barges and rigs. Industry Number 4469 represents those companies engaged in furnishing miscellaneous services incidental to water transportation such as boat hiring and cleaning.

Able Seaman (able-bodied). Performs various tasks on board ship such as standing watch, steers vessel as directed by mate, and breaks out rigs, overhauls, and stows cargo-handling gear, stationary rigging, and running gear.

Vocational Requirements: Passage of Coast Guard (CG) examination plus 12 to 18 months experience (CG 191, Subchapter B; 1972: 52).

Scullion (galley man; scullery man). Performs any combination of tasks involved in cleaning ship's galley.

No specific educational or vocational requirements.

Barge Captain (scow captain). Supervises and coordinates activities on towed barge that transports cargo on lakes, bays, sounds, and rivers.

Educational Requirements: High school diploma.

Vocational Requirements: License issued by Coast Guard plus 1 to 2 years experience (CG 191, Subchapter B; 1972: 11-18).

Barge Engineer (marine engineer; mechanic, marine engine). Supervises and coordinates activities of crewmen engaged in operating and maintaining propulsion engines and other engines, boilers, deck machinery, and electrical, refrigeration, and sanitary equipment aboard ship.

Educational Requirements: High school diploma.

Vocational Requirements: License issued by Coast Guard plus minimum of 4 years experience (CG 191, Subchapter B; 1972: 23-29).

Barge Loader (dock hand; dockman; pierman; wharfman; wharf operator; wharf tender). Transfers liquid cargo, such as petroleum, gasoline, heating oil, sulfuric acid, from and onto barges and tankers.

Vocational Requirements: Minimum of 30 days to 3 months experience.

Barge Loader Helper (dock helper; dockman helper; wharf helper; wharf-tender helper). Connects hoses to transfer liquid cargo, such as petroleum, gasoline, heating oil, sulfuric acid, from and into barges and tankers.

No specific educational or vocational requirements.

Bargeman. Performs duties such as handling lines during docking of vessel, stands steering watches, washes deck, and the loading and unloading of material.

Vocational Requirements: Minimum of 3 to 6 months experience.

Boatswain. Supervises Able Seamen and Deckhands engaged in cleaning decks, chipping, scraping, wirebrushing, and painting decks, sides and superstructure.

Educational Requirements: High school diploma.

Vocational Requirements: License issued by Coast Guard plus minimum of 2 years experience.

Booking Clerk. Books out-bound freight shipments on company's ships to insure capacity cargo for each ship.

Vocational Requirements: 6 months to 1 year experience.

Cadet, Deck. Learns and performs all deck and navigational duties aboard ship under supervision of deck officer to become eligible for position of Mate, Ship.

Educational Requirements: High school diploma.

Vocational Requirements: Possession of merchant mariner's document or an approved appropriate certificate (CG 191, Subchapter B; 1972: 58).

Cadet, Engineer. Trains as Engineer by performing all duties concerned with operating and repairing propulsion plant and auxiliary equipment in engine room of ship.

Educational Requirements: High school diploma.

Vocational Requirements: Possession of merchant mariner's document or an appropriate certificate (CG 191, Subchapter B; 1972: 58).

Checker (cargo checker; freight checker; marine clerk). Compiles records of amount, kind, and condition of cargo loaded on or unloaded from ship.

Vocational Requirements: 3 to 6 months experience.

Clerk and Dispatcher, Pilot Station. Dispatches Pilot, Ship to ships entering or leaving port; writes up order showing name of ship, berth, tugboat company, and time of arrival or departure, and notifies Pilot, Ship and pilot boat operator of assignment.

Vocational Requirements: 3 to 6 months experience.

Cook, Chief. Supervises and coordinates activities of kitchen personnel and participates in preparation of meals aboard ship.

Vocational Requirements: Minimum of 2 to 4 years experience.

Cook, Mess. Cooks and serves meals to crew aboard ship.

Vocational Requirements: Minimum of 2 to 4 years experience.

Deck Engineer. Repairs and maintains deck machinery, such as cargo winches and anchor windlasses; operates machinery to determine causes of malfunctioning.

Educational Requirements: High school diploma.

Vocational Requirements: License issued by Coast Guard plus 2 to 4 years experience (CG 191, Subchapter B; 1972: 26).

Deckhand. Performans any combination of the following duties: handling lines to moor vessels to wharves, washing decks, standing steering watches, and loading or unloading material from barges, scows, and dredges.

Vocational Requirements: 3 to 6 months experience.

Derrick-Boat Captain (derrick-boat runner). Supervises and coordinates activities of crew operating a derrick mounted on a barge.

Educational Requirements: High school diploma.

Vocational Requirements: License issued by Coast Guard plus 2 to 4 years experience (CG 191, Subchapter B; 1972: 11-18).

Dredge Captain (dredge operator; dredge runner). Commands vessel equipped with machinery for excavating under water to facilitate building structures in harbors, estuaries, straits, sounds, rivers, lakes, bays, and oceans.

Educational Requirements: High school diploma.

Vocational Requirements: License issued by Coast Guard plus 2 to 4 years experience (CG 191, Subchapter B; 1972: 11-18).

Dredge Deckhand. Performs any combination of the following duties such as handling lines to moor vessels to wharves, washing decks, standing steering watches, and loading or unloading material.

Vocational Requirements: 3 to 6 months experience.

Dredge Mate. Supervises and coordinates activities of crewmen aboard dredge (vessel equipped with machinery to excavate under water) used in building of structures in harbors, estuaries, straits, sounds, rivers, lakes, bays, and oceans.

Educational Requirements: High school diploma.

Vocational Requirements: License issued by Coast Guard plus 2 to 4 years experience (CG 191, Subchapter B; 1972: 14-23).

Engineer (marine engineer; mechanic, marine engine). Supervises and coordinates activities of crewmen engaged in operating and maintaining propulsion engines and other engines, boilers, deck machinery, and electrical, refrigeration, and sanitary equipment aboard ship. When more than one Engineer is required, may be designated Engineer, Chief; Engineer, First Assistant; Engineer, Second Assistant; Engineer, Third Assistant. May be designated according to ship assigned as Barge Engineer; Engineer, Fishing Vessel; Tugboat Engineer.

Educational Requirements: High school diploma.

Vocational Requirements: License issued by Coast Guard plus minimum of 4 years experience (CG 191, Subchapter B; 1972: 23-29).

Float Master (boat dispatcher). Coordinates movement of freight by barge or lighter to provide the most efficient service to shippers consistent with available equipment and facilities.

Educational Requirements: High school diploma.

Vocational Requirements: 2 to 4 years experience.

Junior Engineer (maintenance man, engine). Repairs and maintains propulsion engines and other engines and engine parts aboard ship.

Educational Requirements: High school diploma.

Vocational Requirements: License issued by Coast Guard plus 2 to 4 years experience (CG 191, Subchapter B; 1972: 23-29).

Manager, Marine Service. Directs activities of boat-repair service, according to knowledge of maintenance needs of small craft and marine safety requirements.

Educational Requirements: High school diploma.

Vocational Requirements: Minimum of 2 to 4 years experience.

Master, Passenger Barge (barge captain). Commands barge to transport passengers on inland waterways, such as estuaries, lakes, bays, sounds, and rivers.

Educational Requirements: High school diploma.

Vocational Requirements: License issued by Coast Guard plus a minimum of 2 to 4 years experience (CG 191, Subchapter B; 1972: 11-18).

Mate, Ship (ship officer). Supervises and coordinates activities of crewmen on board ship: inspects ship during loading to ensure that cargo is stowed according to specifications. When more than one Mate, Ship is required, may be designated Mate, Chief (usually on vessels inspected by U.S. Coast Guard); Mate, First (usually on uninspected vessels); or Mate, Fourth; Mate, Second; Mate, Third.

Educational Requirements: High school diploma.

Vocational Requirements: License issued by Coast Guard plus a minimum of 2 to 4 years experience (CG 191, Subchapter B; 1972: 14-23).

Ordinary Seaman. Stands deck department watches and performs a variety of tasks to preserve painted surfaces of ship and to maintain lines, running gear, and cargo handling gear in safe operating condition.

Vocational Requirements: License issued by Coast Guard plus 3 to 6 months experience (CG 268, Subchapter P; 1973: 5).

Pilot, Ship. Commands ships to steer them into and out of harbors, estuaries, straits, and sounds, and on rivers, lakes, and bays. May be designated according to vessel commanded as Pilot, Tank Vessel.

Educational Requirements: High school diploma.

Vocational Requirements: License issued by Coast Guard plus a minimum of 2 to 4 years experience (CG

268, Subchapter P; 1973: 5).

Superintendent, Marine. Manages on-shore activities for company vessels: reads radio message from Master, Ship to determine services requested. Requisitions ship's stores or equipment to be delivered on dock at vessel's arrival. Places orders for fuel oil and arranges for time of delivery. When licensed to command ship, may be designated as Port Captain.

Educational Requirements: High school diploma.

Vocational Requirements: Minimum of 4 to 10 years experience.

Tugboat Captain. Commands tugboat to tow barges and ships into and out of harbors, estuaries, straits, and sounds, and on rivers, lakes, and bays. Required to hold license issued by U.S. Coast Guard.

Educational Requirements: High school diploma.

Vocational Requirements: License issued by Coast Guard plus 2 to 4 years experience (CG 191, Subchapter B; 1972: 11-18).

Tugboat Mate. Supervises and coordinates activities of crewmen aboard tugboat. Required to hold license issued by U.S. Coast Guard.

Educational Requirements: High school diploma.

Vocational Requirements: License issued by Coast Guard plus 2 to 4 years experience

(CG 191, Subsection B;
1972: 14-23).

Requirements for jobs in water transportation are, in many cases, more stringent than for those connected with other facets of the offshore oil and gas industry. More specific requirements for the job types master (captain), mate, engineer, able seaman, and cadet are given in the following excerpts from the U.S. Coast Guard publication CG-191 entitled, Rules and Regulations for Licensing and Certificating of Merchant Marine Personnel.

Master.

10.05-5(b) The minimum service required to qualify an applicant for a license as master of steam or motor vessels of not more than 500 gross tons, operated in connection with the offshore mineral and oil industries, limited to a stated distance offshore on the continental shelf of the Atlantic, Gulf, or Pacific Coast of the United States, as determined by the Commander of the District in which the license is issued, is:

10.05-5(b) (1) 1 year as a licensed mate of mineral or oil industry vessels; or,

10.05-5(b) (2) 1 year as a licensed master of first-class pilot of inland steam or motor vessels, plus 1 year in the deck department of coastwise vessels or mineral or oil industry vessels; or, 10.05-5(b) (3) 2 years' service as a licensed master of ocean or coastwise uninspected vessels; or,

10.05-5(b) (4) 3 years' service in the deck department of ocean or coastwise vessels of which at least 1 year shall have been as master of person in charge of vessels of at least 50 gross tons. If the required service as master or person in charge has been on vessels of more than 15 and less than 50 gross tons, the service may be accepted as qualifying experience for a license as master of vessels of not more than 100 gross tons.

Mate of Steam or Motor Vessels Engaged in Offshore Mineral and Oil Industries.

10.05-28(a) The minimum service required to qualify an applicatant for a license as mate of steam or motor vessels of not more than 500 gross tons, operated in connection with the offshore mineral and oil industries, limited to a stated distance offshore on the continental shelf of the Atlantic, Gulf, or Pacific Coast of the United States, as determined by the Commander of the District in which the license is issued, is:

10.05-28(a) (1) Two years' service as a licensed officer in charge of a deck watch on mineral or oil industry vessels; or

10.05-28(a) (2) One year's service as master or first-class pilot of inland steam or motor vessels plus 6 months in the deck department of coastwise vessels or mineral or oil industry vessels; or

10.05-28(a) (3) One year's service as a licensed master or 2 years' service as a licensed mate of ocean or coastwise uninspected vessels; or

10.05-28(a) (4) Three years' service in the deck department of ocean or coastwise steam or motor vessels, including mineral and oil industry vessels.

Chief Engineer.

10.10-11(a) The minimum service required to qualify an applicant for license as chief engineer of motor vessels is:

10.10-11(a) (1) 1 year's service as first assistant engineer of motor vessels; or,

10.10-11(a) (2) 2 years' service as second assistant or junior first assistant engineer in charge of a watch on motor vessels while holding a license as first assistant engineer of motor vessels; or,

10.10-11(a) (3) While holding a license as chief engineer of steam vessels, either:

10.10-11(a) (3)(i) 3 months' service as first assistant engineer of motor vessels;

10.10-11(a) (3)(ii) 3 months' service as observer chief engineer on motor vessels; or,

10.10-11(a) (3)(iii) 6 months' service as oiler or junior engineer of motor vessels.

First Assistant Engineer.

10.10-15(a) The minimum service required to qualify an applicant for license as first assistant engineer of motor vessels is:

10.10-15(a) (1) 1 year's service as second assistant engineer of motor vessels; or,

10.10-15(a) (2) 2 years' service as third assistant engineer or junior second assistant engineer in charge of a watch on motor vessels, while holding a license as second assistant engineer of motor vessels; or,

10.10-15(a) (3) While holding a license as first assistant engineer of steam vessels, either:

10.10-15(a) (3)(i) 3 months' service as second assistant engineer of motor vessels;

10.10-15(a) (3) (ii) 3 months' service as observer first assistant engineer on motor vessels; or,

10.10-15(a) (3) (iii) 6 months' service as oiler or junior engineer of motor vessels; or

10.10-15(a) (4) 3 years' service as oiler or fireman on motor vessels for a license as first assistant engineer of motor towing or ferry vessels of not more than 2,000 horsepower; or

10.10-15(a) (5) While holding a license as third assistant engineer of motor vessels of any horsepower, 3 months' service as third assistant engineer or observer first assistant engineer on motor vessls for a license as first assistant engineer of motor towing or ferry vessels of not over 2,000 horsepower; or, 10.10-15(a) (6) 3 years' service as oiler or fireman on motor vessels for a license as first assistant engineer of motor vessels of not more than 1,000 horsepower.

Second Assistant Engineer.

10.10-19(a) The minimum service required to qualify an applicant for license as second assistant engineer of motor vessels is:

10.10-19(a) (1) 1 year's service as engineer in charge of a watch, while holding a license as third assistant engineer of motor vessels; or,

10.10-19(a) (2) 2 years' service as assistant engineer to the engineer in charge of a watch, while holding a license as third assistant engineer of motor vessels; or,

10.10-19(a) (3) 5 years' service in the engine department of motor or steam vessels, 1 year of this required service may have been on steam vessels; 4 years and 6 months of which must have been as a qualified member of the engine department, 2 years and 6 months of which must have been as oiler or junior engineer on motor vessels; or,

10.10-19(a) (4) While holding a license as second assistant engineer of steam vessels, either:

10.10-19(a) (4) (i) 3 months' service as third assistant engineer of motor vessels;

10.10-19(a) (4) (ii) 3 months' service as observer second assistant engineer on motor vessels; or,

10.10-19(a) (4) (iii) 6 months' service as oiler or junior engineer of motor vessels.

Third Assistant Engineer.

10.10-23(a) The minimum service required to qualify an applicant for license as third assistant engineer of motor vessels is:

10.10-23(a) (1) 3 years' service in the engine department of motor or steam vessels, one-third of this required service may have been on steam vessels; 2 years and 6 months of which must have been as a qualified member of the engine department, 1 year and 6 months of which must have been as oiler or junior engineer on motor vessels; or,

10.10-23(a) (2) 3 years' service as an apprentice to the machinist trade engaged in the construction or repair of marine, locomotive, or stationary engines together with 1 year's service in the engine department of motor vessels as oiler or junior engineer, one-third of such service may have been on steam vessels; or,

10.10-23(a) (3) Graduation from:

10.10-23(a) (3) (i) The U.S. Merchant Marine Academy (engineering);

10.10-23(a) (3) (ii) The engineering class of a nautical schoolship approved by and conducted under rules prescribed by the Commandant and listed in Part 166 of Subchapter R (Nautical Schools) of this chapter;

10.10-23(a) (3) (iii) The U.S. Naval Academy; or

10.10-23(a) (3) (iv) The U.S. Coast Guard Academy; or, 10.10-23(a) (4) Satisfactory completion of the prescribed course (engineering) at a U.S. Government operated training school or at a recognized maritime union or nonprofit organization training school approved by the Commandant, may be accepted as the equivalent of sea service up to 4 months, provided the applicant has obtained the additional qualifying experience prior to enrollment; or,

10.10-23(a) (5) Graduation from the marine engineering course of a duly recognized school of technology together with 3 months' service in the engine department of motor vessels, one-third of such service may have been on steam vessels; or,

10.10-23(a) (6) Graduation from the mechanical or electrical engineering course of a duly recognized school of technology together with 6 months' service in the engine department of motor vessels, one-third of such service may have been on steam vessels; or,

10.10-23(a) (7) 6 months' service as oiler or junior engineer on motor vessels while holding a license as third assistant engineer of steam vessels.

Able Seaman.

12.05-7(a) The minimum service or training required to qualify an applicant for certification and the various endorsements as able seaman is listed in this paragraph:

12.05-7(a) (1) High seas and inland waters.

12.05-7(a) (1) (i) "Any waters--unlimited." 3 years' service on deck in vessels of 100 gross tons or over operating on ocean or coastwise routes or on the Great Lakes.

12.05-7(a) (1) (ii) "Any waters--unlimited." The period of time spent by the applicant successfully completing a course of able seaman's training in a training school approved by the Commandant may be accepted as the equivalent of sea service up to a maximum of 1 year of the 3 years required in Subdivision (i) of this subparagraph.

12.05-7(a) (1) (iii) "Any waters--unlimited." Satisfactory completion of 18 months' training in a seagoing training ship approved by the Commandant.

12.05-7(a) (1) (iv) "Any waters--12 months." 12 months' service on deck in vessels of 100 gross tons or over operating on ocean or coastwise routes or on the Great Lakes. (Holders of certification under this provision are limited to one-fourth of the number of able seamen required by law to be employed on a vessel.)

12.05-7(a) (1) (v) "Any waters--12 months." Satisfactory completion of a course of training at a U.S. Maritime Service Training Station of at least 9 months, 6 months of which shall have been served aboard a seagoing training vessel. (Holders of certification under this provision are limited to one-fourth of the number of able seamen required by law to be employed on a vessel.)

12.05-7(a) (2) Great Lakes and inland waters.

12.05-7(a) (2) (i) "Great Lakes--18 months' service." 18 months' service on deck in vessels of 100 gross tons or over operating on ocean or coastwise routes, or on the Great Lakes, smaller lakes, bays, or sounds. (Holders of certification under this provision may comprise the required number of able seamen on vessels on the Great Lakes and on the smaller lakes, bays, and sounds.) If the seaman possesses the requisite service for certification under Subparagraph (1) (iv) of this paragraph, there shall be added "any waters--12 months."

12.05-7(a) (3) Tugs and towboats.

12.05-7(a) (3) (i) "Tugs and towboats--any waters." 18 months' service on deck in vessels operating on ocean or coastwise routes, or on the Great Lakes, or on the bays and sounds connected directly with the seas.

12.05-7(a) (4) Bays and sounds.

12.05-7(a) (4) (i) "Bays and Sounds--12 months, vessels 500 gross tons or under not carrying passengers." 12 months' service on deck in vessels operating on ocean or coastwise routes, or on the Great Lakes, or on the bays and sounds connected directly with the seas.

12.05-7(a) (5) Barges.

12.05-7(a) (5) (i) "Seagoing barges--12 months." 12 months' service on deck in vessels operating on ocean or coastwise routes, or on the Great Lakes, or on the bays and sounds connected directly with the seas.

Cadet.

12.25-1(a) Every person employed in a rating other than able seaman or qualified member of the engine department of United States merchant vessels requiring such certificated persons shall produce an appropriate certificate of service or merchant mariner's document to the shipping commissioner, United States Collector or Deputy Collector of of Customs, or master, before signing articles of agreement.

12.25-1(b) No certificate of service shall be required of any person employed on any unrigged vessel, except seagoing barges, or on any sail vessel of less than 500 net tons while not carrying passengers for hire and while not operating outside the line dividing inland waters from the high seas, as defined in Section 2 of the Act of February 19, 1895, as amended (33 U.S.C. 151) and in 33 CFR Part 82.

No ratings other than cadet (deck) or cadet (engine) as appropriate, and lifeboatman shall be shown on a merchant mariner's document issued to a member of the U.S. Merchant Marine Cadet Corps. The merchant mariner's document shall also be stamped "Valid only while cadet in U.S. Maritime Administration training program." The merchant mariner's document thus prepared shall be surrendered upon the holder being certified in any other rating or being issued a license and the rating of cadet (deck) or cadet (engine) shall be omitted from any new merchant mariner's document issued (U.S. Coast Guard, 1972).

Table 2.7 shows an average listing of the job types found on tugboats, crewboats, and supply boats operating in connection with OCS oil and gas industry. The requirements regarding the manning of inspected vessels are set forth in various statutes with many qualifications as to their applications (CG 268: 3). In most cases, it is the responsibility of the Officer-in-charge, Marine Inspections, or the owner, master, or person in charge or command of the vessel to determine the minimum number of officers and members of the crew to be carried on board a vessel (CG 268: 4).

SECONDARY INDUSTRIES

Heavy Construction

According to the Louisiana Department of Employment Security (1976), there were 17 firms in Lafourche Parish which were included in Industry Group 1621--Heavy Construction, Except Highway and Street Construction (Chapter 1), with a total of 34 employees. These data concerning the number of firms correlate with those obtained from the Louisiana State Licensing Board for Contractors, Louisiana Roster of Contractors, 1976, which shows 18 firms (Table 2.8) as falling into this SIC category.[4]

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[4] These 18 are licensed and qualify for heavy construction work and do not include eight other firms which are licensed and qualified to do Municipal and Public Works construction.

TABLE 2.7

LISTING OF JOB TYPES AND AVERAGE NUMBER

PER TYPE FOUND ON TUGBOATS, CREW BOATS, AND SUPPLY BOATS

Job Type	Tugboats		Crew Boats		Supply Boats	
	1	2	1	2	1	2
Captain (Master)*	1	1	1	1	1	1
Mate			1		2	
Engineer	1		1		1	
Assistant Engineer					1	
Able Seaman					1	
Cook			1		1	
Deckhand	2	1	2	1	2	1

[1] Length greater than 100 feet.

[2] Length less than 100 feet.

*If vessel operates for more than 12 hours per day, two captains are required; otherwise, one crew per boat.

Source: Black, 1976.

TABLE 2.8

HEAVY CONSTRUCTION CONTRACTORS

LICENSED IN LAFOURCHE PARISH, 1976

Name of Contractor	Location
Adams, Ronald, Contractor, Inc.	Thibodaux
Blair, A.F., Co., Inc.	Thibodaux
Coastal Dragline Works, Inc.	Lockport
Dantin, Joe, Contractors	Thibodaux
Gideon Industries, Inc.	Golden Meadow
Hebert, Clyde J., Jr.	Thibodaux
House Engineering and Moving Co.	Thibodaux
Jeffers Construction Co., Inc.	Thibodaux
Lafourche Construction Co., Inc.	Thibodaux
Lafourche Gas Corporation	Thibodaux
Low Land Construction Co.	Thibodaux
Matco Construction Co.	Thibodaux
Pertuit, J. J., Contractors, Inc.	Raceland
Shell Enterprises, Inc.	Larose
South Lafourche Construction Co., Inc.	Cut-Off
TBW Offshore Welders, Inc.	Thibodaux
Plaisance Dragline and Dredging Co., Inc.	Golden Meadow
Plaisance, Kip, Contractors, Inc.	Golden Meadow

Source: Louisiana State Licensing Board for Contractors, 1976.

Sample of Heavy Construction Job Types with Educational and Vocational Requirements

Due to the small number of persons in Lafourche Parish actually employed in this category, only a sample of job types and descriptions is given. If more information concerning job type descriptions and requirements relating to heavy construction is needed, it can be obtained from the U.S. Employment Service, The Dictionary of Occupational Titles, Volumes I and II, Third Edition, 1965; plus its associated Supplement, 1966.

Carpenter Rough (bracer; timberman). Builds rough wooden structures, such as concrete forms, scaffolds, tunnel and sewer supports, and temporary frame shelters.

Vocational Requirements: 2 to 4 years directly related work experience.

Cement-Gun Nozzleman (cement sprayer; insulator; nozzleman). Sprays mortar, through a hose, over exposed surfaces of structures.

Vocational Requirements: 6 months to 1 year directly related work experience.

Concrete-Batching-And-Mixing-Plant Foreman (batch-plant foreman). Supervises and coordinates activities of workers engaged in transporting and mixing ingredients to make concrete: Directs workers engaged in transferring sand and gravel aggregates by crane or other conveyor from barges and trucks to storage piles or bins.

Vocational Requirements: Minimum of 4 years directly related work experience.

Cherry-Picker Operator. Operates cherry picker (pneumatic hoist attached to structural framework) which moves on rails along tunnel side to hoist loader dinkey cars from mucking machine to front of train.

Vocational Requirements: 6 months to 1 year work experience.

Concrete-Mixing-Truck Driver (batch-mixing-truck driver; moto-mix operator; ready-mix-truck driver; transit-mix operator). Drives truck equipped with auxiliary concrete mixer.

Vocational Requirements: 6 months to 1 year work experience.

Construction Worker II. Performs any combination of the following duties concerned with erecting, repairing, and wrecking buildings and bridges, installing waterworks, locks, and dams; grading and maintaining railroad right-of-ways and laying ties and rails; and widening, deepening, and improving rivers, canals, and harbors, requiring little or no independent judgement.

No specific educational or vocational requirements.

Diesel-Pile-Driver Operator (hammerman; hoisting engineer, pile driving). Operates pile driver mounted on skids, barge, crawler treads, or locomotive crane to drive piling as foundations for structures, such as buildings, bridges, and piers.

Vocational Requirements: Normally required to possess heavy equipment operator's license.

Dredge Pipeman. Installs and removes lengths of pipe through which material dug from river or harbor bottom by suction dredge is discharged on shore.

No specific educational or vocational requirements.

Form Builder (carpenter form; wood-form builder). Constructs built-in-place or prefabricated wooden forms for molding concrete structures, following blueprints.

Vocational Requirements: Minimum of 2 to 4 years directly related work experience.

Grading Foreman (dirt-working foreman; excavating foreman; rough-grading foreman). Supervises and coordinates activities of workers engaged in excavating and grading right-of-way for construction of projects, such as highways, streets, drainage ditches, and dams.

Educational Requirements: High school diploma.

Vocational Requirements: Minimum of 4 to 10 years directly related work experience.

Laborer, Pile Driving, Ground Work (cant-hook man, pile driving; ground-man; line man, pile driving; lumber handler, pile driving). Assists Leadsman, Pile Driving to erect piles and sheet piling for use in building structural foundations, retaining walls, and cofferdams.

No specific educational or vocational requirements.

Operating Engineer (heavy-equipment operator). Operates several types of power construction equipment, such as compressors, pumps, hoists, derricks, cranes, shovels, tractors, scrapers, or motor graders, to excavate and grade earth, erect structural and reinforcing steel, and pour concrete.

Vocational Requirements: Normally must possess heavy equipment operator's license plus a significant amount of work experience.

Painter, Structural Steel (painter, bridge; painter, steel). Paints structural steel framework of buildings, griders, cables of bridges, and other structural steel.

Vocational Requirements: 3 to 6 months work experience.

Shorer (bracer; carpenter, shoring; carpenter, trench bracing; cribber; cribbing setter; sheeting setter; shore setter; trench bracer; trench shorer). Erects timbers, cross braces, and sheeting for temporary retaining walls.

Superintendent, Construction (superintendent, job). Directs activities of workers concerned with construction of buildings, dams, highways, pipelines, or other construction projects.

Educational Requirements: Bachelor's degree in Construction Technology. or a related degree.

Vocational Requirements: Minimum of 4 to 10 years directly related work experience.

Ship and Boat Building and Repairing

The ship and boat building and repair industry in Lafourche Parish is concentrated along the major waterway, Bayou Lafourche. Along each side of its banks from Thibodaux to Leeville can be found numerous facilities employing as few as ten personnel and as many as several hundred. The products that they manufacture or repair are as diversified as the quantity of personnel employed, ranging from amphibious vehicles built by Quality Boiler and Machine Works, Inc. at Thibodaux (Webre, 1976: 11) to inland waterways push boats built by Halter-Marine Services, Inc. at Lockport (Work Boat, 1975: 58).

The major emphasis, however, is on the manufacture and repair of vessels such as crew, tug, and supply boats which are used to serve the offshore oil and gas industry.

The Department of Employment Security (1976) lists under the SIC classification code number 3731--Ship Building and Repairing, twelve manufacturing firms employing 259 personnel. Under code number 3732--Boat Building and Repairing, there were five firms listed, employing 319.

Table 2.9 shows a comprehensive listing of the job types and number per type which would be utilized in the design and construction of one ocean tugboat.

Ship and Boat Building and Repairing--Educational and Vocational Requirements

Job types listed in this subsection are included in the SIC classification code under Major Group 37--Manufacturing. They are found under two different industry numbers: 3731--Ship Building and Repairing, and 3732--Boat Building and Repairing (Chapter 1).

Architect, Marine (architect, naval; naval designer). Designs and oversees construction and repair of marine craft and floating structures, such as ships, barges, tugs, dredges, submarines, floats, and buoys.

Educational Requirements: Bachelor's degree in Marine Architecture.

Vocational Requirements: Minimum of 4 to 10 years work experience.

TABLE 2.9

JOB TYPES AND PERSONNEL PER TYPE

NECESSARY FOR CONSTRUCTION OF ONE OCEAN TUGBOAT

Job Type	Number
Architect, Marine	4
Cantilever-Crane Operator	3
Draftsman, Hull-Stress Calculation	6
Electrician	22
Electrician Foreman	1
Electrician Helper	10
Hull Inspector	2
Laborer, Shipyard	20
Loftsman	6
Loftsman, Head	1
Machinery Erector	6
Machinist Foreman, Outside	1
Machinist Helper, Outside	15
Machinist, Marine Engine	15
Machinist, Outside	10
Painter, Shipyard	10
Painter Foreman, Shipyard	1
Pipe Coverer and Insulator	3
Pipe Fitter	20
Pipe Fitter Foreman	1
Pipe Fitter Helper	15
Rigger	4
Shipfitter	40
Shipfitter Foreman	2
Shipfitter Helper	30
Welder	35
Welder Foreman	1
Yardman	1

Source: Morgan, 1976.

Cantilever-Crane Operator (rig operator). Operates electrically powered rig (tower) equipped with cantilevers (horizontally extended structural-steel framework) which supports hoists used to move heavy objects in shipyards.

Vocational Requirements: 3 to 6 months work experience.

Dockman (dock hand; docking man). Performs essential duties concerned with drydocking and cleaning exteriors of ships and maintenance of drydock and piers.

No specific educational or vocational requirements.

Dockmaster (dock foreman; docking master). Supervises and coordinates activities of workers engaged in drydocking vessels for painting, cleaning, and repair.

Educational Requirements: High school diploma.

Vocational Requirements: 2 to 4 years directly related work experience.

Draftsman, Hull-Stress Calculation. Specializes in calculating stresses to which ship members will be subjected in preparation for specification of size, weight, and material for each member.

Educational Requirements: Bachelor's degree in Marine Engineering.

Vocational Requirements: 2 to 4 years work experience.

Cutter, Aluminum Sheet. Cuts boat hulls and decks to specified shape from sheet aluminum, using portable saw.

No specific educational or vocational requirements.

Electrician (electrician, marine; electrician, outside). Installs and repairs wiring, fixtures, and equipment of all electrical services aboard ship and in shipyard facilities, following blueprints and wiring diagrams.

Vocational Requirements:	Minimum of 4 to 10 years directly related work experience.

Electrician Foreman. Supervises and coordinates activities of workers engaged in installation and repair of wiring and electrical equipment aboard ship and in shipyard facilities.

Educational Requirements:	High school diploma.
Vocational Requirements:	Minimum of 4 to 10 years work experience.

Electrician Helper. Assists Electrician in the installation and repair of wiring, fixtures, and equipment aboard ship and in shipyard facilities.

Vocational Requirements:	6 months to 1 year work experience.

Hull Inspector. Inspects construction of hulls, compartments, tanks, and decks of ships for conformance to plans and specifications.

Vocational Requirements: Minimum of 4 to 10 years work experience.

Laborer, Shipyard. Performs any one or more of the following tasks in a shipyard: loads vehicles, washes trucks, cleans boats, piers, drydocks, sorts lumber and metals, mixes and pours cement on bottom of boats, removes paint and scale from boat's metal surfaces, or assists journeymen workers by gathering and supplying materials.

No specific educational or vocational requirements.

Loftsman (mold loftsman). Lays out lines of boats to full scale on a mold-loft floor and constructs templates and molds to be used as patterns and guides for layout and fabrication of various structural parts of the boat.

Vocational Requirements: 2 to 4 years work experience and graduate of an approved apprenticeship program.

Loftsman, Head. Supervises and coordinates activities of workers engaged in laying out and constructing templates and molds used as patterns and guides for fabrication of structural parts of boats.

Vocational Requirements: Journeyman status plus a minimum of 4 to 10 years work experience.

Machinery Erector (craneman; crane rigger; groundsman; hook-and chain man; hook tender; slinger; yard rigger). Assembles rigging to lift and move equipment or material in boatyard.

Vocational Requirements: 1 to 2 years work experience.

Machinist Foreman, Outside. Supervises and coordinates activities of workers engaged in installation of boat's machinery, such as propelling machinery, auxiliary motors and pumps, and steering gear.

Educational Requirements: High school diploma.

Vocational Requirements: Minimum of 4 to 10 years direct work experience.

Machinist Helper, Outside (machinist helper, marine). Assists Machinist, Outside by performing such routine duties as: furnishing needed materials, tools, and supplies; cleaning work area, machines, and equipment, feeding or offbearing machine; holding materials or tools.

No specific educational or vocational requirements.

Machinist, Marine Engine (marine-engine mechanic). Installs or repairs diesel engines in boats, tugs, and trawlers.

Vocational Requirements: 2 to 4 years work experience.

Machinist, Outside (engineer, steam; machinist, installation; machinist, marine; marine erector; marine machinist, outfitter; outside-installation man). Installs boat's machinery, such as propelling machinery, auxiliary motors, pumps, ventilating equipment, and steering gears, working from blueprints and using handtools, calipers, and micrometers.

Vocational Requirements: Minimum of 4 to 10 years work experience.

Manager, Marine Service. Directs activities of boat repair service, according to knowledge of maintenance needs of small craft and marine safety requirements.

Vocational Requirements: Minimum of 2 to 4 years work experience.

Marine Engineer. Designs and oversees installation and repair of marine powerplants, propulsion systems, heating and ventilating systems, and other mechanical and electrical equipment in ships, docks, and marine facilities.

Educational Requirements: Bachelor's degree in Marine Engineering.

Vocational Requirements: Minimum of 2 to 4 years work experience.

Painter, Shipyard. Responsible for the preparation and painting of parts, equipment, interiors, and exteriors of boats and trawlers.

Vocational Requirements: Minimum of 2 years work experience.

Painter Foreman, Shipyard. Supervises and coordinates activities of workers engaged in painting parts, equipment, interiors, and exteriors of boats and trawlers.

Vocational Requirements: Minimum of 4 to 10 years work experience.

Pipe Coverer and Insulator. Covers boilers, pipes, and tanks with insulating materials to reduce loss or absorption of heat, prevent mositure condensation, and to deaden sound.

Vocational Requirements: Minimum of 4 years work experience.

Pipe Fitter (pipe fitter, marine). Lays out, installs, and maintains ships' piping systems, such as steam heat and power, hot water, hydraulic, air pressure, and oil lines, following blueprints and using handtools and shop machines.

Vocational Requirements: Must be able to pass rigid test concerning pipe fitting.

Pipe Fitter Foreman. Supervises and coordinates activities of workers engaged in installing and maintaining piping systems of boats.

Vocational Requirements: Must be able to pass rigid test plus 4 to 10 years work experience.

Pipe Fitter Helper (fitter helper). Assists Pipe Fitter with the installation and maintenance of piping systems of boats.

Vocational Requirements: Normally required to pass simple welding test.

Rigger (erector; loft rigger; outside rigger). Installs and repairs rigging and weight-handling gear on boats and attaches hoists and pulling gear to rigging to lift, move, and position machinery.

Vocational Requirements: Minimum of 2 to 4 years work experience.

Rigger Foreman (rigger, chief). Supervises and coordinates activities of workers engaged in installation and repair of rigging, and in hoisting and positioning machinery, equipment, and structural parts aboard boats.

Vocational Requirements: Minimum of 4 to 10 years work experience.

Rigger Helper. Assists Rigger in moving, lifting, and positioning machinery and structural members of boats under repair or construction.

No specific educational or vocational requirements.

Shipfitter (fitter). Lays out and fabricates metal structural parts, such as plates, bulkheads, and frames, and braces them into position within hull of boat for tacking or welding.

Vocational Requirements: Minimum of 4 to 10 years work experience.

Shipfitter Foreman (steel construction foreman; steel installation foreman). Supervises and coordinates activities of workers engaged in fabricating and installing metal structural parts, such as bulkheads, plates, and frames on boats.

Vocational Requirements: Minimum of 4 to 10 years work experience.

Shipfitter Helper. Assists Shipfitter in fabricating, assembling, and installing bulkheads, plates, frames, stanchions, and other heavy steel structural parts within hull of boat.

Vocational Requirements: 6 months to 1 year work experience.

Welder, Arc. Welds metal parts together, as specified by layout, diagram, work order, or oral instructions, using electric arc welding equipment.

Vocational Requirements: Normally required to pass test plus 1 to 2 years work experience.

Welder, Foreman. Described in section on Pipelaying.

Yardman. Moves towboats or other vessels from shop to yard, and launches vessels, using winch.

Vocational Requirements: 3 to 6 months work experience.

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CHAPTER 3

THE IMPACT OF OCS DEVELOPMENT ON SEAFOOD, FUR, AND RECREATION IN LAFOURCHE PARISH

In this chapter, a brief description of the shrimp, oyster, menhaden, fur, and recreation industries in Lafourche Parish is presented, along with a discussion of OCS related impacts on these industries.

LIVING WETLAND RESOURCES

Wetlands serve as a nursery, habitat, and source of nutrients for many seafood and fur animals. Destruction of wetlands leads to diminished production from these organisms. Natural and man-made phenomena cause stresses and destruction of the wetland environment. Natural stresses result from wave erosion, hurricanes, natural sedimentation from rivers and streams, natural pollution (such as oil seeps and natural phosphorus), certain marine organisms, geologic subsidence and other factors. Man-made changes in the wetlands which have caused environmental stress include pollution from urban runoff, industry, and pesticides; channelization and drainage and filling of wetlands for urbanization, agriculture and mining, which cause loss of habitat and productive capabilities. Channeling and dredging in the marsh and estuary areas are necessary for access to offshore and onshore oil facilities, laying pipelines, and constructing oil wells. As a consequence, various ecological changes occur along with oil industry development (Mumphrey <u>et al</u>., 1975: 41-95).

Mumphrey <u>et al</u>. (1975: 86) list the following ecological changes in coastal zones caused by channelization and dredging by the petroleum industry:

1. interfering with sheet water flow through the marsh;
2. allowing rapid salinity changes with the resultant death of vegetation and erosion of the marsh;
3. allowing destruction of marsh by wave action;
4. decreasing productivity by the presence of straight vs. sinuous channels that accelerate removal of freshwater and also confine water movement;
5. destruction of barrier islands with resultant increased destruction of marsh.

The flushing rate (movement of fresh water from wetlands into bayous and to the Gulf) increases when north-south bayous are straightened and deepened. This results because the water does not have time to unload sediment and nutrients in the wetland area. The faster movement of water in the bayous and canals also causes erosion along the unstable banks of the streams. Other channels that are dug east-west across the marsh create spoil banks that interrupt the normal north-south sheet-like flow of water. This flow of water is important because it disperses nutrients and detritus over the wetlands. Additionally, man-made channels disrupt nursery areas of many commercially important marine animals (e.g., shrimp and menhaden). Dredging and channeling for the building of oil wells and pipelines can often destroy vegetation and habitats of marsh animals. (See Mumphrey et al. (1975: 86-89) for a more complete discussion.) Burying pipelines and the revegetation of their paths through the marshes mitigates, but does not eliminate the effects of the associated channels (Willingham et al., 1974). Also, creative dispersal of spoil banks can mitigate some of the effects of channelization.

Where deep, straight canals are cut, salt wedges can result and extend far inland, causing the death of vegetation which results in the loss of nutrients, habitat, and erosion in the wetlands. These large, straight canals carry high velocity seawater (waves) during hurricanes and destroy vegetation. After a hurricane, the spoil banks tend to trap the saline seawater in the wetlands and prohibit it from draining. The result is the destruction of more vegetation and erosion. Also, the dredging of canals near barrier islands helps speed their destruction. Normally, these islands protect the plant and animal life of the wetlands from destruction by storm-generated tidal surges and diminish wetland erosion (Mumphrey et al., 1975: 89-93).

The seafood and fur industries in Lafourche Parish are rather large. Therefore, preservation of wetlands productivity is important to the parish economy. The average employment in fishing for 1975-1976 is 250 (from Table 3.1). Commercial seafood landings in Lafourche Parish are shown in Table 3.2. Table 3.8 presents employment data on the fur industry.

The Shrimp Industry

Louisiana's most important fishery in dollar terms is shrimp. The catch for the years 1940 to 1974 are shown in Table 3.3. Since trawling is performed over extensive acres of water, oil platforms do not affect the size of the shrimp catch. Of the several species caught in state waters, brown shrimp (Penaeus aztecus) and white shrimp (Penaeus setiferus) are the most important. During the 1958 to 1971 seasons, brown shrimp totaled 41% of the total Louisiana shrimp production. White shrimp, at one time, contributed 95% of the total offshore Louisiana catch. However, because of increased amounts of fresh water into estuary nursery grounds, where shrimp spend considerable time, there has been a decline in the catch since 1952 (Barrett and Gillespie, 1973). Figure 3.1 shows that white shrimp spawn in the open Gulf during May through July. After that, the larvae return to bays and estuaries and mature to adults in the safety of nursery grounds. The adults then return to the Gulf in the early spring and live in waters less than 100 feet deep (Viosca, 1957: 8-9).

TABLE 3.1

EMPLOYMENT IN SEAFOOD INDUSTRIES IN LAFOURCHE PARISH FOR 1975-1976 BY QUARTER*

SIC Number	Description	1975-1	1975-2	1975-3	1975-4	1976-1
0910	Commercial fisheries	86	109	120	118	79
0912	Finfish	5	5	10	7	10
0913	Shellfish	90	129	154	139	126
0989	Fish hatcheries, farms, and preserves	8	13	15	18	10
	TOTAL	189	256	299	282	225

*Because of disclosure problems relating to single-firm industries, Table 3.1 should not be further reproduced without the permission of its source.

Source: Louisiana Department of Employment Security, n.d.

TABLE 3.2

COMMERCIAL SEAFOOD LANDINGS

FOR GOLDEN MEADOW-LEEVILLE PORT

Year	Size (1000 lbs.)	Value ($)
1972	37,900	9,100,000
1973	32,565	8,626,000
1974	26,819	8,000,000
1975	23,395	11,260,000

Source: National Marine Fisheries Service, 1973-1976.

TABLE 3.3

LOUISIANA SHRIMP CATCH, 1940-1974

Year	Quantity (1000 lbs.)	Value (1000 $)
1940	90,820	3,645
1941*		
1942*		
1943*		
1944*		
1945	103,352	12,402
1946*		
1947*		
1948	79,966	16,827
1949	77,046	17,662
1950	70,630	14,696
1951	78,164	17,587
1952	75,854	15,722
1953	81,589	16,427
1954	77,709	15,451
1955	68,986	13,745
1956	56,886	15,316
1957	31,917	9,660
1958	39,760	13,080
1959	57,036	12,803
1960	61,758	15,881
1961	31,027	8,913
1962	43,585	14,985
1963	80,809	19,789
1964	59,382	18,794
1965	62,593	19,584
1966	62,276	24,390
1967	75,325	24,575
1968	67,768	25,623
1969	82,888	33,358
1970	90,948	34,614
1971	92,481	43,285
1972	83,035	47,066
1973	58,653	44,513
1974	59,591	32,206**

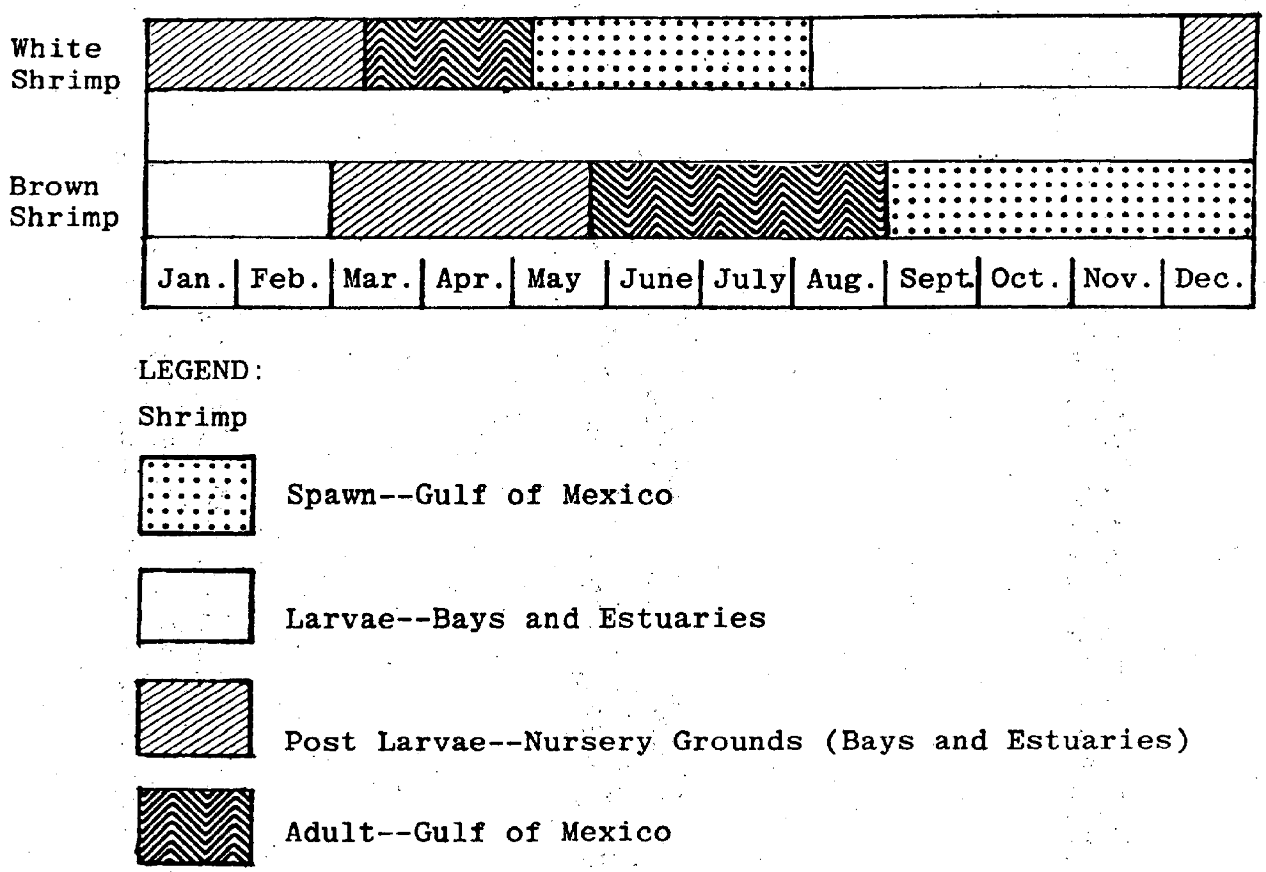
*Data not available for these years

**As it appears in source.

Source: U.S. Fish and Wildlife Service, 1955-1969 and National Marine Fisheries Service, 1970-74; 1975.

FIGURE 3.1

SEASONAL MOVEMENTS OF SHRIMP



Source: Dames and Moore, 1975: 2-396.

Since fishermen have extended their trawling grounds into deeper Gulf waters, the brown shrimp has become more important than the white. Brown shrimp are associated with muddy substrates of peat and sandy mud. They bury themselves during the day and at night they feed in the Gulf's surface waters. Trawlers bring in their greatest catches during summer nights. Brown shrimp spawn in the open Gulf waters during fall and early winter. Larvae reaching the estuary nursery grounds remain until maturity when adults return to the open water in June (Figure 3.1). Brown shrimp are more tolerant of high salinities than white, 19 ppt (parts per thousand) being an optimum salinity (Barrett and Gillespie, 1973). Growth of the brown shrimp is dependent on moderate temperatures, 20^{o} C or greater, and salinity near 19 ppt (White, 1975).

Estuarine nursery grounds provide shrimp with safety until they reach maturity. Plants, animals, and inorganic and organic detritus in the nurseries provide food for the shrimp. The estuarine nursery grounds are affected in two major ways by man's activities. First, changes in salinity and chemical composition of water are the results of channeling. Secondly, loss of vegetated marsh areas by channeling and dredging reduces the shrimp supporting capacity of the estuaries (McGinnis et al., 1972: 3-24).

Another problem which may affect the shrimp catch is the laying of pipelines. Pipelines laid in bays and offshore waters are either buried in the seabed or are eventually covered by the substrate (ocean floor material that supports plant or animal life). Occasionally, before pipelines are covered, or when they become uncovered by water current action, trawlers face navigational hazards. Nets become caught and snagged on exposed lines. For the same navigational reasons, trawling is not performed near oil platforms. However, many people believe the pipelines do not interfere with overall yields. Willingham et al. (1974: 135) concluded "offshore pipelines...didn't appear to diminish yields of aquatic organisms." Many shrimpers say the best trawling areas are along underwater pipelines. Shrimp and other smaller fish hide from predators and feed in the abundant growths of seaweed found on both sides of a pipeline (LaPlace, 1976).

The largest shrimp production areas are in Terrebonne and Lafourche Parishes with Barataria and Caminada Bays being the traditional center of brown shrimp production in Louisiana (Dames and Moore, 1975; White, 1975). Only slightly less important are Timbalier and Terrebonne Bays. The average inshore production of brown and white shrimp for 1959 to 1972 in the Barataria and Caminada Bay areas was approximately 28% of the annual inshore brown shrimp catch in Louisiana (White, 1975). Table 3.4 shows the brown shrimp catch in Barataria and Caminada Bays for 1959 to 1972 (Barrett and Gillespie, 1973). 1970 yielded the largest

TABLE 3.4

BARATARIA AND CAMINADA BAYS,

BROWN SHRIMP CATCH, 1959-1972

Year	Catch (millions of pounds)
1959	2.75
1960	2.99
1961	1.03
1962	1.50
1964	1.05
1965	2.59
1966	2.88
1967	3.55
1968	3.69
1969	4.37
1970	4.95
1971	4.68
1972	4.21

Source: Barrett and Gillespie, 1973: 26.

catch with 4.95 million pounds. At the 1974 per pound value of $0.54 computed from Table 3.3, a catch of about 4 million pounds is valued at about $2 million.

While shrimp catches are important, processing is a necessity to distribute the various shrimp products. Shrimp producers sell shrimp in several forms including fresh headless, fresh peeled, fresh heads-on, frozen peeled, frozen heads-on, frozen heads-off, canned and dried. Four seafood companies in Lafourche Parish provide fresh and frozen shrimp (Department of Commerce and Industry, 1975). The Louisiana Advisory Commission (1973: 187-188) recommends that the dockside value of commercial catches be multiplied by a factor of between 2.5 and 3.5 to obtain the total worth of production after value added in processing. Using a factor of 3, a catch of 4 million pounds is valued, after processing, at $6 million.

The Oyster Industry

The Eastern or Atlantic oyster, Crassostrea virginica Gmelin, is the only commercially valuable oyster taken in Louisiana waters (Pollard, 1973). Although Crassostrea virginica may live in a salinity range of 10 to 30 ppt, it is usually found in salinities of 10 to 15 ppt. The reason for greater populations in a lower salinity range is the low salinity intolerance of oyster predators, such as the fungus Dermocystidium marinum and the conch (commonly called oyster drill), Thais haemastoma.

Dermocystidium marinum infects oysters usually during high temperature periods and in salinities above 10 ppt. Infection is usually lethal to the host oyster, but also may cause loss of weight, castration, and failure to grow normally. A change to a lower salinity achieved by fresh water flushing of the estuary is believed to be the best way to rid the oyster bed of the fungus (Mackin, 1962).

The conch Thais haemastoma hayse is common in the northern Gulf waters. T. haemastoma feeds on oysters and other mollusks by drilling holes in the shell or penetrating the shell from the edge by secreting enzymes that soften the mollusks' shells. The conch has a high reproductive rate and high survival rate of larvae. A salinity of 10 ppt or lower will prevent the conch from entering waters and exposure to a salinity of 7 ppt or lower for one or two weeks is known to kill it. T. haemastoma breeds in Louisiana during a period beginning no later than the end of March and ending in July. The conch's tendency to climb on rocks or structures above ground to attach its eggcases has led many oystergrowers to erect stakes in the oyster grounds to trap the animal (Galtsoff, 1964: 433).

Louisiana's oyster production depends on "seed" oysters taken from state-managed seed grounds east of the Mississippi River and transported to private grounds for cultivation. Cultivating oysters has become more important in Louisiana with the depletion of natural oyster reefs. Some believe that the decline in productivity in the natural oyster reefs is due to overfishing more than the effects of salinity changes. Mackin and Hopkins (1962) define an oyster reef as "an area of not less than 500 square yards of the bottom of any body of water upon which oysters are found or have been found within a term of five years...in quantities which would warrant taking them for profit by means of tongs." The largest natural oyster reef is the Point au Fer reef in the Atchafalaya Bay (Mackin and Hopkins, 1962).

The first seed plantings were tried in 1886 near the end of the Mississippi River delta with the Garden Island Bay oyster culture. Plantings were later begun below Quarantine Bay in an area known as the "Salt Works" (Mackin and Hopkins, 1962). Natural reefs were used to provide seed oysters.

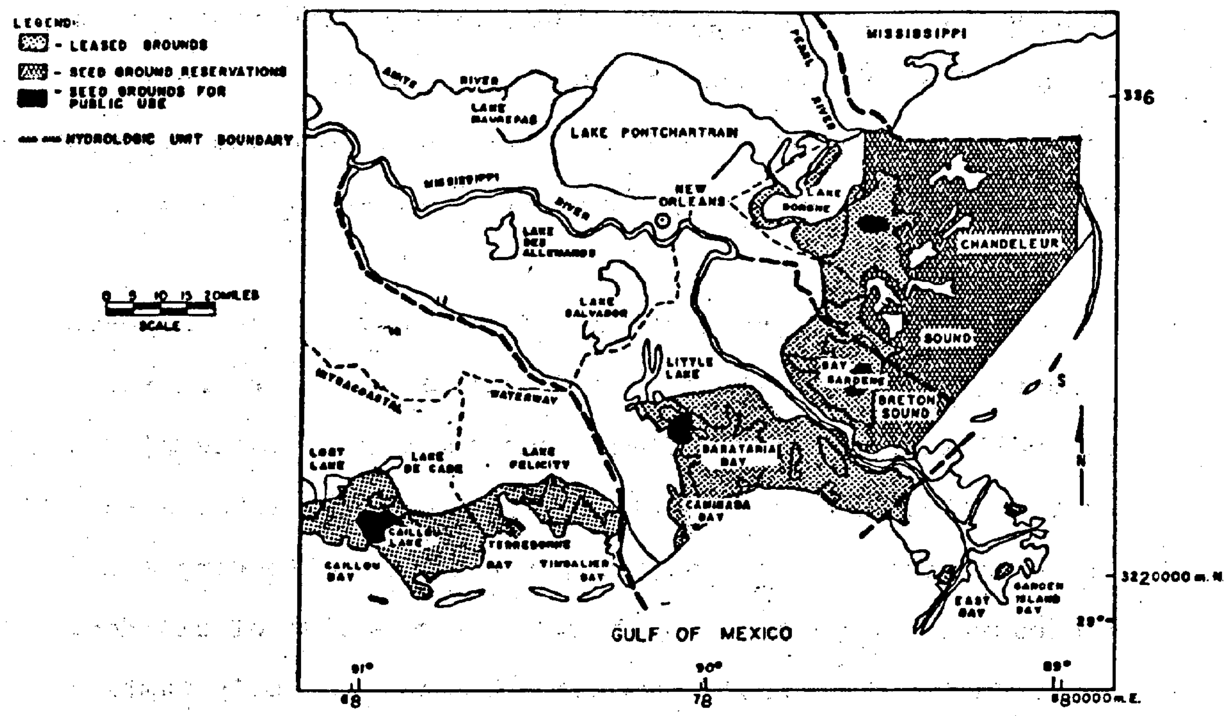
Oysters are dredged from the seed areas and transported to public and private leases for cultivation. Since 1904, an individual may obtain in his name up to one thousand acres in total of oyster lease cultivation grounds from the state (Mackin and Hopkins, 1962). Corporations may hold in total more than one thousand acres by having each of its various stockholders hold one thousand acres. Individuals or corporations who own factories are allowed to hold five hundred oyster lease acres for the first factory, two hundred and fifty acres for the second factory, and none for other factories. This is in addition to acres held as oyster cultivators. Leases are valid for fifteen years (Lay, 1976). Figure 3.2 shows the principal lease and seed grounds in southeast Louisiana.

Louisiana oysters tend to grow faster, spawn more abundantly, and have a larger population in salinities up to 30 ppt. The abundance of natural predators in higher salinities forces the oyster to keep to lower salinity waters. Mackin and Hopkins (1962) believe the best oyster producing areas are high salinity waters where freshets (fresh water intrusions) drive out or kill predators. Oysters can withstand freshets by shutting their shells for long periods.

The oil industry has had two main effects on the oyster populations of Louisiana, one direct and another indirect. Oil pollution directly affects the commercial value of the oyster. Oysters are sessile (attached to the substrate) filter feeders. Oysters ingest crude oil in feeding and concentrate it in their systems. The ingestion of oil does not affect their feeding process; however, an oily taste is imparted, making them undesirable in markets. Over time, however, if the oil is dispersed, the oysters will eventually lose the oily taste. In a study done on the effects of an oil spill from a Mecom Oil Company well, Mackin and Sparks (1962) found that after two months, the oil taste had "probably disappeared" from a great number of the population in the most contaminated area (located in Grand Isle Block, Freeport Sulphur vicinity), because of the breakdown of the oil.

FIGURE 3.2

PRINCIPAL OYSTER PRODUCING AREAS IN SOUTHEAST LOUISIANA



Source: Dames and Moore, 1975: 2-407.

Salinity changes have been caused indirectly by the oil industry through channeling and dredging for access to offshore oil facilities. The increases in salt water allows the oyster predators to enter oyster grounds and often cause serious damage. Also, dredging that covers oyster beds or dislocates oysters from the substrate can cause destruction of the oyster reef.

Table 3.5 shows the catch and value of oysters in Louisiana for the years 1940 through 1974. In 1940, 12,412.2 thousand pounds of oysters were taken at a value of $694,875. In 1963, 11,563.2 thousand pounds of oysters were valued at $3,720,113 and in 1974, 9,971 thousand pounds were valued at $6,347,912. The 1968 catch was the largest catch at 13,122 pounds and was valued at $5,305,000.

In Lafourche Parish, 15,157 acres were leased for oyster cultivation in 1976 (Louisiana Wildlife and Fisheries Commission, 1976d). Barataria Bay produces 357 pounds of oyster per acre leased. This is second only to Lake Borgne (539 pounds per leased acre). In terms of production alone, Barataria Bay is valued first. An approximate 49% of the oyster meat produced in Louisiana during the 1963-67 period was from Barataria Bay (U.S. Coast Guard, 1976: 2.4-2.9). If this proportion still holds, then Barataria Bay in 1974 produced 4.9 million pounds of oysters with a value of $9.3 million after processing.

TABLE 3.5

LOUISIANA OYSTER CATCH 1940-1974

Year	Pounds (in thousands)	Unprocessed Value
1940	12,412.2	$ 694,875
1941*		
1942*		
1943*		
1944*		
1945	9,884.1	2,829,007
1946*		
1947*		
1948	9,016.3	3,157,393
1949	9,687.5	3,459,341
1950	8,715.4	2,842,603
1951	8,163.7	1,902,647
1952	11,401.6	3,075,141
1953	9,435.3	2,672,664
1954	8,361.1	2,350,270
1955	9,394.9	2,753,177
1956	10,056.1	2,238,034
1957	10,489.3	2,756,098
1958	8,264.8	2,425,917
1959	9,667.5	2,645,124
1960	8,310.8	2,303,997
1961	10,139.2	2,849,090
1962	10,160.3	3,316,554
1963	11,563.2	3,720,113
1964	11,401.1	2,976,152
1965	8,342.7	2,401,607
1966	4,764.0	2,156,000
1967	7,743.0	3,414,000
1968	13,122.0	5,305,000
1969	9,178.0	3,969,000
1970	8,639.0	3,631,000
1971	10,528.0	4,638,000
1972	8,805.0	4,457,000
1973	8,953.8	5,545,022
1974	9,971.2	6,347,912

*NOTE: Data not available for these years.

Source: U.S. Fish and Wildlife Service, 1955-1969 and National Marine Fisheries Service, 1970-1974; 1975.

The Menhaden Industry

Since its beginning in Louisiana in 1948, the menhaden fishery has been an important commercial fishery in the state and recently is second only to shrimp. The two major species caught are *Brevoortia patronus* and *Brevoortia gunteri*. In 1974, 524,363,440 pounds of menhaden were caught in the four-parish area, including St. Mary, Assumption, Terrebonne, and Lafourche. Value of the catch was $19,027,142 (National Marine Fisheries Service, 1975). After processing, the value was approximately $57 million. Table 3.6 shows that the entire state's menhaden catch has greatly increased since 1948, based on the market for the fish and unrelated to the oil industry. Because extensive areas of the Gulf are trawled for menhaden, the size of their catch is unrelated to the oil and gas platforms.

The industrial fish industry is relatively new in the Gulf of Mexico. Bottom fish or "trash-fish" are used for feeding a variety of agricultural and domestic animals. In 1952, a pet food plant opened in Pascagoula, Mississippi, starting the bottom fish industry in the Gulf. At least 65 bottom fish species are caught for processing, most of which are of the Sciaenid family (Dunham, 1972). Industries use menhaden oil for manufacturing margarine and in a wide variety of industrial products and processes. Fish meal and solubles from menhaden are used for agricultural purposes.

TABLE 3.6

MENHADEN CATCH FOR LOUISIANA

Year	Catch (1000 pounds)	Value (in thousands $)
1948	88,110	*
1949	165,914	*
1950	207,755	*
1951	209,574	*
1952	283,373	2,765
1953	307,492	3,690
1954	270,094	3,727
1955	298,309	4,594
1956	320,521	4,840
1957	162,817	2,459
1958	241,813	3,627
1959	442,740	*
1960	470,108	*
1961	581,682	6,748
1962	689,157	7,994
1963	633,484	7,862
1964	599,538	9,046
1965	682,435	11,790
1966	555,852	9,558
1967	510,414	6,134
1968	622,291	7,740
1969	856,251	12,764
1970	959,810	18,931
1971	1,237,093	20,015
1972	928,252	15,279
1973	894,931	37,221
1974	1,079,304	39,539

*NOTE: Data not available for these years.

Source: U.S. Fish and Wildlife Service, 1955-1969 and National Marine Fisheries Service, 1970-1974 and 1975.

Most of the commercial fish important to Louisiana industry rely on estuaries for food or live part of their lives in the estuaries. Table 3.7 shows the migratory behavior of selected coastal organisms. Fish are subjected to two stresses from the oil industry: pollution from oil spills and destruction of estuary nursery and feeding grounds. Channeling and dredging have increased salinity in most of the estuary and marsh areas of Louisiana. Changes in salinity cause changes in flora, plankton, and overall habitat. Levee building for drainage and flood protection decreases the amount of freshwater runoff from land. This, in turn, leads to a depletion in nutrients necessary for plankton life (menhaden food). Straightening channels and bayous increases the flushing rate and turbidity of the stream or stops sheetwater flow, resulting in diminished wetland nutrients. Increased turbidity affects ability of many plankton species to float (Patrick, 1967).

Fish populations can be damaged in five major ways by oil spills:

1. coating and exposure to hydrocarbon concentrations in excess of 0.1 ppm cause eggs and larvae to die;
2. adult fish, especially anadromous fish, die or fail to reach spawning grounds if spill occurs in a critical, narrow, or shallow waterway;
3. contaminated spawning of nursery grounds causes loss of a local breeding population;

TABLE 3.7

MIGRATORY BEHAVIOR OF COASTAL ORGANISMS

Month	Movement into Estuaries (or nearshore zone)	Movement from Estuaries
Jan.	Southern Hake, Red Drum (peak)	Menhaden, Spadefish
Feb.	Stingray, Brown Shrimp Postlarvae, Menhaden, Spadefish	
Mar.	Gulf Killifish, Spot, Cutlassfish, Hogchoker, Butterfish, Rough Silverside, Flounder, Tonguefish	Blue Catfish, Sheepshead Minnow, Longnose Killifish
Apr.	Gafftopsail Catfish, Sea Catfish, Bluefish, Bumper, Sand Seatrout, Southern Kingfish, Shipjack Herring (in and out same month), Adult Croaker, Black Drum (peak), Pinfish, Atlantic Threadfin, Toadfish, Midshipman	Bighead Searobin
May	Striped Anchovy, Lizardfish, Sardine, Spanish Mackerel, White Shrimp Postlarvae	Menhaden, Southern Hake
June	Needlefish, Pompano, Crevalle Jack, Leatherjacket, Atlantic Moonfish	Butterfish
July	Ladyfish, Lookdown	
Aug.		Ladyfish, Atlantic Threadfin
Sept.		Adult Croaker, Rough Silverside

TABLE 3.7 CONTINUED

Month	Movement into Estuaries (or nearshore zone)	Movement from Estuaries
Oct.	Menhaden, Sheepshead Minnow, Bighead Searobin	Sardine, Bluefish, Leatherjacket, Atlantic Moonfish, Sand Seatrout, Cutlassfish, Spanish Mackerel
Nov.	Blue Catfish, Juvenile Croaker	Striped Anchovy, Gafftopsail, Sea Catfish, Needlefish, Pompano, Crevalle Jack, Bumper, Lookdown, Pinfish, Tonguefish, Toadfish, Midshipman, White Shrimp Juveniles
Dec.	Longnose Killifish	Stingray, Lizardfish, Gulf Killifish, Spot, Southern Kingfish, Flounder, Hogchoker

Source: Dames and Moore, 1975: 2-373.

4. productivity and spawning patterns are changed;
5. local food species of adults, juveniles, fry, or larvae are affected (Council on Environmental Quality, 1974: 107, 109).

Moore and Dwyer (1974: 819-827) describe five ways individual organisms respond to the effects of oil pollution. The first is direct lethal toxicity, resulting in death. Cellular and sub-cellular processes, especially membrane activity, are interfered with by the hydrocarbons released by crude oil. The most toxic of the hydrocarbons (the chemical components of petroleum) are the lower boiling point aromatics. These stay in the environment the longest. The larvae and juveniles of species are more sensitive to toxic matter than the adults. Adult marine organisms respond to lethal toxic levels from concentrations of soluble hydrocarbons in the 1-100 parts per million (ppm) range. Larvae stages may be affected by levels as low as 0.1 ppm.

The second response is sub-lethal disruption of physiological or behavioral activities. Disruption of cellular and physiological processes does not include immediate death, though it may occur in the long-run. Feeding and reproduction of species are possibly affected.

Direct coating of oil is the third response. This can cause smothering of the species and/or interference with feeding and movement. Oil can also destroy the water proofing and insulating properties of animals with feathers and fur.

Oil can be ingested as animals try to clean themselves. Bird mortality, as a result of direct oil coating, has been well documented along the California coast.

The fourth response is the incorporation of hydrocarbons in food chains. This includes tainting of edible organisms such as oysters and clams. Accumulation and concentration of polycyclic aromatic hydrocarbons is a major concern, especially since this includes carcinogens.

The final response listed is changes in biological habitats, especially alteration of substrate characteristics. The substrate is the ocean floor material that supports plant or animal life. Species living passively on the substrate (not depending heavily on the substrate for support) may have little or no interference with their habitat. Flora and fauna living in the substrate or actively dependent on it may have adverse effects (Council on Environmental Quality, 1974: 106). Although the quantity and types of oil that may prevent a species from utilizing a substrate are unknown, data indicate concentrations of 10 to 100 parts per billion (ppb) of low to medium boiling point aromatic hydrocarbons may interfere with the species' relationship to the substrate. Chemical sensing and communications upon which anadromous fish depend will be interfered with by the presence of aromatic hydrocarbon derivatives in such concentrations (Council on Environmental Quality, 1974: 106-107).

The Fur Industry

O'Neil and Linscombe (undated) studied the fur industry of Louisiana and found that the state leads the United States in fur productions, amounting to 40 to 65 percent of the total catch per year. Fur trapping began in Louisiana in the 18th century with the founding of New Orleans. Furs were transported to the city and shipped to all parts of the world. Mink, raccoon, otter and alligator were hunted in Louisiana coastal marshes during the 1800s. Burning of the marsh to make alligator habitats more accessible to hunters and other factors such as salinity changes caused changes in the marsh vegetation. These man-induced changes to the marsh produced a favorable environment for the muskrat. During the early 1900s, efforts were begun to trap muskrat in large numbers.

Nutria were first brought to Avery Island, Louisiana, in 1938 from Argentina by Mr. E. A. McIlhenny. During captivity, some nutria escaped and others were intentionally released. This resulted in the establishment of a sizeable population in south Louisiana by 1943. The presence of nutria has offset changes in marsh vegetation and has consequently caused the muskrat population to decline (O'Neil and Linscombe, undated: 23). The nutria is now Louisiana's most valuable fur animal. Table 3.8 gives an indication of the importance of fur trapping to employment in Lafourche Parish. Table 3.9 shows the Louisiana fur catch for the 1974-1975 season. After processing, its value is greater

TABLE 3.8

FUR LICENSES SOLD IN LAFOURCHE PARISH

DURING THE 1973-1974, 1974-1975, and 1975-1976 SEASONS

Year	Fur Dealers[1] ($150/year)	Fur Buyer ($25/year)	Fur Trapper[2] ($2/season)
1973-1974	2	12	432
1974-1975	2	12	517
1975-1976	2	13	496*

[1] Fur dealers must also deposit $500 to insure payment of severence tax (O'Neill and Linscombe, no date).

[2] May be employed part-time in trapping in addition to other work.

*Chauvin, 1976.

Source: Louisiana Wildlife and Fisheries Commission, no date, b.

TABLE 3.9

LOUISIANA FUR CATCH, 1974-1975 SEASON

Category	Number of Pelts	Approximate Price to Trapper	Unprocessed Value
Muskrat (Eastern)	240,214	$ 3.25	$ 780,695.50
Muskrat (Western	60,000	4.50	270,000.00
Mink	32,319	4.50	145,435.50
Nutria (Eastern)	1,000,000	4.50	4,500,000.00
Nutria (Western)	502,617	5.50	2,764,393.50
Raccoon (Coastal)	70,000	4.00	280,000.00
Raccoon (Upland)	90,863	7.00	636,041.00
Opossum	30,447	1.50	45,670.50
Otter	6,118	25.00	152,950.00
Skunk	298	1.00	298.00
Fox	3,471	16.00	55,536.00
Bobcat	775	25.00	19,375.00
Beaver	276	5.00	1,380.00
Coyote	342	10.00	3,420.00
TOTAL PELTS	2,038,379		$9,655,195.00
Nutria Meat	9,000,000 lbs.	.09	$ 810,000.00
Muskrat Meat	250,000 lbs.	.09	22,500.00
Raccoon Meat	930,000 lbs.	.30	279,000.00
Opossum Meat	250,000 lbs.	.25	62,500.00
TOTAL MEAT	10,430,000 lbs.		$1,174,000.00
TOTAL PELTS AND MEAT			$10,829,195.00

Source: Louisiana Wildlife and Fisheries Commission, no date, a.

than $30 million (Louisiana Wildlife and Fisheries Commission, no date, a). Assuming that the proportion of fur taken in Lafourche Parish is equal to its proportion of the area of the coastal parishes--6% (Mumphrey et al., 1975: 100)--the processed value of fur animals to Lafourche Parish is over $1.8 million.

Muskrat and nutria live in coastal marsh areas and have a diet consisting of three-cornered grass, salt meadow cord-grass, cattail bullwhip, alligator weed and other grasses. (Muskrat may also eat small amounts of fish, mussels, insects, and snails). Three-cornered grass (Scirpus oeneyi) is found in brackish marshes in dense, uniform stands often covering large areas. Marshes of three-cornered grass produce more than eighty percent of the muskrat catch and many of the nutria (McGinnis et al., 1972: 2.20).

Fur bearing animals are affected in several ways by man's activities in the coastal zone. Habitat land loss for fur animals consists of land disturbed by dredging and channeling operations and the resulting spoil banks. An indirect effect on habitat is the increased salinity in the marsh resulting from channeling. Salinity changes affect vegetation important to the animals, such as three-cornered grass (McGinnis, et al., 1972: 3.17-3.18). Channeling may also create migrational and home range barriers for animals. Crossing spoilbanks will subject many animals to increased predatory vulnerability (McGinnis, et al., 1972: 3.18).

Temporary displacement and interruption of animal activities may accompany pipeline construction and surveillance in back-filled canals. Multipurpose canals may result in animals being periodically subjected to noise and sight of moving objects which may effect the behavior of local populations. Animals avoid areas where aircraft and vehicular traffic occur. The presence and noise from vehicular traffic in canals may affect the survival of some animal populations (McGinnis, et al., 1972: 3.19).

Two positive side-effects of dredging and channeling can be found in the marsh lands. First, trappers and hunters make use of open canals to reach unaccessable trapping and hunting grounds. Secondly, stable spoil banks will become revegetated with shrubbery, creating new habitats for a diversified population (McGinnis, et al., 1972: 3.18).

RECREATIONAL RESOURCES

The developed recreation resources in Lafourche Parish are outlined in a study entitled the State Comprehensive Outdoor Recreation Plan (SCORP) by the Louisiana State Parks and Recreation Commission (a and b). The study includes an inventory of facilities and their locations. Table 3.10 shows the SCORP listing of these recreational facilities. The SCORP list shows two wildlife management areas, with no facilities offering boating, hunting and fishing in Lafourche Parish (Figure 3.3). The Pointe-au-Chien Wildlife Management Area was acquired by the Louisiana Wildlife and Fisheries

TABLE 3.10

RECREATIONAL AREAS IN LAFOURCHE PARISH, 1976

Location	Acreage	Facilities
NON-PROFIT AREAS		
Levert's Bayou Side Park, West of Thibodaux	2	Playground (1), playfield (1), picnic tables (6), picnic area (1 acre), boat ramps (1)
Bayou Country Club, Thibodaux	90	Playground (1), playfield (1), swimming pool (2500 square feet), 9-hole golf course (1)
VFW Playground, Thibodaux	1	Playground (1)
First Baptist Church, Thibodaux	3	Basketball court (1)
Tidelands Golf and Country Club, between Cut-Off and Galliano	65	Playground (1), swimming pool (800 square feet), 9-hole golf course (1)
Lions Club Park, Thibodaux	10	Playground (1), playfield (1), picnic tables (10), picnic area (10 acres), informal camping (10 acres), archery range

TABLE 3.10 CONTINUED

Location	Acreage	Facilities
COMMERCIAL AREAS		
Harvey Cypress Inn Boat Launch, Chackbay	1	Boat ramp (1), fishing pier (75 feet)
Jog Romes Boat Ramp, south of Golden Meadow	2	Boat ramp (1), rental boats (15), fishing pier (50 feet)
Melancon Boat Launch, north of Leeville	2	Boat ramp (1), fishing pier (100 feet)
Leeville Playground, Leeville	1	
Scuddy Boat Launch, west of Raceland	1	Boat ramp (1)
South Louisiana Recreation Resort, Inc., Des Allemands	1287	Playground (1), playfield (1), swimming pool (800 square feet), boat ramp (1), rental boats (37) trailer camping spaces (25), trailer camping area (8 acres), hunting (1035 acres)

TABLE 3.10 CONTINUED

Location	Acreage	Facilities
Sam Foret, between St. Charles and Raceland	1	Boat ramp (1)
Pleasure Ponds, Des Allemands	1	Boat ramp (1), rental boats (20), fishing pier (20 feet)
LOCAL AREAS		
City Pool Municipal, Thibodaux	5	Swimming pool (15,000 square feet), grandstand seats (500)
Stark Field, Thibodaux	10	Baseball field (1), football field (1), grandstand seats (2,500)
Peltier Park, Thibodaux	42	Baseball fields (5), tennis court (1), playgrounds (3), picnic tables (18), picnic area (3 acres), grandstand seats (2,000)

TABLE 3.10 CONTINUED

Location	Acreage	Facilities
St. Genevieve, Thibodaux	10	Baseball fields (3), basketball courts (2), football fields (2), tennis court (1), grandstand seats (500)
Acadia Park, Thibodaux	22	Baseball fields (2), basketball court (1), football fields (2), tennis court (1), volleyball court (1), playground (1), playfields (3), swimming pool (6,000 square feet), picnic tables (20), picnic area (10 acres)
Lockport Boat Ramp, Lockport	1	Boat ramp (1)
Jakridge Community Park, Golden Meadow	30	Baseball fields (2), basketball courts (2), tennis courts (2), volleyball court (1)
Dominique Park, north of Lake Fields	3	Picnic tables (8), picnic area (1 acre), boat ramps (1)

TABLE 3.10 CONTINUED

Location	Acreage	Facilities
Thibodaux Civic Center, Thibodaux	5	Grandstand seats (5,000)
St. Charles Street, Thibodaux	2	Baseball field (1), football field (1)
Cameco, Thibodaux	10	Baseball fields (2), basketball court (1), football fields (2), grandstand seats (250)
Bayouside, Thibodaux	1	Playfield (1), picnic tables (10), picnic area (0.5 acres), boat ramp (1)
Municipal Pool, Thibodaux	2	Swimming pool (6,000 square feet), grandstand seats (500)
Greco Park, North Thibodaux*		Baseball field (1), basketball court (1), tennis court (1), playground

TABLE 3.10 CONTINUED

Location	Acreage	Facilities
PARISH AREAS		
Cut-Off	5	Baseball field (1), football field (1), tennis court (1), playgrounds (2), swimming pool (6,000 square feet), grandstand seats (300)
Parish Landing, Raceland	5	Boat ramp (1)
Fourchon Boat Launch, Port Fourchon	2	Boat ramps (2)
Chackbay	3	Baseball field (1), football field (1), playground (1), grandstand seats (500)
Bayou Boeuf, Kraemer	4	Baseball field (1), football field (1), playground (1), grandstand seats (400)
Choctaw	3	Baseball field (1), football field (1), playground (1), boat ramp (1)

TABLE 3.10 CONTINUED

Location	Acreage	Facilities
St. Charles	5	Baseball field (1), basketball courts (2), football field (1), volleyball courts (2), playground (1), grandstand seats (350)
Alidor, west of Raceland	4	Baseball field (1), playground (1)
Raceland	6	Baseball fields (2), basketball courts (4), football fields (2), playgrounds (4), playfield (1), boat ramps (3), grandstand seats (400)
Mathews	1	Playrounds (2)
Lockport	18	Baseball fields (3), football field (1), tennis court (1), playgrounds (4), swimming pool (3,200 square feet), boat ramps (6), grandstand seats (750), fishing pier (60 feet)
Lake Fields Wildlife Community Ward, Lake Fields	1,000	Hunting (1,000 acres)

TABLE 3.10 CONTINUED

Location	Acreage	Facilities
Larose	4	Baseball field (1), football field (1), playgrounds (2), boat ramps (2), grandstand seats (250)
Galliano	3	Baseball field (1), football field (1), playground (1), grandstand seats (200)
Golden Meadow	5	Baseball field (1), football field (1), playgrounds (3), swimming pool (6,000 square feet)
X Settlement, south of Golden Meadow	4	Baseball field (1), playgrounds (2)
Des Allemands	0.2	Playground (1)
Bayou Blue	4	Baseball field (1), basketball courts (2), football field (1), playground (1), grandstand seats (250)

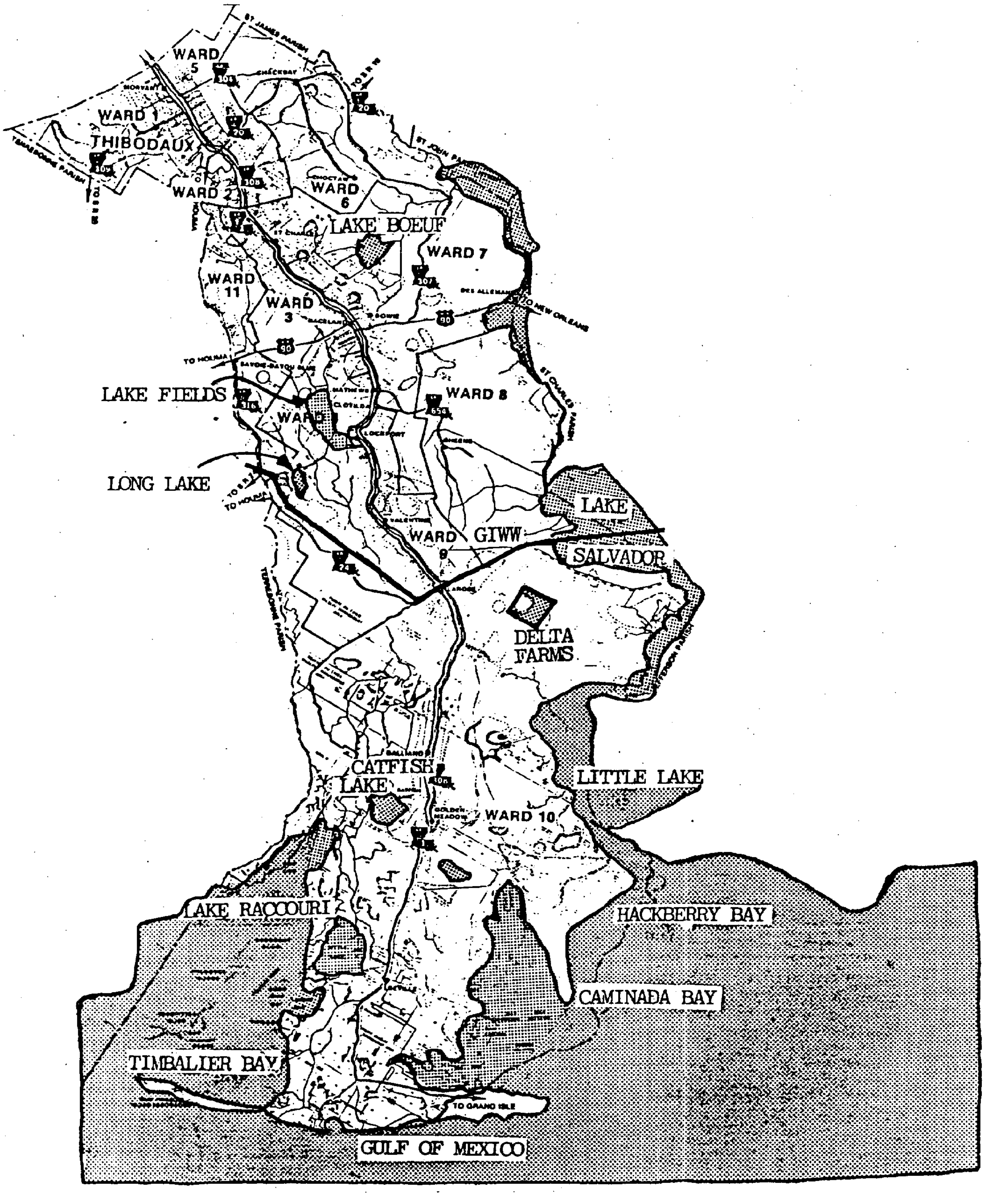
TABLE 3.10 CONTINUED

Location	Acreage	Facilities
STATE AREAS		
Pointe-au-Chien Wildlife Management Area, west of Golden Meadow	22,595	Hunting (22,595 acres)
Wisner Game Management Area	26,310	Hunting (26,310 acres)
E. D. White Memorial		
FEDERAL AREAS		
East Timbalier National Widlife Refuge	337	

*Brown, 1976.

Source: Louisiana State Parks and Recreation Commission, 1974, b.

FIGURE 3.3
LAFOURCHE PARISH



Source: Thibodaux Chamber of Commerce, 1976.

Commission in 1968, and consists of 22,595 acres, located in both Lafourche and Terrebonne Parishes. Wisner Game Management Area (26,310 acres) was leased to the State of Louisiana in 1968 by the Edward Wisner Donation Advisory Committee (Louisiana State Parks and Recreation Commission, 1974b). A third wildlife management area, Salvador, is located within St. Charles Parish and forms the parish boundary line with Lafourche. The area was purchased in 1968 by the Louisiana Wildlife and Fisheries Commission and consists of 27,499 acres (Louisiana Advisory Commission on Coastal and Marine Resources, September, 1973). One National Wildlife Refuge, East Timbalier, is a barrier island located off the Lafourche Parish coastline. The refuge contains 337 acres (Louisiana State Parks and Recreation Commission, 1974b).

Four distinct types of terrain can be found in coastal parishes like Lafourche; these include water, marsh, swamp, and highlands. Of course, most of these areas are undeveloped for recreation. However, many recreational activities take place on each type of land form, including picnicking, and camping in the highlands; fishing, boating, water-skiing, and swimming in the water areas; and hunting in areas depending on the game sought.

Table 3.11 lists the outdoor recreation supply and needs for a region including Lafourche Parish and Table 3.12 presents employment in recreation data for Lafourche Parish.

TABLE 3.11

SUPPLY AND NEEDS OF OUTDOOR RECREATION

IN THE REGION INCLUDING ASSUMPTION, LAFOURCHE,

ST. JAMES, ST. JOHN, ST. CHARLES, AND TERREBONNE PARISHES

Number	Category
SUPPLY, 1974	
33	swimming pools with 143,655 square feet
0	swimming beaches
104	baseball fields
27	football fields
25	basketball courts
15	tennis courts
62	playgrounds with equipment on 74 acres
17	playgrounds with equipment on 36 acres
9	volleyball courts
23,210	grand stand seats for attending outdoor events
243	picnic tables on 76 acres
118,357	hunting acres
51	tent camping sites
116	trailer camping sites with 45 hook-ups
60	total camping acres
11	cabins
0	camp buildings
0	miniature golf courses
8	nine-hole golf courses on 485 acres
70	boat ramps on 70 land acres
172	rental boats
515	feet of fishing pier
1	horse trail of one mile
0	motorcycle trails

TABLE 3.11 CONTINUED

Number	Category
1	nature trail of one mile
0	hiking trails
0	bicycle trails
1	scenic vista point
2	historic exhibits
ADDITIONAL FACILITY NEEDS, 1975	
419	boat ramps for freshwater fishing with 43,576 acres of suitable water
202	boat ramps for motor boating with 52,520 acres of suitable water
331	football fields
323	baseball fields
2,478	picnic tables
274	nature trails
344	basketball courts
6	swimming beaches
11	swimming pools
357	tennis courts
85	horseback riding trails
2,527	tent camping sites
249,829	acres of big game hunting land
110	boat ramps for saltwater fishing with 11,440 acres of suitable water
25	nine-hole golf courses
2,140	trailer camp sites
54	hiking trails
13	boat ramps for water skiing with 6,760 acres of suitable water
184	miles of stream suitable for canoeing

Source: Louisiana State Parks and Recreation Commission, 1974, a: 6.7 and 6.12.

TABLE 3.12

EMPLOYMENT IN RECREATION IN LAFOURCHE PARISH FOR 1975 AND 1976, BY QUARTER*

SIC Number	Description	YEARLY QUARTERS 75-1	75-2	75-3	75-4	76-1
7010	Hotels, Motels, and Tourist Courts	55	54	61	69	72
7011	Hotels, Motels, and Tourist Courts	62	72	73	71	56
7031	Trailer Parks	2	2	2	0	0
7032	Sports and Recreational Camps	2	5	7	9	10
7930	Bowling Alleys, Billiard and Pool Establishments	24	24	20	20	21
7932	Billiard and Pool Establishments	2	2	2	2	1
7940	Commercial Sports	28	36	44	32	29
	TOTAL EMPLOYED	175	195	209	203	189

*Because of disclosure problems relating to single-firm industries, Table 3.12 should not be further reproduced without the permission of its source.

Source: Department of Employment Security, 1976.

Boating

Lafourche Parish is ideally situated for most boating activities. Bayous, lakes and bays allow boating for pleasure, sight-seeing, fishing, hunting, sailing, skiing, and canoeing. Easy access to the Gulf of Mexico for deep-sea fishing, skin-diving and pleasure boating is available. According to the SCORP, there are 70 boat ramps on 70 acres of land and 172 rental boats available in a region including Assumption, Lafourche, St. Charles, St. James, St. John, and Terrebonne Parishes (Louisiana State Parks and Recreation Commission, 1974a). The SCORP inventory (Table 3.10) shows a total of 27 boat ramps in Lafourche Parish and 72 available rental boats. There are five marinas in Lafourche, four in the Leeville area, and one at Port Fourchon. For the same region, the State Plan projects boating facility needs to 1975, as shown in Table 3.11.

Table 3.13 lists user days for selected recreational activities in the parish during 1970. Registration of all motorboats powered by machinery, whether the machinery is the principal source of propulsion or not, is required by Louisiana law. Table 3.14 lists the fees for motorboat registration in the State. The Louisiana Wildlife and Fisheries Commission recorded a total of 6,892 registered motorboats as of December 31, 1975 in Lafourche Parish (Louisiana Wildlife and Fisheries Commission, 1976b).

TABLE 3.13

SELECTED RECREATIONAL ACTIVITIES, USER DAYS,

LAFOURCHE PARISH, 1970

Activity	User Days
Swimming at Beach	164,688
Picnicking	138,861
Motor Boating	134,590
Sailing, Canoeing	19,876
Fishing, Crabbing, Crawfishing	403,770
Camping	103,924
Horseback Riding	76,097
Nature and Pleasure Walks, Hiking	385,029
Bicycling	727,467
Driving for Pleasure	473,052
Sightseeing	226,020
Hunting	188,539
Water Skiing	37,481
Bird Watching	100,517
TOTALS	3,179,911

Source: Louisiana State Parks and Recreation Commission, 1974, a.

TABLE 3.14

FEES: INITIAL THREE-YEAR PERIOD MOTORBOAT REGISTRATION

Category	Fee
Dealer (for demonstration purposes), each certificate	$25.00
Livery (for rental to individuals)	
First three, each	5.00
Addition, each	3.00
All Other (personal, commercial fishing, etc.), each	5.00
Transfer of Ownership for Remainder of Period	1.00
Duplicate Certificate of Original Lost or Destroyed	1.00
Change of Address	0.25

Source: Louisiana Wildlife and Fisheries Commission, 1976, a.

Hunting

Hunting is a popular sport in Lafourche Parish and includes deer, waterfowl, rabbit, dove, quail, and squirrel. Although the number of waterfowl has decreased over the past years, it is still a favorite game. The types of ducks hunted in Lafourche Parish are dos gris, mallard, ring-neck, wood duck, pintail, redheads, blue and green teal, canvas back and poule d'eau. Geese are also hunted. Pointe-au-Chien and other lake areas such as Little Lake and Lake Fields, are favorite hunting spots. Many areas, such as Pointe-au-Chien have been overhunted and now have poor takes. In the future, areas such as Pointe-au-Chien will probably be regulated as to the number of hunters per day to insure the availability of game. Wisner Game Management Area uses a reservation system to manage the amount of hunters per day (Brown, 1976).

According to Brown (1976), a rough estimate of the population for Lafourche Parish involved in hunting would be 35%. This includes licensed residents and residents not requiring a license (those under 16 and over 59 years of age). Table 3.15 shows a list of hunting licenses sold in Lafourche Parish for the 1974 to 1975 season. The total number of resident licenses sold was 8,057.

Table 3.11 shows 118,357 available hunting acres and a projected need to 1975 of 249,829 acres for big game hunting (deer, etc.) in the six-parish region including

TABLE 3.15

HUNTING AND FISHING LICENSES SOLD IN LAFOURCHE PARISH, 1974-1975

Type of License	Price	Number Sold
Hunting License		
Resident Basic Season	$ 5.00	7,034
Resident Big Game	5.00	1,023
Nonresident Season	25.00	0
Nonresident Reciprocal Season[1]		2
Nonresident 3-day Trip	10.00	3
Nonresident Trip Reciprocal[1]		7
Nonresident Big Game	20.00	0
Fishing License		
Resident	2.00	6,490
Nonresident Season	6.00	27
Nonresident 7-day Trip	3.00	13

[1]Nonresident reciprocal licenses are sold to residents of states such as Texas at lower costs than regular nonresident licenses.

Source: Louisiana Wildlife and Fisheries Commission, 1976, c.

Lafourche (Louisiana State Parks and Recreation Commission, 1974a).

Fishing

Saltwater and freshwater fishing are popular in Lafourche Parish. Although many lakes and bayous are fished, some potential areas are not because of inaccessibility. Many areas can only be reached by boat. Lakes Boeuf, Fields, and Long are popular freshwater fishing areas. The Gheens Area, Dufrene Road, Bayou Boeuf Area and Fourchon Road (Chapter 5) also offer good sports fishing (Brown, 1976).

Saltwater and deep-sea fishing have developed with the advance of offshore oil discoveries. Most fishing of this type takes place in the vicinity of oil platforms. A jetty extending from the mouth of Bayou Lafourche at Belle Pass has become a popular saltwater fishing spot.

Brown (1976) estimates that 60% of the Lafourche Parish population participates in fishing as a sport. Table 3.15 shows fishing licenses sold in Lafourche Parish during the 1974-1975 season. This is not an accurate count of sports fishermen because many people who actively fish do not and have never owned a license (Brown, 1976). Also, people under the age of 16 or over 59 are not required to own licenses. The number of licenses purchased probably represents those active in deep-sea and saltwater fishing.

Potential Recreation Development

Lafourche Parish has great development potential for water sports, camping, fishing, and hunting. A large portion of fishing, hunting, and other recreation expenditures are internal rather than from persons residing outside Lafourche Parish. The parish is largely uncommercialized and has not been tapped as a tourist attraction. Most tourism in the areas has been established at Grand Isle, Louisiana. Grand Isle, which is in Jefferson Parish, is accessible by car only on Highway 1 through Lafourche Parish. However, many people in Lafourche benefit from Grand Isle tourists. Money is spent in Lafourche Parish on gasoline, food, and souvenir items. Numerous residents of Lafourche also own second homes or businesses on Grand Isle (Melancon, 1976).

The possibility for Grand Isle-type recreation has been enhanced by the development of the Port Fourchon area. (See Chapter 5.) The area offers sites for beaches, camps, marinas, boat launches, stores, motels, restaurants, and other tourist-oriented spots.

Water Sports

Development of water sports such as boating, water-skiing, and swimming are related to the affluence and leisure time of the population in the area. Per capita income and leisure time has continued to increase in Lafourche Parish with the development of the oil industry. See Chapter 1, Table 1.2. Water sports also depend on the physical aspects present in the environment such as lakes, rivers, and beach areas. Lafourche Parish has many water areas and interest should continue to increase as affluence, leisure time, and accessibility to water areas is increased and new facilities are built.

Most of the navigable water bodies in Lafourche Parish available for water sports, such as Little Lake, Lake Fields, Lake Boeuf, and Long Lake, are surrounded by marsh, swamp, or woodland and are accessible only by boat. Facilities on site, such as boat launches or marinas, are limited. Lack of formal ramps or launches leads many people to launch boats wherever feasible. Permits from the U.S. Army Corps of Engineers are necessary for the construction of launch sites and the time involved in obtaining such permits hinders the building of new facilities. Accessibility and the number of facilities available for supporting water activities is inadequate to meet the potential need.

Although the Louisiana Gulf Coast has many beaches, few are accessible by road. A study by the U.S. Army Corps of Engineers inventoried the Louisiana beach zone. Table 3.16 lists the miles of beach along Caminada and Barataria Bays and Terrebonne and Timbalier Bays. Under shore use, only 0.1 mile is listed as public recreation. This is found at Grand Isle, Louisiana, in Jefferson Parish. Lafourche Parish now has a road leading to a three-mile stretch of

TABLE 3.16

BAY, LAKE, AND ESTUARY SHORELINES, SOUTH CENTRAL LOUISIANA (IN MILES)

	Terrebonne and Timbalier Bays	Caminada and Barataria Bays
A. Physical Characteristics		
Shore with Beach Zone (Sand)	111.0	40.0
Shore without Beach Zone (Mud and/or Silt)	102.0	134.0
B. Historic Shore Changes		
Critical Shore Erosion	0.0	0.0
Noncritical Shore Erosion	213.0	174.0
Noneroding Shore (Stable or Accreting)	0.0	0.0
C. Shore Ownership		
Public, Federal	0.0	0.2
Public, Nonfederal	18.5	17.2
Private	194.5	156.6
D. Shore Use (1970)		
Recreation, Public	0.0	0.1
Recreation, Private	0.0	7.4
Nonrecreation Development	0.0	4.3
Undeveloped	213.0	162.2
TOTAL SHORELINE MILES	213.0	174.0

Source: U.S. Army Corps of Engineers, 1973: 54-55.

beach at Port Fourchon. This area is now being developed by the Greater Lafourche Port Commission. Melancon (1976) indicates that the Commission hopes to build up the Fourchon beach in a manner similar to that done along the Mississippi Gulf Coast to increase its desirability as a recreation resource. An estimated 319 acres of beach frontage is available for public use (Gulf South Research Institute, 1974) (Figure 3.4 and Table 3.17).

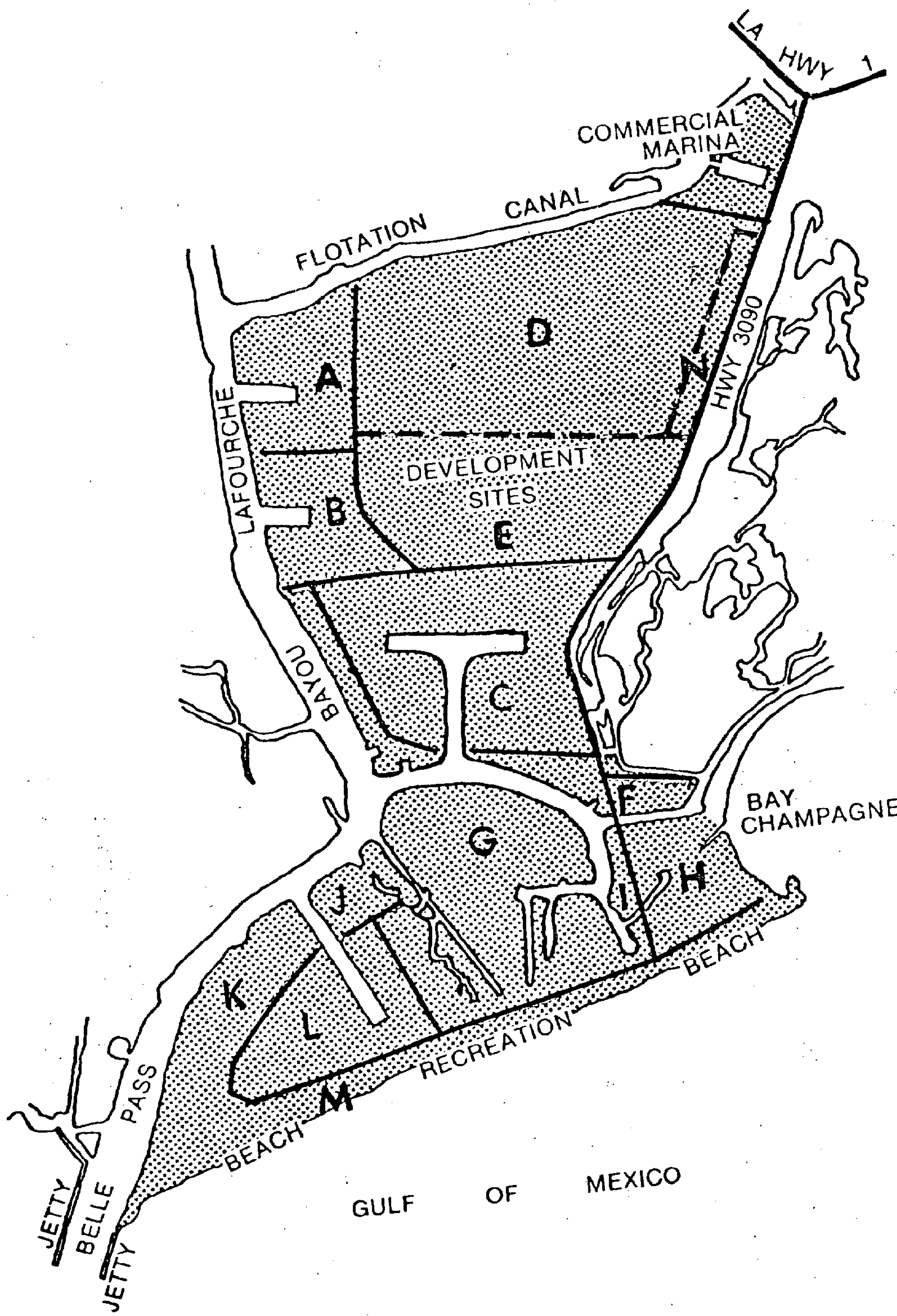
In addition to an accessible beach area, Port Fourchon may, in the future, offer such on-site facilities as camping, food and lodging facilities, and a public park augmented by access to fishing jetties, commercial sportfishing, boating, swimming, and hunting. Docking space and facilities will increase access to offshore fishing areas. In short, recreation will account for ten to twenty percent of the Fourchon area, depending on demand (Gulf South Research Institute, 1974: 3-4). See Chapter 5.

Camping and Camps

Camping is becoming an increasingly popular sport throughout the United States. However, in Lafourche Parish the availability of potential camp sites is limited by the amount of dry land. Few spots are available for camp sites at present. Port Fourchon is one potential area for public and private camping areas such as K.O.A. (Kampgrounds of America). Facilities are needed to meet the two main

FIGURE 3.4

PROPOSED PLAN OF DEVELOPMENT FOR PORT FOURCHON*



*To be used in conjunction with Table 3.17.

Source: Gulf South Research Institute, 1974: 19.

TABLE 3.17

DESCRIPTIONOF SITES AT PORT FOURCHON*

Site	Acreage	Elevation	Depth of Direct Water Access	Anticipated Use
A	186.6	4.2'	30'	Industry
B	138.9	4.2'	30'	Industry
C	586.0	4.2'	30'	Industry
D	903.4	Existing	30'	Future Development
E	469.0	Existing	None	Future Development
F	43.6	Existing	12'	Recreation
G	401.9	3.3'	30'	Industry
H	130.1	Existing	Beach	Recreation
I	24.5	Existing	12'	Recreation/Light Industry
J	145.0	3.3'	30'	Industry
K	220.2	3.3'	30'	Industry
L	191.6	3.3'	30'	Recreation/Light Industry
M	188.9	Existing	Beach	Recreation
N	58.7	Existing	None	Supporting Industry

*To be used in conjunction with Figure 3.3

Source: Gulf South Research Institute, 1974: 20.

camping categories: self-contained (pulled or driven campers) and tents. Table 3.10 shows one camp site (Resort, Inc.) in Lafourche Parish with twenty-five trailer sites on eight acres at Des Allemands.

Camp dwellings used as second homes or hunting and fishing lodges are plentiful throughout much of south Louisiana. These structures range from elaborate elevated homes on beach fronts as at Grand Isle, to free-standing trailers on high or low ground. Presently, camp sites are found throughout Lafourche Parish in the Lake Fields, Lake Boeuf, Lake Long, Des Allemands, Bully Camp, Little Lake, Lake Raccourci and Fourchon areas (see Figure 3.3).

Potential development of new sites depends on available land space. Most land in the southern part of the parish is owned by large companies or is in private hands. See Chapter 4, Table 4.5. Many people do not actually own the land their camp is on, but lease the land from the owner. Port Fourchon is considered a prime area for future camp sites with beach frontage.

Hunting and Fishing

Hunting and fishing, like water sports, depends on the accessibility of the area and the average cost involved in hunting and fishing trips. Cost may include transportation by car to and from the launch site and transportation by boat to a favored area. Expenses may also involve the cost of special equipment.

Many areas, such as Pointe-au-Chien, need improved game management to increase the possible hunting yield and to improve the quality of the experience. Other areas, such as Lake Boeuf, will require state cooperation to develop their potential. According to Brown (1976), Lake Boeuf has become overgrown by weeds native to Florida and will necessitate drainage, clearance, and restockage of water and fish by the state to again become a prime recreational area.

Role of Oil Rigs in Sports Fishing

Deep-sea sports fishing in Louisiana increased dramatically with the advent of the offshore oil industry. As a result of man's search for oil, numerous platforms were established throughout the Gulf (Chapter 2). Almost immediately after being placed in the water, the legs and templates of the platforms become covered with algae, which can thrive on steel or rubber in water, near the surface, forming artificial reefs. The platforms allow algae growth in the upper layers of deep Gulf waters while it normally colonizes only in shallow water where it is not dispersed by currents.

Growth of algae is followed by occurrences of organisms that attach themselves to the platform structure. Barnacles, bryozoa, coral, tunicates, hydrozoans, mollusks and worms are found growing on the platform frame. Many of these types of animals not only need shallow, warm and sunlighted waters, but require waters of salinities less than oceanic. The surface waters of the Gulf are less saline than the deeper waters.

Small fish are attracted to the platforms for two important reasons: to initially feed on the sea life attached and to hide from larger prey. The platform offers them hiding and food among the attached sea life. Larger fish follow the smaller fish in search of food.

The large concentrations of fish that gather at the "artificial reef" sites also include many species that were unknown in Gulf waters before the platforms were built. This is not to say the fish were not there before, only that the presence of "artificial reefs" concentrates the fish that were before scattered over a larger area. Many of these fish are sports fish including resident fish (living year round in the vicinity of platforms) and seasonal migrants (coming in with warmer weather). Resident fish include the following: grouper, red snapper, trigger fish, spade fish, giant sea bass and pompano. Seasonal migrants include Spanish and long mackerel, tarpon, lady fish and several species of jack, bluefish and cobia. Marlin, sailfish, wahoo, tuna, sharks, skates and rays are also found (Bureau of Land Management, 1972).

Conflicts arise between commercial and sports fishermen and many commercial fishermen feel that sports fishermen are taking a large portion of the potential catch in such species as bass and flounder from the commercial fishermen (McHugh, 1967). A 1970 estimate of 50,443,755 pounds for the sports catch in Louisiana is 6% of the commercial fish catch of the same period. However, this proportion is comparativelysmall. In Massachusetts, it has been estimated that the sports catch is 14% of the commercial catch (Mumphrey, et al., 1975: 108). Many researchers fear that the taking of fish concentrated around platforms will deplete fish stocks in the Gulf (St. Amant, 1972). St. Amant, however, (Treadway, 1976) has said that there is no evidence showing that fish stocks in the Gulf are in danger or that the fish population is being depleted by either commercial or sports fishermen. Sports fish are affected in the same way as commercial fish by the oil industry. See earlier section of this chapter. Many sport and game fish gather around offshore platforms for feeding and protection. Their mobility allows them to escape the effects of oil spills by moving into deeper water; however, those fish whose nursery grounds are in contaminated estuaries face greater problems.

The habitats of birds and onshore animals are affected by the oil industry as discussed earlier in this chapter. The natural areas of the wetlands are sometimes spoiled by the oil industry for the enjoyment of people in their outdoor activities. Therefore, the oil industry may impact hunting, fishing, camping, water sports, etc. both through pollution (oil spills) and disruption of the natural setting.

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CHAPTER 4

TAX BASE OF LAFOURCHE PARISH

In this chapter, the tax base of Lafourche Parish which is heavily based on the oil and gas industry is discussed. The first section deals with parish assessed value and taxes paid while the second section presents the actual value of the oil and gas industry in Lafourche.

Assessed Value and Taxes Paid in Lafourche Parish

In 1975, the total assessed valuation for Lafourche Parish was $105,330,400 (Table 4.1), which is a $2.57 million increase over the previous year's $102,759,920 valuation (Robichaux, 1975). The sources of the increases are described in Table 4.2, with about equal amounts coming from public service corporations (railroads, telephone companies, interstate and intrastate pipeline companies, and utilities) and new homes and real estate covered by homestead exemption. The Tax Collector's office collected property taxes in the amount of $7,705,279 in 1975, a $296,534 increase over the previous year. Of the 1975 sum, $6,580,628 (85%) was paid by public service corporations, oil and gas companies, and other business establishments (Robichaux, 1975). Police Jury Taxes are listed in Table 4.3. The largest single sum collected was $421,321.60 for Special Parish-Wide Drainage. The recreation and library tax each generated $210,660.80.

TABLE 4.1

ASSESSED VALUATIONS IN LAFOURCHE PARISH,

BY WARDS, 1975

Total Assessed Valuation of the Parish		$105,330,400
Ward 1	Resident	$2,577,440
	Merchandise	144,060
	Non-Resident	1,633,360
	Public Service Corporations	1,234,060
	TOTAL	$5,588,920
Ward 2	(Outside City of Thibodaux)	
	Resident	$1,357,180
	Merchandise	142,900
	Non-Resident	56,760
	Public Service Corporations	367,300
	TOTAL	$1,924,140
Ward 2	(In City of Thibodaux)	
	Resident	$5,444,260
	Merchandise	3,452,660
	Non-Resident	2,927,520
	Public Service Corporations	1,637,180
	TOTAL	$13,461,620
Ward 2LB	(In City of Thibodaux--North Thibodaux)	
	Resident	$425,560
	Merchandise	222,000
	Non-Resident	3,700
	Public Service Corporations	56,380
	TOTAL	$707,640
Ward 3	Resident	$3,803,800
	Merchandise	445,800
	Non-Resident	400,160
	Public Service Corporations	1,542,420
	TOTAL	$6,192,180
Ward 4	Resident	$3,028,100
	Merchandise	572,100
	Non-Resident	743,740
	Public Service Corporations	881,540
	TOTAL	$5,225,480

TABLE 4.1 CONTINUED

Ward 5	Resident	$1,045,700
	Merchandise	628,080
	Non-Resident	791,700
	Public Service Corporations	1,415,880
	TOTAL	$3,881,360
Ward 6	Resident	$1,411,520
	Merchandise	37,480
	Non-Resident	363,500
	Public Service Corporations	1,302,500
	TOTAL	$3,115,000
Ward 7	Resident	$1,196,800
	Merchandise	224,560
	Non-Resident	4,735,320
	Public Service Corporations	3,961,440
	TOTAL	$10,118,120
Ward 8	Resident	$490,460
	Merchandise	6,700
	Non-Resident	865,220
	Public Service Corporations	427,940
	TOTAL	$1,790,320
Ward 9	Resident	$646,160
	Merchandise	970,000
	Non-Resident	1,385,200
	Public Service Corporations	1,495,360
	TOTAL	$4,496,720
Ward 10	Resident	$8,422,280
	Merchandise	2,103,300
	Non-Resident	23,137,940
	Public Service Corporations	12,024,220
	TOTAL	$45,687,740
Ward 11	Resident	$1,549,880
	Merchandise	117,220
	Non-Resident	328,720
	Public Service Corporations	1,145,340
	TOTAL	$3,141,160

TABLE 4.1 CONTINUED

MUNICIPALITIES	
CITY OF THIBODAUX	
Resident	$6,121,160
Merchandise	3,674,660
Non-Resident	2,931,220
Public Service Corporations	1,693,560
TOTAL	$14,420,600
TOWN OF LOCKPORT	
Resident	$1,015,020
Merchandise	340,960
Non-Resident	--
Public Service Corporations	313,780
TOTAL	$1,669,760
TOWN OF GOLDEN MEADOW	
Resident	$838,160
Merchandise	268,100
Non-Resident	998,000
Public Service Corporations	264,540
	$2,368,800

Source: Robichaux, 1975.

TABLE 4.2

SOURCES OF 1975 INCREASE IN ASSESSED VALUATION

IN LAFOURCHE PARISH

Source	Increase
Public Service Corporations	$1,097,760
New Homes and Real Estate Covered by Homestead Exemption	960,390
New Improvements Which Are Not Covered by Homestead Exemption	438,880
Business Establishments (Merchandise; Furniture and Fixtures; New Businesses, Banks; Machinery and Equipment)	73,450
TOTAL INCREASE	$2,570,480

Source: Robichaux, 1975.

TABLE 4.3

POLICE JURY TAXES IN LAFOURCHE PARISH, 1975

	Total Non-Exempt Taxes	Total Taxes Under Homestead Exemption	Grand Total
Parish Tax (4 and 1)	$311,844.18	$66,969.64	$378,813.82
Public Buildings:			
Court House Imp. (Bonds)	21,628.74	4,703.86	26,332.60
Ag. & Livestock Ex. Bldg. (Bonds)	21,628.74	4,703.86	26,332.60
Maintenance & Operation Public Buildings	129,772.44	28,223.16	157,995.60
Public Health (Maintenance & Operations)	86,514.96	18,815.44	105,330.40
Library Tax	173,029.92	37,630.88	210,660.80
Drainage & Imp. (Bonds)	108,143.70	23,519.30	131,663.00
Special Parish Wide Drainge	346,059.84	75,261.76	421,321.60
Road Lighting Dist. #1	172,294.04	--	172,294.04
Garbage Dist. # 1(Ward 10)	214,414.57	23,839.60	238,254.17
Garbage Dist. #3 (Ward 1)	19,245.80	8,141.30	27,387.10
Recreation Tax	173,029.92	37,630.88	210,660.80
	$1,777,606.85	$329,439.68	$2,107,046.53

an increase of $122,789.52 over last year.

TABLE 4.3 CONTINUED

	Total Non-Exempt Taxes	Total Taxes Under Homestead Exemption	Grand Total
Drainage District No. 1 (Portions Ward 4, 9, and 10)	127,390.80	$45,567.72	$172,958.52
an increase of $7,998.84 over last year.			

Source: Robichaux, 1975.

Table 4.1 shows ward level valuations for 1975 in Lafourche Parish. These valuations are on property divided into the following categories: resident, merchandise, nonresident, and public service corporations.[1] According to Robichaux (1976a), a rough estimate of assessed valuation of oil and gas related industries (the oil and gas and supporting businesses such as transportation, communications, tools, etc.) can be obtained by adding the nonresident value and one-half of the public service corporations value. Although the nonresident value contains businesses unrelated to oil and gas, such as sugar cane as does the public service value, using one-half of the public service value compensates for this. Public service related oil and gas activity is in the form of railroad, telephone, pipeline, and utilities services. The 1975 values for each ward and three cities obtained are shown in Table 4.4. Note the high values for Ward 10 (south of the Intracoastal Waterway where most of the oil activity is located). The average

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[1]Resident property refers to all real estate, commercial and residential lands and all improvements on the lands. Nonresident property refers to stock and equipment, including oil and gas wells and gathering lines owned by oil and gas businesses, sugar cane and paper mills, banks, etc. Merchandise includes stock and equipment of all businesses not in the nonresident category. Oil and gas in the ground is not assessed or taxed by the parish. Oil and gas taken from the ground is subject to severance taxes collected by the state.

TABLE 4.4

ESTIMATES OF OIL AND GAS RELATED ASSESSED VALUATIONS AND TAXES PAID

IN LAFOURCHE PARISH, BY WARD, 1975

Ward	Estimated Assessed Value	Estimated Percent of Total Assessment (from Table 4.1)	Estimated Tax Paid
1	$2,250,390	40.3	$180,031
2 (outside Thibodaux)	240,410	12.5	19,233
2 (inside Thibodaux)	3,746,110	27.8	299,689
2 LB	31,890	4.5	2,551
3	1,171,370	18.9	93,710
4	1,184,510	22.7	4,761
5	1,499,640	38.6	119,971
6	1,014,750	32.6	81,180
7	6,716,040	66.4	537,283
8	1,079,190	60.3	86,335
9	2,132,880	47.4	170,630
10	29,150,050	63.8	2,332,004
11	901,390	28.7	72,111
TOTAL	$51,118,620		$3,999,489
MUNICIPALITIES			
Thibodaux	3,788,000	26.3	303,040

TABLE 4.4 CONTINUED

Ward	Estimated Assessed Value	Estimated Percent of Total Assessment (from Table 4.1)	Estimated Tax Paid
Lockport	$ 156,890	9.4	$12,551
Golden Meadow	1,130,270	47.7	90,422
TOTAL	$5,075,160		$406,013

Source: Computed by authors. See text.

millage used for the computation of 1975 property taxes paid was 80 mills or $80/$1000 (Robichaux, 1976a). The results are also shown in Table 4.4. Note that in 1975 oil and gas related industries provided about 50% of the assessed valuation and property taxes for Lafourche Parish (Table 4.4).

Table 4.5 lists large land owners in Lafourche Parish. Louisiana Land and Exploration Company is the largest single owner, with 134,215 acres and an assessed valuation of $648,720. They also pay the largest property tax of $49,285. Table 4.6 shows highest assessment and taxpayers in Lafourche Parish during 1975. Eight of the ten are oil or gas corporations and the other two are public service corporations. Oil and gas property and drilling rigs and related equipment are assessed according to a schedule promulgated by the Louisiana Tax Commission (no date).

Actual Value of the Oil and Gas Industry in Lafourche Parish

The actual value of oil and gas land equipment ($5,082,060), drilling rigs ($618,840), oil tanks ($384,540), and gathering lines($1,756,350) in Lafourche Parish is shown in Table 4.7[2]. As would be expected from its location

[2]The "actual value" referred to here is the value determined by the local assessor or the Louisiana Tax Commission. It is equivalent to "assessed value" discussed earlier. The "actual value" so determined is about one-tenth of the market value. For example, an actual value of $5 million represents

TABLE 4.5

LIST OF LARGE LAND OWNERS,

LAFOURCHE PARISH, 1975

Land Owner	Number of Acres	Assessed Valuation	Taxes Paid
La. Land & Exploration Co. American Bank Building New Orleans, Louisiana	134,215	$648,720	$49,285
Wid. Charles E. Gheens c/o Golden Ranch Plantation Gheens, Louisiana	55,356	$272,660	$17,518
Bowie Lumber Co. 1031 Whitney Bank Building New Orleans, Louisiana	45,229	$193,580	$13,185
Tenneco P.O. Box 2511 Houston, Texas 77001	42,770	$195,120	$14,869
La. Delta Farms c/o W. H. Crenshaw Lockport, RFD, Louisiana	35,163	$183,760	$14,348
William & Robin Scully P.O. Box 1610 New Orleans, Louisiana	26,924	$143,200	$11,183
Mrs. Lydia Harrison Walter J. Harrison William H. Harrison & 3 Others 507 Decatur Street New Orleans, Louisiana	22,059	$95,400	$7,322
Exxon Corporation c/o J. L. Windlinger P.O. Box 53 Houston, Texas 77001	18,343	$140,640	$10,518
Lafourche Realty Co., Inc. c/o Alfred B. Connable 1201 American National Bank Kalamazoo 4, Michigan	17,300	$75,380	$5,785

TABLE 4.5 CONTINUED

Land Owner	Number of Acres	Assessed Valuation	Taxes Paid
South Coast Corp. 1420 Carondelet Building New Orleans, Louisiana	15,119	$217,760	$15,268
TOTAL	412,478	$2,166,220	$159,281

Source: Robichaux, 1975

TABLE 4.6

HIGHEST ASSESSMENT AND TAXPAYERS

LAFOURCHE PARISH, 1975

Taxpayer	Assessed Valuation	Taxes Paid
Texaco, Inc. (The Texas Pipe Line Co. Included)	$7,046,800	$548,119
Gulf Refining Corporation (Gulf Refining Pipe Line Co. Included)	$5,110,580	$402,169
La. Power & Light Company	$4,830,020	$362,952
Chevron Oil Company The California Co. Div. (Cal-Ky Pipe Line Co. Included)	$3,956,160	$309,664
Exxon Corporation	$3,931,600	$295,954
South Central Bell	$3,729,140	$243,181
Tenneco, Inc. (Tennessee Gas Pipe Line Co. Div)	$3,501,040	$278,144
United Gas Pipe Line Company	$3,052,000	$220,441
Texas Eastern Transmission	$2,637,760	$203,974
Amoco Products Company	$1,637,660	$119,061
TOTAL	$39,432,760	$2,983,659

Source: Robichaux, 1975.

TABLE 4.7

ACTUAL VALUE OF OIL AND GAS EQUIPMENT

IN LAFOURCHE PARISH, BY WARD LEVEL, 1976

	OIL AND GAS LAND EQUIPMENT		OIL & GAS GATHERING LINES		DRILLING RIGS		OIL TANKS		TOTAL	
Ward	Actual Value	% of Total Value	Actual Value	% of Total Value	Actual Value	% of Total Value	Actual Value	% of Total Value	Actual Value	% of Actual Value
1	$273,970	5.4	$78,420	4.5	$33,500	5.4	$21,530	5.6	$407,420	5.2
2	43,200	0.8	1,300	0.1	--	--	2,720	0.7	47,220	0.6
3	17,950	0.4	14,500	0.8	--	--	3,120	0.8	35,570	0.4
4	114,140	2.2	30,400	1.7	--	--	2,760	0.7	147,300	1.9
5	64,450	1.3	3,330	0.2	28,500	4.6	8,140	2.1	104,420	1.3
6	48,830	1.0	9,700	0.6	--	--	5,860	1.5	64,390	0.8
7	387,500	7.6	136,230	7.7	85,500	13.8	28,430	7.4	637,660	8.2
8	107,330	2.1	282,020	16.0	--	--	5,240	1.4	394,590	5.0
9	193,230	3.8	110,260	6.3	56,260	9.1	23,780	6.2	383,480	4.9
10	3,758,950	74.0	1,058,310	60.3	415,080	67.1	271,400	70.6	5,503,740	70.2
11	72,510	1.4	31,880	1.8	--	--	11,560	3.0	115,950	1.5
TOTAL	$5,082,060	100.0	$1,756,350	100.0	$618,840	100.0	$384,540	100.00	$7,841,790	100.0

Source: Lafourche Parish Tax Assessor's Office, 1976.

adjacent to the Gulf, Ward 10 contains the greatest proportion of equipment ($3,758,950; 74.0%), drilling rigs ($415,080; 67.1%), tanks ($271,400; 70.6%), and gathering lines ($1,058,310; 60.3%). Table 4.8 presents the number and actual value of oil wells (2530; $16,640,090) and gas wells (392; $4,772,350) in the parish. Again, Ward 10 contains the greatest number of oil wells (2221) valued at $14,818,240 (89.1% of total value) and gas wells (196) valued at $2,422,000 (50.8%) Recall that the value of oil and gas wells refers to the equipment involved and not of the oil and gas in the ground.

The total actual value of oil and gas land equipment, gathering lines, drilling rigs, oil tanks, oil and gas wells for Lafourche Parish during 1972-1976 is shown in Table 4.9[3]. The highest value for each category is in the year 1976.

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[2](cont'd) a market value of $50 million. It may be noted that the oil and gas companies contend that they are assessed at 15% of market value, which would reduce estimates of market value (Robichaux, 1976b).

Gathering lines move oil and gas from the wells to transmission lines. Inter- and intra-state transmission lines are included under public service corporations. Both are assessed and taxed by local parishes (Robichaux, 1976b).

[3]The approximate assessed value of oil and gas related industries in Lafourche Parish for 1975, $51,118,620 (Table 4.4), is greater than the actual value of oil and gas equipment, drilling rigs, oil tanks, gathering lines, and wells for 1975, $25,606,060 (Table 4.9) because assessed value for peripheral industries (mainly public service corporations) are included in the former figure, but not in the latter. The same would be true at the ward level and for other years (Robichaux, 1976b).

TABLE 4.8

ACTUAL VALUE AND NUMBER OF OIL AND GAS WELLS

IN LAFOURCHE PARISH, BY WARD LEVEL, 1976

	OIL WELLS			GAS WELLS			TOTAL	
Ward	#	Actual Value	% of Total Value	#	Actual Value	% of Total Value	Actual Value	% of Total Value
1	74	$357,730	2.1	53	$479,070	10.0	$836,800	3.9
2	--	--	--	7	121,220	2.5	121,220	0.6
3	1	28,600	0.2	6	84,910	1.8	113,510	0.5
4	12	74,570	0.4	8	87,410	1.8	161,980	0.8
5	3	620	0.0	13	167,700	3.5	168,320	0.8
6	--	--	--	14	192,310	4.0	192,310	0.9
7	45	371,620	2.2	70	923,410	19.4	1,295,030	6.0
8	87	410,610	2.5	5	62,360	1.3	472,970	2.2
9	83	495,910	3.0	15	175,320	3.7	671,230	3.2
10	2,221	14,818,240	89.1	196	2,422,000	50.8	17,240,240	80.5
11	4	82,190	0.5	5	56,640	1.2	138,830	0.6
TOTAL	2,530	$16,640,090	100.0	392	$4,772,350	100.0	$21,412,440	100.0

Source: Lafourche Parish Tax Assessor's Office, 1976.

TABLE 4.9

TOTAL ACTUAL VALUE OF OIL AND GAS EQUIPMENT IN LAFOURCHE PARISH, 1972-1976

YEAR	OIL AND GAS LAND EQUIPMENT Actual Value	OIL AND GAS GATHERING LINES Actual Value	DRILLING RIGS Actual Value	OIL TANKS Actual Value	OIL AND GAS WELLS #	OIL AND GAS WELLS Total Actual Value	OIL AND GAS WELLS Average Value /well	TOTAL
1972	$4,293,510	$1,611,300	$405,600	$338,120	2,834	$20,314,280	$7,168	$26,962,810
1973	4,420,570	1,585,920	446,070	333,120	2,819	19,396,210	6,881	26,181,890
1974	4,430,759	1,766,890	348,560	327,930	2,863	19,316,640	6,747	26,190,779
1975	4,372,870	1,719,290	373,560	334,300	2,794	18,806,040	6,622	25,606,060
1976*	5,082,060	1,756,350	618,840	384,540	2,922	21,412,440	7,328	29,254,230

*from Tables 4.7 and 4.8

Source: Louisiana Tax Commission, 1974, 1976.

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_______________ (1976b) Assistant to the Lafourche Parish Assessor, Thibodaux, Louisiana, telephone interview.

CHAPTER 5

LAFOURCHE PARISH INFRASTRUCTURE AND OCS DEVELOPMENT

INTRODUCTION

As pointed out earlier, the effects of OCS development in Lafourche Parish are mainly confined to the southern part of the parish. As a consequence, most of the responses to and needs generated by OCS development occur there. However, some of the impacts related to OCS mining such as the demand for transportation and facilities affect the entire parish. In this chapter a review of the responses to infrastructure needs in Lafourche Parish for facilities such as ports, waterways, highways, vocational schools, airports, and utilities are presented. Also introduced are the unmet infrastructure needs generated by OCS development.

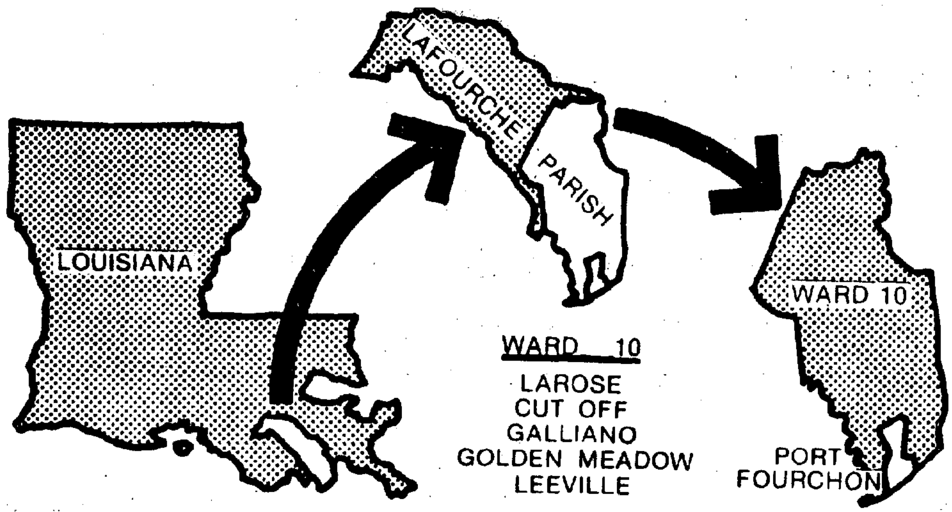
PORT FACILITIES

General Description

For many years there has been support in Lafourche Parish for the idea of developing the area at the mouth of Bayou Lafourche (Melancon, 1976a). This support resulted in the creation of the Greater Lafourche Port Commission by an act of the state legislature in 1960. The port commission has authority over the area included in Ward 10 of Lafourche Parish, which is all the territory south of the Gulf Intracoastal Waterway (Greater Lafourche Port Commission

FIGURE 5.1

GENERAL LOCATION, WARD 10, LAFOURCHE PARISH



Source: Greater Lafourche Port Commission, no date.

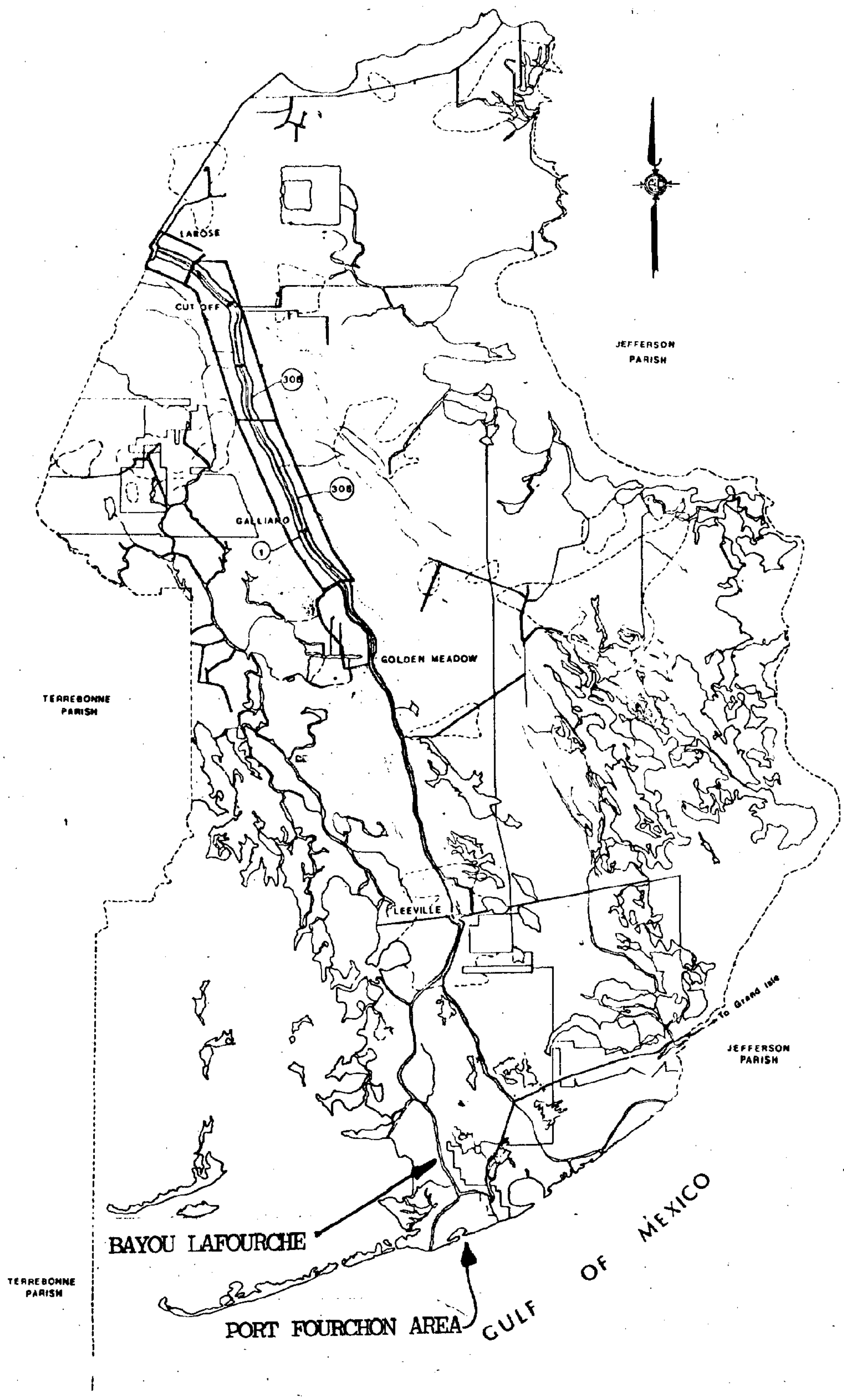
(GLPC): n.d.). See Figure 5.1. It is this area which has had the most substantial impact from OCS development. The Commission has full powers of a port, harbor, and terminal district (GLPC: n.d.). Prior to 1970, its nine members were appointed by the governor, but beginning in that year they were elected to six-year terms by the people of the tenth ward (Barker, 1976). It is now the only port commission in the State of Louisiana whose members are elected rather than appointed (Melancon, 1976a).

The major objectives of the Port Commission focus on the mouth of Bayou Lafourche (Figure 5.2). In this area, the goals have been to improve navigation, establish a port, create industrial sites, and develop its recreational potential (Melancon, 1976a). These goals are in relation to four sectors of activity: fishing and the seafood industry, recreation, offshore oil, and the proposed superport. These sectors are expected to be the major factors in stimulating South Lafourche "to experience dynamic economic growth within the near future" (Gulf South Research Institute (GSRI), 1974: 7). This proposed multiple use of the area had a prime role in justifying the Port Fourchon project, which is discussed later.

On of the first major projects of the Port Commission was the dredging of Bayou Lafourche. In the mid-1960s, it dredged a new channel west of the Bayou from Belle Pass to the twenty foot depth contour of the Gulf and deepened the Bayou to 20 feet from Belle Pass northward for four miles.

FIGURE 5.2

WARD 10 OF LAFOURCHE PARISH



Source: URS/Forrest and Cotton, 1976.

It also deepened the Bayou to 12 feet from the 4 mile point to Leeville, and to 9 feet from Leeville to Golden Meadow. The 12 foot depth to Leeville was needed primarily to serve oil company vessels that dock at Leeville, whereas a 9 foot depth was deemed adequate to serve the fishing boats and oil company crew boats that dock at Golden Meadow (Melancon, 1976a). At the time this dredging was done, it was the intention of the Port Commission to deepen the Bayou further in the future, but now the costs of such a move (both economically and environmentally) make it much more feasible to develop the Port Fourchon area (Melancon, 1976b).

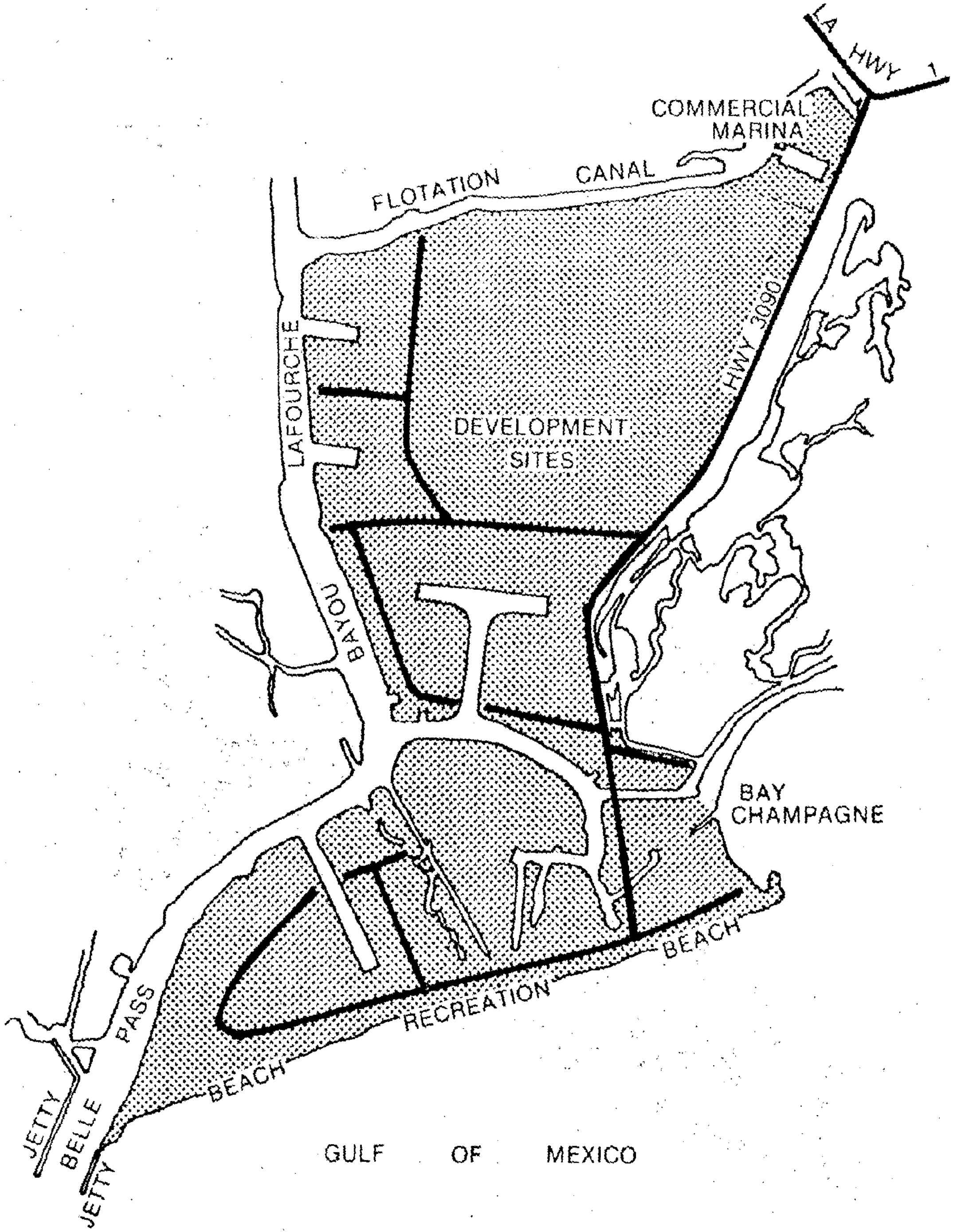
Another project of the Port Commission was the bringing of potable water to the lower portion of Lafourche Parish (including the Port Fourchon area). Since the salinity of the water surrounding this area makes it unsuitable for drinking, it was necessary to bring in drinking water from the northern end of the parish. At present, this water is mainly to serve the offshore workers and the people of Grand Isle (Barker, 1976). Currently, the water line is adequate, but if the proposed development in the Port Fourchon area does occur, it may be insufficient in the future (Melancon, 1976b).

As already mentioned, the major goal of the Port Commission is to develop the area at the mouth of Bayou Lafourche--Port Fourchon. The Port Fourchon development area is a 3600 acre site consisting of land, marsh, and sand beach. It is bounded on the west by Bayou Lafourche, on the north by a flotation canal, on the east by Louisiana Highway 3090, and on the south by the Gulf of Mexico (see Figure 5.3) (GSRI, 1974: 14).

The total proposed plan of development for Port Fourchon is shown in Figure 5.4 and Table 5.1. As can be seen in Table 5.1, the elevation of the industrial sites will be 3.3 feet and 4.2 feet. Also, the plan provides for recreational as well as industrial development. Sites D and E are now being considered for recreational development in addition to those already listed in Table 5.1 (Melancon, 1976b). This project, when completed, is to accomplish the aforementioned objectives of the Port Commission (i.e., improve navigation, establish a port, create industrial sites, and develop recreational areas). The first phase of the project, which cost $4.2 million, included navigational improvements such as the dredging of Belle Pass to a depth of 20 feet and a width of 300 feet, and the digging of a flotation canal connecting Bayou Lafourche with a commercial marina, providing access for large shrimp boats (Figure 5.4). Physical facilities constructed include the commercial marina (with a capacity of 68 large shrimp boats), a docking facility and warehouse on the bayou (Site C, Figure 5.4--now leased to Shell Oil Company and Dowell, an oil company service industry), a water distribution system with a 300,000 gallon elevated storage tank, and a five-ramp boat launch for sports craft (Site F, Figure 5.4). Also, the basic

FIGURE 5.3

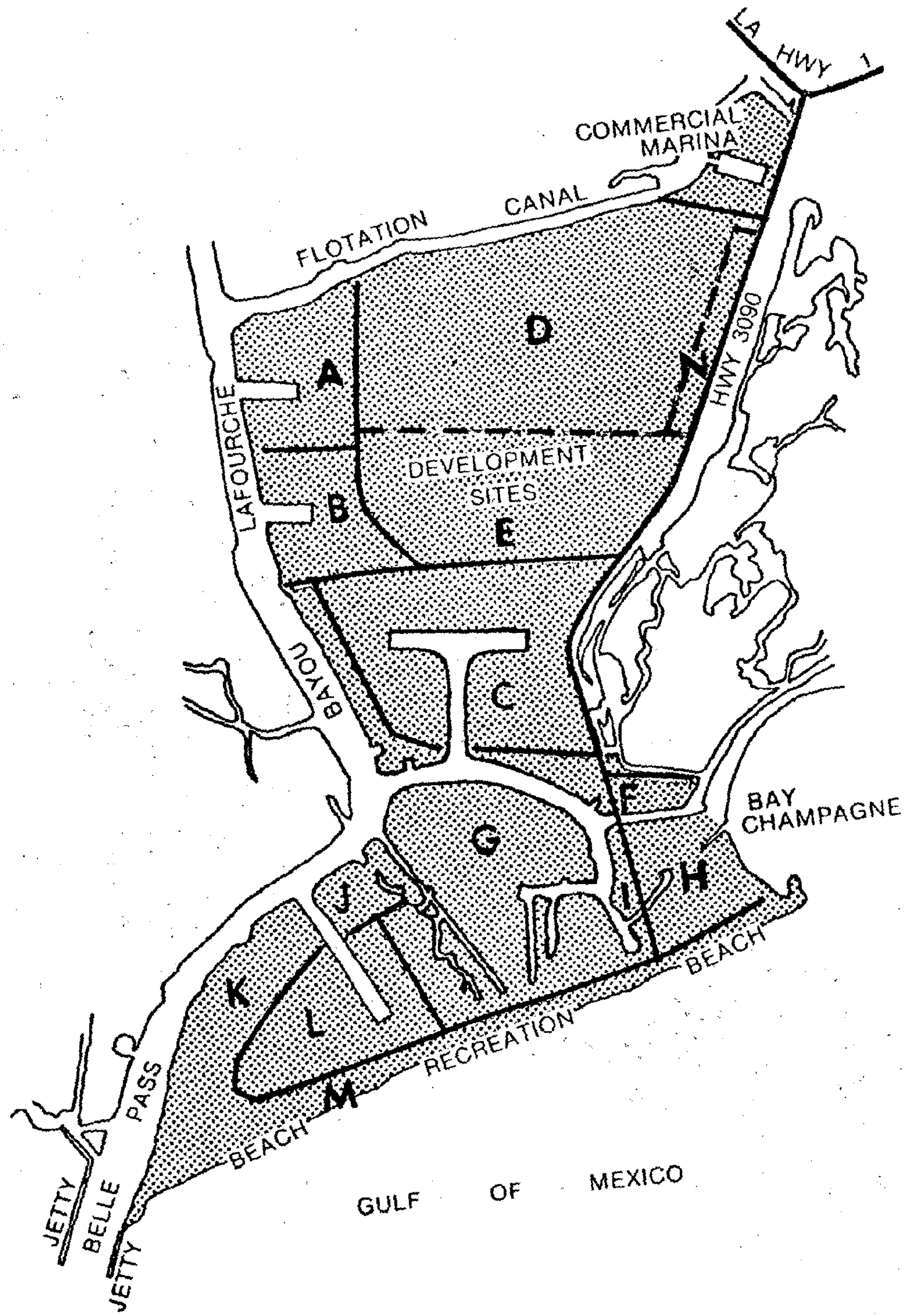
DETAILED MAP OF PORT FOURCHON SITE



Source: Gulf South Research Institute, 1974.

FIGURE 5.4

PROPOSED PLAN OF DEVELOPMENT FOR PORT FOURCHON*



*To be used in conjunction with Table 5.1.

Source: Gulf South Research Institute, 1974: 19.

TABLE 5.1

DESCRIPTION OF SITES AT PORT FOURCHON *

SITE	ACREAGE	AVERAGE ELEVATION	DEPTH OF DIRECT WATER ACCESS	ANTICIPATED USE
A	186.6	4.2	30	Industry
B	138.9	4.2	30	Industry
C	586.0	4.2	30	Industry
D	903.4	Existing	30	Future Development
E	469.0	Existing	None	Future Development
F	43.6	Existing	12	Recreation
G	401.9	3.3	30	Industry
H	130.1	Existing	Beach	Recreation
I	24.5	Existing	12	Recreation/Light Industry
J	145.0	3.3	30	Industry
K	220.2	3.3	30	Industry
L	191.6	3.3	30	Recreation/Light Industry
M	188.9	Existing	Beach	Recreation
N	58.7	Existing	None	Supporting Industry

*To be used in conjunction with Figure 5.4.
Source: Gulf South Research Institute, 1974: 20.

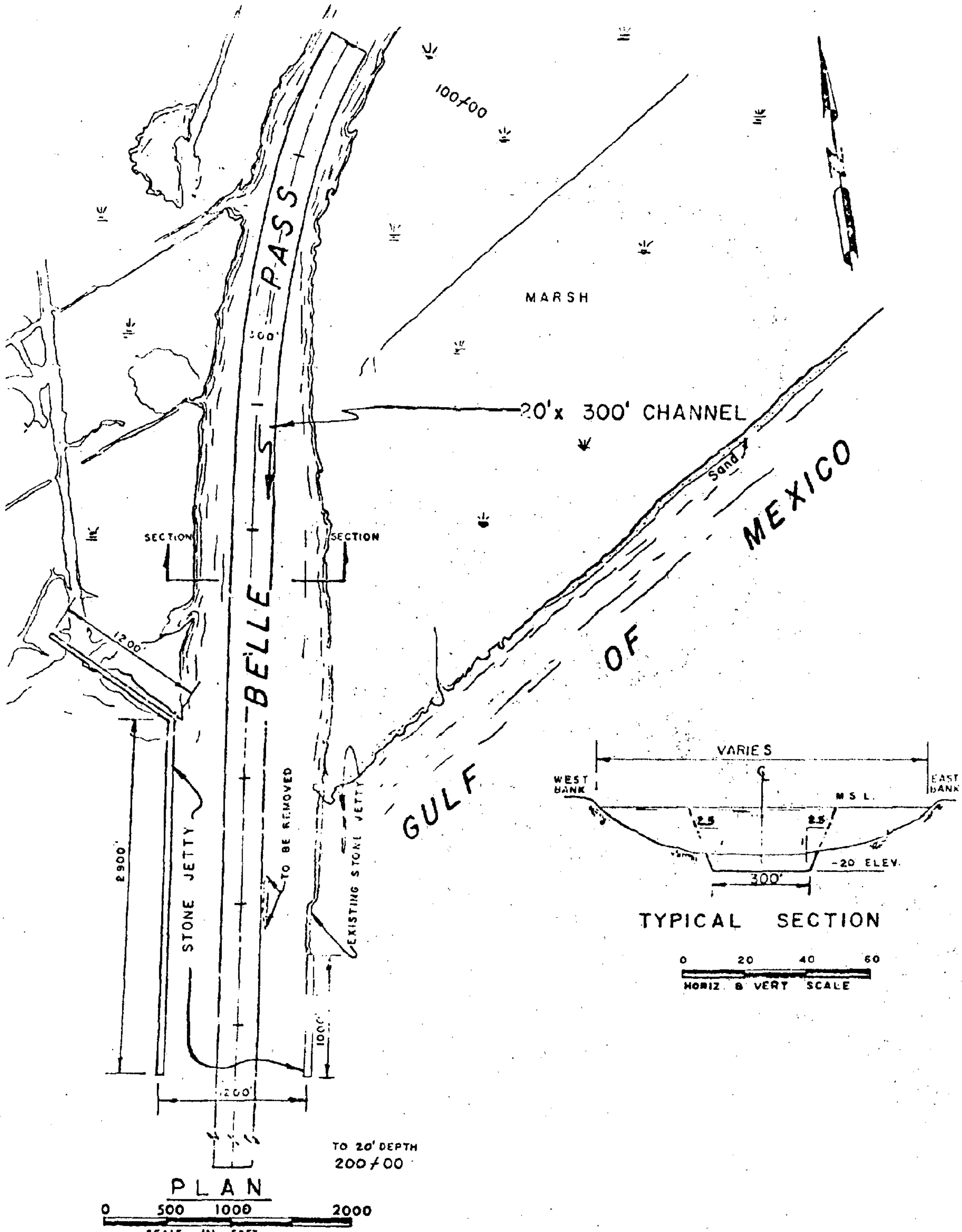
roads and utility systems within the site were constructed, as well as a bridge over Chevron Canal providing access to the beach area. Other navigational aids and flood protection projects were also included in Phase I (GSRI, 1974: 15).

Phase II, at a cost of just over $3 million, included jetty improvements and maintenance dredging near Belle Pass (Melancon, 1976b). More specifically, the old small jetty was replaced by a 1200 foot wide stone jetty system extending 2900 feet into the Gulf of Mexico, and the channel in Belle Pass was restored to a 20 foot depth and 300 foot width and extended out into the Gulf to the 20 foot contour (see Figure 5.5) (GSRI, 1974: 15).

Figure 5.6 contains the proposed elements of the next phase. It will consist of maintenance dredging in the 20 foot by 300 foot channel in Belle Pass and Bayou Lafourche, as well as the dredging of a 20 foot deep by 400 foot wide slip (as shown). The fill from this dredging will be used as site preparation material for a 450 acre site bounded by the shell road, the proposed access road, and Louisiana Highway 3090. Also, a water and sewerage system will be installed on the site (the sewerage system will be built to allow future development to tie into it) as well as a drainage system. The access road will be 1.19 miles long and consist of a sand embankment and clam shell surface. A police and administration building is also included in this phase. The total projected costs of these proposals is approximately $3.3 million (Dames and Moore, 1975).

FIGURE 5.5

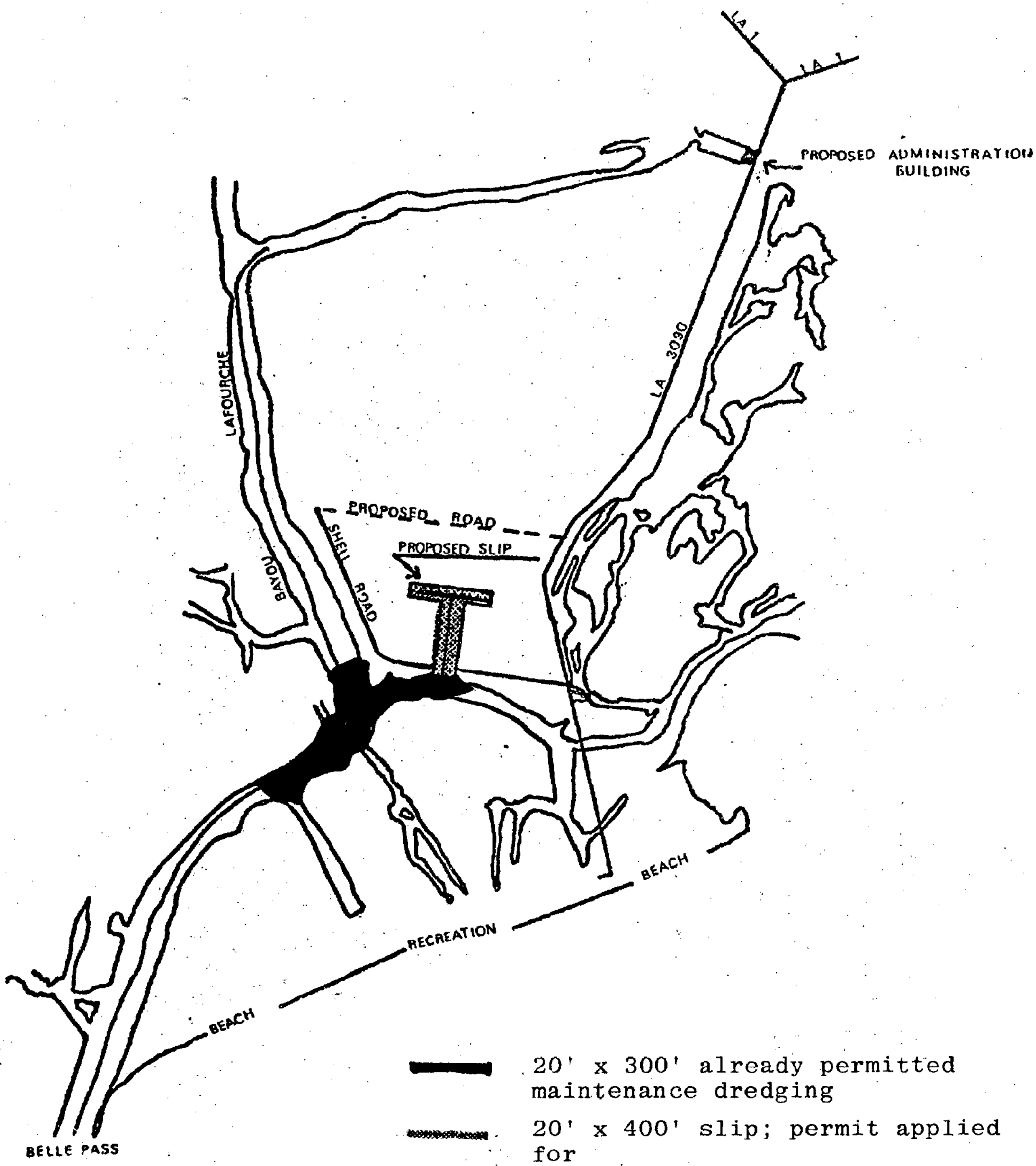
LOCATION AND SECTION OF PROPOSED CHANNEL AT BELLE PASS



Source: Gulf South Research Institute, 1975: 17.

FIGURE 5.6

PORT FOURCHON PROPOSED IMPROVEMENTS



Source: Dames and Moore, 1975.

After this phase, future development (as outlined in Figure 5.4 and Table 5.1) will depend to a large extent on the demand for additional industrial and recreational land. In addition, it is the goal of the Port Commission to eventually increase the depth and width of the channel in Belle Pass and Bayou Lafourche to 30 feet deep and 400 feet wide. It is felt that the trend toward larger vessels used by the oil companies would make this action necessary and desirable.

Port Fourchon would become the only deepwater port between the Mississippi River and Lake Charles (Melancon, 1976b). This is important in attracting oil and gas related support industries. For example, while crew boats and supply vessels can use shallower waters, transporting platforms and rigs requires deeper water (GSRI, 1974: 50). Therefore, this 30 foot depth would be necessary to attract manufacturers of platforms and rigs.

Projected Impact of Port Fourchon Development

It is felt that the locational advantages of Port Fourchon, that is, its proximity to the Gulf of Mexico and the deepwater channel capable of handling industry needs, will undoubtedly attract industry. Also, the dominant industries already located in Lafourche Parish will have a strong influence on the types of industry that locate in the port area (GSRI, 1974: 50). That is, the industries most likely to locate at Port Fourchon are those associated with the offshore oil industry (including establishments involved in fabrication of platforms and equipment and establishments serving both the operational and maintenance needs of the platforms offshore) or the commercial fishing industry (ranging from establishments providing materials such as fishing boat supplies to facilities for processing and distributing seafood) (GSRI, 1974: 57).

The types of businesses that might be attracted to Port Fourchon have been divided into three categories. The first category, offshore-associated activities, consists of industries engaged in building the platforms and providing the drilling equipment and other machinery basic to the platform operations. Table 5.2 has the related SIC classifications included in this category and the Appendix has descriptions of these SIC classifications. The second category, oilfield service and associated industries, includes industries concerned with fabrication and repair of metal structures other than large offshore platforms and excluding tanks, worksheds, and similar facilities found on offshore platforms (see Table 5.2 for SIC classifications). The third category is port-associated establishments. It would consist mainly of warehouses or storage facilities adjacent to the waterfront (see Table 5.2) (GSRI, 1974: 52-54).

A projected direct aggregate <u>net</u> impact of each of the three categories in terms of employment, earnings, value added, value of shipments, and capital expenditures was estimated in Table 5.3 based on the following assumptions

TABLE 5.2

SIC CLASSIFICATIONS INCLUDED IN THE THREE CATEGORIES OF INDUSTRY EXPECTED TO BE ATTRACTED TO PORT FOURCHON[1]

OFFSHORE-ASSOCIATED ACTIVITIES	
SIC 3533	Oilfield Machinery and Equipment Manufacture
SIC 3731	Ship Building and Repair
SIC 3732	Boat Building and Repair
SIC 3599	Miscellaneous and Specialized Machinery Manufacture
OILFIELD SERVICE AND ASSOCIATED INDUSTRIES	
SIC 3441	Fabricated Structural Steel
SIC 3443	Metal Platework
SIC 3444	Sheetmetal Work
SIC 3449	Miscellaneous Metal Work
PORT-ASSOCIATED ESTABLISHMENTS	
SIC 13	Oil and Gas Extraction
SIC 1621	Heavy Construction
SIC 1791	Structural Steel Erection
SIC 2031	Can and Cured Seafood
SIC 2036	Frozen Seafood
SIC 42	Field Service

[1] See Appendix for description of these SIC classifications.

Source: Gulf South Research Institute, 1974: 52-56.

TABLE 5.3

DIRECT NET IMPACT OF THE PORT FOURCHON DEVELOPMENT ON LAFOURCHE PARISH

CATEGORY	EMPLOYMENT	EARNINGS	VALUE ADDED	VALUE OF SHIPMENTS	INITIAL CAPITAL INVESTMENTS
Offshore Fabrication	257	$3,036,453	$4,615,342	$13,146,381	$4,357,515
Offshore Service	48	341,600	648,285	1,395,224	557,000
Port Associated	66	510,910	1,932,312	5,660,738	630,000
TOTAL	371	$3,888,965	$7,195,859	$20,202,343	$5,545,515

Source: Gulf South Research Institute, 1974: 58.

(GSRI, 1974: 57-58):

1. Because of the advantages offered as a result of port development, at least one large offshore fabricator will locate in the port area a facility for constructing deep-water platforms.

2. Accessibility of the area to the Gulf will cause the relocation of at least one offshore service facility in the area.

3. Accessibility to the Gulf, along with better protection of property, will cause shrimpers to use the marina facilities available in the port area.

4. Port-associated facilities (such as warehouses, branch sales offices, and service facilities) will relocate in the port area to provide better service to customers previously located along Bayou Lafourche. These facilities would include those servicing the offshore oil industry and the commercial fishing industry. Two of these facilities and their warehouses will locate in the new port area.

5. Most of the movement into the Port Fourchon area will be the result of present trends toward expansion of the industry and will therefore not adversely affect other port areas. This assumption is based upon the need for expansion in offshore oil and the resulting requirement for facilities capable of constructing larger platforms. Because of channel limitations, existing areas will not adequately accomodate such construction and would therefore not be adversely affected by the new port.

Table 5.4 presents the projected total direct and indirect net impact of the Port Fourchon development on Lafourche Parish. This table is based on data compiled by the Economic Development Council of the New Orleans Chamber of Commerce concerning the marginal effect of 100 new industrial jobs on the metropolitan New Orleans economy. The New Orleans economy was used as an indicator because it, like

TABLE 5.4

DIRECT AND INDIRECT NET IMPACT OF THE PORT FOURCHON DEVELOPMENT

ITEM AFFECTED	DIRECT	INDIRECT	TOTAL
Population	371[a]	1,197	1,558
Household	371	371	742
Personal Income	$3,633,510	$2,634,100	$6,267,610
Bank Deposits	185,500	1,187,200	1,372,700
New Retail Establishments	--	11	11
Employment	371	241	612
Retail Sales	$1,453,403[b]	$1,228,010	$2,681,413

[a] Due to almost full employment in the parish, it is felt that all direct employment will cause workers to migrate into the parish.

[b] Retail sales cover only those sales resulting from personal spending.

Source: Gulf South Research Institute, 1974: 61.

the Lafourche area economy, is based largely on the oil industry and industries supporting the needs of the oil industry (GSRI, 1974: 59-60).

It is significant to note that Table 5.4 does not include impacts such as the increased ad valorem taxes, sales taxes, or income taxes that would accrue to state and local governments as a result of the project (GSRI, 1974: 60), nor does it include the increased services these governments would have to provide to the expanded population. Also, since this projection of impact assumes that all of the direct employment generated by the project will be filled by migrants, any economic benefits to the current residents of Lafourche would come as a result of the indirect impact. It should be noted that any net gains in Lafourche Parish may come at the expense of other areas of the state.

Impact of the Superport on Port Fourchon

Since it would be capable of handling the vessels involved in building and maintaning a deep-draft offshore oil port, Port Fourchon would be beneficial to such a port if it were located at the proposed site off Lafourche Parish. In turn, this facility is expected to have the following effects on Port Fourchon:

1. Construction of the oil terminal, its operating platforms, single-point mooring systems, and pipeline would cost approximately $180 million. Such a large construction project, along with the present and proposed channel depths of the port and its proximity to the project, would greatly increase the possibility of an offshore platform

fabricator's locating within the port area.

2. Besides an offshore service facility, maintenance and operations facilities would locate within the harbor area, not only because of proximity to the offshore terminal and channel depth, but also because of the more modern facilities and land use plan. Such a facility would employ from 100 to 150 skilled personnel on a permanent basis.

3. Port associated facilities would supply offshore oil operations, and the offshore oil terminal with the necessary services and supplies used by the industry.

4. The onshore facilities of the offshore oil terminal would include storage tanks, pipelines, and other necessary monitoring and control facilities and would require some 1600 acres of land. Being within the Louisiana coastal zone, the development of so large a site will have strong environmental repurcussions. The 3500 acre Port Fourchon site is already developed, from an environmental standpoint. The area has a sound foundation for a tank farm and therefore is a candidate along with other close sites for the location of onshore terminal facilities (GSRI, 1974: 94-95).

However, it is not expected that there will be any refineries at Port Fourchon. If a refinery is built anywhere in Lafourche Parish, it will probably be in the Thibodaux area (Melancon, 1976b).

Of the above effects, it should be noted that number 4 represents a type of development that will occur only if a superport is built. The other three effects merely increase the likelihood that these types of developments will occur and that such developments will be more intensive at Port Fourchon than would be the case if a superport is not located in the area.

WATERWAYS

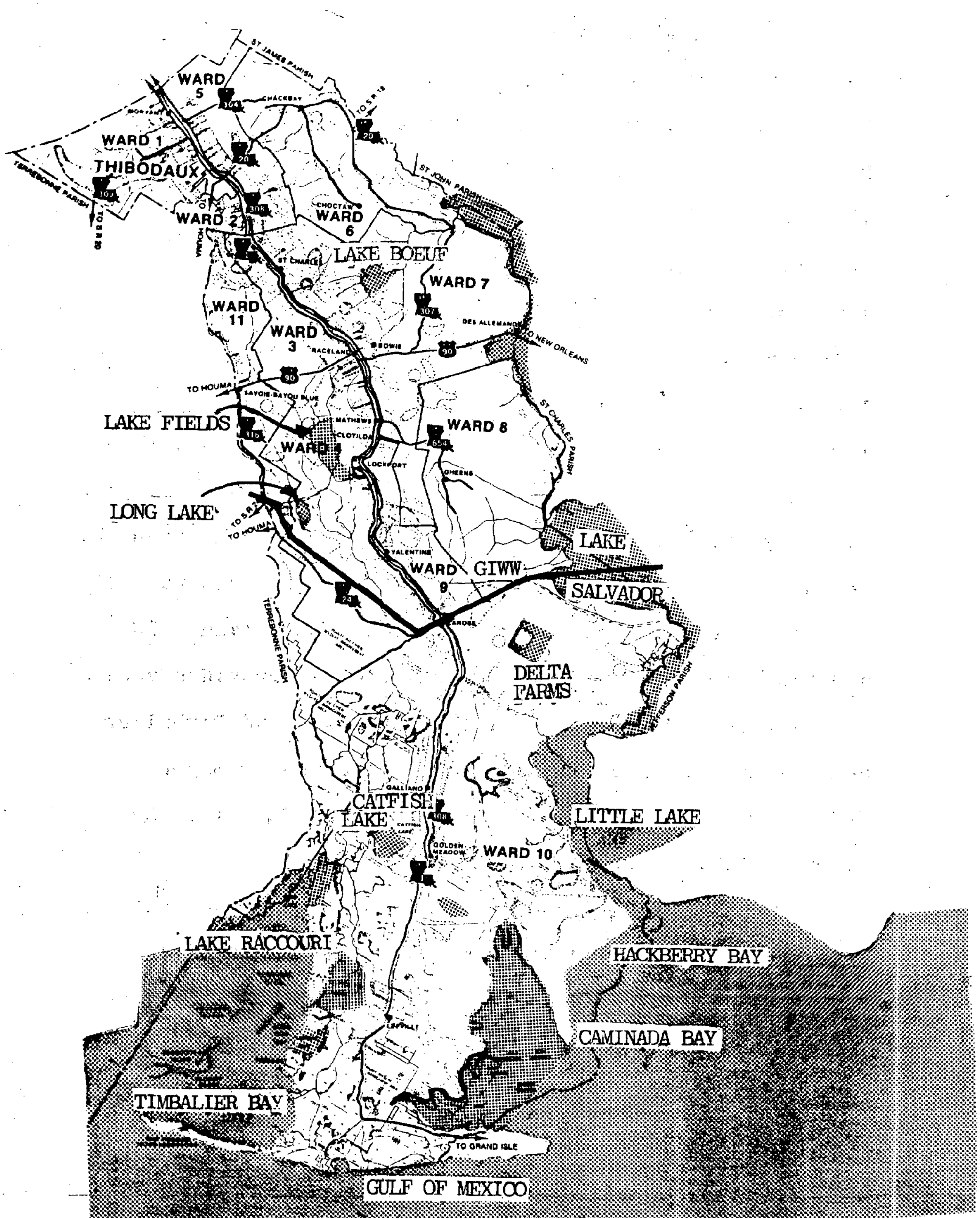
Existing Waterways

The principalwaterway in Lafourche Parish is Bayou Lafourche, which runs from Donaldsonville to the Gulf of Mexico (Figure 5.7). Another major waterway, the Gulf Intracoastal Waterway, passes through Lafourche, intersecting Bayou Lafourche at Larose (Figure 5.7). Other minor waterways include the Scully, Breton, and Yankee Canals which connect Bayou Lafourche to the bays and inland marshes to the east but navigation on these is limited to small boats or is nonexistent due to low-level fixed bridges and pile barrier. Also, there is Bayou Blue and many smaller channels on both sides of Bayou Lafourche which have no water connection with it, but begin at its natural levee and traverse the adjacent marshland. In addition, the Southwestern Louisiana Canal provides access to Caminada and Barataria Bays on the east and Timbalier and Terrebonne Bays on the west while crossing Bayou Lafourche at Leeville (U.S. Army Engineer District, New Orleans (USAED), 1973: II-13).

As already mentioned, Bayou Lafourche is the major commercial waterway in the parish. It was originally a distributary of the Mississippi River, but severe floods in 1903 led plantation owners to petition the state to block the bayou at the Mississippi, and this was done in 1904 (USAED, New Orleans, 1973: II-12). However, since 1957, a pumping station at Donaldsonville has been diverting water from the Mississippi River to the bayou (Arthur D.

FIGURE 5.7

LAFOURCHE PARISH



Source: Thibodaux Chamber of Commerce, 1976.

Little, Inc., n.d.: 4-61).

Congressional authorization for navigational improvements on Bayou Lafourche was passed in the River and Harbor Act of August 30, 1935. This act provided for a permanent closure of the head of the bayou at the Mississippi River without a lock, a channel 6 feet deep by 60 feet wide (6' x 60') from Napoleonville (Assumption Parish) to Lockport, a channel 6 feet deep by 60 feet wide from Larose to the Gulf of Mexico with a jettied entrance at Belle Pass, and the closure of Pass Fourchon at the Gulf of Mexico (Department of the Army, 1938: 791).

Dredging of the channel between Napoleonville and Thibodaux has been deauthorized under Public Law 90-149 approved November 22, 1967 (USAED, New Orleans, 1972: 3). Also, the section between Thibodaux and Lockport is in an inactive status due to lack of rights-of-way and spoil area (USAED, New Orleans, 1972: 4). The channel from Larose to the Gulf of Mexico and the jetties at Belle Pass were completed in 1939 (Department of the Army, 1972: II-6). In addition, the section between Lockport and Larose was dredged to a nine feet deep by 100 feet wide channel as part of the Gulf Intracoastal Waterway project in 1936 (USAED, New Orleans, 1972: 4).

The River and Harbor Act of 1960 provided for additional improvements in Bayou Lafourche. It authorized the deepening and widening of the channel from Golden Meadow to Leeville to 9 feet deep by 100 feet wide and from Leeville to the 12 foot depth contour of the Gulf to 12 feet deep by 125 feet wide. It also provided for restoring and extending the existing jetties at Belle Pass to the 12 foot depth contour if found advisable to reduce maintenance (USAED, New Orleans, 1972: 3). The Golden Meadow to Leeville section was completed in August, 1966, and the Leeville to the Gulf segment was completed in September 1963 (Department of the Army, 1972: II-6).

As noted earlier, the Greater Lafourche Port Commission is developing the area at the mouth of Bayou Lafourche known as Port Fourchon. The Port Fourchon project included dredging a new 20 feet deep by 300 feet wide channel at Belle Pass just west of the existing channel from mile 0.76 of Bayou Lafourche to the 20-foot depth contour of the Gulf and dredging the existing Bayou Lafourche channel for four miles northward of Belle Pass. The existing channel was then closed. This work was completed in March 1968 (USAED, New Orleans, 1972: 5). As discussed earlier, jetty improvements have also been completed by the Port Commission.

Concerning maintenance dredging of Bayou Lafourche, the last dredging in the Larose to Golden Meadow section was completed before 1949. There has been no maintenance dredging in the Golden Meadow to Leeville section due to a lack of spoil areas. Maintenance dredging was performed in the Leeville to Gulf of Mexico segment in February 1964 in the Belle Pass Jetty Channel and the predicted frequency of maintenance in this segment is every ten years (USAED, New Orleans, 1972: 5). The Greater Lafourche Port Commission has also performed maintenance dredging in this segment.

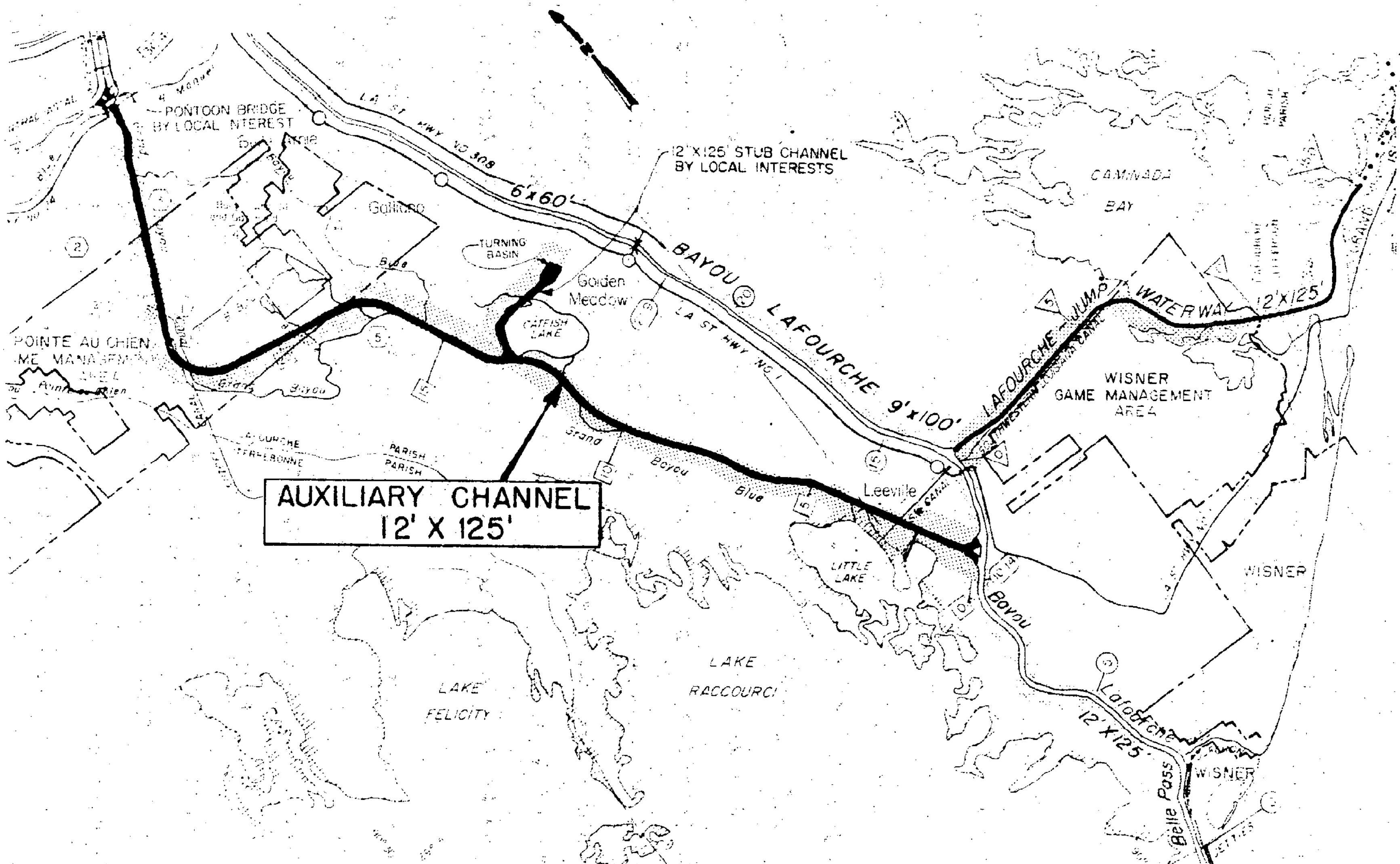
Future Waterways

The River and Harbor Act of June 14, 1960 also provided for the construction of two new waterways known as the Bayou Lafourche Auxiliary Channel and the Lafourche-Jump Waterway (Figure 5.8). The Auxiliary Channel proposal includes 30.4 miles of a 12 feet deep by 125 feet wide channel roughly parallel and to the west of Bayou Lafourche from the Intra-coastal Waterway near Larose to Bayou Lafourche just south of Leeville. A stub channel (12 feet deep by 125 feet wide) will be constructed by local interests from the Auxiliary Channel near Catfish Lake to the vicinity of Golden Meadow. The stub channel will terminate as a turning basin 1300 feet long by 600 feet wide. It is estimated that this Auxiliary Channel will require maintenance dredging every four years in the area of confluence with the Gulf Intracoastal Waterway and Bayou Lafourche and every six years in the rest of it (USAED, New Orleans, 1972: 5-6).

The Lafourche Parish Policy Jury has acquired all necessary rights-of-way (Department of the Army, 1972: II-6) for the channel. The Corps of Engineers is currently conducting a study of possible alternative routes for the channel in order to avoid passing through the Pointe-Au-Chien

FIGURE 5.8

PROPOSED AUXILIARY CHANNEL AND LAFOURCHE-JUMP WATERWAY



Source: U.S. Army Engineer District, New Orleans, 1972.

Game Management Area (Barton, 1976).

The proposal for the Lafourche-Jump Waterway calls for a 12-foot by 125-foot channel from Bayou Lafourche, just north of Leeville, eastward along the Southwestern Louisiana Canal and then along the shoreline of Caminada Bay and the north side of Grand Isle to the existing Bayou Rigaud unit of the Barataria Bay Waterway. Maintenaance dredging is predicted to be necessary every six years across marsh areas and every four years across open water areas and at the intersection with Bayou Lafourche (USAED, New Orleans, 1972: 6-7). However, rights-of-way for this project are not available due to multiplicity and other complications of ownership (Department of the Army, 1972: II-6).

Impact of OCS Development on Lafourche Parish Waterways

The waterway improvements authorized in the River and Harbor Act of July 14, 1960 are largely a response to OCS oil and gas development. The overall project is to provide safe navigation and more efficient operation in the movement of materials and equipment to and from oil, gas, and sulphur-producing areas; the movement of shell, shrimp, and oysters by fishing vessels; and the provision of an evacuation route and refuge from Gulf storms and hurricanes (USAED, New Orleans, 1972: 1-2).

The 12-foot by 125-foot channel from Leeville to the Gulf was needed primarily to serve the increasingly larger oil company vessels that dock at Leeville. The 9-foot by one hundred-foot channel from Leeville to Golden Meadow serves the fishing boats as well as the oil company crew boats and service vessels that dock at Golden Meadow (Melancon, 1976c).

The Bayou Lafourche Auxiliary Channel is intended to alleviate navigation hazards along Bayou Lafourche. That is, expansion of both oil and fishing operations has exceeded the ability of the bayou to accomodate the water traffic adequately. Its already narrow channel width (especially above Golden Meadow) is further reduced by overhanging buildings and wharves. Barges cannot be loaded to capacity and a reduced speed is necessary to keep wave wash to reasonable limits in order to avoid damaging moored vessels and structures. The narrowness makes transporting large oil barges and drilling equipment exceedingly difficult. An extra tug is necessary on windy days to hold the barge straight and avoid collision damage. Since there is considerable commercial and residential development on both banks of Bayou Lafourche, widening of the bayou is not a feasible alternative. Construction of the auxiliary channel will facilitate the use of larger, more modern vessels used by the fish and oil industries and thus eliminate the need to use circuitous routes by way of the Gulf Intracoastal Waterway (USAED, New Orleans, 1972: 2-3).

The Lafourche-Jump Waterway proposal would facilitate movement of vessels carrying fish and oilfield supplies between Bayou Lafourche and the highly productive areas to the east. At present, this route (the Southwestern Louisiana Canal and Caminada Bay) is navigated only by smaller boats and shallow draft barges with considerable difficulty and requiring additional time and power to negotiate. The Lafourche-Jump Waterway would enable the larger vessels currently in use by the fishing and oil-related industries to use this shorter route from Bayou Lafourche to Barataria Bay and surrounding waters (USAED, New Orleans, 1972: 2).

These two proposed waterways are also expected to have an impact on the Port Fourchon development. By improving the port's access to barge traffic on inland waterways (especially the Gulf Intracoastal Waterway), its desirability as a site for industrial development will be further enhanced (Melancon, 1976c). The ecological impacts of cutting such waterways are serious and have been discussed earlier (Chapter 2).

Freight Traffic on Bayou Lafourche

As can be seen from Table 5.5, crude petroleum is one of the major commodities of freight traffic on Bayou Lafourche. Except for the years 1966 and 1967, it has been the leading commodity, in terms of weight, shipped on the bayou. Assuming that inbound traffic and northbound through traffic of crude petroleum is predominantly from offshore production while outbound traffic, southbound through traffic and local

TABLE 5.5

SIGNIFICANT FREIGHT COMMODITIES ON BAYOU LAFOURCHE (IN SHORT TONS) 1950-1966

Commodity / Year	1950	1953	1954	1962	1963	1964	1965	1966
Crude Petroleum	1,928,450	1,695,014	100,648	1,363,465	1,623,812	732,635	892,421	433,172
Sulphur		111,011	149,713	335,720	369,998	352,946	514,893	595,145
Water	9,197	33,955	92,345	277,529	332,270	322,965	410,042	456,629
Iron and Steel Pipe	19,244			69,786	84,415	71,561	57,883	41,704
Ships and Boats		4		25	51		586	632
Fish (except shellfish)	13	77	444					
Shellfish	15,004	20,563	20,372	3,307	1,764	3,587	5,827	1,114
Shells	91,305	139,368	246,697	132,207	125,471	133,795	177,062	219,738
Clay	15,040	44,649	67,065	72,615	74,537	56,926	41,437	55,346
Sugar	26,884	35,842	36,055	85,852	70,808	60,983	46,134	59,153
Ice	*	27,719	52,227	10,960	61,358	15,520	9,461	8,920
Sodium Hydroxide	*	*	*	11,307	14,328	15,558	20,238	18,597

TABLE 5.5 CONTINUED

Commodity / Year	1950	1953	1954	1962	1963	1964	1965	1966
Distillate Fuel Oil	11,108	18,261	20,555	76,153	106,090	60,372	41,400	50,864
Machinery (except electrical)	*	*	*	*	*	*	40	--
Miscellaneous Manufactured Products	*	*	*	*	*	*	78,797	103,817
Sand, Gravel, Crushed Rock	*	1,149	801	17,337	9,773	16,042	20,094	6,183

*Category not reported. May be contained in other categories reported in source document.

Source: U. S. Department of the Army (1951, 1954, 1955, 1963-1967).

TABLE 5.5 CONTINUED

SIGNIFICANT FREIGHT COMMODITIES ON BAYOU LAFOURCHE (IN SHORT TONS) 1967-1974

Year / Commodity	1967	1968	1969	1970	1971	1972	1973	1974
Crude Petroleum	516,047	761,755	829,395	574,939	454,494	351,088	375,558	441,618
Sulphur	634,355	500,297	431,545	426,117	387,956	350,757	208,621	134,203
Water	541,452	405,882	287,383	333,776	294,593	281,951	212,087	211,241
Iron and Steel Pipe	28,236	25,496	12,511	27,517	27,179	29,960	31,514	7,863
Ships and Boats	903	1,406	560			223	1,864	2,558
Fish (except shellfish)						601	924	887
Shellfish	9,025	8,281	9,897	13,863	13,050	14,794	17,304	24,991
Shells	241,157	257,561	253,430	322,139	235,914	249,458	283,875	390,508
Clay	47,464	43,096	41,454	43,633	30,622	11,481	11,223	17,371
Sugar	54,393	47,945	50,451	44,249	40,466	43,664	40,160	40,815
Ice	8,592	10,668	12,989	12,425	18,250	28,332	21,516	18,275
Sodium Hydroxide	23,967	28,758	24,213	32,930	32,921	33,300	35,841	33,600

TABLE 5.5 CONTINUED

Year Commodity	1967	1968	1969	1970	1971	1972	1973	1974
Distillate Fuel Oil	46,649	35,043	37,087	31,302	28,373	25,045	40,478	46,028
Machinery (except electrical)	228	353	375	89	250	219	345	13,112
Miscellaneous Manufactured Products	141,621	86,022	20,456	22,559	26,492	63,320	112,272	102,360
Sand, Gravel, Crushed Rock	6,283	12,680	4,833	8,325	24,423	19,293	20,230	30

Source: U. S. Department of the Army (1968-1975).

traffic[1] is from onshore production, it can be seen in Table 5.6 that onshore production accounted for most of the volume of this commodity until 1969. In that year, offshore production became the dominant source of petroleum freight and has held the lead ever since.

However, Table 5.5 shows that total petroleum freight on Bayou Lafourche has declined since 1950 when nearly two million tons of crude petroleum was shipped via Bayou Lafourche. While fluctuating over the years, there was a general downward trend through 1972 when it reached 351,088 tons. In both 1973 and 1974 there were modest increases.

Another significant commodity shipped on Bayou Lafourche has been sulphur (Table 5.5). There was little or no sulphur shipped on the bayou in 1950 and 111,011 tons shipped in 1953. This volume rose steadily, reaching a peak in 1967 of 634,355 tons. In 1966 and 1967, sulphur exceeded crude petroleum as the leading commodity, in terms of weight, shipped on Bayou Lafourche. Since 1967, sulphur tonnage has steadily declined to 134,203 tons in 1974. All of this tonnage has been in northbound through traffic, and it is reasonable to

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[1] In-bound and out-bound -- Traffic moving from one waterway into another is termed "out-bound" in the case of the shipping waterway and "in-bound" with respect to the receiving waterway.

Through traffic -- Since waterways bearing tonnages neither loaded nor discharged at points thereon are entitled to that traffic, such movements are termed "through traffic." (Department of the Army, 1950).

Internal (local) -- Traffic between ports or landings wherein the entire movement takes place on inland waterways (Department of the Army, 1974).

TABLE 5.6

CRUDE PETROLEUM FREIGHT ON BAYOU LAFOURCHE

Year	Inbound[1]	Northbound[2]	Total	Outbound[1]	Southbound[2]	Local[3]	Total
1950	93,241	342,351	435,592	1,486,104		6,754	1,492,858
1953	41,255	470,614	511,869	1,179,027		4,118	1,183,145
1954	39,719	237	39,956	54,369		6,323	60,692
1962	217,378	253,383	470,761	889,096		3,608	892,704
1963	155,230	547,826	703,056	920,756			920,756
1964	110,701	10,570	121,271	597,315		14,049	611,364
1965	186,548	125,573	312,331	443,610	122,823	13,657	580,090
1966	78,467	30,462	108,929	294,137	30,106		324,243
1967	206,456	19,572	226,028	290,019			290,019
1968	310,871	60,447	371,318	390,358			390,358
1969	280,883	324,805	605,688	223,707	79		223,786
1970	277,569	134,471	412,040	156,823		5,362	162,185
1971	285,587	51,871	337,458	116,479	714		117,193
1972	220,976	42,876	263,852	87,226	557		87,783

TABLE 5.6 CONTINUED

Year	Inbound[1]	Northbound[2]	Total	Outbound[1]	Southbound[2]	Local[3]	Total
1973	231,824	35,446	267,270	108,288			108,288
1974	271,450	42,733	314,183	124,862		2,573	127,435

[1]Traffic moving from one waterway to another is termed "outbound" in the case of the shipping waterway and "inbound" with respect to the receiving waterway.

[2]This refers to the direction of "through traffic," that is, traffic that is neither loaded nor discharged at points on the waterway.

[3]Movements of freight within the confines of a channel or port.

Source: U. S. Department of the Army (1951, 1954, 1955, 1963-1975).

conclude that the offshore sulphur mine near Grand Isle, which began operations in 1960, has had a significant impact on the rise of sulphur shipments during the 1960s.

The third ranking commodity shipped on Bayou Lafourche has been water. From less than 9,200 tons in 1950, water shipments increased steadily to a high of 541,452 tons in 1967 (Table 5.5) and have declined since then to 211,241 tons. The increase until 1967 can be accounted for by the growing demand for water caused by the increase in workers involved with offshore oil and gas development. The decline since that time can be attributed to the decrease in offshore activity as well as the extension of a water line to the South Lafourche and Grand Isle area by the Greater Lafourche Port Commission.

Two other commodities related to outer continental shelf development include "iron and steel pipe" and "ships and boats" (or "watercraft and parts" as the category was called before 1965). As Table 5.5 shows, tonnage for iron and steel pipes was under 20,000 in 1950 and rose to 84,415 tons in 1963 and declined thereafter. It can be speculated that much of this pipe in the late fifties and early sixties was used to construct the pipeline network as well as to line the oil and gas wells being drilled. The decline in pipe tonnage after 1963 can be attributed mainly to the fact that once the pipeline network was in place, only minor additions were needed in response to new wells, and also to the decline in drilling activity. Also, Table 5.5 illustrates the rising importance of water transportation since ships and boats accounted for only four tons of freight in 1953, rose to 1,406 in 1968, declined, and then rose to 1,864 tons in 1973 and 2,558 tons in 1974.

Other important commodities shipped on Bayou Lafourche include fish, shellfish, and shells. Shipments of all three of these commodities have risen in recent years (except fish declined slightly in 1974), although each of them had reached high points in the 1950s, declined, and only recently surpassed their former peaks.

Table 5.5 also shows the trends for other commodities shipped on Bayou Lafourche. Sodium hydroxide used in paper and pulp manufacturing and other industrial processes increased steadily over the period. (A paper mill is located in Lockport (Table 1.3).) Clay for drilling mud peaked in the early sixties and fell dramatically in the early seventies. Distillate fuel oil, of course, follows the general pattern of mining activity. Sugar shipments (Table 1.3) are only remotely related to OCS and have held rather steady while miscellaneous manufactured products have increased over the period.

Table 5.7 is a listing of the freight traffic on Bayou Lafourche by commodity type and volume for 1950, 1954, 1962, 1965, 1970, and 1974.

HIGHWAYS

The Present Lafourche Parish Highway System

As Figure 5.9 illustrates, the highway system in Lafourche Parish consists primarily of LA 1, which runs along the west bank of Bayou Lafourche to the southern end of the parish

TABLE 5.7

DOMESTIC FREIGHT TRAFFIC ON BAYOU LAFOURCHE, VARIOUS YEARS (IN SHORT TONS)

1950

Commodity	Total	Inbound	Outbound	Local	Through traffic North-bound	Through traffic South-bound
TOTAL	2,182,289	289,332	1,507,135	25,840	345,640	150
Fish, fresh or frozen, except shellfish	13	--	--	13	--	--
Shellfish and shellfish products	15,004	9,556	--	5,398	--	50
Sea shells, unmanufactured	91,305	91,205	--	--	100	--
Sugar	26,884	20,273	6,611	--	--	--
Logs	3,675	--	3,675	--	--	--
Posts, poles, and piling	4,986	4,886	--	--	--	100
Lumber, including shingles, box, crate, and cooperage materials, plywood and railroad ties	671	649	22	--	--	--
Gas oil and distillate fuel oil	11,108	8,992	847	--	300	969

TABLE 5.7 CONTINUED

1950

Commodity	Total	Inbound	Outbound	Local	Through traffic North-bound	Through traffic South-bound
Petroleum, crude	1,928,450	93,241	1,486,104	6,754	342,351	--
Motor fuel and gasoline, including blending agents or anti-knock compounds of petroleum origin	16,786	16,786	--	--	--	--
Residual fuel oil (including bunker oil)	7,144	6,124	--	--	--	1,020
Lubricating oils and greases	166	--	166	--	--	--
Building cement	1,074	1,003	--	--	--	71
Clays and earths	15,040	6,929	2,360	2,585	--	3,166
Nonmetallic minerals, n.e.c.	2,200	--	--	--	--	2,200
Iron and steel manufactures, n.e.c.	132	42	70	--	--	20
Iron and steel pipe and fittings	19,244	13,509	223	--	2,016	3,496
Construction, excavating, and conveying machinery and parts	1,345	220	570	65	175	315

TABLE 5.7 CONTINUED

1950

Commodity	Total	Inbound	Outbound	Local	Through traffic North-bound	Through traffic South-bound
Mining, well, and pumping machinery, and parts	4,030	2,808	419	20	83	700
Automobiles, trucks, and buses, excluding parts, accessories, and service equipment	348	193	155	--	--	--
Commodities, n.e.c.	23,479	7,652	4,164	11,005	440	218
Water	9,197	5,264	1,741	--	175	2,017
Government materials used in waterway improvements	8	--	8	--	--	--

Total ton-miles, 45,675,309.

TABLE 5.7 CONTINUED

1954

Commodity	Total	Inbound	Outbound	Local	Through traffic North-bound	Through traffic South-bound
TOTAL	897,072	440,653	170,239	81,678	158,753	45,749
Fish and products, fresh	444	--	--	444	--	--
Shellfish and products	20,372	744	--	19,628	--	--
Sea shells, crude	246,697	234,550	--	500	--	11,647
Sugar	36,055	19,694	16,361	--	--	--
Groceries and food, n.e.c.	172	--	172	--	--	--
Posts, poles, and piling	836	234	2	--	--	600
Wood, nonmanufactured, n.e.c.	100	--	--	--	--	100
Motorfuel and gasoline	20,315	16,380	3,935	--	--	--
Gas oil, distillate fuel oil	20,555	16,805	1,042	74	--	2,634
Petroleum, crude	100,648	39,719	54,369	6,323	237	--
Residual fuel oil	3,052	2,460	101	--	--	491
Lubricating oils and greases	1	--	1	--	--	--
Building cement	8,404	3,741	4,018	125	25	495

TABLE 5.7 CONTINUED

1954

Commodity	Total	Inbound	Outbound	Local	Through traffic North-bound	Through traffic South-bound
Stone and mfrs, n.e.c.	50	--	50	--	--	--
Clays and earths	67,065	42,250	19,454	2,831	30	2,500
Brick and tile	54	54	--	--	--	--
Sulphur	149,713	--	--	--	149,713	--
Salt	100	100	--	--	--	--
Sand, gravel, crushed rock	801	794	7	--	--	--
Iron and steel scrap	505	140	180	100	85	--
Iron, steel semifinished prod	5,190	5,190	--	--	--	--
Rolled, finished stl mill prod	43,156	16,479	3,309	--	2,760	20,608
Tools and basic hardware	69	69	--	--	--	--
Metal mfrs and parts, n.e.c.	295	125	170	--	--	--
Const., mining mach., parts	18,023	2,987	12,113	180	2,343	400
Industrial mach., parts, n.e.c.	649	66	568	--	--	15

TABLE 5.7 CONTINUED

1954

Commodity	Total	Inbound	Outbound	Local	Through traffic North-bound	Through traffic South-bound
Motor vehicles	1,648	656	992	--	--	--
Vehicles and parts, n.e.c.	97	71	26	--	--	--
Industrial chemicals, n.e.c.	1,374	365	979	--	30	--
Commodities, n.e.c.	4,898	472	702	--	3,500	224
Water	92,345	36,371	51,059	--	--	4,915
Ice	52,227	97	627	51,473	30	--
Waterway improvement mat.	1,120	--	--	--	--	1,120
Lumber and shingles	42	40	2	--	--	--

Total ton-miles, 18,697,862.

TABLE 5.7 CONTINUED

1962

Commodity	Total	Inbound	Outbound	Local	Through traffic North-bound	Through traffic South-bound
TOTAL	2,629,495	729,930	1,154,167	20,338	697,582	27,478
Shellfish and products	3,307	3,307	--	--	--	--
Shells, unmanufactured	132,207	129,747	2,460	--	--	--
Sugar	85,852	59,707	26,145	--	--	--
Posts, poles, and pilings	4,734	4,334	--	--	--	400
Lumber and shingles	65	65	--	--	--	--
Wood manufactures, n.e.c.	46	3	43	--	--	--
Gasoline	731	729	--	2	--	--
Gas oil, distillate fuel oil	76,153	38,278	22,340	548	1,273	13,714
Petroleum, crude	1,363,465	217,378	889,096	3,608	253,383	--
Residual fuel oil	11,035	11,035	--	--	--	--
Building cement	19,737	10,043	5,251	722	1,156	2,565
Stone and mfrs, n.e.c.	50	--	--	--	--	50
Clays and earths	72,615	32,581	26,705	11,782	--	1,547

TABLE 5.7 CONTINUED

1962

Commodity	Total	Inbound	Outbound	Local	Through traffic North-bound	Through traffic South bound
Sulphur, liquid	335,720	--	--	--	335,720	--
Limestone, crushed	175	175	--	--	--	--
Sand, gravel, crushed rock	17,337	17,037	300	--	--	--
Iron and steel pipe	69,786	62,614	747	128	1,166	5,131
Rolled, finished stl mill prod	55	50	5	--	--	--
Metal mfrs and parts, n.e.c	322	--	314	8	--	--
Const., mining mach., and parts	470	150	233	57	30	--
Industrial mach., parts, n.e.c.	431	275	156	--	--	--
Motor vehicles	1,010	535	293	182	--	--
Watercraft and parts	25	25	--	--	--	--
Sodium hydroxide, caustic soda	11,307	11,307	--	--	--	--

TABLE 5.7 CONTINUED

1962

Commodity	Total	Inbound	Outbound	Local	Through traffic North-bound	Through traffic South-bound
Industrial chemicals, n.e.c.	10,161	317	9,497	272	--	75
Commodities, n.e.c.	123,510	49,288	66,271	3,004	1,251	3,696
Water	277,529	80,250	93,351	25	103,603	300
Ice	10,960	--	10,960	--	--	--
Waterway improvement mat.	700	700	--	--	--	--

Total ton-miles, 38,710,186.

TABLE 5.7 CONTINUED

1965

Commodity	Total	Inbound	Outbound	Local	Through traffic North-bound	Through traffic South-bound
TOTAL	2,341,886	631,427	577,789	24,178	949,615	158,877
Shellfish, except prepared or preserved	5,827	5,827	--	--	--	--
Marine shells, unmanufactured	182,889	167,378	--	--	--	9,684
Crude petroleum	892,421	186,548	443,610	13,657	125,783	122,823
Sand and gravel	20,094	20,094	--	--	--	--
Clay	41,437	26,405	12,215	2,011	--	806
Sulphur, liquid	514,893	--	--		514,893	--
Sugar	46,134	28,616	17,518	--	--	--
Molasses, inedible	25	--	25	--	--	--
Ice	9,461	--	9,461	--	--	--
Logs	1,661	--	1,661	--	--	--
Rafted logs	50	--	--	--	--	50
Timber, posts, poles, and piling	2,189	2,189	--	--	--	--
Sodium hydroxide	20,238	20,238	--	--	--	--

TABLE 5.7 CONTINUED

1965

Commodity	Total	Inbound	Outbound	Local	Through traffic North-bound	Through traffic South-bound
Miscellaneous chemical prod	9,983	248	7,234	1,694	--	807
Kerosene	1,278	--	--	--	--	1,278
Distillate fuel oil	41,400	30,582	8,712	--	165	1,941
Building cement	4,806	1,891	592	378	957	988
Structural clay products	1,600	1,600	--	--	--	--
Iron, steel shapes, exc sheet	108	108	--	--	--	--
Iron and steel pipe and tube	57,883	54,185	3,518	--	--	180
Metal containers	24	--	24	--	--	--
Machinery, except electrical	40	--	--	--	--	40
Ships and Boats	586	586	--	--	--	--
Misc transportation equipment	30	--	30	--	--	--
Misc manufactured products	78,797	32,976	44,181	778	12	850

TABLE 5.7 CONTINUED

1965

Commodity	Total	Inbound	Outbound	Local	Through traffic North-bound	Through traffic South-bound
Iron and steel scrap	90	90	--	--	--	--
Waste and scrap, n.e.c.	2,632	257	225	--	--	2,150
Water	410,042	50,671	28,626	5,660	307,805	17,280
Commodities, n.e.c.	1,095	938	157	--	--	--

Total ton-miles, 27,729,089.

TABLE 5.7 CONTINUED

1970

Commodity	Total	Inbound	Outbound	Local	Through traffic North-bound	Through traffic South-bound
TOTAL	2,430,512	918,305	542,635	12,627	579,736	377,209
Rice	3,310	1,960	1,350	--	--	--
Shellfish, except prepared	13,863	13,863	--	--	--	--
Marine shells, unmanufactured	322,139	223,525	--	--	--	98,614
Crude petroleum	574,939	277,569	156,823	5,362	134,471	714
Sand, gravel, crushed rock	8,325	14	17	--	3	8,291
Clay	43,633	26,854	8,629	7,158	127	865
Sulphur, liquid	426,117	--	--	--	426,117	--
Sugar	44,249	32,348	11,901	--	--	--
Ice	12,425	--	12,425	--	--	--
Timber, posts, poles, piling	1,367	1,367	--	--	--	--
Wood manufactures, n.e.c.	20	20	--	--	--	--
Sodium hydroxide	32,930	32,930	--	--	--	--
Basic chemicals and prod, n.e.c.	1,900	184	1,640	76	--	--

TABLE 5.7 CONTINUED

1970

Commodity	Total	Inbound	Outbound	Local	Through traffic North-bound	Through traffic South-bound
Distillate fuel oil	31,302	27,871	122	3	--	3,306
Liquefied gas	42,185	7,757	15,434	--	18,994	--
Rubber and misc plastics prod	8	8	--	--	--	--
Building cement	1,691	1,167	332	28	4	160
Misc nonmetallic mineral prod	1,423	1,423	--	--	--	--
Iron and steel pipe and tools	27,517	26,542	825	--	--	150
Fabricated metal products	300	--	300	--	--	--
Machinery, except electrical	89	19	50	--	20	--
Misc manufactured products	22,659	10,532	12,085	--	--	42
Water	333,776	58,690	10,019	--	--	265,067
Commodities, n.e.c.	484,345	173,662	310,683	--	--	--

Total ton-miles, 37,173,513.

TABLE 5.7 CONTINUED

1974

Commodity	Total	Inbound	Outbound	Local	Through traffic North-bound	South-bound
TOTAL	1,552,454	971,697	245,373	3,273	177,451	154,660
Fresh fish, except shellfish	887	887	--	--	--	--
Shellfish, except prepared	24,991	24,991	--	--	--	--
Marine shells, unmanufactured	390,508	384,997	--	--	--	3,511
Crude petroleum	441,618	271,450	124,862	2,573	42,733	--
Sand, gravel, crushed rock	30	10	20	--	--	--
Clay	17,371	15,750	1,621	--	--	--
Sulphur, liquid	134,203	--	--	--	134,203	--
Nonmetallic minerals, n.e.c.	300	300	--	--	--	--
Sugar	40,815	31,454	9,361	--	--	--
Molasses	2,269	--	2,269	--	--	--
Groceries	18	--	18	--	--	--
Ice	18,275	--	18,275	--	--	--
Timber, posts, poles, piling	485	485	--	--	--	--

TABLE 5.7 CONTINUED

1974

Commodity	Total	Inbound	Outbound	Local	Through traffic North-bound	Through traffic South bound
Sodium hydroxide	33,600	33,600	--	--	--	--
Basic Chemicals and Prod, n.e.c.	1,576	650	926	--	--	--
Gasoline	30	30	--	--	--	--
Distillate fuel oil	46,028	38,967	6,103	628	--	330
Building cement	2,673	1,475	844	13	--	339
Misc nonmetallic mineral prod	622	622	--	--	--	--
Iron, steel shapes, exc sheet	606	606	--	--	--	--
Iron and steel pipe and tube	7,863	7,020	438	--	15	390
Fabricated metal products	232	51	181	--	--	--
Machinery, except electrical	13,112	5,390	7,722	--	--	--
Ships and Boats	2,558	181	2,377	--	--	--
Misc manufactured products	102,360	44,293	58,040	22	--	--
Waste and scrap, n.e.c.	500	--	--	--	500	--

TABLE 5.7 CONTINUED

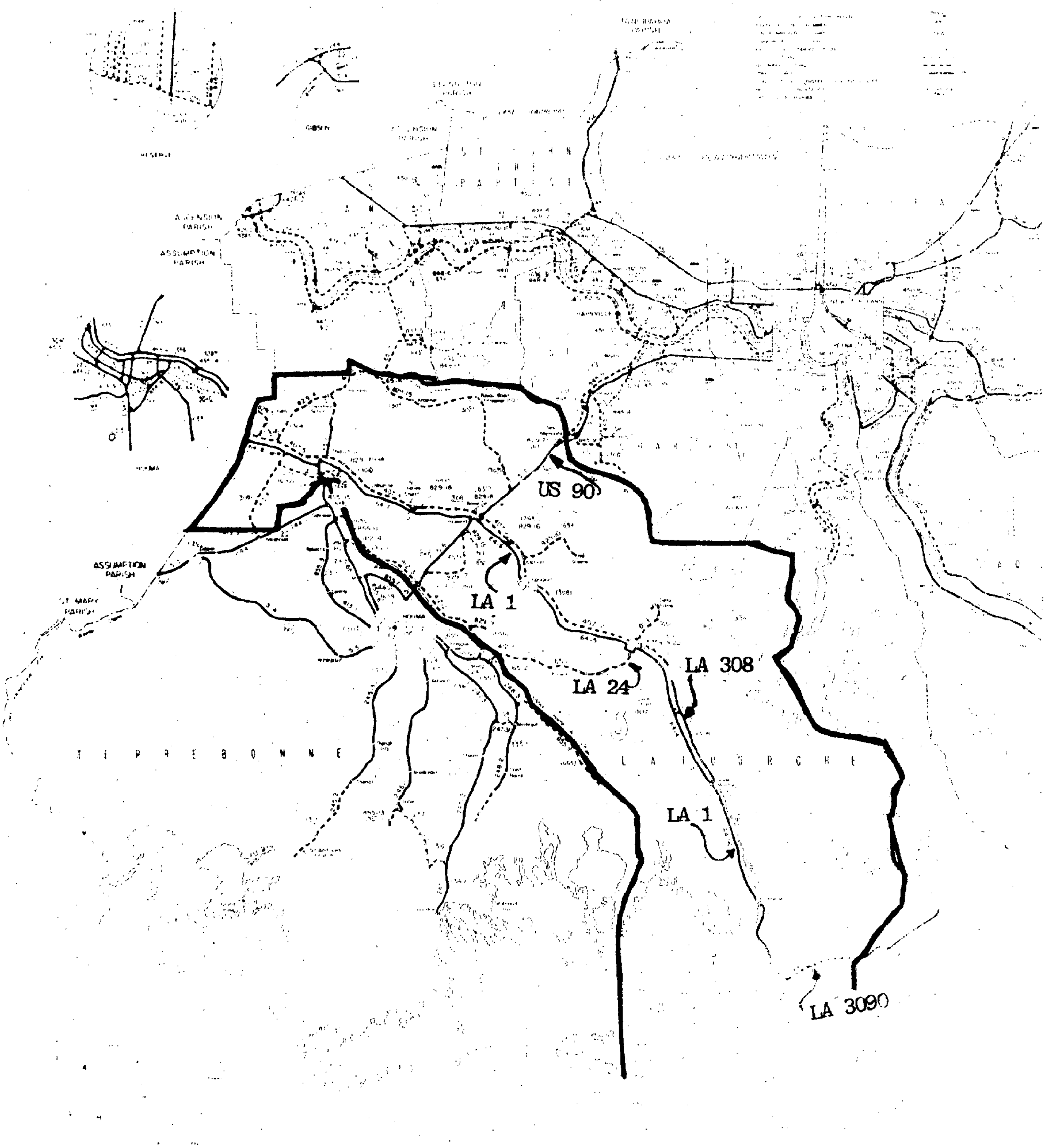
1974

Commodity	Total	Inbound	Outbound	Local	Through traffic North-bound	Through traffic South-bound
Water	211,241	108,013	6,903	35	--	96,290
Commodities, n.e.c.	6,083	470	5,413	--	--	200
Waterway improvement mat	51,600	--	--	--	--	51,600
Total ton-miles, 23,006,175.						

Source: U. S. Department of the Army, 1951, 1955, 1963, 1966, 1971, 1975.

FIGURE 5.9

PRINCIPAL HIGHWAYS IN LAFOURCHE PARISH



Source: Department of Highways, 1975.

and then to Grand Isle. Also, LA 308 parallels LA 1 on the east bank of the bayou as far south as Golden Meadow. The only other significant roads in southern Lafourche are LA 24, which connects Larose to Bourg and the Houma area, and LA 3090, which links Port Fourchon to LA 1. In the northern end of the parish, US 90 crosses the parish from Houma to Des Allemands and intersects LA 1 at Raceland. There are also several minor highways in the northern end which connect villages like Chackbay, Kraemer, and Chacahoula (Terrebonne Parish) to the major roads.

The state highway system in Lafourche, as of 1974, consisted of 269 miles of roadway divided into the categories shown in Table 5.8.

The average daily traffic on the most significant roadways is shown in Table 5.9. This table indicates the trend of traffic in the past few years. That is, on most segments of highway in the parish, traffic increased from its 1968 level, reaching a peak in 1972 or 1973, and then dropping off in 1974. This decrease can be attributed partly to a decline in offshore activity and partly to a nationwide decrease in automobile usage as a response to the "energy crisis." As can be seen in Table 5.9, the most traffic on any one roadway is on US 90. Also, the Raceland-Thibodaux corridor, on LA 1, is heavily travelled.

Table 5.10, which presents the 1972 adequacy ratings of Lafourche Parish highways, shows that nearly all segments of

TABLE 5.8

HIGHWAY MILES IN LAFOURCHE PARISH, BY CATEGORY

	Urban	Rural	Total
Interstate	--	--	--
Primary	4.46	107.68	112.14
Secondary	--	13.32	13.32
Farm-to-Market	2.13	141.41	143.54
Total	6.59	262.41	269.00

Source: Louisiana Department of Highways, 1975.

TABLE 5.9

AVERAGE DAILY TRAFFIC ON LAFOURCHE PARISH HIGHWAYS, VARIOUS YEARS

(VEHICLES PER DAY)

Segment	Distance	Average Daily Traffic 1968	1972	1973	1974
LA 1					
Jefferson Parish Line-Leeville	13.29	2008	2213	2132	1638
Leeville-Golden Meadow	10.93	4107	4925	4769	3826
Golden Meadow-Larose	12.05	6800	7869	7869	6409
Larose-Lockport	14.33	4695	5607	6389	6308
Lockport-Raceland	8.93	6684	6946	8484	7419
Raceland-Thibodaux	14.71	6525	7793	8525	7312
Thibodaux-Assumption Parish Line	6.60	5122	6211	6971	6397
LA 308					
Golden Meadow-Larose	12.18	2590	2723	2723	2554
Larose-Lockport	15.43	1540	590	1614	1492
Lockport-Raceland	7.33	2254	2928	2903	2538
Raceland-Thibodaux	14.89	1757	2144	1768	1831
Thibodaux-Assumption	6.64	1031	3137	1724	1818
US 90					
Terrebonne Parish Line-Raceland	8.22	8346	6994	7608	7613
Raceland-St. Charles Parish Line	9.63	8394	9724	9775	9590
LA 24					
Larose-Terrebonne Parish Line	13.32	1710	2259	2160	2232

TABLE 5.9 CONTINUED

Segment	Distance	Average Daily Traffic 1968	1972	1973	1974
LA 3090					
Louisiana 1-Port Fourchon	3.47	270	490	248	490

Source: Louisiana Department of Highways, 1969, 1973a, 1974, and 1975.

TABLE 5.10

1972 ADEQUACY RATINGS OF LAFOURCHE PARISH HIGHWAYS

Segment	Control Section Number	Length	Adequacy[1]
LA 1			
Jefferson Parish Line-Leeville	64-2-1	5.60	89
	64-2-2	7.72	87
Leeville-Golden Meadow	64-90-1	9.36	75
	64-90-2	1.45	a
Golden Meadow-Larose	64-4-1	1.75	a
	64-4-2	2.09	67
	64-4-3	8.30	67
Larose-Lockport	64-5-1	3.05	76
	64-5-2	.89	62
	64-5-3	4.97	75
	64-5-4	5.42	77
Lockport-Raceland	64-6-1	1.41	b
	64-6-3	.90	75
	64-6-4	6.25	68
	64-6-5	.44	c
Raceland-Thibodaux	64-7-1	13.10	62
	64-7-2	1.61	d
Thibodaux-Assumption Parish Line	64-8-1	.80	d
	64-8-2	5.61	63
LA 308			
Golden Meadow-Larose	407-1-1	8.45	69
	407-1-2	3.83	69
Larose-Lockport	407-2-1	.26	59
	407-2-2	11.61	62
	407-2-3	3.56	66

TABLE 5.10 CONTINUED

Segment	Control Section Number	Length	Adequacy[1]
Lockport-Raceland	407-3-1	.63	c
	407-3-2	3.32	61
	407-3-3	.27	58
	407-3-4	2.83	58
	407-3-5	.17	56
	407-3-6	.11	56
Raceland-Thibodaux	407-4-1	.20	d
	407-4-2	2.24	48
	407-4-3	1.70	45
	407-4-4	10.18	47
	407-4-5	1.00	c
Thibodaux-Assumption Parish Line	407-5-1	.87	53
	407-5-2	1.66	46
	407-5-3	.48	51
	407-5-4	3.37	49
	407-5-5	.29	d
US 90			
Terrebonne Parish Line-Raceland	5-6-1	6.99	67
	5-6-2	1.25	c
Raceland-St. Charles Parish Line	5-7-1	1.11	c
	5-7-2	2.25	65
	5-7-3	5.93	97
	5-7-4	.31	96
LA 24			
Larose-Terrebonne Parish Line	65-1-1	13.32	68

TABLE 5.10 CONTINUED

Segment	Control Section Number	Length	Adequacy[1]
LA 3090			
LA 1-Port Fourchon	64-30-1	3.47	69

[1] Adequacy is determined on a scale of 100, considering the surface (40 points), safety (30 points), and service (30 points) of the roadway, with adjustments for traffic volume and lack of paved surface.

a Under jurisdiction of City of Golden Meadow

b Under jurisdiction of City of Lockport

c Under jurisdiction of City of Raceland

d Under jurisdiction of City of Thibodaux

Source: Louisiana Department of Highways, 1973b.

the US 90 corridor and Raceland-Thibodaux corridor (LA 308 and LA 1) are rated poorly (below 70 is considered poor). The notable exception is the 6.24 mile segment of US 90 from the St. Charles Parish line to Raceland. This segment is a four-lane highway and has ratings of 97 and 96. However, the two-lane segment of US 90 (from the end of the four-lane segment to Terrebonne Parish) is rated only in the 60s, as is the segment of LA 1 from Raceland to Thibodaux. The Raceland-Thibodaux segment of LA 308 is one of the worst rated in the parish with its subsections rated at 48, 45, and 47.

The above roadways are in the northern end of the parish where the impact of OCS development is not highly significant. While there is an apparent need for improvement in some of these roadways (and some improvements are under construction and planned), it is not considered that OCS development had a major role in necessitating the improvements.

In the southern portion of the parish (south of US 90), OCS development has had a more significant impact. Oil company vessels such as crew boats and service and supply vessels are moored primarily between Lockport and Golden Meadow with the greatest concentration in the Golden Meadow area. The area south of the Gulf Intracoastal Waterway has been the area with the greatest impact from OCS development. In light of this, it can be seen from Table 5.9 that the most heavily travelled highways south of US 90 are the segments of LA 1 and LA 308 between Raceland and Lockport and between Larose and Golden Meadow. Table 5.10 shows that most segments of highway within these two corridors are rated below 70, the exception being one 0.9 mile segment between Lockport and Raceland. The segment of LA 1 between Larose and Lockport has slightly less traffic than the Golden Meadow-Larose segment of LA 1 and has a somewhat higher rating (generally upper 70s). LA 308 between Larose and Lockport is the least travelled section of that highway and is rated poorly (generally lower 60's). LA 24, from Larose to the Terrebonne Parish line was rated at 68 in 1972, but an improvement project was initiated on this stretch in 1973, so it is expected that it would be rated higher today.

South of Golden Meadow, traffic drops off sharply. The only roads in this area are LA 1, which goes through Leeville to Grand Isle, and LA 3090, a spur from LA 1 south of Leeville to Port Fourchon (see Figure 5.9). Table 5.9 shows that the 1974 average daily traffic on LA 1 drops from 6409 on the Larose-Golden Meadow segment to 3826 from Golden Meadow to Leeville and to 1638 beyond Leeville to the Jefferson Parish line. This lesser amount of traffic results in a higher adequacy rating for these segments as the Golden Meadow-Leeville segment is rated at 75 and Leeville-Jefferson Parish is rated 89 and 87. LA 3090 is a shell road with an average daily traffic of only 490. Its adequacy rating is 69.

Highway Improvements 1956-1975

Table 5.11 lists the total amount of money spent by the

TABLE 5.11

TOTAL SPENT ON HIGHWAY CONSTRUCTION IN IMPACTED AREA[1]

IN FISCAL YEARS 1957-1975

Fiscal Year	Roads	Bridges	Total
1957	$ 527,254.40	$ 24,887.09	$ 552,141.49
1958	105,219.35	23,163.07	128,382.42
1959	2,486,054.49	98,228.20	2,584,282.69
1960	468,302.51	938,449.38	1,406,751.89
1961	497,109.17	665,116.15	1,162,225.32
1962	186,323.84	61,381.53	247,705.37
1963	1,359.32	11,199.99	12,559.31
1964	58,102.13	7,675.62	65,777.75
1965	540,906.90	51,997.29	592,904.19
1966	35,305.80	69,133.97	104,439.77
1967	469,709.31	48,488.83	518,198.14
1968	34.11	1,754,114.68	1,754,148.79
1969	--	2,238,765.60	2,238,765.60

TABLE 5.11 CONTINUED

Fiscal Year	Roads	Bridges	Total
1970	--	$ 766,795.88	$ 766,795.88
1971	166,838.34	945,882.38	1,112,720.72
1972	1,294,241.18	234,795.62	1,529,036.80
1973	16,474.16	41,040.03	57,514.19
1974	1,915,939.57	775,948.69	2,691,888.26
1975	4,243,915.16	4,065,277.74	8,309,192.90
Total	$13,013,089.74	$12,822,341.74	$25,835,431.48

[1] Impacted area includes LA 1, LA 308, LA 24, LA 3090, and bridges across Bayou Lafourche and Gulf Intracoastal Waterway south of US 90.

Source: Louisiana Department of Highways, annually 1958-1976.

Louisiana Department of Highways from July 1, 1956 through June 30, 1975 on LA 1, LA 308, LA 24, LA 3090, and bridges over Bayou Lafourche and the Gulf Intracoastal Waterway in the area of significant impact from OCS development (the area south of US 90).

The most significant projects during these years are listed in Table 5.12. Of these projects, the most important in terms of future OCS development and the one that clearly represents a direct response to OCS development is the construction of LA 3090 from LA 1 to the Port Fourchon area (the segment designated as "Leeville-Fourchon City" by the Highway Department). This road is the only completely new highway built in Lafourche during those years. Over $777,000 was spent constructing the road during the years 1963-1967 and another $354,000 was spent in 1974. It is currently a shell road and its importance lies in the future and is dependent on the development of Port Fourchon.

The only other completely new projects were the construction of a new bridge over Bayou Lafourche at Leeville during the years 1966-1972 (LA 1) and one over the Gulf Intracoastal Waterway at Larose during the years 1973-1975 (LA 308). The remaining projects in the table consist of improvements to existing roads and bridges, but the increased use of these roads and bridges caused by OCS development clearly was a major factor in creating a need for these improvements and those planned for the future.

TABLE 5.12

THE MOST SIGNIFICANT HIGHWAY PROJECTS IN LAFOURCHE PARISH (SOUTH OF US 90)

IN FISCAL YEARS 1957-1975

Highway Number	Project Number	Name of Project	Year	Cost
LA 1	64-06-16	Lockport Relocation	1957-60	$1,189,187.51
LA 24	65-01-05	Larose-Bourg	1957-58	309,465.96
LA 24	65-01-06	Larose-Bourg	1957-59	207,883.66
LA 1	64-05-26	Lockport-Cut Off	1958-61	538,718.46
LA 1	64-05-23	Gulf Intracoastal Waterway (GIWW) Bridge and Approaches	1958-62	1,689,329.20
LA 3090	64-30-01, 02, 03	Leeville-Fourchon City	1963-67, 74	1,131,649.64
LA 1	64-03-95	Bayou Lafourche Bridge and Approaches (Leeville)	1966-72	3,644,911.58
LA 308	407-01-16	Bayou Lafourche Bridge and approaches (between Larose and Golden Meadow)	1967-72	877,640.75
LA 1	64-05-38	Cut Off-Lockport	1970-72	955,260.32
LA 308	407-01-19	Golden Meadow-Cut Off	1970-72	606,165.18

TABLE 5.12 CONTINUED

Highway Number	Project Number	Name of Project	Year	Cost
LA 1	64-06-26	Lockport-Raceland	1970-73	504,063.66
LA 24	65-01-09	Larose-Bourg	1973-a	1,031,876.95
LA 24	65-01-10	Larose-Bourg	1973-a	673,717.33
LA 308	407-02-86	Relocation, State Route, Rita	1973-a	379,905.84
LA 308	407-03-12	Relocation, State Route Rita	1973-a	786,444.60
LA 308	407-02-89	GIWW Bridge	1973-a	3,859,017.30
LA 308	407-02-91	GIWW Bridge	1973-a	448,479.32
LA 308	407-02-92	GIWW Bridge	1973-a	302,736.03
LA 308	407-02-93	Cut Off-Raceland	1973-a	506,426.44
LA 1	64-04-19	Golden Meadow-Larose	1974-a	634,161.32
LA 1	64-04-18	Golden Meadow-Cut Off	1974-a	350,530.49

a These projects were still in progress as of June 30, 1975.

Source: Louisiana Department of Highways, annually 1958-1976.

It should also be noted that a major highway construction project is currently in progress in the northern end of the parish. This project is the relocation of US 90 as a four-lane facility from the point where the present four-lane segment ends, east of Raceland, and continuing through Lafourche Parish into Terrebonne Parish. This project, through 1975, cost approximately $20 million. This, of course, will affect the southern portion of the parish also since it will improve accessibility to points northeast and west of the parish.

Future Highways

Concerning the need for future highways, the Louisiana Highway Department has determined that LA 1, from Thibodaux to Golden Meadow, is a road with one of the greatest needs for improvement in the state due to its high volume of traffic and the fact that it is only two lanes (Wagner, 1976). In fact, the need to improve both LA 1 and LA 308 was the most often cited problem in the Lafourche Parish Problem Identification Survey in 1973 (Cooperative Extension Service, 1973). In response to this need, authorization has already been granted for the relocation of LA 1 as a four-lane facility from Larose to Golden Meadow, which is one of the busiest segments of the road. One section of the segment, in Golden Meadow, is already under contract and the other two sections are expected to be under contract soon. Long-range plans call for the relocation of LA 1 or LA 308 or or both as four-lane facilities from Larose to Thibodaux, but nothing much has been done on these proposals thus far (Wagner, 1976).

South of Golden Meadow, traffic, as already mentioned, is much lighter than it is on the segments north of that city. Thus, the present two-lane highway, LA 1, is expected to be adequate for several years. However, if Port Fourchon is developed and it generates a lot of traffic, LA 1 may need to be widened somewhat, but in all likelihood it will remain a two-lane road (Wagner, 1976).

LA 3090, the shell road linking Port Fourchon to LA 1, will remain a shell road for the time being, mainly because the amount of traffic it now handles does not justify a hard surface, and also because it needs to settle more before it is paved. Again, if Port Fourchon develops, it will have to be improved in the future, but there are no definite plans for improvement now (Wagner, 1976).

There has been another proposal for a new twenty-eight mile, four-lane, grade level highway from Larose to Lafitte, in Jefferson Parish. However, environmental ramifications of this highway have stirred considerable controversy. In a memorandum prepared on behalf of the National Wildlife Federation and the Louisiana Wildlife Federation, a Washington, D.C. law firm, Arnold and Porter, charged that a thorough re-evaluation of the highway is needed before "an extraordinarily valuable wetlands resource is irreparably damaged" (Brumfield, 1976). The firm also charged that the Louisiana

Highway Department's Environmental Impact Statement is "patently inadequate" and fails to "present any plausible justification for the proposed highway, aside from secondary development, which the project is transparently designed to encourage" (Brumfield, 1976).

In February 1976, the Louisiana Highway Department announced it is holding this section of highway in abeyance pending completion of long-term, in-depth studies. This move has been regarded as virtual abandonment of the project (Barry, 1976).

VOCATIONAL SCHOOLS

Needs in Lafourche Parish

To assess the need for a vocational school in Lafourche Parish, in 1972 the Lafourche Parish School Board appointed a Manpower Survey Committee, composed of business, education, and industry leaders. This committee conducted a manpower survey (by means of a mail questionnaire) during the period from November 2, 1972 through January 15, 1973. The purpose of the survey was to determine current and future manpower requirements and to relate these occupational skill needs to the vocational-technical program in the parish school system. Nearly 28% of the employers (accounting for 47% of employees) who received questionnaires responded to them (Kennedy, 1973: 1).

The survey found that, on the average, 27.7% of employees hired in Lafourche Parish are required to have either trade and vocational-technical training or vocational high school cooperative training. The study also determined that the three comprehensive high schools in Lafourche, as of 1973, were not filling the demands of business and industry for skilled workers due primarily to budgetary limitations and a previous lack of exact data about the needs of employers (Kennedy, 1973: 8).

The major vocational programs at the three high schools in 1973 were automobile and diesel mechanics and welding. Home economics and agri-business programs were also offered along with cooperative distributive and office education programs. The survey found that the most urgent needs are in the areas of marine navigation, ship fitters and metal fabrication, machinists, and fourteen other areas listed in Table 5.13 (Kennedy, 1973: 8-9). All of these areas have employee shortages of 40% or higher, as reported by employers in the manpower survey. As can be seen, the two occupations with the greatest shortage are "captains, mates, pilots, etc." and "Metal Fabrication, Fitters, etc." Both of these occupations, with a 75% and 71.4% shortage, respectively, are significantly affected by OCS development, the former in the water transportation industry and the latter mainly in the ship building industry. In fact, twelve of the seventeen occupational shortages could be affected by OCS related development.[2]

On the basis of the information obtained in the survey, the Lafourche Parish Manpower Survey Committee recommended the expansion and development of all existing vocational-technical programs as well as the location of a vocational-technical high school in Lafourche Parish with at least one branch due to the territorial length of the parish (Kennedy, 1973).

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[2]Captains, mates, pilots, etc.; metal fabrication, fitters, etc.; machinists; protective services; miscellaneous machine trades; miscellaneous professional/technical; electricians, etc.; painters; carpenters, bricklayers, plumbers; mechanics and machinery repair; welder and flame cutters; and truck drivers.

TABLE 5.13

RANKED PERCENTAGE OF EMPLOYEE SHORTAGE
BY OCCUPATIONAL GROUP, 1972
IN LAFOURCHE PARISH

Rank Order of Shortage	Occupational Group	Percentage Employee Shortage
1	Captains, Mates, Pilots, etc.	75.0
2	Metal Fabrication, Fitters, etc.	71.4
3	Machinists	70.0
4	Protective Services	63.6
5	Farm Work, Tractor Drivers	63.6
6	Miscellaneous Machine Trades	63.6
7	Miscellaneous Professional/Technical	60.0
8	Electricians, etc.	58.5
9	Painters	58.3
10	Carpenters, Bricklayers, Plumbers	56.8
11	Television Repairmen	55.6
12	Mechanics and Machinery Repair	50.5
13	Welders and Flame Cutters	48.1
14	Truck Drivers, Heavy and Light	47.1
15	Salesmen, Commodities	41.5
16	Miscellaneous Processing	40.9
17	Processing, Foods, etc.	40.0

Source: Kennedy, 1976: 15.

Current and Planned
Vocational-Technical Programs and Facilities

Since the release of the study, three new vocational buildings have been constructed, one at each of the three high school campuses. The present vocational-technical program consists of the following (Authement, 1976):

Agriculture--Vocational agriculture and related agribusiness courses are offered in five of the eight junior high schools and the three senior high schools.

Business and Office Education--Business and office education is available at the senior high school level. The three senior high schools also have programs in cooperative office education.[3]

Distributive Education--Distributive education, dealing with marketing, wholesaling and distribution, is offered at the three senior high schools.

Home Economics--Home economics is offered in all of the junior and senior high schools; in addition, food service is offered in the three senior high schools.

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[3] Cooperative education is a program in which a student alternates his/her time between actual work experience and classroom instruction.

Trade and Industrial Education--The following programs are offered at the senior high school level: automotive mechanics, building trades, diesel mechanics, electronics, nautical science, offset printing and welding.

Guidance--All junior and senior high schools are staffed with guidance counselors who provide vocational guidance for students.

Exploratory Industrial Arts[4]--Exploratory industrial arts is offered in several junior high schools and planned for all junior high schools as soon as teachers are available.

Health Careers--A program in health careers is offered in one of the senior high schools, with plans to expand the program to other schools in the near future.

Petroleum Technology--Petroleum technology courses, even though not classified as vocational, but closely related, are offered at the three senior high schools. This program has proven very useful to students entering the petroleum and related industries.

The vocational teachers and facilities of Lafourche Parish are also available to and used extensively by out-of-school youths and adults of the community in order to

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[4]Exploratory industrial arts is a survey program in which the student is exposed to a wide range of industrial arts such as automotives, electronics, welding, etc.

provide additional work skills for those in need (Authement, 1976).

In addition to the programs and facilities offered by the Lafourche Parish school system, two new state vocational-technical schools will soon be available to residents of Lafourche. One is to be located in Thibodaux and should be available for occupancy in September of 1976. The second is located in Galliano and will be available during the 1977-78 school year (Authement, 1976). The new vocational-technical school in Thibodaux will offer: (a) all office and business education, (b) distributive education and marketing, (c) building trades (electrical, plumbing, carpentry, and masonry), (d) welding, and (e) auto mechanics programs. No petroleum technology or nautical science training programs will be offered in Thibodaux. The Galliano school will be a branch of the Thibodaux school. If there is determined to be a need for petroleum technology or nautical science programs, they are more likely to be offered at the Galliano branch, but this has not been decided (Marcello, 1976). From Table 5.13, there appears to be a need for a nautical science program.

Vocational Programs at Nicholls State University

In addition to the vocational programs at the secondary and vo-tech school level, Nicholls State University in Thibodaux also offers a variety of vocational training programs, primarily through its College of Life Sciences and Technology. This college includes the Departments of Agriculture, Biological Sciences, Engineering and Technology, Home Economics, and Nursing (Nicholls State University, 1976: 127). Though not strictly vocational, the Department of Petroleum Engineering Technology offers a B.S. and an associates degree in Petroleum Technology (Green, 1976) involving the following courses (Nicholls State University, 1976: 229):

Well Drilling and Completion Technology--A study of well drilling and completion practices of the petroleum industry involving mechanical, hydraulic, and other technical problems.

Drilling Fluid Technology--A study of the nature and control of oil well drilling fluids.

Drilling Fluid Technology Laboratory--Laboratory work in the evaluation and control of the physical and chemical properties of well drilling fluids.

Reservoir Engineering--A study of the chemistry of oil field hydrocarbons and their behavior under varying conditions of pressure, volume, and temperature.

Oil Production Technology--A study of the mechanical, hydraulic, and technical problems involved in free-flowing wells, pumping wells, and gas lift wells.

Field Handling Technology of Crude Oil--Laboratory work in equipment, instruments, and problems in separation, gauging, testing, and storing of crude oil.

Gas Production Technology--A study of the mechanical, hydraulic, and other technical problems in producing natural gas from wells.

Field Handling Technology of Natural Gas--Laboratory work in equipment, instruments, and problems involved in treating, measuring, and testing natural gas.

Well Logging Technology--A study of the various well logging methods and laboratory practice in interpretation of logs, and their application to the solution of oil field problems.

Well Completion, Service, and Workover--A study of the mechanical, hydraulic, technical, and economical problems involved in the completion, service, and repair of oil and gas wells.

These courses (and other engineering technology courses) are also offered on a cooperative education basis. That is, the student can alternate his/her time between working and going to classes (Nicholls State University, 1976: 137).

Nicholls State offers other vocational type courses in Office Administration (typing, shorthand, data processing, office systems and procedures, office management and procedure, and secretarial problems) and Home Economics (food and nutrition, meal management, clothing, textiles, institutional planning management, home management, etc.) as part of Bachelor degree programs. Associate degrees are also offered in Food Service Management, Nursing, and Sugar Cane Technology (Nicholls State University, 1976: 127).

Another significant aspect of Nicholls' vocational training program is its Division of Continuing Education through which it offers a wide variety of programs both on and off campus. These offerings include courses, conferences, institutes, short courses, seminars, workshops, and special training programs. Assistance is provided to industry and public agencies in the form of employee training and career development programs. The specific activities of the Division of Continuing Education are announced periodically through brochures and announcements in the mass media (Nicholls State University, 1976: 175).

In addition to these programs offering direct vocational training, Nicholls also offers training for teachers of vocational courses. These vocational teacher-training courses are in the areas of Business Education, Home Economics, and Industrial Arts (Nicholls State University, 1976).

AIRPORTS, HELIPORTS, AND SEAPLANE BASES

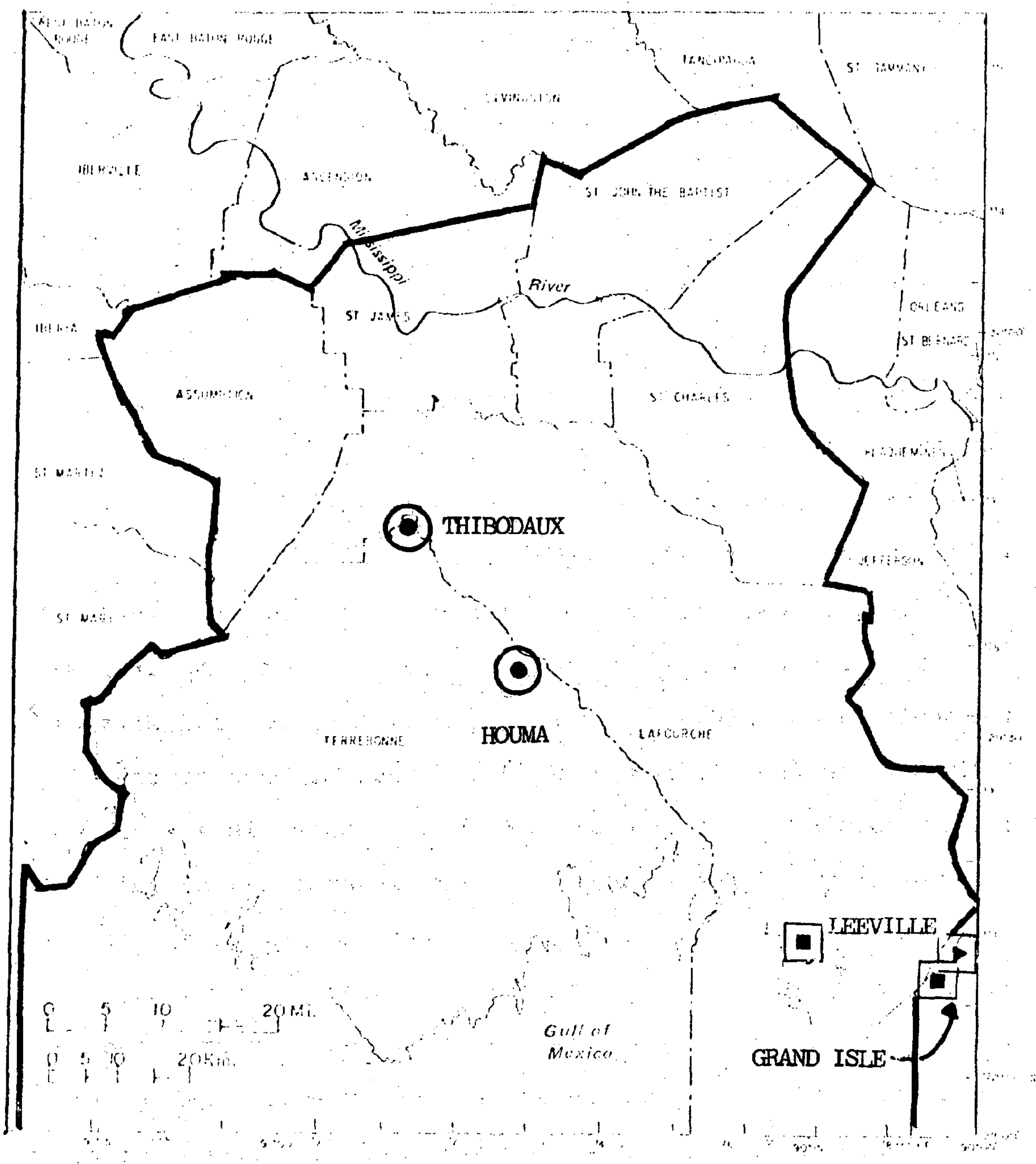
Introduction

Lafourche Parish is part of Airport Planning District No. 3, which consists of Assumption, St. Charles, St. James, St. John the Baptist, and Terrebonne Parishes, in addition to Lafourche. However, as can be seen in Figure 5.10, all significant airports, heliports, and seaplane bases in the district are either in Lafourche Parish, or just over the parish line in Houma. In addition, there is a seaplane base and heliport just over the parish line in Grand Isle, which is in Airport Planning District No. 1.

The two most significant factors affecting the development of air transportation in the area have been the area's wetlands, and the development of the oil and gas industry both onshore and offshore. The fact that so much of the area consists of wetlands has meant that there is a scarcity of land high and dry enough on which airports can be built. As a result, there are only two significant land-airports in the area--one at Thibodaux and the other at Houma (in Terrebonne Parish). Since neither of these airports have scheduled air carrier passenger service, the area is served by New Orleans International Airport, and to some degree by the airports in Baton Rouge and Lafayette (Airways Engineering Corp., 1976: III-74). The development of oil and gas fields in the wetlands created the need for seaplane transportation to these otherwise inaccessible fields and the considerable

FIGURE 5.10

EXISTING AIRPORT SYSTEM FOR PLANNING DISTRICT 3 AND GRAND ISLE



Primary Airport

General Aviation Airport

Service Airport

Seaplane Base

Heliport

Source: Airways Engineering Corp., 1976.

amount of seaplane and helicopter activity in the area (Airways Engineering Corp., 1976: IV-26). Also, the development of offshore oil and gas fields induced the need for helicopter transportation to complement, and as an alternative to, water transportation.

Airports

As already noted, the only land-airport in Lafourche Parish is at Thibodaux (and it is actually located across the parish line in Terrebonne Parish). This airport is owned by the City of Thibodaux and open for public use. It is classified as a Basic Utility airport by the Louisiana Division of Aviation, which means that it can handle about 95% of the general aviation fleet under 12,500 pounds. Also, it is intended primarily to serve medium-sized population communities with a diversity of usage and potential for increased activities (Airways Engineering Corp., 1976: VI-6). The Thibodaux airport currently handles no cargo or mail and it is not projected to do so. All of its activities are passenger-oriented. However, there are no scheduled air carrier or commuter flights at Thibodaux and none are projected. All passengers are in the nonscheduled general aviation[5] category. There was a total of 15,840 such passengers in 1975 (Airways Engineering Corp., 1976).

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[5] General aviation includes all civil aircraft operations, including those of air taxi operators (Airways Engineering Corp., 1976: VIII-33).

In 1975, there were 18 fixed-wing land aircraft based at Thibodaux, and no seaplanes or helicopters. The airport has one asphalt runway 75 feet wide and 3000 feet long. It handled a total of 24,400 departures and arrivals of aircraft during the year, of which 15,600 were local and 8,800 were itinerant. The total number of enplaned passengers was 15,840. See Table 5.14 (Airways Engineering Corp., 1976).

The airport in Houma, just outside Lafourche Parish, is owned by Terrebonne Parish and, like Thibodaux, is open for use by the public. It is classified as a Basic Transport (BT) airport, indicating that it can accomodate all general aviation aircraft up to 60,000 pounds, including propellor transports and business or executive jets. A BT airport must have at least 500 annual itinerant operations by business jet aircraft or aircraft between 12,500 and 60,000 pounds (Airways Engineering Corp., 1976: VI-7) and Houma easily meets this criterion.

The Houma airport has no cargo or mail operations, nor does it have any scheduled air carrier or commuter passenger service, and none of these are projected for the future. In 1975, it did handle 37,440 general aviation passengers (Table 5.14). There were 70 land aircraft based at this airport in 1975, all of them under 12,500 pounds. In addition, four amphibious/seaplane aircraft and 14 helicopters were based at Houma. Its two 200 feet wide by 5000 feet long concrete runways handled a total of 52,300 aircraft arrivals and

TABLE 5.14

AVIATION ACTIVITY IN AIRPORT PLANNING DISTRICT NO. 3,

BY AIRPORT, VARIOUS YEARS

THIBODAUX AIRPORT

Forecast Summary	1975	1980	1985	1995
Annual Operations Total:	24,400	32,700	43,700	78,200
Local:	15,600	20,900	27,900	50,000
Itinerant:	8,800	11,800	15,800	28,200
Military:	0	0	0	0
Busy Hour:	27	36	48	86
Based Aircraft Total:	18	24	32	57
Fixed Wing - Land				
Over 12,500 Pounds:	0	0	0	0
Under 12,500 Pounds:	18	24	32	55
Single Engine				
Over 4 Place:	13	17	22	38
Under 4 Place:	5	6	9	15
Multi-Engine:	0	1	1	2
Amphibious/Seaplane:	0	0	0	1
Helicopter:	0	0	0	1
Scheduled Air Carrier Departures:	--	--	--	--
Enplaned Passengers Total:	15,840	21,240	28,440	50,760
General Aviation:	15,840	21,240	28,440	50,760
Air Carrier:	--	--	--	--
Enplaned Cargo (Tons):	--	--	--	--
Enplaned Mail (Tons):	--	--	--	--

Notes/Comments: Classification: BU 1975-1985; GU 1995
GU (General Utility) means serves fringe of metropolitan (New Orleans) area.

TABLE 5.14 CONTINUED

HOUMA AIRPORT

Forecast Summary	1975	1980	1985	1995
Annual Operations Total:	52,300	70,300	93,700	167,100
Local:	31,000	41,500	55,500	99,400
Itinerant:	20,800	27,800	37,200	66,700
Military:	500	1,000	1,000	1,000
Busy Hour:	57	77	103	137
Based Aircraft Total:	88	117	156	279
Fixed Wing - Land				
Over 12,500 Pounds:	0	1	1	2
Under 12,500 Pounds:	70	93	123	219
Single Engine				
Over 4 Place:	49	66	87	155
Under 4 Place:	9	12	16	28
Multi-Engine:	12	16	21	38
Amphibious/Seaplane:	4	5	7	13
Helicopter:	14	18	25	45
Scheduled Air Carrier Departures:	--	--	--	--
Enplaned Passengers Total:	37,440	50,040	66,960	120,060
General Aviation	37,440	50,040	66,960	120,060
Air Carrier:	--	--	--	--
Enplaned Cargo (Tons):	--	--	--	--
Enplaned Mail (Tons):	--	--	--	--

Notes/Comments: Classification: BT 1975-1995.
Note: It is assumed that 25% of the total operations are performed by helicopters.

TABLE 5.14 CONTINUED

GRAND ISLE SEAPLANE BASE (FREEPORT SULPHUR COMPANY)

Forecast Summary	1975	1980	1985	1995
Annual Operations Total:	11,800	16,600	23,200	45,700
Local:	2,400	3,400	4,700	9,300
Itinerant:	9,400	13,200	18,500	36,400
Military:				
Busy Hour:	13	18	25	50
Based Aircraft Total:	2	2	2	3
Fixed Wing - Land				
Over 12,500 Pounds	--	--	--	--
Under 12,500 Pounds	--	--	--	--
Single Engine				
Over 4 Place:	--	--	--	--
Under 4 Place:	--	--	--	--
Multi-Engine:	--	--	--	--
Amphibious/Seaplane:	2	2	2	3
Helicopter:	--	--	--	--
Scheduled Air Carrier Departures:	--	--	--	--
Enplaned Passengers Total:	16,920	23,760	33,300	65,520
General Aviation:	16,920	23,760	33,300	65,520
Air Carrier:	--	--	--	--
Enplaned Cargo (Tons):	--	--	--	--
Enplaned Mail (Tons):	--	--	--	--

Notes/Comments: Classification CT 1975-1995
CT means Seaplane Transport.

TABLE 5.14 CONTINUED

LEEVILLE HELIPORT (GULF OIL CORPORATION)

Forecast Summary	1975	1980	1985	1995
Annual Operations Total:	16,700	21,900	28,500	48,700
Local:	200	300	300	600
Itinerant:	16,500	21,600	28,200	48,100
Military:	--	--	--	--
Busy Hour:	23	30	39	67
Based Aircraft Total:	16	20	26	44
Fixed Wing - Land				
Over 12,500 Pounds:	--	--	--	--
Under 12,500 Pounds:	--	--	--	--
Single Engine				
Over 4 Place:	--	--	--	--
Under 4 Place:	--	--	--	--
Multi-Engine:	--	--	--	--
Amphibious/Seaplane	--	--	--	--
Helicopter:	16	20	26	44
Scheduled Air Carrier Departures:	--	--	--	--
Enplaned Passengers Total:	41,250	54,000	70,500	120,050
General Aviation:	41,250	54,000	70,500	120,050
Air Carrier:	--	--	--	--
Enplaned Cargo (Tons):	--	--	--	--
Enplaned Mail (Tons):	--	--	--	--

Notes/Comments: Classification: HELP 1975-1995.

TABLE 5.14 CONTINUED

GRAND ISLE HELIPORT (FREEPORT; HUMBLE OIL COMPANY)

Forecast Summary	1975	1980	1985	1995
Annual Operations Total:	3,500	4,900	6,900	13,600
Local:	300	400	600	1,200
Itinerant:	3,200	4,500	6,300	12,400
Military:				
Busy Hour:	4	7	9	19
Based Aircraft Total:	2	2	2	3
Fixed Wing - Land				
Over 12,500 Pounds:	--	--	--	--
Under 12,500 Pounds:	--	--	--	--
Single Engine				
Over 4 Place:	--	--	--	--
Under 4 Place:	--	--	--	--
Multi-Engine:	--	--	--	--
Amphibious/Seaplane	--	--	--	--
Helicopter:	2	2	2	3
Scheduled Air Carrier Departures:	--	--	--	--
Enplaned Passengers Total:	8,000	11,250	15,750	31,000
General Aviation:	8,000	11,250	15,750	31,000
Air Carrier:	--	--	--	--
Enplaned Cargo (Tons):	--	--	--	--
Enplaned Mail (Tons):	--	--	--	--

Notes/Comments: Classification HELP 1975-1995.

TABLE 5.14 CONTINUED

PROPOSED LAPLACE AIRPORT

Forecast Summary	1975	1980	1985	1995
Annual Operations Total:		8,500	11,960	42,750
Local:		4,270	6,010	22,140
Itinerant:		4,230	5,950	20,610
Military:				
Busy Hour:		9	13	47
Based Aircraft Total:		8	11	50
Fixed Wing - Land				
Over 12,500 Pounds:		0	0	0
Under 12,500 Pounds:		8	11	45
Single Engine				
Over 4 Place:		5	7	27
Under 4 Place:		1	2	7
Multi-Engine:		2	2	11
Amphibious/Seaplane:		--	--	--
Helicopter:		--	--	5
Scheduled Air Carrier Departures:				
Enplaned Passengers Total:		7,614	10,710	37,098
General Aviation:		7,614	10,710	37,098
Air Carrier:				
Enplaned Cargo (Tons):		--	--	--
Enplaned Mail (Tons);		--	--	--

Notes/Comments: Classification GU 1985-1995.

TABLE 5.14 CONTINUED

PROPOSED HOUMA SEAPLANE BASE

Forecast Summary	1975	1980	1995	1995
Annual Operations Total:		40,600	54,400	97,600
Local:		3,600	4,800	8,700
Itinerant:		37,000	49,600	88,900
Military:				
Busy Hour:		44	60	106
Based Aircraft Total:		67	89	159
Fixed Wing - Land				
Over 12,500 Pounds:		--	--	--
Under 12,500 Pounds:		--	--	--
Single Engine				
Over 4 Place:		--	--	--
Under 4 Place:		--	--	--
Multi-Engine:		--	--	--
Amphibious/Seaplane:		66	87	155
Helicopter:		1	2	4
Scheduled Air Carrier Departures:		--	--	--
Enplaned Passengers Total:		66,600	89,280	160,020
General Aviation:		66,600	89,280	160,020
Air Carrier:				
Enplaned Cargo (Tons):		--	--	--
Enplaned Mail (Tons):		--	--	--

Notes/Comments: Classification CT 1980-1995.

TABLE 5.14 CONTINUED

PROPOSED LEEVILLE AIRPORT

Forecast Summary	1975	1980	1985	1995
Annual Operations Total:		3,600	6,200	10,500
Local:		300	600	1,000
Itinerant:		3,300	5,600	9,500
Military:		--	--	--
Busy Hour:		4	7	12
Based Aircraft Total:		3	6	10
Fixed Wing - Land				
Over 12,500 Pounds:		0	1	1
Under 12,500 Pounds:		3	4	7
Single Engine				
Over 4 Place:		1	2	3
Under 4 Place:		1	1	2
Multi-Engine:		1	2	3
Amphibious/Seaplane:		--	--	--
Helicopter:		--	1	2
Scheduled Air Carrier Departures:		--	--	--
Enplaned Passengers Total:		5,940	10,080	17,100
General Aviation:		5,940	10,080	17,100
Air Carrier:		--	--	--
Enplaned Cargo (Tons):		--	--	--
Enplaned Mail (Tons):		--	--	--

Notes/Comments: Classification BT 1980-1995.

Source: Airways Engineering Corp., 1976.

departures, including 31,000 local, 20,800 itinerant and 500 military operations (Airways Engineering Corp., 1976).

Seaplane Bases

In the southern portion of Louisiana, the construction of a seaplane base instead of a land airport is less expensive and preferential in terms of ecology (Airways Engineering Corp., 1976: VI-7). In addition, as already mentioned, seaplanes are more useful for providing access to oil and gas fields located in the wetlands. At present, there is no seaplane base in Lafourche Parish or anywhere in Planning District No. 3 which meets the criteria to allow it to be included in the Louisiana Airport System Plan (LASP). However, there were 54 amphibious/seaplane aircraft based in Planning District No. 3 in 1975 (Airways Engineering Corp., 1976: III-77). Most of these are apparently based at the three seaplane bases in Houma or at the one in Leeville. In addition, there is a seaplane base at Grand Isle, which is included in the LASP. This base at Grand Isle is owned by Freeport Sulphur Company, but is open for public use (Table 5.14). It has a 15,000 feet long runway (all water, of course) and two seaplanes are based there. Most of its operations are itinerant, accounting for 9,400 arrivals and departures of aircraft, compared to only 2,400 aircraft local operations and 16,920 passengers.

Helicopter Operations

Louisiana is the site of the most extensive helicopter operations in the world. The most significant role of helicopters is related to the offshore oil and gas industry. They are used to: (1) transport oil rig crews to and from the drilling platforms and associated facilities of offshore fields, (2) transport emergency parts and service personnel, and (3) perform pipeline patrol and oil spill control tasks. The three largest operators, Petroleum Helicopters, Inc., Air Logistics, and Air Marine, operate a total of over 200 helicopters in Louisiana (Airways Engineering Corp., 1976: IV-26).

It should be noted that not every site used for the landing and takeoff of helicopters need be designated as a heliport, for it is neither necessary nor feasible to establish a heliport for all helicopter operations (Airways Engineering Corp., 1976: VI-7). However, there is a major heliport designated by LASP as such in Lafourche Parish at Leeville, as well as one at Grand Isle. In addition, the Houma airport (which has already been discussed) includes 14 helicopters in its operations, and they account for approximately 25% of the airport's total operations (Airways Engineering Corp., 1976).

The Leeville heliport is owned by Gulf Oil, and is therefore private and not open to the public. However, it is classified by the State Aviation Division as a Helicopter

Emergency Landing Pad (HELP) and is therefore open to the public for emergency landings only. Sixteen helicopters were based here in 1975 and of its 16,700 helicopter arrivals and departures, 16,500 were itinerant operations and 200 were local (Table 5.14). These operations serviced a total of 41,250 enplaned passengers (Airways Engineering Corp., 1976).

The Grand Isle Heliport is owned by Humble Oil and Refining Company. Like the heliport at Leeville, it is in the HELP category and is open to the public only for emergency landings. Only two helicopters were based here in 1975 and 3,200 of its operations were itinerant compared to 300 local operations. A total of 8,000 passengers were served (Table 5.14) (Airways Engineering Corp., 1976).

Another important function of helicopters in Louisiana is to provide ambulance service to hospitals. St. Anne's Hospital in Raceland is one hospital equipped with a landing pad for such purposes (Grimball et al., 1973). However, it is usually not economically feasible to maintain a helicopter fleet exclusively for ambulance purposes, so while landing facilities are provided for helicopters normally used in other operations, there are no helicopters in Lafourche operated specificially for ambulance service (Airways Engineering Corp., 1976: VI-7).

Future Aviation Needs

The Louisiana Airport System Plan projects that Planning District No. 3 will be the fastest growing of the state's eight districts, in terms of airport operations, over the next twenty years (Airways Engineering Corp., 1976: VI-25). However, this projection is based on an increase in activity by the petroleum industry which may not be valid unless a deep-water oil port is constructed in the area as proposed. The projected increase in aviation activity for Planning District No. 3 is presented in Table 5.15. As can be seen, total operations (number of arrivals and departures) is expected to increase from 123,800 in 1975 to 444,850 in 1995, an increase of about 260%. A large part of the increase is expected to occur in itinerant operations. The number of fixed wing-land aircraft is expected to rise from 88 to 329, with three of the added vehicles being larger than 12,500 pounds. Seaplanes are expected to increase in number from 54 in 1975 to 169 in 1995, while helicopters rise to 101 from the 1975 total of 31.

No scheduled air carrier service is expected to begin in the 20-year planning period, although it is felt that Houma has the potential for a third-level intrastate commuter service. However, even if such a service is initiated, it is not expected to be of a magnitude great enough to affect the forecast or to require additional facilities at the airport (Airways Engineering Corp., 2976: III-75). The number of general aviation passengers is expected to increase substantially from 144,390 in 1975 to 505,288, an increase of 250%.

TABLE 5.15

AVIATION ACTIVITY IN AIRPORT PLANNING DISTRICT NO. 3, VARIOUS YEARS

Forecast Summary	1975	1980	1985	1995
Annual Operations Total:	123,800	177,600	238,460	444,850
Local:	46,800	69,948	95,110	181,840
Itinerant:	46,100	106,652	142,350	262,010
Military	500	1,000	1,000	1,000
Busy Hour:	--	--	--	--
Based Aircraft Total:	173	239	320	599
Fixed Wing - Land	88	129	172	329
Over 12,500 Pounds:	0	2	2	3
Under 12,500 Pounds:	88	127	170	326
Single Engine				
Over 4 Place:	62	88	118	223
Under 4 Place:	14	19	28	52
Multi-Engine:	12	22	26	54
Amphibious Seaplane:	54	71	94	169
Helicopter:	31	39	54	101
Scheduled Air Carrier Departures:	--	--	--	--
Enplaned Passengers Total:	144,390	205,434	275,970	505,288
General Aviation:	144,390	205,434	275,970	505,288
Air Carrier:	--	--	--	--
Enplaned Cargo (Tons):	--	--	--	--
Enplaned Mail (Tons):	--	--	--	--

Source: Airways Engineering Corp., 1976: VI-30.

To meet this increase, the Louisiana Airport System Plan recommends expansion and improvements of existing facilities as well as the construction of new facilities. Figure 5.11 shows the proposed new airport system for Planning District No. 3 and Grand Isle. Table 5.14 shows the projected level of activity for each of the existing airports as well as for the new airports proposed for Leeville, Laplace, and Houma.

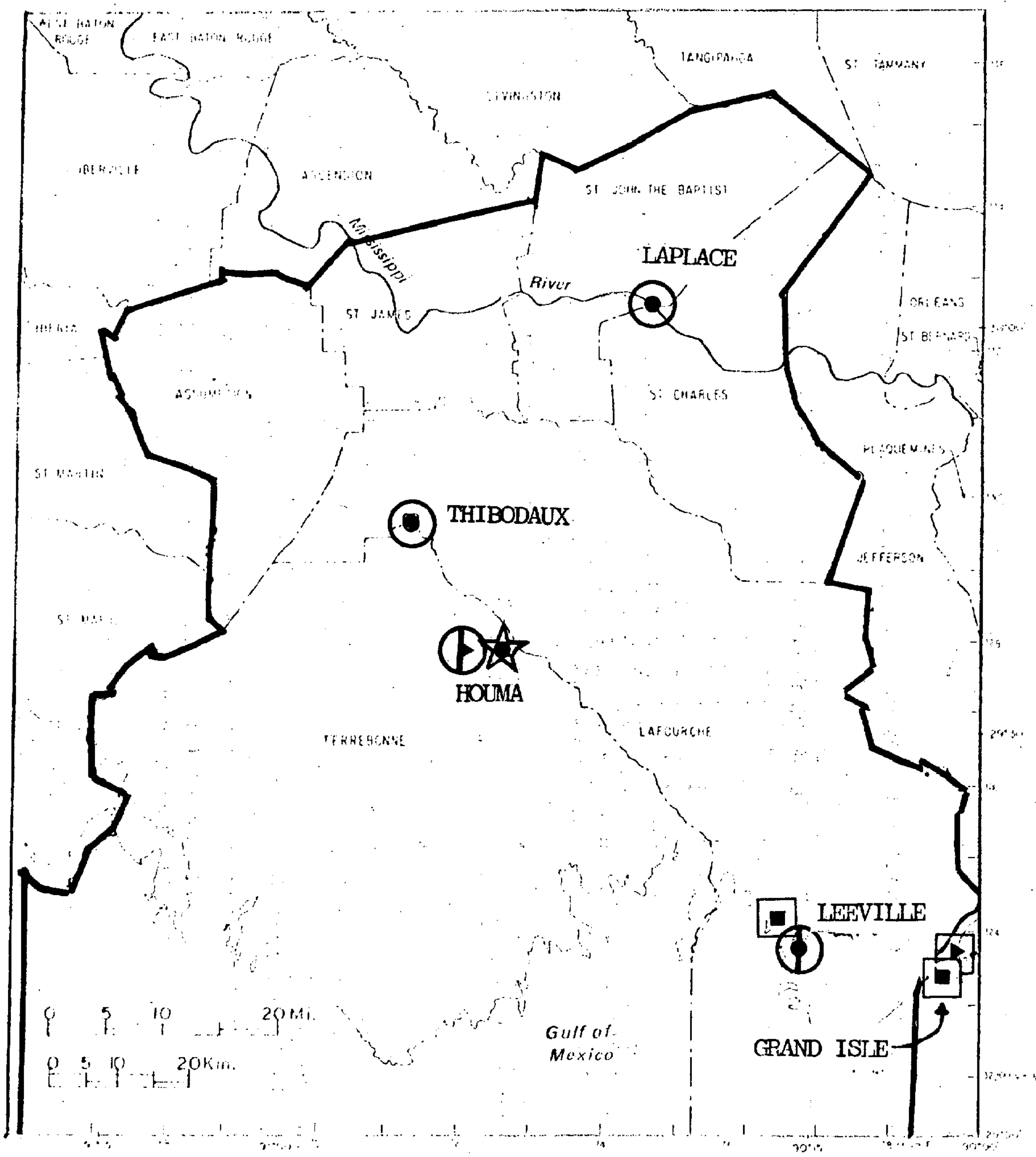
Table 5.16 lists the type of construction and improvements proposed for both the existing and proposed airports in Planning District No. 3 and in Grand Isle as well as the costs for expansion and the time schedule for expansion. As can be seen in Table 5.16, the total costs of airport system expansion in Planning District No. 3 and in Grand Isle is $8,662,449. This amount is to be divided by locality, as follows:

Grand Isle (Jefferson Parish)	$ 149,190
Laplace (St. John the Baptist Parish)	1,695,689
Houma (Terrebonne Parish	4,041,171
Lafourche Parish	2,776,399
TOTAL	$8,662,449

Of the amount spent in Lafourche Parish, $2,065,394 is expected to be provided by the federal government, $568,804 by the State of Louisiana, and $142,201 by the local government ($79,719 by the City of Thibodaux for its airport and $62,482 by the City of Leeville for its proposed airport).

FIGURE 5.11

PROPOSED AIRPORT SYSTEM, PLANNING DISTRICT 3 AND GRAND ISLE



Primary Airport

Gateway Airport

Service Airport

Proposed Airport

General Aviation Airport

Seaplane Base

Heliport

Source: Airways Engineering Corp., 1976.

TABLE 5.16

RECOMMENDED AIRPORT IMPROVEMENTS AND TOTAL COSTS, LOUISIANA STATE AIRPORT SYSTEM PLAN AIRPORTS

PLANNING DISTRICT 3	OWNER IF DIFFERENT THAN PARISH	TYPE OF IMPROVEMENT[3] Land	Site Preparation	Paving	Visual Aids	Approach Aids	Buildings	Emergency Parking	Other	IMPROVEMENT COST BY PERIOD[3] 1976-80	1981-85	1986-95	TOTAL 1976-95
Lafourche Parish													
Leeville (New)										$1,211,160	$ 20,000	$ 0	$1,231,160
Leeville PHI Heliport[1]	Gulf Oil Corp.	X	X	X	X	X		X	X	0	0	0	0
Thibodaux	City of Thibodaux	X	X	X	X	X		X	X	398,079	802,340	344,820	1,545,239
St. John the Baptist Parish													
Laplace		X	X	X	X			X	X	1,127,409	568,280	0	1,695,689
Terrebonne Parish													
Houma-SPB (New)		X	X	X	X	X	X	X	X	691,660	77,320	415,670	1,184,650
Houma		X	X	X	X	X	X	X	X	1,080,623	964,349	811,549	2,856,521
Jefferson Parish[4]													
Grand Isle Seaplane Base	Freeport Sulphur	X	X	X			X	X	X	15,600	84,330	48,260	148,190
Grand Isle Freeport Heliport[1]	Humble Oil & Mfr Co.							X		1,000	0	0	1,000
PLANNING DISTRICT 3 TOTALS[2]										$4,508,931	$2,432,289	$1,572,039	$8,513,259
TOTAL (INCLUDING GRAND ISLE)										$4,525,531	$2,516,619	$1,620,299	$8,662,449

NOTES, TABLE 5.16

SOURCE: Types of improvements are based on demand capacity estimates for each airport. Costs were calculated by multiplying each improvement by unit costs of recent airport projects in Louisiana. All costs are in constant 1975 dollars.

NOTES: [1]Privately owned airport--public use agreement needed.

[2]Totals may not add due to rounding.

[3]Federal Government matches approximately $3 for every local $1. All improvements are government financed. Freeport Heliport funds are all state/local.

[4]Although Grand Isle is in Planning District 1, its proximity to Lafourche Parish necessitates its inclusion in this table.

SOURCE: Airways Engineering Corporation, 1976.

As Table 5.16 illustrates, improvements at the existing and proposed airports include acquisition of land, site preparation, paving, visual aids, approach aids, emergency parking, and "other" improvements. "Other" includes roads, fire equipment, auto parking, obstruction removal, and any other airport improvement not covered in the preceding categories (Airways Engineering Corp., 1976: III-2).

The three totally new proposed facilities include land airports at Laplace and Leeville and a seaplane base at Houma (Table 5.14). The airport at Laplace (to be owned by St. John the Baptist Parish) is to be classified as a General Utility airport, meaning it is primarily intended to serve the fringe of a metropolitan area (in this case, New Orleans) (Airways Engineering Corp., 1976: VI-6), and therefore its impact on Lafourche Parish is minimal. Its runway is to be 3,700 feet long by 75 feet wide. The seaplane base at Houma is intended to replace the three seaplane bases currently operating in Houma on the Gulf Intracoastal Waterway and the Houma Navigation Canal. This seaplane base, as proposed, is to be owned by Terrebonne Parish and would include a runway (water) 150 feet wide and 5000 feet long. The land airport at Leeville will be classified as Basic Transport and have an asphalt runway 75 feet wide and 5,400 feet long and is to be owned by Lafourche Parish (Airways Engineering Corp., 1976).

Of the above recommended improvements, the Louisiana Airport System Plan recommends that development of the airports at Leeville, Houma, and Thibodaux have priority. Development of the Houma seaplane base and the airport at Laplace could be postponed until later time periods, if necessary (Airways Engineering Corp., 1976: III-75).

ELECTRICAL POWER FACILITIES

Present Electrical Situation

The electrical power needs of Lafourche Parish are presently being supplied by three companies--Thibodaux Municipal Light and Power Company, South Louisiana Electric Co-op Association, and Louisiana Power and Light Company (L P & L).

Thibodaux Municipal Light and Power Company is owned and operated by the City of Thibodaux for the residences and businesses of that city. In 1957, the company replaced its old generating plant with a new diesel-powered plant with a capacity of 6000 kilowatts (KW). In 1959, a 3000 KW diesel unit was added and a third 3000 KW diesel unit was added in 1961. Three 6250 KW diesel units were installed in 1969 and a steam-powered plant with a capacity of 20,000 KW was constructed in 1973. Thus, present generating capacity of the company is 30,750 KW from the diesel units and 20,000 KW from the steam plant for a total capacity of 50,750 KW. Present production averages 30,000-35,000 KW. Therefore, generating capacity is adequate at present with a capacity to production ratio of about 1.5 (Thibodaux Municipal Light and Power Company, 1976).[6]

The South Louisiana Electric Co-op Association is a

[6] The City Council of Thibodaux has called a special election for August 14, 1976 in which to decide whether the residents of the city want to sell their power company to L P and L. An expected 50 percent reduction in electrical rates would be forthcoming if the sale is approved (Morning Advocate, 1976).

private company based in Houma and serves rural areas in Terrebonne and Lafourche Parishes. Its Lafourche territory extends from Gray (in Terrebonne Parish) in the north, southward to about one mile south of U.S. 90, and eastward through Clotilda to Gheens. It generally serves only residential and farming customers. It has no generating capacity of its own, but buys its electricity from the Association of Louisiana Electrical Co-ops through Louisiana Power and Light, Gulf States Utilities Company, and Central Louisiana Electric Company. There has been much growth of the company since 1950, but exact data detailing this growth are unavailable (South Louisiana Electric Co-op Association, 1976).

Louisiana Power and Light Company supplies the bulk of Lafourche Parish's electrical needs. It has a 138 and a 115 kilovolt transmission line running east of Bayou Lafourche from the Assumption Parish line to the L P & L Leeville transmission substation (see Figure 5.10). This line connects with the Gulf States Utilities system at Plaquemine. Therefore, some of the power in this line is generated by Gulf States, and distributed by L P & L. However, the bulk of the power comes from L P & L's Waterford Plant in Taft, Louisiana and its Ninemile Plant in Westwego, Louisiana. There is an L P & L 230 KV transmission line from its Waterford plant to the L P & L transmissión substantion at Raceland. There are two L P & L 115 KV transmission lines from the Ninemile plant to Lafourche Parish. One goes through Jefferson and St. Charles Parishes to the substation at Raceland while the other goes south through Barataria in Jefferson Parish and joins the L P & L transmission substation at Golden Meadow. Other L P & L 115 KV transmission lines in Lafourche include one from the Raceland substation to the L P & L Coteau transmission substation in Terrebonne Parish, one from the L P & L Thibodaux transmission substation to the L P & L Vacherie (St. James Parish) transmission substation, and one from the L P & L Valentine transmission substation to an L P & L transmission substation at Chauvin, also in Terrebonne Parish.

Table 5.17 shows transmission lines and substations that have been built by L P & L since 1950. As can be seen, virtually all of the major electrical facilities have been built since then. While other factors, such as increased use of electricity by households and businesses, have contributed to the need for additional electrical capacity, it is obvious that the growth stimulated by development of oil and gas resources was a major factor in producing the need for these additional facilities.

Louisiana Power and Light's distribution lines primarily run along both sides of Bayou Lafourche from the Assumption Parish line to Golden Meadow. There are several short spurs from these lines at various points with some longer spurs to serve the rural area in the northern part of the parish. South of Golden Meadow, there is one

TABLE 5.17

YEAR OF CONSTRUCTION OF ELECTRICITY TRANSMISSION LINES AND SUBSTATIONS IN LAFOURCHE PARISH SINCE 1950

Transmission Lines	
Section	Year
Raceland-Napoleonville	1951
Raceland-Coteau	1952
Raceland-Valenting	1954
Valentine-Golden Meadow	1957
Golden Meadow-Leeville	1958
Valentine-Chauvin	1972
Thibodaux-Vacherie	1976
Distribution Lines	
Section	Year
Leeville-Grand Isle (Caminada), two lines	1964
Transmission Substations	
Location	Year
Thibodaux	1956
Valentine	1956
Leeville	1957
Golden Meadow	1962
Distribution Substation	
Location	Year
South Point	1957

Source: Smith, 1976.

line to Leeville and two lines from Leeville to Grand Isle. One is a direct line through the marshes while the other follows the route of Louisiana Highway 1. In addition, there is an L P & L distribution substation at South Point (junction of Louisiana Highway 1 and Louisiana Highway 3090) and two distribution lines from there to the Port Fourchon area (Bond, 1976).

Future Electrical Needs

Since Lafourche Parish constitutes only a small part of the regional power system, and the electrical generating plants serving Lafourche also serve a much larger region, the future needs of Lafourche Parish must be considered in terms of the region as a whole.

The 1975 total electrical generating capacity for the St. James-Lafourche-Terrebonne area and the New Orleans-Baton Rouge corridor was estimated to be 10,200 million kilowatt-hours (KWH). By 1990, current population and industry is expected to increase its demand to 50,140 million KWH. In addition, new household and industrial demand will amount to an additional requirement of 6300 KWH. Thus, total future consumption for the year 1990 is expected to be 56,460 million KWH (U.S. Coast Guard, 1976: 3.9-45).

To meet this increased demand, Louisiana Power and Light is constructing an 1165 million KWH Nuclear generating plant in Taft, Louisiana. This plant is expected to be operational by 1982. They are also considering plans for two nuclear plants in Plaquemine, having a total capacity of 2400 million KWH by 1985. In addition, Gulf States Utilities (which also supplies a portion of Lafourche Parish) is planning two nuclear units northwest of Baton Rouge, which will have a total capacity of 1880 million KWH by 1985, a 580 million KWH conventional plant in St. Gabriel, Louisiana to begin operation in 1976, and a 480 million KWH conventional plant in Bridge City, Texas, which will begin operation in 1979. These facilities will increase generating capacity in the region by 6505 million KWH by 1985, bringing the total generating capacity to 16,705 million KWH (U.S. Coast Guard, 1976: 5-72).

In addition, there is a 41,700 million KWH increase planned for the Louisiana part of the South Central Power Grid by 1990, and manufacturing plants are expected to increase their own generating capacity by about 9000 million KWH. This would increase total capacity to 67,405 million KWH by 1990. This would be sufficient to supply the 1990 demand in the St. James-Lafourche-Terrebonne area and New Orleans-Baton Rouge corridor (56,480 million KWH) and allow for increases in other parts of the South Central Power Grid's service areas (U.S. Coast Guard, 1976: 3.9-47).

By 2010, new household and industrial demand that is expected to occur without LOOP is expected to be an additional 21,140 million KWH (over 1990 demand), bringing total demand to 77,600 million KWH. If LOOP is built, an additional

3,560 million will be required for a total 2010 demand of 81,160 million KWH (U.S. Coast Guard, 1976: 3.9-47).

Thus, it appears that current plans will be sufficient to supply electrical demand through 1990, but additional capacity will have to be provided after that year.

PIPELINES

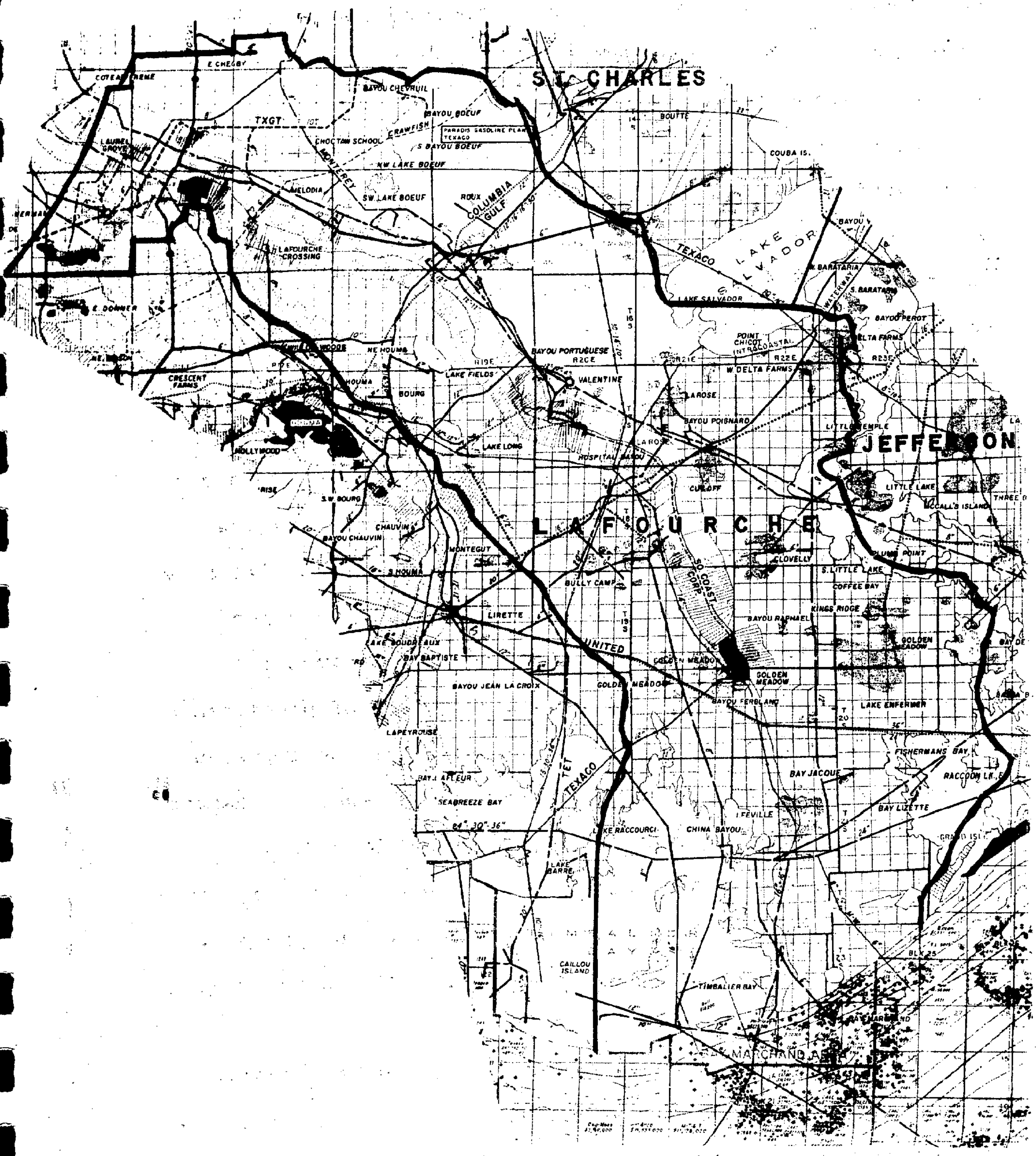
Introduction

Oil and gas may be transported from the Outer Continental Shelf to shore either by pipeline or by bulk carriers (barges and tankers). Presently, virtually all OCS production is transported by pipeline and it seems likely that pipelines will continue to be the dominant form of transporting OCS oil and gas. See Figures 2.9 and 5.12 for a map of existing pipelines. Nearly all current plans for developing petroleum resources within 200 miles of the coast include pipelines. Barges and tankers are used as a temporary means of transportation during field development or to transport oil from fields with low production rates. However, due to their poor oil spill record, they do not represent a desirable alternative to pipelines at the present time (Kash, White, et al., 1973: 63).

The socioeconomic impacts of pipelines are minimal. During the construction phase, there is a large assembly of men and equipment for a brief period of time. Since construction is not confined to one location, but instead

FIGURE 5.12

PIPELINE SYSTEM IN LAFOURCHE PARISH



Source: Transcontinental Gas Pipe Line Corporation.

stretches along a route of as much as a hundred miles or more, construction communities are not established near the job site as in other types of construction. In fact, since Lafourche Parish (and most of South Louisiana) consists largely of wetlands, when pipeline routes cross these wetlands, it is frequently necessary to house the workers in what are known as "quarter-boats," which follow the construction. While it is possible that individual communities could experience a slight population growth if construction personnel stayed in them while working on a pipeline, such an increase is likely to be temporary and the overall effect on population and the public services (housing, education, etc.) associated with such growth is virtually nonexistent (McGinnis _et al_., 1972: 3.30-3.31). See Chapter 2 for a description of pipeline construction.

The most significant economic impacts of pipelines are related to their environmental effects. For example, a pipeline through the marshes sometimes affects the habitat of fur animals, causing them to move to other areas. However, the canals associated with the pipelines may provide accessibility for the trappers to areas which were previously inaccessible by boat (McGinnis _et al_., 1972: 3.28). See Chapter 3.

The fishing industry is also affected by pipeline construction, primarily by its dredging and canaling aspects. The increased siltation, changes in salinity, changes in drainage patterns, and other disruptions of the natural processes of the marshes all affect the environment on which finfish and shellfish depend (Chapter 3) (McGinnis, et al., 1972: 3.29).

Other impacts of pipeline construction include those on archaeological and historical sites, esthetics, and recreation. There are very few historical sites in the area and these are easily avoided, so the impact on them is minimal.[7]

Also, there are several archaeological sites in Lafourche Parish that may be affected, including one that is within 0.2 miles of a Louisiana Offshore Oil Port (LOOP) alternative pipeline route (U.S. Coast Guard, 1976: 2.5-18). These may need to be protected in the future.

The esthetic impact of pipelines on marshes is generally considered to be negative, although the full impact is observed only by the aerial observer who can see the marshes cut up for miles by canals near certain oil field areas. Thus, the esthetic impacts have affected relatively small numbers of people. The impact on recreation has not been all negative. In fact, as in the case of the fur trappers, the pipeline canals have opened up many areas for boaters and sport fisherman (McGinnis et al., 1972: 3.31-3.32).

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[7]The only historical site listed in the "Inventory of Sites Having Commemorative Preservation or Recreation Significance" is the Lake Salvador area (State Parks and Recreation Commission, 1974: 5.5). This does not mean, however, that there are not other sites which may be included in a later "Inventory."

Future Pipelines

Future pipelines are affected by two factors: (1) the location of new oil and gas fields, and (2) the construction of the LOOP. Of course, new oil and gas fields will require gathering lines to link them with existing transmission lines. However, due to a combination of excess line capacity already available and depletion of existing fields, it is expected that very few, if any, new transmission lines will be needed (McGinnis et al., 1972: 3.7). However, if LOOP is built at the proposed location, eighteen miles off the coast of Lafourche Parish, new oil pipelines will definitely be required.

The pipeline system associated with LOOP is presented in Figure 5.13. It consists of four major segments as follows:

(1) From the tanker(s) to the base assembly of the SPM[8] to which the tanker is moored.

(2) From each SPM to the pumping platform.

(3) From the pumping platform to the onshore Fourchon booster station and then on to the Clovelly Dome storage terminal, near Cut-Off in Lafourche Parish.

(4) From Clovelly Dome to the Capline pipeline in St. James Parish.[9]

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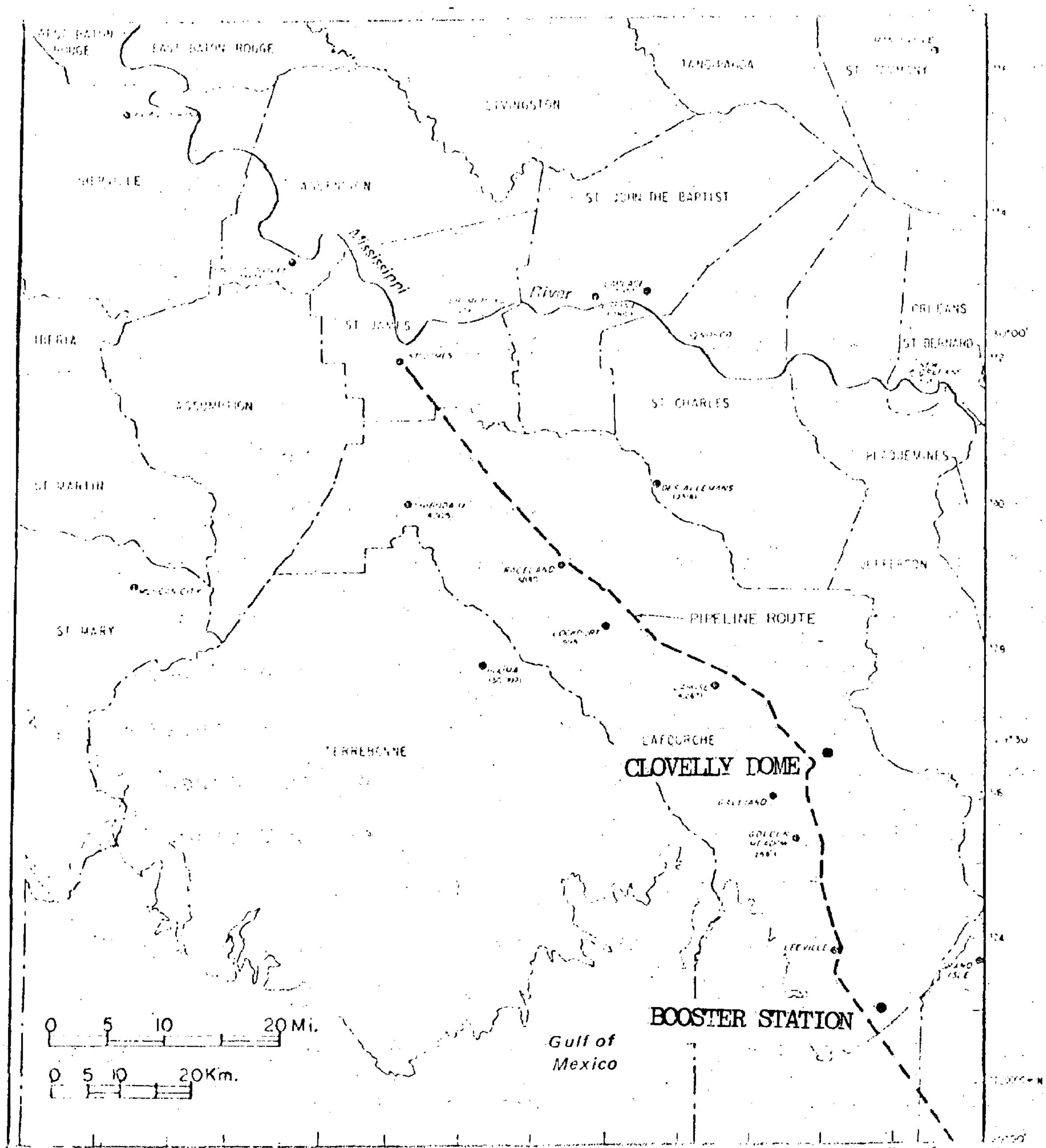
[8]SPM is a "single point mooring"--a buoy-type device to which the tanker moors. Its base has a connection through which the oil from the tanker is transmitted.

[9]The Capline is a privately owned pipeline to refineries in the Midwest United States.

FIGURE 5.13

PROPOSED ROUTE OF LOOP PIPELINE



Source: U.S. Coast Guard, 1976: 2.5-8.

The first section of this pipeline system will consist of two parallel 1200 feet strings of flexible hose from each SPM which connect the tanker's cargo manifold to the fluid swivel on the base assembly of the SPM. These hoses consist of 35- and 40-feet lengths of 24 inch I.D. (inside diameter) hoses, except for the last three sections which bend over the tanker's rail. These sections may be 16 inches, 20 inches, or 24 inches I.D., depending on tanker size. Approximately 1000 feet of the hoses will be buoyant while the last 200 feet will curve downward from the surface of the water to the base assembly of the SPM. The hoses will be equipped with visible markers, battery-powered lights, end marker buoys, butterfly valves, and blind flanges. The floating portion of the hoses will be inspected weekly and the underwater portion monthly. Handling, inspection, and replacement of the hose will follow the procedures recommended by the Oil Companies International Marine Forum--Buoy Mooring Forum (U.S. Coast Guard, 1976: 1.3-37).

The second segment of the pipeline system will consist of an 8000 feet long 56 inch O.D. (outside diameter) pipeline from each SPM to the pumping platform complex (PPC). These pipelines will have a minimum wall thickness of 0.75 inches of steel. In addition, to inhibit corrosion, it will be coated first with either a 0.5 inch thick layer of an asphalt/sand mixture or an 0.125 inch thick layer of a coal tar enamel wrapped in fiberglass and felt. The second coating will consist of a four inch thickness of concrete reinforced with two layers of galvanized steel wire mesh. This will yield a specific gravity of 1.1, sufficient to maintain stability against a three feet per second cross current. Additional protection against external corrosion will be provided by sacrificial anodes at 1000 feet intervals. These anodes will be designed for a forty year life and provide a current capacity of 0.1 milliampere per square foot of pipe surface. Protection against internal corrosion will consist of epoxy coating and by the injection of chemical inhibitors at the base of the SPM. These pipelines will be buried with a minimum of three feet of sea bed cover and with ten feet of cover within 500 feet of the risers.[10] The pipeline will be inspected internally when flanges are unbolted or sections are removed. The risers and support clamps will be inspected annually by divers (U.S. Coast Guard, 1976: 1.3-38).

The third segment will consist of three parallel 48 inch O.D. pipelines connecting the pumping platform to the Clovelly Dome storage terminal. This line will have an onshore booster station located just south of Louisiana Highway 1 and west of Louisiana Highway 3090 (although an alternative site to the east of Louisiana Highway 3090 in

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[10] Risers are the vertical sections of pipeline extending from the sea floor up to the lower deck of the pumping platform (U.S. Coast Guard, 1976: 1.3-39).

the Port Fourchon area development area has also been proposed). The section of the pipeline from the pumping platform to the booster station will be 21 miles long, of which 18 miles will be offshore and three miles onshore. The section from the booster station to the Clovelly Dome storage area will be 22.5 miles long (U.S. Coast Guard, 1976: 1.3-39).

The offshore sections of these 48 inch pipelines will be designed, buried, coated, and cathodically protected in much the same manner as the 56 inch pipelines with minor differences due to differences in size. A right-of-way of approximately 200 feet is proposed to avoid as many existing pipelines as possible and to pass clear of existing platforms. Permission will be needed to cross over live existing pipelines. From the 15 feet depth contour of the Gulf to the shore, the pipelines will be buried 10 feet below the bottom of the Gulf and they will be buried 10 feet below a flotation canal from the shore to the Fourchon booster station (U.S. Coast Guard, 1976: 1.3-40).

The onshore section of the lines, from the booster station to the Clovelly Dome storage terminal, will be coated to inhibit corrosion. Those sections through marsh and swamp areas will be coated with concrete as well and they will be equipped with sacrificial anodes like those on the 56 inch pipelines below the Gulf floor. The pipelines will be buried at least three feet below the ground surface and deeper beneath waterway crossings. The proposed route includes about 59 pipeline crossings, 4 minor waterway crossings, and one highway crossing. There will be remotely-controlled shutoff valves at the Fourchon booster station and at the Clovelly Dome storage terminal, but none in-between. However, there will be locally-controlled valves on each side of water crossings and elsewhere (U.S. Coast Guard, 1976: 1.3-40, 41).

The final stretch of the LOOP pipeline connects the Clovelly Dome storage facility to a point near the Capline's St. James terminal on the Mississippi River, a distance of 53 miles. This segment will consist of two parallel lines. The first of these lines will be 42 inches O.D. and its design, coating, burial, etc. will be similar to the 48 inch pipelines between the Fourchon booster station and the Clovelly Dome storage terminal. The second line will be sized and built later, but it is expected to have a 42 inch O.D. also. The proposed route includes two highway crossings, two mainline railroad crossings, and approximately thirty-five pipeline crossings. Remotely-controlled shutoff valves will be located on each side of the Intracoastal Waterway, and locally controlled valves will be located elsewhere, as required. The corrosion protection system for the 11 miles through the marshes will be of the sacrificial anode type as described above, and the 42 miles in the freshwater swamp and dry land will have a somewhat different current corrosion protection system. A future booster station, if required, would be located near the midpoint of this segment near U.S. Highway 90. (U.S. Coast Guard, 1976: 1.4-11).

In addition to the crude oil pipelines and their associated facilities (booster station and storage terminal), the LOOP would require additional pipelines to provide fuel for the pumping platform and to dispose brine from the Clovelly Dome storage terminal. The fuel line will transmit natural gas to the pumping platform from Block 47 field, a distance of four miles. The pipe will have a six inch diameter and will be buried to a 10 feet depth for 500 feet adjacent to its riser, and three feet the rest of the way to the gas field. Design, coating, construction, inspection, testing and maintenance of this pipeline will be similar to the offshore sections of the crude oil pipelines (U.S. Coast Guard, 1976: 1.3-44).[11]

The brine disposal pipeline will be 36 inches O.D. and extend for 28 miles from the Clovelly Dome storage facility to a point in the Gulf two miles from shore. The route of this pipeline will be adjacent to the crude oil pipeline and it crosses one highway, four minor waterways, nine large pipelines (16 inches and over), and about 50 small pipelines.

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[11] Pipelines from the pumping platform complex to the Capline will be electronically inspected and cleaned. Chemical inhibitors will be injected to retard corrosion (U.S. Coast Guard, 1976: 1.3-40).

The pipeline will be buried except at the far end where underwater diffusors will be installed to mix the brine with the waters of the Gulf. It will be designed and constructed in accordance with Part 195, Title 49, Code of Federal Regulations (U.S. Coast Guard, 1976: 1.3-45).

APPENDIX

SELECTED SIC CATEGORY DESCRIPTIONS

The following is a description of the SIC classifications listed in Table 5.2

MAJOR GROUP 13 -- CRUDE PETROLEUM AND NATURAL GAS

The Major Group as a Whole

This major group includes establishments primarily engaged in: (1) producing crude petroleum and natural gas, (2) recovering oil from oil sands and oil shale, and (3) producing natural gasoline and cycle condensate. Types of activities included are exploration, drilling, oil and gas well operation and maintenance, the operation of natural gasoline and cycle plants, and the mining and extraction of oil from oil sands and oil shale. This major group also includes such basic activities as emulsion breaking and desilting of crude petroleum to render the oil marketable. Pipe line transportation of petroleum, gasoline and other petroleum products (except gathering lines) is classified in Major Group 46--Pipe Line Transportation, and of natural gas in Major Group 49--Electric, Gas, and Sanitary Services. Establishments primarily engaged in petroleum refining and in the production of lubricating oils and greases are classified in Major Group 29.

MAJOR GROUP 16 -- CONSTRUCTION OTHER THAN BUILDING CONSTRUCTION -- GENERAL CONTRACTORS

GROUP NO.	INDUSTRY NO.	
162		HEAVY CONSTRUCTION, EXCEPT HIGHWAY AND STREET CONSTRUCTION

GROUP NO.	INDUSTRY NO.	
	1621	Heavy Construction, Except Highway and Street Construction

(See Appendix to Chapter 1.)

MAJOR GROUP 17 -- CONSTRUCTION--SPECIAL TRADE CONTRACTORS

179 MISCELLANEOUS SPECIAL TRADE CONTRACTORS

1791 Structural Steel Erection

Special trade contractors primarily engaged in the erection of structural steel.

Building fronts installation, metal: contractors
Concrete reinforcement, placing of: contractors
Elevator front installation, metal: contractors
Iron work, structural: contractors
Metal furring: contractors
Storage tanks, metal, erection
Store fronts installation, metal: construction
Structural steel erection: contractors

MAJOR GROUP 20 -- FOOD AND KINDRED PRODUCTS

203 CANNED AND PRESERVED FRUITS, VEGETABLES, AND SEA FOODS

2031 Canned and Cured Fish and Sea Foods

Establishments primarily engaged in cooking and canning fish, shrimps, oysters, clams, crabs, and other sea foods; and those engaged in smoking, salting, drying or otherwise curing fish for the trade. Establishments primarily engaged in shucking and

GROUP NO.	INDUSTRY NO.	

packing fresh oysters in nonsealed containers, or freezing and packaging fresh fish, are classified in Industry 2036.

Broth, clam: canned
Canned fish, crustacea, and mollusks
Caviar, canned and preserved
Chowder, clam: canned
Codfish: smoked, salted, dried, and pickled
Crab meat, canned and preserved
Finnan haddie (smoked haddock)
Fish: boneless, cured, dried, pickled, salted, and smoked
Fish, canned
Fish egg bait, canned
Herring: smoked, salted, dried and pickled
Mackerel: smoked, salted, dried, and pickled
Oysters, canned and preserved
Salmon, canned
Salmon, smoked, salted, dried, and pickled
Sardines, canned
Sea food products, canned
Shellfish, canned
Shrimp, canned
Soup, sea food: canned
Tuna fish, canned

2036 Fresh or Frozen Packaged Fish and Sea Foods

Establishments primarily engaged in preparing fresh and raw or cooked frozen packaged fish and other sea food. This industry also includes establishments primarily engaged in the shucking and packaging of fresh oysters in nonsealed containers.

Crab meat, fresh: packed in nonsealed containers
Crab meat picking
Fish fillets
Fish: fresh, quick frozen, and cold pack (frozen)--packaged
Fish sticks

Frozen prepared fish
Oysters, fresh: shucking and packaging in nonsealed containers
Sea foods: fresh, quick frozen, and cold pack (frozen)--packaged
Shellfish: fresh, quick frozen, and cold pack (frozen)--packaged
Shrimp: fresh, quick frozen, and cold pack (frozen)--packaged

MAJOR GROUP 34 -- FABRICATED METAL PRODUCTS, EXCEPT ORDINANCE MACHINERY AND TRANSPORTATION EQUIPMENT

344 FABRICATED STRUCTURAL METAL PRODUCTS

3441 Fabricated Structural Steel

Establishments primarily engaged in manufacturing fabricated iron and steel or other metal for structural purposes, for bridges, buildings; and sections for ships, boats and barges. Establishments primarily engaged in manufacturing metal doors, sash, frames, molding, and trim are classified in Industry 3442; and fabrication work done by construction contractors at the site of construction is classified in construction industries

Barge sections, prefabricated metal: not made in rolling mills
Bridge sections, railway and highway: prefabricated/not made in rolling mills
Expansion joints: iron, steel, and monel
Floor jacks, metal: not made in rolling mills
Floor posts, adjustable: metal not made in rolling mills
Highway bridge sections, prefabricated: not made in rolling mills

GROUP NO.	INDUSTRY NO.	

Joists, open web steel: long-span series--
not made in rolling mills
Radio and television towers
Railway bridge sections: prefabricated: not
made in rolling mills
Ship sections, prefabricated metal
Steel joists, pen web: long-span series--
not made in rolling mills
Steel tri-level railroad car racks (for
transporting motor vehicles, etc.)
Structural steel, fabricated: not made in
rolling mills
Television towers, not made in rolling mills
Towers, transmission

3443 Fabricated Plate Work (Boiler Shops)

Establishments primarily engaged in manufacturing power and marine boilers, pressure and nonpressure tanks, processing and storage vessels, heat exchangers, weldments and similar products by the process of cutting, forming and joining metal plates, shapes, bars, sheet, pipe mill products and tubing to custom or standard design for factory or field assembly. Establishments primarily engaged in manufacturing nonelectric heating apparatus other than power boilers are classified in Industry 3433, and household cooking apparatus in Industry 3631.

Absorbers, gas
Accumulators (industrial pressure vessels)
Acetylene cylinders
Aftercooler shells
Aftercoolers, steam jet
Air preheaters, nonrotating: plate type
Air receiver tanks, metal plate
Airlocks

Annealing boxes, pots, and covers
Atomic waste casks
Autoclaves, industrial
Baffles
Bails, ladle
Bins, prefabricated metal plate
Boiler shop products: industrial boilers,
smokestacks, and steel tanks
Boilers: industrial, power and marine
Boxes, condenser
Breechings, metal plate
Buoys, metal
Cable trays, metal plate
Caissons, metal plate
Cars, for hot metal
Casing, boiler: metal plate
Casings, scroll
Chutes, metal plate
Condensers, barometric
Condensers, steam
Containers, shipping, metal plate (torpedoes,
bombs, warheads), except missile casings
Cooling towers, metal plate
Cryogenic tanks, for liquids and gases:
metal plate
Culverts, metal plate
Cupolas, metal plate
Cyclones, industrial: metal plate
Cylinders, pressure: metal plate
Digesters, process: metal plate
Ducting, metal plate
Economizers (boilers)
Evaporators (process vessels), metal plate
Exchanges, heat: industrial, scientific,
and nuclear
Farm storage tanks, metal plate
Fermenters (process vessels), metal plate
Floating covers, metal plate
Flumes, metal plate
Forms, collapsible: for tunnels
Fractionating columns, metal plate
Fuel tanks, metal plate
Fumigating chambers, metal plate
Gas holders, metal plate
Gates, dam: metal plate
Heat transfer drives (finned tubing)
Hoods, industrial: metal plate
Hooks, crane: laminated plate
Hoppers, metal plate
Housing cabinets for radium, metal plate
Housings, pressure
Hydropneumatic tanks, metal plate

GROUP NO.	INDUSTRY NO.

Intercooler shells
Jackets, industrial: metal plate
Kettles (process vessels), metal plate
Knockouts, free water: metal plate
Ladles, metal plate
Liners, industrial: metal plate
Liquid oxygen tanks, metal plate
Melting pots, for metal
Missile silos and components, metal plate
Mixers, for hot metal
Nuclear core structurals, metal plate
Nuclear shielding, metal plate
Oil storage tanks, metal plate
Penstocks, metal plate
Perforating on heavy metal
Pile shells, metal plate
Pipe, large diameter: metal plate--made by plate fabricators
Plate work, fabricated: cutting, punching, bending, and shaping
Precipitators (process vessels), metal plate
Pressure vessels, industrial: metal plate--made in boiler shops
Pressurizers and auxiliary equipment, nuclear, metal plate
Reactors, nuclear: military and industrial
Retorts, industrial
Rocket casings
Separators, industrial process: metal plate
Septic tanks, metal plate
Skid tanks, metal plate
Smelting pots and retorts
Smokestacks, boiler plate
Space simulation chambers, metal plate
Spheres, for liquids or gas: metal plate
Standpipes
Steam jet aftercoolers
Steam jet inter condensers
Sterilizing chambers, metal plate
Stills, pressure: metal plate
Storage tanks, metal plate
Surge tanks, metal plate
Tanks for tank trucks, metal plate
Tanks, metal plate: lined
Tanks, standard line and custom fabricated: metal plate--made in boiler shops
Towers: bubble, cooling, fractionating--metal plate
Towers, tank: metal plate
Trash racks, metal plate
Troughs, industrial: metal plate
Truss plates, metal

Tunnel lining, metal plate
Tunnels, vacuum: metal plate
Tunnels, wind
Vacuum tanks, metal plate
Vats, metal plate
Vessels, process and storage: industrial metal plate--made in boiler shops
Water tanks, metal plate
Weldments

3444 Sheet Metal Work

Establishments primarily engaged in manufacturing sheet metal work for buildings (not including fabrication work done by construction contractors at the place of construction), and manufacturing sheet metal stovepipes, light tanks, etc.

Air cowls, scoops, or airports (ship ventilators), sheet metal
Awnings, sheet metal
Bins, prefabricated: sheet metal
Booths, spray: prefabricated sheet metal
Canopies, sheet metal
Casings, sheet metal
Coal chutes, prefabricated sheet metal
Cooling towers, sheet metal
Cornices, sheet metal
Culverts, sheet metal
Curtain walls, sheet metal
Door hoods, aluminum
Downspouts, sheet metal
Ducts, sheet metal
Eaves, sheet metal
Elbows, for conductor pipe, hot air ducts, stovepipes, etc.: sheet metal
Flooring, cellular steel
Flues, stove and furnace: sheet metal
Flumes, sheet metal
Forming machine work for the trade, except stampings: sheet metal
Forms for concrete, sheet metal
Furnace casings, sheet metal
Furnace flues, sheet metal
Guard rails, highway: sheet metal
Gutters, sheet metal
Hoods, range--sheet metal
Hoppers, sheet metal

GROUP NO.	INDUSTRY NO.	

Irrigation pipe, sheet metal
Laundry hampers, sheet metal
Machine guards, sheet metal
Mail chutes, sheet metal
Mail collection or storate boxes, sheet metal
Pile shells, sheet metal
Pipe, sheet metal
Post office collection boxes
Radiator shields and enclosures, for steam and hot water radiators: sheet metal
Restaurant sheet metal work
Roof deck, sheet metal
Sheet metal specialties, not stamped
Siding, sheet metal
Skylights, sheet metal
Spouts, sheet metal
Stove boards, sheet metal
Stove pipe and flues, sheet metal
Vats, sheet metal
Ventilators, sheet metal
Wells, light: sheet metal

3449 Miscellaneous Metal Work

Establishments primarily engaged in manufacturing miscellaneous ferrous and nonferrous metal work, such as prefabricated and portable metal buildings and parts, metal plaster bases, fabricated bar joists and concrete reinforcing bars, and prefabricated exterior metal panels.

Bars, concrete reinforcing: fabricated steel
Buildings, prefabricated and portable: metal
Carports, prefabricated: metal
Concrete reinforcing steel bars, fabricated
Docks, prefabricated: metal
Dwellings, prefabricated or portable: metal
Expanded metal, not made in rolling mills
Farm buildings, prefabricated or portable: metal

GROUP NO.	INDUSTRY NO.	
		Garages, prefabricated or portable: metal Houses, prefabricated or portable: metal Lath, expanded metal: not made in rolling mills Panels for prefabricated metal buildings Plastering accessories, metal: not made in rolling mills Portable buildings, prefabricated metal Prefabricated buildings, metal Ramps, prefabricated: metal Sections for prefabricated metal buildings Silos, metal Utility buildings, prefabricated or portable: metal

MAJOR GROUP 35 -- MACHINERY, EXCEPT ELECTRICAL

	3533	Oil Field Machinery and Equipment
		(See Appendix to Chapter 1.)
359		MISCELLANEOUS MACHINERY, EXCEPT ELECTRICAL
	3599	Miscellaneous Machinery, Except Electrical
		(See Appendix to Chapter 1.)

MAJOR GROUP 37 -- MANUFACTURING

373		SHIP AND BOAT BUILDING AND REPAIRING
	3731	Ship Building and Repairing
		(See Appendix to Chapter 1.)
	3732	Boat Building and Repairing
		(See Appendix to Chapter 1.)

MAJOR GROUP 42 -- MOTOR FREIGHT TRANSPORTATION AND WAREHOUSING

The Major Group as a Whole

This major group includes establishments furnishing local or long-distance trucking, transfer, and drying services, or engaged in the storage of farm products, furniture and other household goods, or commercial goods of any nature. The operation of terminal facilities for handling freight, with or without maintenance facilities, is also included. This group does not include delivery department or warehouses operated by business concerns for their own use. Companies primarily engaged in the storage of natural gas are classified in Industry 4922.

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