EVALUATION OF POTENTIAL GEOPRESSURE GEOTHERMAL TEST SITES IN SOUTHERN LOUISIANA

MASTER

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ABSTRACT

Six geopressured-geothermal prospects in southern Louisiana were studied in detail to assess their potential use as test sites for the production of geopressure- geothermal energy. Each of the six sites contains substantial quantities of energy. Three of these prospects, Grand Lake, Lake Theriot, and Bayou Hebert, appear to be suitable for a test site. The following table presents a summary of the findings:

PROSPECT	PHYSIOGRAPHY	TOP OF GEO-PRESSURE, FT.	BULK ROCK VOLUME $FT^3 \times 10^9$	K md	ϕ %	IN-PLACE WATER BBL $\times 10^9$	AVG. PRESSURE PSIA	AVG. TEMP. °F	AVE. WATER SALINITY, PPM	GAS SOLUB. SCF/BBL	IN-PLACED DISSOLVED GAS SCF $\times 10^{12}$
Grand Lake	Marsh	13,600	657	21	18	21	12,600	240	100,000	28	0.6
Lake Theriot	Marsh	12,600	1,738	103	28	87	11,620	232	46,000	32	2.8
Bayou Hebert	Dry Land/ Marsh	13,000	543	45	16	15	11,600	230	87,000	26	0.4
Kaplan	Dry Land	12,000	312	273	23	13	12,770	259	57,000	37	0.5
South White Lake	Marsh	14,900	211	68	12	4	16,200	281	150,000	23	0.1
Solitude Point	Dry Land	19,000	1,914	5	9	30	15,000	328	60,000	58	1.7

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1. INTRODUCTION

Under the Energy Research and Development Administration Contract #E-(40-1)-4889, "Investigations on the Geopressure Energy Resource of Southern Louisiana"[1], 63 potentially attractive geopressured aquifers were identified. These 63 sites are shown in Figure 1. They are also indicated in Appendix I. The 63 prospects were given a preliminary ranking. The top three sites of this ranking are as follows:

RANK	PROSPECT NUMBER	PARISH	NAME
1	10	Cameron	Johnson's Bayou
2	30	Terrebonne	Atchafalaya Bay
3	2	Vermilion	S.E. Pecan Island

These three prospects, together with two others (LaFourche Crossing and Rockefeller Refuge) suggested by the U.S. Geological Survey in Bay St. Louis, were evaluated in detail during the first year of contract DE-AS05-76-ET28465. The evaluation of these five potential geopressured-geothermal test sites is the subject of a previous report.[2] The evaluation of additional potential test sites located within the original study area and the newly emerging Tuscaloosa Trend of Louisiana is the subject of this report.

2. PROSPECT RANKING BASED ON TOTAL AVAILABLE ENERGY

The preliminary ranking criteria consisted of (1) areal extent, (2) sand content, (3) mud weight, (4) temperature, and (5) well control. These parameters are indirect measures of the geopressured-geothermal energy potential of a prospect. The total geopressured-geothermal energy available could be calculated from these parameters, and a ranking based on total energy available is feasible.

[1,2]References are given on P. 45

Geopressured zones in the Gulf Coast offer the potential for developing three sources of energy--hydraulic, thermal, and dissolved gas. Dissolved gas is the most promising source of energy from geopressured aquifers.

Unlike geothermal areas of the western United States, the Gulf Coast displays geopressured temperatures too low to be used directly in flashing water to steam to drive a turbine. The hot water can be used, however, to heat other low-boiling-point liquids so that the vapors can then be used to drive a turbine (a binary energy). Propane, Butane, Freon, and others have been mentioned as potential binary engine-working fluids.

Hydraulic energy could be used by allowing wells to produce at high rates and high pressures. A turbine would be used to convert this energy to electricity. However, the relative energy is small compared to thermal and dissolved gas.[1] Because of the low amount of hydraulic energy, only dissolved-gas energy and thermal energy are considered in total available energy calculations.

The calculation of total available energy is given in detail in Appendix II. Table 1 (p. 46) gives the ranking of the prospects according to energy available.

It should be noted that Atchafalaya Bay, Southeast Pecan Island, and Johnson's Bayou prospects are ranked number 1,2, and 6 respectively.

Table 2 (p. 48) gives the location, total energy, and other pertinent data for the 15 most promising prospect areas (exclusive of the three sites examined and ranked from the FY 1978 study). These 15 top prospects were retained for more screening to select the five most desirable areas from the standpoint of geopressure energy development.

3. SALIENT FEATURES OF THE FIFTEEN MOST PROMISING PROSPECTS

Additional data were gathered on the 15 most promising prospects indicated by the ranking based on total energy available. The data gathered on each prospect area include:

- The number of wells drilled through the geopressured interval
- Approximate average depth to the top of the geopressured zone

- Average geopressured sand thickness
- Number of wells cored in the geopressured interval
- Number of wells pressure tested in the geopressured interval
- The results of any previous studies conducted in the prospect area

In addition to the above information, which is summarized in Table 3 (p. 49), a physiographic map was prepared for each area, Figures 2 through 16.

The salient features of each of the above prospects are discussed hereafter. Based on these features, a decision was made to retain or not retain the prospect for further detailed mapping and evaluation within the scope of this study.

3.1 Eugene Island Block 16 Prospect

The prospect is located partially offshore and partially in Atchafalaya Bay. The eastern portion of Eugene Island Block 16 prospect has previously been studied and included in the "Atchafalaya Bay Prospect" report[2] (FY 1978 study). There is no deep well control in the western portion of the prospect. It is therefore rated "poor" from the standpoint of geopressure development desirability and was not retained for further detailed mapping and evaluation.

3.2 Bayou Hebert Prospect

Bayou Hebert prospect is located in the Eastern portion of Vermilion Parish north of Vermilion Bay. A total of 29 wells were cored, and nine wells were pressure tested. There are enough data and control points in this area for a detailed study. Preliminary log examination indicated an average sand thickness of 451 ft. In addition, the northern portion of the prospect is located on recent silts and clays which are higher than the marsh. These soils are firm and should furnish a good foundation for a drilling rig.

The prospect is, therefore, rated "good" and was retained for detailed mapping and evaluation.

Two sandstone aquifers near the top of the geopressured zone were mapped and tested under DOE Contract No. EY-76-S-05-4937 with McNeese State University. However, no information is available on the deep Planulina Sands, which are known to display high pressures and temperatures.

3.3 Lake Theriot Prospect

This prospect is located in the Northern portion of Terrebonne Parish approximately 12 miles southwest of Houma, Louisiana, in an area of coastal marsh and lakes. Lake Theriot Prospect appears to be a "very good" prospect and was retained for further detailed evaluation. Twenty-four wells were drilled into geopressured zones; two of them were cored. The eastern flank of the prospect is located on a firm silty ridge. One well tested in the eastern flank of the prospect showed a shut-in pressure of 14,054 psig from perforations at 15,211 to 15,222 ft. This is equivalent to a gradient of 0.92 psi/ft.

3.4 South White Lake

Located south of White Lake in Southwest Vermilion and Southeast Cameron Parishes, this prospect was first selected during the early phase of the geopressured energy resource investigation under ERDA contract EY-76-S-05-4889 with L.S.U. During the early investigation, only the Discorbis "B" zone of the upper Miocene was mapped. At that time it was noted that additional geopressured sands other than those within the Discorbis "B" zone underlie the prospect area. No estimate was made for areal extent or volume of these sands because of the limited time for the project.

These deep sands merit further study. The South White Lake prospect was retained for complete and detailed mapping and evaluation of all geopressured intervals.

3.5 Ellsworth Prospect

The Ellsworth Prospect area is located just south of the Lafourche Crossing prospect. A large east-west fault separates the two prospect areas. Lafourche Crossing was studied in detail[2] (FY 1978 study) and chosen to be the site of the first geopressure test well in Louisiana. As we would like the mapped prospect areas to be as widely distributed geographically as possible, Ellsworth Prospect was not retained for further study at present.

3.6 West Cameron Block 26 Prospect

The West Cameron Block 26 Prospect area is located primarily in the offshore (Gulf of Mexico) area of Louisiana, extending southward into the "Federal Offshore" area. In order to penetrate all the geopressured sands, a well would have to be drilled to an approximate depth of 24,500 ft. Because of the location and the depth of the geopressured sands, the development of this prospect does not seem desirable at the present stage of the study.

3.7 Kaplan Prospect

The Kaplan Prospect area is located almost entirely on lands suitable for drilling. Adequate data is available as 17 wells were drilled into the geopressured interval. Five of these wells were cored, and seven were pressure tested. The overall ranking of the prospect is "good", and it was retained for further mapping and evaluation.

3.8 Spanish Lake Prospect

Examination of well logs in the Spanish Lake Prospect area showed that most wells did not appear to be geopressured. The few that were geopressured had little or no sand. This prospect merits no further evaluation and will be eliminated from consideration.

3.9 Stephenville Prospect

The Stephenville Prospect area is a low-lying area of coastal marsh and shallow lakes. The 11 wells drilled into the geopressured interval indicated a relatively thin sand thickness (170 ft). The prospect is therefore rated "poor" and does not warrant immediate detailed mapping and evaluation.

3.10 East Cote Blanche Bay Prospect

The East Cote Blanche Bay Prospect area was mapped and studied in detail by M.B. Kumar (Louisiana Geological Survey Bulletin No. 43, 1977). The results of Kumar's study were also reported in a paper published by the American Association of Petroleum Geologists Bulletin.[3]

3.11 Coteau Charles Prospect

A limited number of wells (7) was drilled into the geopressured zone. The sand thickness is relatively thin. In addition, Coteau Charles Prospect is adjacent to Lake Theriot Prospect, which is highly ranked (4th) and has been retained already for detailed studies. In order to respect a certain geographic distribution of the prospects to be studied in detail, Coteau Charles Prospect was not retained for further evaluation.

3.12 Weeks Bay Prospect

The prospect is located on the West flank of the Weeks Island Salt dome and in the salt marsh and waters of Weeks Bay. Only one deep well (18,000 ft) was drilled on the prospect.

Because of the location and the absence of enough control points, the Weeks Bay Prospect is rated "poor" and does not merit further study.

3.13 Baldwin Prospect

The Baldwin Prospect geopressured sands appear to be very erratic. The area has numerous faults and permeability barriers. The prospect occupies a low rank on the list of 15 most promising prospects. Considering all the aforementioned features, Baldwin Prospect does not warrant further study at the present time.

3.14 Grand Lake Prospect

Detailed mapping has already been started on Grand Lake Prospect during the first year of the contract. This prospect appeared to be "good" early because of the large number of control points. Fifty-four wells in the prospect area penetrated the geopressured zone. More than 100 wells, including the 54 above, are used to map the Grand Lake Prospect area.

3.15 Kraemer Prospect

Approximately 20 wells have been drilled on this prospect.

Only four of these wells were drilled into the geopressured zone, and they went only 300 to 400 ft into the zone. These wells showed no significant sand development. Because of the limited number of control points, the Kraemer Prospect was not retained for further study.

4. POTENTIAL GEOPRESSURED - GEOTHERMAL PROSPECTS RETAINED FOR DETAILED EVALUATION

Five prospect areas were selected from the 15 top-ranked areas. The selection criteria are discussed in the previous section. These five areas are:

1. Grand Lake Prospect
2. Lake Theriot Prospect
3. Bayou Hebert Prospect
4. Kaplan Prospect
5. South White Lake Prospect

Due to an ever-increasing interest, the newly emerging Tuscaloosa Trend of Louisiana was added to the above list. A prospect area was defined within that trend and was studied in detail. This prospect area is:

6. Solitude Point Prospect

The location of these prospects is shown in Figure 17.

The results of this investigation are reported on a site-by-site basis in Chapters 6, 7, 8, 9, 10, and 12. Chapter 11 relates the preliminary results of a regional study of the Tuscaloosa Trend. For each of the six sites, the following information is presented:

General Information
Geology
Stratigraphy
Sand Volume
Temperature
Pressure
Salinity
Porosity
Permeability
Dissolved Gas
Test Well Site
Salt Water Disposal Wells

5. METHODOLOGY OF DETAILED EVALUATION

5.1 Geology

Well logs from all wells within the prospect and its immediate area were analyzed and correlated. From this information, structural maps, isopach maps, and cross-sections were constructed for each of the six prospects. No effort was made to locate the many small "splinter" faults that no doubt exist within the major fault blocks. Bulk sand volumes were determined from the isopach maps using standard procedures.

5.2 Aquifer Temperature

Several values of temperature and depth are usually available from a well log. A plot of the logarithm of temperature versus depth was found to be a good technique for temperature representation.[4] For each of the six prospects, temperatures from many of the wells were plotted, and a least-squares straight line drawn through the data so that the resulting equation had the form:

$$T = ae^{bD}$$

where T = temperature, °F

D = depth, feet

a, b = constants obtained by least squares

It should be noted that these temperatures are uncorrected for the effects of mud circulation and are probably lower than true temperatures by 20 to 30°F.

5.3 Aquifer Pressure

The wells in the prospects were generally drilled using high density muds (greater than 12 pounds per gallon). Since the mud density is used to control encountered pressures, the hydrostatic head exerted by the mud represents an upper limit to the encountered pressures. A much more desirable estimate of pressure would be from actual bottom-hole measurements. Few such measurements were available from the six prospects.

Abnormal pressures were also estimated, using conventional well logs. The resistivity recorded in shale formations was plotted versus depth, and a trend line was then established for normal compaction. An example of such a plot is shown on Figure 18 prepared for Exxon Fee #26, Vermilion Parish, Louisiana.

The equation of the normal trend observed in this geologic region is of the form:

$$R_{sh} = ae^{bD}$$

Where R_{sh} is the shale resistivity (ohm-m) and D is the depth (feet). The normal trend in the example well displayed a value of a and b equal to 0.401 and 0.00007, respectively.

Interpretation of geopressure from such a plot depends on the departure from the normal trend. The divergence of observed shale resistivity value, $(R_{sh})_o$, from the extrapolated normal trend line value, $(R_{sh})_n$, determines the shale resistivity ratio $(R_{sh})_o/(R_{sh})_n$. From Figure 19 the fluid pressure gradient (FPG) corresponding to the shale resistivity ratio is found. Figure 4 was plotted using data collected by Hottman and Johnson[5] in overpressured Miocene and Oligocene formations of the Gulf Coast area. The least squares fit of these data is forced through FPG = 0.465 at $(R_{sh})_o/(R_{sh})_n = 1.0$. This type of forced fit was first proposed by Lane and Macpherson.[6] It should be noted that when sufficient pressure data is available in an area of interest, a specific shale resistivity ratio-formation pressure gradient should be established.

The observed shale resistivity in the interval 17,400 to 17,900 feet of Exxon Fee #26 ranges between 0.5 and 0.6 ohm-m. The corresponding shale resistivity ratio is between 0.41 and 0.36. Using Figure 4, a formation pressure gradient ranging between 0.81 and 0.84 psi/ft is obtained. These values are in close agreement with measured pressure gradients of 0.88 psi/ft.

5.4 Aquifer Salinity

Water salinity was calculated using conventional well logging techniques. The electrical resistivity of the water was calculated from the SP log using the following equation:

$$SP = -K \log (R_{mf}/R_w)$$

where:

- K = constant; K = 71 at 77°F and varies with temperature
- R_{mf} = mud filtrate resistivity, ohm-meters
- R_w = water resistivity, ohm-meters
- SP = deflection of the SP curve away from the "shale line", millivolts

To convert water resistivity (R_w) to parts per million:

$$\text{ppm (NaCl)} = 10^x$$

with

$$x = \frac{3.452 - \log(R_{w_{75}} - 0.0123)}{0.955}$$

where $R_{w_{75}}$ is the resistivity of the water corrected to a temperature of 75°F (Correlations are available for this correction.)

5.5 Porosity and Permeability

Core data were requested from several of the oil companies operating in the six prospects. All of the companies were very cooperative, but only a few scattered cores, mostly side-wall, were available in the geopressured zones.

Porosity was also calculated from conventional well logs by using the equations:

$$F = 0.62/\phi^{2.15}$$

and

$$F = R_o/R_w$$

where:

- ϕ = porosity, fraction
- F = formation factor
- R_o = Resistivity of the formation, ohm-meters
- R_w = Resistivity of the formation water, ohm-meters

R_o is measured directly by a log such as the induction log, and R_w is determined by the procedures described in section 5.4.

Permeability measured on cores would have been desirable, but such information was scarce. An attempt was made to obtain a site-specific correlation of permeability and electric well log parameters.[7] A correlation was found to exist between the formation factor (F) and permeability (k). Figure 20 illustrates the F-k correlation developed using the relatively extensive core data available for the Grand Lake prospect. The correlation is expressed as:

$$F = 28\ K^{-0.157} \qquad \text{(K in millidarcies)}$$

This same correlation, although specifically established for the geopressured sands of Grand Lake, was also used in estimating permeabilities for several other prospects.

5.6 Dissolved Natural Gas Content

Saturation levels of methane were estimated using the correlation of Culberson and McKetta[8] and the salinity correction of Eichelberger.[9]

6. GRAND LAKE PROSPECT

Grand Lake Prospect is located slightly north of the central portion of the Atchafalaya Swamp (floodway) and occupies a relatively small area in St. Mary, Iberia and St. Martin parishes. The Atchafalaya Swamp is in the South Central part of the State and extends from Krotz Springs in St. Landry Parish to below Morgan City, St. Mary Parish. This swampy area is elongated in a north-south direction and is approximately 66 miles long and 20 miles wide.

The center of the Prospect is the point where the boundaries of St. Mary and St. Martin Parishes intersect the southern boundary line of Iberia Parish. Several producing oil and gas fields are located in and around the prospect area. They are Jeanerette and Charenton in the southeast; Loisel and Fish Island in the northwest, Big Bayou Pigeon and Bayou Postillion in the northeast, Bayou Long in the east, Mystic Bayou and East Mystic Bayou in the southeast, and Myette Point in the south-central sector. The prospect covers a surface area approximately 150 square miles.

The following geologic maps and stratigraphic sections were prepared from the data obtained from 97 wells listed in Appendix III.

6.1 General Geology

The mapped area lies between four normal down to the coast growth faults. The northern limit is faults B and C, with faults A and L traversing the southern portion of the prospect. These faults exhibit throws of a hundred to several hundreds of feet depending on depth. Displacement along the faults is considerably less in the shallow sandstones than in the deeper beds. Figures 21 and 23 shows several smaller faults on the west and east associated with structural anomalies within the prospect area. These subregional structural highs have formed traps for the accumulation of oil and gas.

The center of the mapped area is a deep trough which is the result of upward movement of sedimentary salt deeply buried in bedded deposits. The Grand Lake Prospect trough is located immediately north of two piercement salt domes in Jeanerette and Charenton. The subregional structure forming the eastern boundary of the prospect is Bayou Long oil and gas field uplift, a nonpiercement type dome, which also had tremendous influence in forming the deep trough. Features such as these are referred to as Rim Synclines and result from pinching off of the mother salt bed as the semiplastic salt moves upward along points of weakness, forming salt domes.

6.2 Stratigraphy and Sand Volume

The area North of Fault "A" and South of Faults "B" and "C" is underlain by shale and sand pods deposited in a middle and outer neritic environment. The top of the geopressure in this segment occurs at an average depth of approximately 14,700 ft. This area is mapped on the Planulina Marker, Figures 23, 26, 27, and 28. Net sand in the older beds ranges from 15 to 30%.

South of Fault "A", geopressure begins in younger beds considerably higher in the section. The Marginulina Ascensionensis Marker at an average depth of approximately 12,500 ft is considered to be the top of geopressure, Figures 21, 27, 28, and 29. Sediments deposited during this period were associated with an inner and middle neritic environment. Net sand in these beds also ranges from 15 to 30%.

Upper Stratigraphic Interval (Marginulina Ascensionensis Marker to Planulina Marker)

The Upper interval is geopressured only in the area south of Fault "A", Figures 21, 24, 27, 28, and 29. There are two good sand zone developments occurring over a large area, with each having a net sand average of 150 ft and 100 ft. Numerous sand zone lenses occur within this interval, which exhibits erratic development and may or may not be developed over the entire area. The net sand thickness ranges from an average low of 400 ft to an average high of 700 ft. The Upper stratigraphic interval contains a volume of 252.8 billion cubic feet (1.72 cu mi) of geopressured sand.

Lower Stratigraphic Interval (Planulina Marker to Correlation Point 9)

The lower interval is geopressured north and also south of fault "A", Figures 23, 26, 27, and 28. This interval has better sand development in the north segment, and the sand zone correlates over a larger area than those in the south segment. There are two good sand zone developments in the northern area, with each having net sand thickness value averaging about 270 ft and 180 ft. The better sand zone developments in the southern area average about 90 ft thick. The north segment net sand volume is 314.3 billion cubic feet (2.14 cu mi) with the southern containing only 90.4 billion cubic feet (0.61 cu mi).

Composite Stratigraphic Interval (Marginulina Ascensionensis Marker to Correlation Point 9)

Figure 25A is an isopach map, south of fault "A", of the entire mapped geopressured interval. A similar composite isopach map was not constructed north of fault "A" because the upper interval, Marginulina Ascensionensis Marker to Planulina Marker, is not geopressured. Maximum sand development in the mapped south segment is 1100 ft thick and is located in the eastern portion. Sand development is thinnest in the western portion in the vicinity of the Charenton salt dome. There are thin sand zone developments west of this point, but they were not considered because it is unlikely that they would contribute any significant producible reserves.

Wells No. 70 and No. 81 on stratigraphic cross sections, Figures 27, 28, and 29, reveal a well-developed geopressured sand zone below Correlation Point 10. Control is lacking to reasonably predict development of the zone or net sand. This deep geopressured zone was not included in any of the isopach maps due to insufficient well control.

6.3 Temperature

Figure 30 illustrates the relationship between temperature and depth for Grand Lake prospect derived from bottom hole temperatures from 97 wells in the area. The temperature distribution is of the form:

$$T = 84\ e^{(6.9 \times 10^{-5} D)}$$

where T is the temperature in °F and D is the depth in feet. At an average depth of 15,200 ft, the temperature is 240°F.

6.4 Pressure

Measured pressures in the prospect area were recorded in five wells. The bottom hole pressures and pressure gradients are:

Well #	Pressure, psi	Depth, ft	Pressure Gradient psi/ft
53	11,700	14,870	0.79
53	12,400	16,000	0.78
53A	9,794	13,690	0.72
54	12,356	14,300	0.86
77	14,283	16,600	0.86
78	14,340	16,600	0.86

Analysis of log-derived shale resistivity trends indicate an average gradient of 0.80 psi/ft in the interval 14,000 to 18,000 ft. Using an overall average gradient of 0.83 psi/ft, the pressure at 15,200 ft is 12,600 psig.

6.5 Salinity, Porosity, and Permeability

Water salinities calculated by conventional well log interpretation techniques ranged from 41,000 to 155,000 ppm. The average calculated salinity is 100,000 ppm.

Sidewall core analysis was available and obtained on 10 wells located in the Prospect area. Seven of the wells had core analysis within the geopressured zone and the three other wells had analysis for sands just above the geopressured top. The cores which were obtained from the very top of a sand or just above a shale lens within a sand zone indicated rather poor permeabilities and moderate porosities. The permeabilities ranged from one to seven millidarcies, and the porosity ranged from 12 to 18 percent. The cores which were taken in the better developed interval of a sand zone had permeabilities ranging from 24 to 920 millidarcies. Porosities obtained from the better developed sand intervals ranged from 19 to 24 percent.

Combined data indicated an average porosity and permeability of 18% and 21 md, respectively.

6.6 Dissolved Gas

Based on the total bulk volume of geopressured sands estimated at 657.5 billion cubic feet an average porosity of 18 percent, the volume of water in-place is 21 billion barrels.

Assuming that the water is saturated with methane, an average gas solubility of 28 SCF/bbl was estimated based on an average pressure of 12,600 psi
240°F, and an average salinity of 100,000 ppm. This results in an in-place value of dissolved gas of 0.5 trillion SCF.

6.7 Test Well Site

Two test well sites are recommended. One site is north of fault A and the second site is south of fault A (Figure 22). The best sand development in the northern segment is located in the vicinity of the southwest quarter of section 4, Township 13 South, Range 11 East. (Figure 25, net sand map Planulina Marker to Correlation Point 9 and Figures 26 and 27, stratigraphic sections A-A' and B-B'). Only the lower mapped stratigraphic interval (Figure 25) is geopressured in this portion of the prospect area. A test well in the southwest quarter of section 4, Township 13 South, Range 11 East, should encounter the top of the geopressure at 13,600 ft, and the well should be drilled to at least 15,600 ft in order to evaluate fully the lower mapped stratigraphic interval. The well should encounter two good sand zones similar to those shown in Chevron Oil Co., the Williams, Inc. No. 1 Well (Figures 26 and 27). It is reasonably safe to anticipate that a well at this location would encounter at least 270 ft and 185 ft of net sand in each of the two sand zones mentioned above. The bottom hole pressure should be 11,700 psia to 12,400 psia, and the temperature should range from 196°F to 246°F, uncorrected.

South of fault "A" the best location for a test well is in the northeast quarter of section 36, Township 13 South, Range 11 East. In this segment of the prospect area, both the upper and lower mapped stratigraphic intervals are geopressured (Figure 24, 25, and 25A, net sand maps, and Figure 29, stratigraphic cross section D-D'). The top of geopressure at this location would be 12,500 ft (Figure 21 structure, map Marginulina Ascensionensis Marker). The stratigraphic interval, Planulina Marker to Correlation Point 9, is well within the geopressured zone and should be topped at 15,100 ft. To evaluate fully the mapped geopressured zones, a well should be drilled to a depth of 17,100 ft. Net sand thickness should be 700 ft in the stratigraphically shallower mapped interval and 300 ft in the lower interval. A well drilled in the northeast quarter of section 36 would be approximately midway between the Lamson and Bennett-Phillips Petroleum Co., Williams, Inc. No. 3 (Well No. 71), and Shell Oil Co., Williams, Inc. No. A-1 (Well No. 75). Several thick sand zones, 100 ft or more, would be encountered in a test well drilled at this site (Figure 29 stratigraphic cross section D-D'). Measured bottom hole pressures recorded in wells located approximately one mile west of the proposed test site were 14,300 psia and 14,283 psia at 16,000 ft (Figure 29). Temperatures, uncorrected, should range from 180°F at the geopressured top to 270°F at the lower base.

6.8 Salt Water Disposal Wells

There are numerous massive saline sand aquifers below the moderately saline water zone that may be utilized to dispose of any hot saline geothermal-geopressured water produced. The depth of the base of the fresh ground water is about 350 ft. Above this depth, all ground water is considered potable and contains a chloride content of 250 parts per million or less (equivalent to 500 milligrams per liter of dissolved solids). There is a 200 to 300 foot-thick, moderately-saline sand zone below the base of the fresh ground water which contains water of 1000 to 10,000 milligrams per liter of dissolved solids. This moderately-saline zone must be protected in all injection wells drilled within this area. The true saline sand aquifers begin at approximately 650 ft. There are many massive saline sand aquifers from 1000 ft deep to 9000 ft or deeper which could be utilized as disposal reservoirs.

7. LAKE THERIOT PROSPECT

The Lake Theriot Prospect is located in the Southern portion of Terrebonne Parish approximately 12 miles southwest of the town of Houma in an area of coastal marsh and lakes. The village of Theriot is located on the Eastern flank, Figure 4. Bayou du Large traverses the Eastern portion of the prospect from North to South. This bayou is bordered on each side by a ridge of firm, silty, sandy soils which will furnish a good foundation for a drilling rig. Access is by Louisiana Highway No. 315, which is a two-laned paved road that runs along the bayou from Houma to a location approximately seven miles south of Theriot.

The largest portion of this prospect, about 90% of the area, is located on marsh land west of Bayou du Large and the balance, about 10%, is located on natural levee deposits of the bayou near the village of Theriot.

The prospect includes portions of Bayou Piquant Field, Bayou Copasaw Field, Lake Hatch, Sunrise, South Sunrise, East Lake Decade, and Lake Pagie oil and gas fields. These fields are separate and distinct geologic features and produce gas and condensate from sands both above and within the geopressured interval. The prospect covers an area of approximately 110 square miles.

The following listed geologic maps and stratigraphic sections, Figures 31-38 were prepared using information from the 50 wells listed in Appendix IV:

Figure 31 - Structure Map Top Stratigraphic Interval "A" (Shows lines of stratigraphic cross sections)

Figure 32 - Net Sand Isopach Map Stratigraphic Interval "A"

Figure 33 - Structure Map Top Stratigraphic Interval "B"

Figure 34 - Net Sand Isopach Map Stratigraphic Interval "B"

Figure 35 - Structure Map Base Stratigraphic Interval "B"

Figure 36 - Composite Net Sand Isopach Map Stratigraphic Intervals "A" and "B" (Proposed test sites shown on this Plate)

Figure 37 - East-West Stratigraphic Section A-A'

Figure 38 - North-South Stratigraphic Section B-B'

7.1 General Geology

The prospect is located in the Miocene geopressured trend of Southern Louisiana. It is these Miocene sands in the prospect area which have been mapped and are the subject of this report. The Miocene has been divided into two stratigraphic intervals, the Upper Interval "A" and the Lower Interval "B". This stratigraphy is shown on Figures 37 and 38. Structure maps and net sand isopach maps have also been prepared for each interval, Figures 31, 32, 33, 34, and 35. Figure 36 is a composite net sand isopach map of the two stratigraphic intervals.

The limiting geologic features of this prospect are Fault "A", with a throw of 700 ft, which is a northern boundary, and Fault "B", with a throw of several hundred feet, which is the southern and western boundary, and Faults "C", "D", and "E", with throws of several hundred feet, forming the eastern boundary, figure 31. These faults are typical east-west striking, down to the south normal growth faults. Geologic and pressure information indicates that these faults are only locally sealing. Stratigraphically equivalent sands are known to be geopressured outside the limits of the prospect.

Several minor faults occur within the prospect. However, these faults are considered to be non-sealing and are identified as Faults F and I.

7.2 Stratigraphy and Sand Volume

The Miocene sediments penetrated in this prospect consist of alternating sands and shales. The geopressured sediments were divided into two stratigraphic intervals for mapping. However, the sands in each interval have similar characteristics. The sand bodies are predominantly fine-grained silty sands which in some areas grade into fine-grained clean sands. The individual sand strata reach a maximum thickness of 600 ft. However, the individual sand bodies are not continuous and do not form a blanket over the entire area. There is thickening and thinning in each interval and, in some instances, the sands disappear and are replaced by shales. This type of sand deposition is interpreted and mapped as "channel deposits" -- the source of the deposits being northeast of the prospect. The top of the geopressured interval lies at a depth of 11,050 to 14,200 ft.

Stratigraphic Interval "A"

There are several sand bodies which occur in this interval. These channel sands have a composite maximum thickness of 725 ft. The thickest development occurs in the area south of Fault "A" in the central northern portion of the prospect, with a second area of thick deposits mapped in the southeastern portion of the prospect, Figure 32. There is no sand developemnt in the southeastern portion of the prospect. Interval "A" contains a volume of 911.1 billion cubic feet (6.18 cu mi) of geopressured sand.

Stratigraphic Interval "B"

There are several sand bodies which occur in this interval. These channel sands have a composite maximum thickness of 900 ft, which occurs in the north-central portion of the prospect south of Fault "A". A second thick area is mapped in the southeastern portion of the prospect, Figure 34. Interval "B" contains a volume of 826.7 billion cubic feet (5.62 cu mi) of geopressured sand.

7.3 Temperature

Figure 39 represents the temperature data collected from all Lake Theriot wells. Lake Theriot area temperature distribution is of the form:

$$T = 83\ e^{6.9 \times 10^{-5} D}$$

where T is the temperature in degree Fahrenheit and D is the depth in feet. At an average depth of 14,900 ft, the temperature is 232°F.

7.4 Pressure

Pressure data were scarce in this area, but a search of the transcripts of several public hearings held on the oil and gas geopressured reservoirs of Lake Pagie Field in the south-western portion of the prospect revealed a pressure gradient of 0.72 psi/ft. Shale resistivity plots indicate an average pressure gradient of 0.78 psi/ft or a pressure of 11,620 psi at an average prospect depth of 14,900 ft. A typical shale resistivity plot obtained within the prospect is shown in Figure 40.

7.5 Salinity, Porosity, and Permeability

No core analysis were available. Salinities, porosities, and permeabilities were calculated using electric logs obtained in several wells located in the vicinity of the proposed well site. The range and average value of these parameters are:

	Range	Average
Salinity	30,000 - 85,000 ppm	46,000 ppm
Porosity	20 - 33%	28%
Permeability	7 - 456 md	103 md

7.6 Dissolved Gas

This geologic study shows that there are 1737.8 billion cubic feet (11.80 cu mi) of porous and permeable sand within the Lake Theriot geopressured prospect. Based on an average porosity of 28%, the volume of water in-place is 86.7 billion barrels.

Assuming that the water is saturated with methane, an average gas solubility of 32 SCF/bbl was estimated based on an average pressure of 11,620 psia, an average temperature of 232°F, and an average salinity of 46,000 ppm. This results in an in-place value of dissolved gas of 2.8 trillion SCF.

7.7 Test Well Site

Figure 36 is a composite total net sand isopach map of the entire geopressured interval (Stratigraphic Intervals "A" and "B"). It shows that the thickest sand section occurs in the area north of Wells No. 8 and 9 and southwest of Well No. 6, which is located in the north-central portion of the prospect. The recommended location for a test well is somewhere in the southeast quarter of Section 17 (shown as a triangle Δ on Figure 36), Township 18 South, Range 16 East, where it would penetrate in both of the stratigraphic intervals. Approximately 1400 ft of permeable sand should be penetrated. The test well should encounter the top of the geopressured interval at 11,500 ft and should be drilled to a total depth of 17,300 ft. This area is located in marsh, which would entail very expensive drilling costs.

An alternate location for a test well would be in the western portion of section 64, T19S, R17E, approximately one mile west of the Town of Theriot (shown as a triangle Δ on Figure 36). Geological control is speculative. Approximately 1000 ft of permeable sand should be penetrated. The test well should encounter the top of the geopressured interval at approximately 12,500 ft and should be drilled to a total depth of 18,500 ft. This area is located on natural levee deposits of Bayou du Large.

7.8 Salt Water Disposal Well

Should a Salt Water Disposal Well be needed for the injection of salt water which would be produced from a geopressured well in the Lake Theriot Prospect, no problem should be encountered.

A disposal well in the vicinity of either proposed location for the geothermal well would encounter the base of the fresh water at 300 to 400 ft (3000 mg/l dissolved solids). The No. 8 well (Code) immediately south of the "northern" proposed location for a geothermal well was logged beginning at 100 ft.

This well has massive sand developments from 900 to 9600 ft. This large interval could be used for disposal purposes, since it is well below the base of the fresh water and is not productive of hydrocarbons anywhere in the area.

In order to recomplete into other sands if needed, it is suggested that the initial injection zone be in the massive sand found in Well No. 8 between 5600 and 5800 ft. Adequate permeability and porosity should be found in these shallow sands.

8. BAYOU HEBERT PROSPECT

The Bayou Hebert prospect is located in the eastern portion of Vermilion Parish just north of Vermilion Bay, Figure 3. The center of the prospect is located approximately 8 miles south of the town of Abbeville and 25 miles south of the City of Lafayette. The southern portion of the prospect, about 80 percent of the area, is located in low-lying coastal marsh. The northern portion, approximately 20 percent, is located on recent silts and clays which are at a higher elevation than the marsh. These soils are firm and will furnish a good foundation for a drilling rig. The northern area is accessible by good paved roads. The southern portion is traversed from east to west by the Intracoastal Canal, which furnishes good access by boats.

The prospect is located in an area of prolific oil and gas production. Major fields are the Bancker and Erath fields on the north, the Tigre Lagoon and South Tigre Lagoon fields on the east, and Live Oak field on the west, Figure 41. The prospect covers an area of approximately 70 square miles.

The following listed geologic maps and stratigraphic sections, Figures 41 through 51, were prepared from information obtained from 69 wells listed in Appendix V.

Figure 41 - Structure Map Top Stratigraphic Interval "A" and Lines of Stratigraphic Sections

Figure 42 - Structure Map Base Stratigraphic Interval "A"

Figure 43 - Net Sand Isopach Map of Stratigraphic Interval "A"

Figure 44 - Structure Map Top of Stratigraphic Interval "B"

Figure 45 - Structure Map Base of Stratigraphic Interval "B"

Figure 46 - Net Sand Isopach Map of Stratigraphic Interval "B"

Figure 47 - Composite Net Sand Isopach Map of Stratigraphic Intervals "A" and "B"

Figure 48 - North-South Stratigraphic Section A-A'

Figure 49 - East-West Stratigraphic Section B-B'

Figure 50 - North-South Stratigraphic Section C-C'

Figure 51 - North-South Stratigraphic Seciton D-D'

8.1 General Geology

The Bayou Hebert prospect is located in the Miocene geopressured trend of South Louisiana in an area of very complex geology. It is highly faulted, and there are several structural highs located in the eastern and western portions of the prospect. A structurally lower synclinal area traverses the center of the prospect from north to south, Figures 41, 42, 44, and 45. The prospect area is confined within a fault block formed by large sealing faults. Fault "A", which is a down-to-the-south growth fault, has a throw of 250 to 500 ft and bounds the prospect on the west and north. It turns southward on the east through the Tigre Lagoon Field, where it forms the eastern boundary of the prospect. Faults B, C, and D are very steeply-dipping spur faults to the west of Fault "A" in the Tigre Lagoon Field that apparently die out westward in the basin area. Faults E and G are spur faults off the large east-west trending fault "F". The fault labelled "H" trends in an east-west direction and is mapped deeper in the section. It marks the southern boundary of the prospect.

Fault "I" is a north dipping fault with a throw of approximately 500 ft. Some minor faults occur within the prospect. However, they are non-sealing and were not mapped.

Sands in the Planulina faunal zone of Lower Upper Miocene age are geopressured and have been mapped.

8.2 Stratigraphy and Sand Volume

The Planulina sands penetrated in this prospect consist of alternating marine sands and shales. The geopressured sediments were divided into two stratigraphic intervals, an upper zone "A" and a lower zone "B", for mapping. Structure maps and net sand isopach maps have been prepared for each stratigraphic interval, Figures 41, 42, 43, 44, 45, and 46. Figure 47 is a composite net sand isopach map of the two intervals. The stratigraphy is shown on Figures 48, 49, 50, and 51. However, the sands in each interval have similar characteristics. The sand bodies are predominantly fine-grained, silty sands which in some areas grade into fine-grained, clean sands. They are porous and permeable.

Stratigraphic Interval "A"

The Upper Stratigraphic interval "A" (Zone A on stratigraphic section) has been mapped over the entire prospect area, Figures 41, 42, and 43. The top of Stratigraphic interval "A", which is also the top of geopressure, ranges from 12,100 ft to 14,100 ft in depth, Figure 41. The best sand development occurs in the eastern portion where the sand reaches a maximum thickness of 590 ft in Well No. 13, located in Sec. 28, T13S, R4E. Other wells in the eastern portion with thick sand sections are:

Well No. 60 - Sec. 23, T14S, R4E - 560 ft
Well No. 57 - Sec. 19, T14S, R5E - 390 ft
Well No. 16 - Sec. 32, T13S, R5E - 440 ft

Well No. 42, located in Sec. 79, T14S, R3E, in the southwest portion of the prospect, has 450 ft of sand in Zone A. This well has no sand in Zone B.

The upper interval has two well-developed sand bodies. These are Sands 2 and 3, which are porous and permeable. They cover all of the prospect area and are continuous and consistent over large areas. Sand 2 ranges in thickness from 50 to 250 ft and Sand 3 from 50 to 300 ft. Interval "A" contains a volume of 424 billion cubic feet (2.88 cu mi) of geopressured sand.

Stratigraphic Interval "B"

The top of stratigraphic interval "B" occurs at a depth ranging from 12,900 ft to 15,800 ft, Figure 44. Many wells were drilled through stratigraphic interval "B" in the eastern portion of the prospect. However, only a few wells penetrated the entire interval in the western portion of the prospect. Because of this, it was possible to prepare a structure map of the top of the interval over the entire area, Figure 44, and a structure map of the base of the interval only in the eastern portion, Figure 45. There was sufficient well control to prepare an isopach map on the sands in the "B" interval in the eastern portion or the prospect only, Figure 46.

The best sand development in stratigraphic interval "B" occurs in the eastern portion of the prospect, Figure 46. The thickest, 575 ft, was logged in Well No. 17, Sec. 31, T13S, R5E. Other wells with thick sand sections are:

Well No. 52 - Sec. 14, T14S, R4E - 560 ft
Well No. 13 - Sec. 28, T13S, R4E - 440 ft
Well No. 25 - Sec. 5, T14S, R5E - 460 ft

The best developed sand in this interval is Sand No. 6, which is the lowest sand mapped. It has a maximum thickness of 520 ft in Well No. 52, Sec. 14, T14S, R4E, in the eastern portion of the prospect. This is a massive sand which covers a large area and is continuous for long distances in the eastern portion of the prospect. It was logged in some of the deeper wells in the western portion of the prospect but it was not as well developed as in the east. It was shaley, and the maximum amount of sand was approximately 100 ft over a long interval. Interval "B" contains a volume of 119 billion cu ft (0.81 cu mi) of geopressured sand.

8.3 Temperature

Figure 52 illustrates the relationship between temperature and depth for Bayou Hebert prospect derived from bottom hole temperatures from 67 wells in the area. The temperature distribution is of the form:

$$T = 82\, e^{7.1 \times 10^{-5} D}$$

where T is the temperature in °F and D is the depth in feet. At an average depth of 14,500 ft, the temperature is 230°F.

8.4 Pressure

Pressure information was available from three wells in the Bayou Hebert Field:

Well	Location	Depth, ft	Pressure psia	Pressure Gradient psi/ft
The Quintana #2. Delcambre	S18-T14S-R5E	15,320	12,350	0.81
The Quintana #1 Broussard	S17-T14S-R5E	15,130	12,350	0.81
The Superior Willis Hulin #1	S2-T14S-R4E	21,060	17,287	0.82

Shale resistivity plots indicate an average pressure gradient of 0.80 psi/ft, as shown in Figure 53.

Based on a gradient of 0.8 psi/ft, a pressure of 11,600 psia is calculated at an average prospect depth of 14,500 ft.

8.5 Salinity, Porosity, and Permeability

Water salinities calculated from the SP log, using conventional well logging interpretation techniques, range from 35,000 to 130,000 ppm. The average calculated salinity is 87,000 ppm.

The porosities derived from available logs using conventional well logging interpretation techniques vary between

10 and 23 percent, with an average of 16 percent.

The permeability of the geopressured sands, derived from correlation with well logs, varies between 15 and 220 md, with an average of 45 md.

8.6 Dissolved Gas

Based on the total bulk volume of geopressured sands estimated at 543 billion cubic feet and an average pososity of 16%, the total volume of water in place is 15.5 billion barrels.

Assuming that the water is saturated with methane, an average gas solubility of 26 SCF/bbl was estimated based on an average pressure of 11,600 psia, an average temperature of 230°F, and an average salinity of 87,000 ppm. This results in an in-place value of dissolved gas of 0.4 trillion SCF.

8.7 Test Well Sites

Figure 47 is a composite net sand isopach map of the geopressured intervals "A" and "B" in the eastern portion of the prospect. This map shows that there is good sand development over the entire eastern area. There are several locations which would be suitable for a geopressure test. However, the best location is in the northern portion of the prospect in the northwest quarter of Sec. 28, T13S, R4E. This location is shown in Figure 47. A well drilled at this location would encounter the top of geopressure at a depth of 12,400 ft. It should be drilled to a depth of 16,150 ft, and approximately 1000 ft of geopressured permeable sand would be penetrated.

8.8 Salt Water Disposal Well

Disposal wells could be drilled anywhere within the prospect without any problems. The base of the fresh water in this area is from 500 to 800 ft (3000 mg/l dissolved solids).

There are many massive sand bodies down to approximately 8000 ft in this area that would be ideal for this type of salt-water disposal.

9. KAPLAN PROSPECT

The Kaplan prospect is located in the northern portion of Vermilion Parish. The Village of Kaplan is located in the eastern portion of the prospect and the Town of Abbeville is located approximately 9 miles east of Kaplan, Figure 8. The prospect is located on land suitable for drilling (minimum elevation is approximately 15 ft). Access is by several good roads; the main ones are Louisiana Highway 14 which traverses the prospect in an East-West direction and Louisiana Highway 35 which traverses it from North to South. These are both good paved highways. The prospect area includes the Kaplan gas field which produces gas from several sands. The shallowest production occurs at 10,986 ft which is approximately 1000 ft above the top of the geopressured zone. However, several sands within the geopressure zone produce gas. The prospect covers an area of approximately 44 square miles.

The following listed geologic maps and stratigraphic sections were prepared using information from the 21 wells listed in Appendix VI.

- Figure 54 - Structure Map Top Stratigraphic Interval "A" (Shows lines of Stratigraphic Sections A-A' and B-B')
- Figure 55 - Net Sand Isopach Map Stratigraphic Interval "A"
- Figure 56 - Structure Map Top Stratigraphic Interval "B"
- Figure 57 - Net Sand Isopach Map Stratigraphic Interval "B"
- Figure 58 - Structure Map Top Stratigraphic Interval "C"
- Figure 59 - Net Sand Isopach Map Stratigraphic Interval "C"
- Figure 60 - Structure Map Top Stratigraphic Interval "D"
- Figure 61 - Net Sand Isopach Map Stratigraphic Interval "D"
- Figure 62 - Structure Map Top Stratigraphic Interval "E"
- Figure 63 - Net Sand Isopach Map Stratigraphic Interval "E"
- Figure 64 - Composite Net Sand Isopach Map Stratigraphic Intervals "A", "B", "C", "D", and "E"
- Figure 65 - East-West Stratigraphic Section A-A'
- Figure 66 - North-South Stratigraphic Section B-B'

9.1 General Geology

This prospect is located in the Miocene geopressured trend of South Louisiana. Sands in the Lower and Middle Miocene are geopressured and have been mapped. The geopressured zone has been divided into five stratigraphic intervals, "A", "B", "C", "D", and "E" for mapping. This stratigraphy is shown on East-West and North-South stratigraphic sections, Figures 65 and 66. Structure maps and net sand isopach maps were prepared for each interval, Figures 54 through 63. Figure 64 is a composite net sand isopach map of the five stratigraphic intervals.

The prospect is bounded on the West and North by fault "A", which has a throw of approximately 1000 ft. This is a typical regional normal growth fault which is downthrown to the south. The limiting factor to the south and east is the projection of the sands to zero thickness.

9.2 Stratigraphy

The Miocene sediments penetrated in this prospect area consist of alternating marine sands and shales. The geopressured sediments were divided into five stratigraphic intervals for mapping purposes. However, sands in each stratigraphic interval have similar characteristics. The sands are fine-grained and silty, and they are porous and permeable Other than the Camerina 1 Sand in Stratigraphic Interval "C", the individual sand bodies are not continuous and do not form a blanket over the entire area. It is of a channeling type deposition. There is thickening and thinning of sands within each interval and in many instances sands disappear and are replaced by shale. The top of the geopressured interval occurs at approximately 12,000 ft.

Stratigraphic Interval "A"

The first sand below the top of the geopressure is located in this interval. Several sands occur within the interval. However, they are erratic and discontinuous and cannot be traced over long distances. The maximum net sand thickness is 200 ft in the Kaplan gas field area. Well No. 15, located in the Kaplan gas field, has produced gas from this interval. Interval "A" contains a volume of 57.3 billion cubic feet (0.39 cu mi) of geopressured sand.

Stratigraphic Interval "B"

Several sand bodies occur within this interval. Here again, they are erratic and discontinuous and cannot be traced over long distances. The maximum net sand thickness of 250 ft occurs in Well No. 15, located in the Kaplan gas field. The interval as mapped contains a volume of 67.2 billion cu ft (0.46 cu mi) of geopressured sand.

Stratigraphic Interval "C"

The main sand in this interval is the Camerina 1 which reaches a maximum thickness of 350 ft in Well No. 12, located in the Kaplan field. There are several other thin, erratic, discontinuous sands in the "C" Interval. The maximum sand thickness of 400 ft in this interval occurs in well No. 12, located in the Kaplan field. Well numbers 11 and 12 have produced gas from this interval in the Kaplan field. This interval as mapped contains a volume of 104.2 billion cubic ft (0.71 cu mi) of geopressured sand.

Stratigraphic Interval "D"

Several erratic, discontinuous, and individual sands occur within this interval. They cannot, therefore, be mapped over large areas. The maximum sand thickness of 230 ft occurs in Well No. 6 in the Kaplan field. This interval has produced gas from Well No. 8 in the Kaplan field. This interval as mapped contains 48.9 billion cubic feet (0.33 cu mi) of geopressured sand.

Stratigraphic Interval "E"

One of the thickest sand bodies in the prospect occurs in this interval. It is best developed in Well No. 4, located in the Kaplan field, where it has a net thickness of 400 ft. It was penetrated in two other wells, Nos. 6 and 18. Most of the other wells were not drilled deep enough to penetrate all of the "E" interval. This interval as mapped contains a volume of 34.7 billion cubic feet (0.24 cu mi) of geopressured sand. This interval has produced gas from Well Number 7, located in the Kaplan field.

9.3 Temperature

Figure 67 illustrates the relationship between temperature and depth for Kaplan prospect derived from bottom hole temperatures from 21 wells in the area. The temperature distribution is of the form:

$$T = 75\ e^{7.8 \times 10^{-5} D}$$

where T is the temperature in °F and D is the depth in feet. At an average depth of 15,900 feet, the temperature is 259°F.

9.4 Pressure

Shale resistivity plots indicate an average formation pressure gradient of 0.8 psi/ft. Figure 68 shows a typical plot for the Kaplan prospect. Based on that gradient, a pressure of 12,770 psig is calculated at an average prospect depth of 15,900 feet.

9.5 Salinity, Porosity, and Permeability

Water salinities calculated from the SP log using conventional well logging interpretation techniques range from 44,000 to 80,000 ppm. The average calculated salinity is 57,000 ppm.

The porosities derived from available logs, using conventional well logging interpretation techniques, vary between 14 and 28 percent, with an average of 23 percent.

The permeability of the geopressured sands derived from correlations with well logs varies between 27 and 705 md, with an average of 273 md.

9.6 Dissolved Gas

Based on the total bulk volume of geopressured sands estimated at 312.3 billion cubic feet and an average porosity of 23 percent, the total volume of water in place is 12.8 billion barrels.

Assuming that the water is saturated with methane, an average gas solubility of 37 SCF/bbl was estimated, based on an average pressure of 12,770 psia, an average temperature of 259°F, and average salinity of 57,000 ppm. This results in an in-place value of dissolved gas of 015 trillion SCF.

9.7 Test Well Site

Due to the very erratic nature of the sands within this prospect, it is believed that the Kaplan area is not suitable for a geopressured test well.

In the event a land test site is desired, the southeast corner of Township 12S, Range 1E would be the optimum site. Figure 64 shows that the thickest and best-developed sand section occurs in that area in the vicinity of Well No. 12.

Well No. 12, located in S23, T12S, R1E, penetrated 750 ft of sand. This well penetrated only about 200 ft of Stratigraphic Interval "D" and none of Interval "E". If it had been drilled deeper, other sands would probably have been penetrated.

9.8 Salt Water Disposal Well

If a Salt Water Disposal Well is needed for the injection of salt water which would be produced from a geothermal well in the Kaplan Prospect, no problem should be encountered.

A disposal well would encounter the base of the fresh water at approximately 800 ft. Wells in the area have massive porous and permeable water sand developments above 10,000 ft.

10. South White Lake Prospect

The South White Lake Prospect is located south of White Lake in southeast Cameron and southwest Vermilion parishes. The center of the prospect is located approximately 40 miles southwest of the town of Abbeville and 10 miles west of the village of Pecan Island, Figure 5. Almost all of the area is located inside the Rockefeller Wildlife Refuge and Game Preserve. The area is located in low-lying coastal marsh except for the extreme northeast portion, which is traversed by Pecan Island, a narrow sand ridge 1/4 to 3/4 mile wide with an elevation of two to four feet above the surrounding marsh.

Louisiana Highway No. 82, a good paved road, is located on the Pecan Island ridge. This road furnishes good access to the prospect from Abbeville, Lake Charles, and Cameron in the southwestern portion of the prospect. The prospect covers an area of approximately 51 square miles.

The following listed geologic maps and stratigraphic cross section, Figures 69 through 75, were prepared using information from the 20 wells listed in Appendix VII.

Figure 69 - Structure Map Top of Discorbis "B" Sand
Figure 70 - Structure Map Base of Discorbis "B" Sand
Figure 71 - Net Sand Isopach Map Sand No. 1
Figure 72 - Net Sand Isopach Map Sand No. 2
Figure 73 - Net Sand Isopach Map Sand No. 3
Figure 74 - Net Sand Isopach Map Sands No. 1, 2, and 3
Figure 75 - East-West Stratigraphic Section A-A'

10.1 General Geology

The prospect is located on the northern border of the Lower Miocene producing trend of southern Louisiana. Sands in the Discorbin "B" Zone of the lowest part of the Upper Miocene are geopressured and have been mapped. The Discorbis "B" Zone has been divided into three stratigraphic intervals for mapping. They are an upper interval, Sand 1, a middle interval, Sand 2, and a lower interval, Sand 3. This stratigraphy is shown on Figure 75. Structure maps were prepared on the top and base of the Discorbis "B" Zone, Figures 69 and 70. Figure No. 74 is a composite net sand isopach map of the three sand intervals.

The limiting geologic features of the prospect are Faults A and A' on the North. They are typical east-west striking, downthrown to the south, growth faults with displacements of 350 to 750 ft. Geologic and pressure information indicates that these are sealing faults which separate the prospect from the area to the north. The east, south, and west limits are defined by no sand development. The prospect is geopressured only in the eastern part, Figures 69 and 75.

10.2 Stratigraphy and Sand Volume

The Discorbis sands penetrated in this prospect consist of alternating marine sands and shales. The sand bodies are predominantly fine-grained, silty sands. They are porous and permeable. The sands in the three intervals, S-1, S-2, and S-3, have similar characteristics. The individual beds reach a maximum gross thickness of 700 ft, with 310 ft of net sand. However, they are not continuous and do not form a blanket across the entire area. There is thickening and thinning in each interval and, in some instances the sands disappear and are replaced by shales. The top of the geopressured interval lies at a depth of 14,870 to 15,000 ft. The S-1 sand of the Discorbis "B" Zone is the first sand below the top of the geopressure.

Stratigraphic Intervals

S-1 Sand Interval

The S-1 sand interval is the uppermost sand body mapped. It covers the entire prospect, Figure 71, and ranges from 70 to 165 ft thick in wells in which it was penetrated. The thickest section logged in the geopressured area was 160 ft in Well No. 1, located in Section 27-T15S-R2W in the eastern part of the prospect, where the best sand development occurs. The geopressured part of the S-1 interval has a volume of approximately 41 billion cubic ft, (0.28 cu mi) of sand.

S-2 Sand Interval

The S-2 sand interval is the middle interval and covers the entire prospect, Figure 72. It ranges in thickness from 100 to 200 ft in wells in which it was penetrated. The thickest section logged was 200 ft in Well No. 3, located in Section 34-T15S-R2W in the eastern and geopressured part of the prospect, where the best sand development occurs. The geopressured part of the S-2 interval has a volume of approximately 64 billion cubic feet (0.43 cu mi) of sand.

The S-3 sand interval is the lowest interval mapped and covers the entire prospect, Figure 73. It ranges in thickness from 200 to 310 ft in wells in which it was penetrated. The thickest section, 310 ft, was logged in Well No. 3, located in Section 34-T15S-R2W in the eastern and geopressured part of the prospect, where the best sand development occurs. The S-3 interval has a volume of 106 billion cubic feet, (0.72 cu mi) of geopressured sand.

S-1, S-2, S-3 Sand Intervals

The combined sand thickness of the S-1, S-2, and S-3 intervals is shown on the map of Figure 74. This map shows that the area of best sand development is located in the Eastern geopressured portion of the prospect. The thickest sand section, 650 ft, was penetrated in Well No. 3, located in Seciton 34-T15S-R2W. The combined volume of net geopressured sand in the three intervals mapped is 211 billion cubic ft (1.43 cu mi).

10.3 Temperature

Figure 76 illustrates the relationship between temperature and depth for South White Lake prospect derived from bottom hole temperatures from 20 wells in the area. The temperature distribution is of the form.

$$T = 72\ e^{8.4 \times 10^{-5} D}$$

Where T is the Temperature in °F and D is the depth in feet. At an average depth of 16,200 ft, the temperature is 281 °F.

10.4 Pressure

This prospect was selected for detailed study because there was good geologic control in the area which showed good sand development, and the wells in the eastern portion were drilled with mud weights of 12.6 to 17.7 ppg. Electrical logs of wells in the eastern portion showed characteristics of abnormal pressured sands below a depth of 15,000 ft. Mapping was extended into the western portion because of good correlation and good well control in the Constance Bayou field area.

However, in communicating with geologists of Superior Oil Company, the operators of wells in the Constance Bayou field located in the western portion of the prospect, it was learned that in drilling these wells, no abnormally high pressures were encountered. Bottom Hole pressures taken in the 10 wells drilled in the field did not indicate abnormally high pressures. One well had a pressure gradient of 0.515 psi/ft. Shale resistivity plots corroborated the absence of abnormal pressure, as shown in Figure 77.

The Union Oil Company of California, S.L. 4321 #1 well (Well #5) in Sec. 8 T16S-R2W, was tested in the deep sands and indicated some 3000 psi above the normal pressure, which is equivalent to a gradient of only 0.64 psi/ft.

There is no obvious explanation for the difference in the pressure in the western and eastern portions of the prospects. The sand bodies correlate across the two areas, but there is some barrier which separates them. However, there is not enough information available to determine the reasons for the pressure difference in the two areas.

Based on the above information, only the eastern part of the prospect could be considered geopressured. The pressure gradient is only 0.64 psi/ft. This is equivalent to 10,400 psi at an average prospect depth of 16,200 ft.

10.5 Salinity, Porosity, and Permeability

Water salinities calculated from the SP log using conventional well logging interpretation techniques range from 60,000 to 250,000 ppm. The average calculated salinity is 150,000 ppm.

The permeability of the geopressured sands derived from correlations with well logs varies between 8 and 190 md, with an average of 68 md.

The porosities derived from available logs using conventional well logging interpretation techniques vary between 10 and 15 percent with an average of 12 percent.

10.6 Dissolved Gas

Based on the total bulk volume of geopressured sands estimated at 211 billion cubic ft and an average porosity of 12 percent, the total volume of water in place is 4.5 billion barrels.

Assuming that the water is saturated with methane, an average gas solubility of 23 SCF/bbl was estimated based on an average pressure of 10,400 psi, an average temperature of 281°F , and an average salinity of 150,000 ppm. This results in an in-place value of dissolved gas of 0.1 trillion SCF.

10.7 Test Well Site

The information available indicates that this prospect is a poor one for a test well. However, if it is decided to drill a test well on the prospect, it should be located in the southwest corner of Section 4-T16S-R2W. This location is in the geopressured area and is close to well No. 5, where abnormal pressure was measured. The well should be drilled to a depth of 17,600 ft to penetrate the sands which were mapped. A total thickness of approximately 650 ft of net sand should be penetrated.

10.8 Salt Water Disposal Well

Should a geopressure test well be drilled in this prospect, there would be no problem in locating a disposal site. Massive sands in the section should have good porosity and permeability.

The suggested total depth for a salt water disposal well in this area is 7000 ft. The base of the brackish water (3000 mg/l) is at 550 to 600 ft.

11. THE TUSCALOOSA TREND

On continuation of site-specific research into the geopressured energy resource of southern Louisiana, it seemed sensible to investigate horizons currently being developed for oil and gas production and known to display high pressures and temperatures. One such area of interest is hereafter referred to as the Tuscaloosa Sand Trend.

The Tuscaloosa Geopressured Trend of south Louisiana extends from the Sabine River on the western edge of the state in an easterly direction through the southern portions of Vernon and Rapides Parishes. It then turns in a southeasterly direction and extends to the vicinity of Lake Borgne near the mouth of the Pearl River, Figure 78.

The drilling of wells along the trend in search of oil and gas has resulted in the discovery of 10 oil and gas fields. The location of some of these fields and some of the key wells drilled along the trend are shown on Figure 78. A total of 131 wells was drilled to date in the Tuscaloosa trend. A list of these wells appears in Appendix VIII. Data from these wells reveals the presence of an updip, normally-pressured, Tuscaloosa section and a downdip, abnormally high-pressured, Tuscaloosa section. The geopressured downdip section is the subject of this study.

11.1 General Limits of the Tuscaloosa Geopressured Trend

The presently defined trend varies from 2 to 12 miles in width and extends approximately 88 miles east to west. The northern limit of the geopressured section roughly parallels the edge of the lower Cretaceous Comanchean shelf. The geological feature which forms this limit has not been determined. One possibility is a major depositional fault or series of faults. It is believed that a series of seismic profiles across the trend may assist in defining the limit.

11.2 General Geology

The Tuscaloosa sands are found at the bottom of the Upper Cretaceous system of the Mesozoic era. The Tuscaloosa is a series of alternating sands and shales which appear to have been deposited in a near shore marine environment. The sands apparently exist on the shelf and shelf edge as deltaic deposits with downdip units having been deposited as submarine fans on the shelf slope.

A structural map, Figure 79, was drawn on the base of the Austin Chalk Pilot Lime Marker, which is easy to identify on the logs. The top of the Tuscaloosa lies approximately 100 ft below the Austin Chalk Pilot Lime Marker, as indicated on the typical log of Figure 80. However, it is slightly higher or lower in other parts of the Fairway and ranges from 12,100 ft to 19,600 ft in depth below the surface.

The Tuscaloosa formation strikes generally in a north-east-southeast direction, with a regional dip to the south of approximately 250 ft/mile in the western part of the state, 160 ft in the central portion and 280 ft in eastern St. Tammany Parish. Local structures which interrupt the regional dip are shown where oil and gas fields are being developed.

11.3 Geopressured Sand Distribution

Distribution of sand in the geopressured zone is shown by the net sand isopach map, Figure 81. This map shows the thickness of the sand from Central Evangeline Parish to the eastern limit of the Fairway. The sand reaches a maximum thickness of 500 ft in the Moncrief Field in St. Landry Parish, with the major development lying in the central portion of the trend. Most of the electrical logs of wells drilled in the eastern portion are presently being held confidential by the operators. When information from these wells is integrated into the study, a better definition of the eastern portion can be made. The volume of sand in the geopressured portion of the Fairway is approximately 6.1 trillion cubic feet (41.2 cu mi). Additional drilling in the trend will probably reveal more geopressured sand in the eastern and western portions of the Fairway.

11.4 Prospect Areas

Based on the preliminary study of the Tuscaloosa Trend, a detailed study of the False River-Judge Digby Field was conducted. Well Control in this area was sufficient to define resonable limits of a prospect area called "Solitude Point". The results of the Solitude Point are the subject of the following chapter.

The Moncrief-Big Cane area in St. Landry Parish also merits detailed study. This area has thick sands in the geopressured zone. However, additional well information is needed for a detailed study.

The Rigolets field area in the eastern end of the trend in Lake Borgne also merits detailed study when well information becomes available. At the present time, most of the well data is held confidential by the operators, and detailed studied will be possible only when this information is released.

12. SOLITUDE POINT PROSPECT

The Solitude Point Prospect begins in the southern portion of Pointe Coupee Parish, extends in a southeasterly direction across West Baton Rouge Parish and on into the west central portion of East Baton Rouge Parish, and terminates in the vicinity of Scotlandville, La. This prospect trends in a south-east-northwest direction and is bounded on the north by a fault, which lies north of and approximately parallels the south limb of the False River ox-bow. The southern limit is postulated to be a zero sand limit which roughly parallels U.S. Highway 190. The prospect covers an area of approximately 142 square miles.

The following geologic maps and stratigraphic cross sections, Figures 82 through 86, were prepared from electric logs listed in Appendix VIII.

Figure 82	Structure Map - Base of Pilot Lime Marker.
Figure 83	Structure Map - Top of Tuscaloosa Marker Sand 2
Figure 84	Net Sand Isopach Map - Tuscaloosa Sand
Figure 85	East-West Stratigraphic Section A-A'
Figure 86	North-South Stratigraphic Section B-B'

12.1 General Geology

The Solitude Point prospect is a portion of a geopressured environment which formed immediately seaward of the Comanchean shelf edge. This shelf edge marked the boundary of the continental land mass and the Gulf of Mexico at that time. The Tuscaloosa sands occur in the lower portion of the Upper Cretaeceous System of the Mesozoic Era and had previously been penetrated by wells drilled in search of oil and gas. The majority of drilling was done in the Florida Parishes, a portion of Louisiana lying east of the Mississippi and north of Lake Pontchartrain.

The geopressured section was revealed by Chevron, U.S.A. with the discovery of the False River Gas field in Pointe Coupee Parish in 1975. False River Field is located in the central portion of the Solitude Point prospect. Approximately 20 miles to the west is Judge Digby Field, which has gained some publicity due to the blowout and subsequent developments of the discovery well.

The sands of the Solitude Point Prospect were deposited on the shelf slope and appear to be a combination of delta lobes, submarine fans, and turbidities. The main depo-center lies between the western edge of St. Landry Parish and the eastern edge of Livingston Parish. As stated previously, the updip or northern edge of the prospect is marked by a down-to-the-coast growth fault "B", Figure 82 and 83. This fault has been identified on seismic profiles, but has not yet been positively identified by electric log correlation. The southern limit is the zero sand limit, as shown on Figure 84. Several small faults occur within the prospect area in addition to a second down-to-the-coast growth fault (Fault "C") with a throw of about 800 ft. Due to the difficulty of accurately correlating the individual sands, it is believed that a single structure map, Figure 83, of the top of the Lower Tuscaloosa interval will be sufficient to delineate the structure. This structure consists of a generally northwest-south-east trending series of anticlinal closures measuring roughly 24 miles in length and 8 miles in width.

12.2 Stratigraphy and Sand Volume

The Tuscaloosa sands occur in the Gulfian series of the Cretaceous system of the Mesozoic Era. The top of the Cretaceous lies immediately below the massive Midway Shale of Eocene time and is marked by the thin Clayton marl. The marl overlies a massive chalk system, which is correlative all along the Gulf Coast. The top of the geopressured section begins in the chalk system, continues downward through the Eagleford, the Tuscaloosa marine shale and into the Tuscaloosa sands. Wells drilled along the trend usually have intermediate casing set and mud weight increased prior to penetrating the chalk. As a matter of practice, all wells are designed to withstand low-volume, high-pressure gas kicks within fractures of the chalk. Updip, on the shelf, pressures return to normal once the chalk series and Eagleford have been drilled.

A definite marker occurs at the top of the lower Tuscaloosa interval. This marker is locally called the Bain marker or Pilot Lime marker. Figure 82 is a structure map on the base of this marker. The Tuscaloosa sands occur immediately below the Pilot Lime Marker and consist of alternating sequences of sands and shales. The sands are very fine-grained, slightly shaley and silty, and of low porosity and permeability. Excessive compaction and secondary cementation contribute to the low porosity. A total net sand map, Figure 84, indicate that the sands are probably replaced by marine shales farther downslope and seaward. The thickest sands are found on the northern side of the structure, reaching in excess of 1000 feet immediately downthrown to Fault "B".

The Solitude Point Prospect of the Tuscaloosa Trend contains a volume of 1914 billion cubic feet (13 cu mi) of geopressured sands.

12.3 Temperature

Figure 87 illustrates the relationship between temperature and depth for the Tuscaloosa trend derived from bottom hole temperatures from 131 wells drilled within the trend. The temperature distribution is of the form:

$$T = 90\ e^{6.8 \times 10^{-5} D}$$

where T is the temperature in °F and D the depth in feet. At an average depth of 19,000 ft, the temperature is 328°F.

12.4 Pressure

Recorded pressure gradients in the prospect range from 0.72 to 0.85 psi/ft. The highest gradient corresponds to the initial shut-in pressure of 16,806 psig recorded at 19,876 ft in Alma Plantation #1 (Well #55). This represents an average gradient of 0.79 psi/ft and an average pressure of 15,000 psig at an average prospect depth of 19,000 ft.

12.5 Salinity, Porosity, and Permeability

Core data were available from seven wells drilled by Chevron Oil Co. in False River, Judge Digby, and Profit Island fields. Core data show that the sands are tight, with porosities and permeabilities averaging approximately 9 percent and 5 millidarcies, respectively.

Log-derived salinities averaged 60,000 ppm.

12.6 Dissolved Gas

Based on the total bulk volume of geopressured sands estimated at 1914 billion cubic feet and an average porosity of 9 percent, the total volume of water in place is 30 billion barrels.

Assuming that the water is saturated with methane, an average gas solubility of 58 SCF/bbl was estimated based on an average pressure of 15,000 psig, an average temperature of 328°F, and an average salinity of 60,000 ppm. This results in an in-place value of dissolved gas of 1.7 trillion SCF.

12.7 Test Well Site

If the low porosity, low permeability, and depth are not considered disqualifying factors, Section 48 would be recommended for a test well site. A well located in the center of irregular section 48, Township 5 South, Range 11 East, should encounter the lower Tuscaloosa at approximately 20,400 ft. At least 900 ft of sand should be encountered bofore reaching the base of the lower Tuscaloosa.

12.8 Salt Water Disposal Well

A well drilled in the vicinity of the proposed test Site should encounter the base of the fresh water at 2800 ft (3000 mg/l dissolved solids). Examination of the Chevron U.S.A. No. 3 Alma Plantation, located in Section 48, T5S-R11E, and approximately one mile southwest of the test site, reveals that a massive sand section occurs at 3100 ft and extends down to 7600 ft. Adequate porosity and permeability should be expected in this interval.

Initial completion should be made in the sand between 4700 ft and 5000 ft. This would allow for recompletion in higher zones or completions for additional disposal wells.

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Table 1

GEOPRESSURE/GEOTHERMAL PROSPECT RANKING BASED ON TOTAL AVAILABLE ENERGY

Prospect Ranking	Prospect Identification Number	Gas Energy 10^{12} BTU	Geothermal Energy 10^{12} BTU	Total Energy 10^{12} BTU
1	30+	367.64	22.59	390.22
2	2**	172.43	11.85	184.28
3	29	160.80	10.19	170.99
4	16	155.55	9.80	165.35
5	40	123.42	7.53	130.95
6	10*	114.38	6.73	121.11
7	3	101.15	7.19	108.35
8	39	101.09	6.14	107.23
9	12	94.15	6.01	100.15
10	14	91.15	5.98	97.13
11	19	91.92	4.81	96.73
12	27	83.80	5.14	88.94
13	31	83.43	5.39	88.81
14	41	82.19	4.71	86.90
15	24	81.26	4.99	86.25
16	23	79.68	4.84	84.51
17	21	78.48	5.23	83.71
18	34	77.48	5.10	82.59
19	50	66.07	3.35	69.42
20	26	64.77	3.80	68.57
21	7	59.49	3.72	63.21
22	4	58.26	3.97	62.24
23	44	48.74	2.89	51.64
24	22	40.87	2.41	43.28
25	45	40.75	2.27	43.02
26	20	39.76	2.21	41.97
27	18	39.22	2.04	41.26
28	53	37.06	1.94	39.00
29	49	36.02	1.80	37.82
30	13	33.48	2.34	35.82

Table 1

(Continued)

Prospect Ranking	Prospect Identification Number	Gas Energy 10^{12} BTU	Geothermal Energy 10^{12} BTU	Total Energy 10^{12} BTU
31	42	33.31	1.80	35.11
32	55	32.16	1.59	33.75
33	9	31.65	1.40	33.05
34	59	29.74	1.34	31.08
35	52	29.37	1.50	30.87
36	56	28.96	1.53	30.48
37	11	27.33	1.63	28.95
38	5	27.14	1.71	28.85
39	33	27.36	1.47	28.83
40	57	20.89	1.23	22.12
41	63	20.03	1.17	21.20
42	54	19.64	1.00	20.63
43	28	19.49	1.00	20.49
44	62	18.09	1.11	19.20
45	51	18.28	0.50	18.78
46	36	17.53	0.87	18.40
47	35	17.40	0.82	18.22
48	32	16.24	0.27	16.52
49	58	12.20	0.72	12.92
50	6	10.87	0.60	11.47
51	38	9.76	0.55	10.32
52	1	8.37	0.34	8.71
53	43	6.79	0.33	7.11
54	8	6.59	0.40	6.99
55	37	6.20	0.27	6.47
56	25	4.79	0.16	4.94
57	17	4.28	0.18	4.45
58	46	2.91	0.05	2.96
59	60	2.59	0.14	2.73
60	61	1.79	0.07	1.86
61	47	0.00	0.00	0.00

+Atchafalaya Bay
*Johnson's Bayou
**S. E. Pecan Island

Table 2

FIFTEEN MOST PROMISING PROSPECTS*

Prospect Ranking	Prospect Identification Number	Parish	Town-ship	Range	Area Sq. Mi	Total Energy 10^2Btu
1	29	St. Mary	Block 16		54	180
2	16	Vermilion	14S	4E	72	165
3	40	Terrebonne	18S	15E	48	131
4	3	Vermilion & Cameron	15S	2W	51	108
5	39	Terrebonne & Lafourche	16S	16E		107
6	12	Cameron	Block 26		54	100
7	14	Vermilion	12S	1E	96	97
8	19	St. Martin	11S	6E	84	97
9	27	St. Martin	15S	13E	54	89
10	31	Iberia	Block 3		60	89
11	41	Terrebonne	19S	17E	40	87
12	24	Iberia & St. Mary	14S	6E	55	86
13	23	St. Mary	14S	9E	60	85
14	21	Iberia & St. Mary	12S	9E	49	84
15	34	Lafourche	14S	17E	40	83

* Exclusive of the 3 sites examined and ranked from the FY 1978 study.[2]

Table 3

THE FIFTEEN MOST PROMISING PROSPECTS' SALIANT DATA

Prospect Ranking	Prospect Name	Prospect I.D. Number	Wells drilled through Geopressured interval	Avg. depth to top of geopressured zone, ft.	Avg. geopressured sands thickness, ft.	Wells cored in geopressured interval	Wells pressure tested in geopressured interval
1	Eugene Island Block 16	29	1	12,700	350	0	0
2	Bayou Hebert+	16	29	13,037	451	2	9
3	Lake Theriot+	40	24	12,675	463	2	1
4	South White Lake+	3	17	14,500	525	3	10
5	Ellsworth	39	17	11,785	280	2	NA
6	West Cameron Block 26	12	10	10,740	375	0	1
7	Kaplan+	14	17	11,800	275	5	7
8	Spanish Lake	19	11	11,622	33	0	0
9	Stephenville	27	11	14,990	170	1	2
10	East Cote Blanche	31	27	13,400	425	13	14
11	Coteau Charles	41	7	13,471	374	4	0
12	Weeks Bay	24	0	--	-	0	0
13	Baldwin	23	21	12,537	215	2	0
14	Grand Lake+	21	54	14,550	475	0	4
15	Kraemer	34	4	?	0	0	0

*Exclusive of the three sites examined and ranked from the FY 1978 study.[2]

+Prospects retained for detailed mapping and evaluation.

FIGURE 1 THROUGH 20

GENERAL

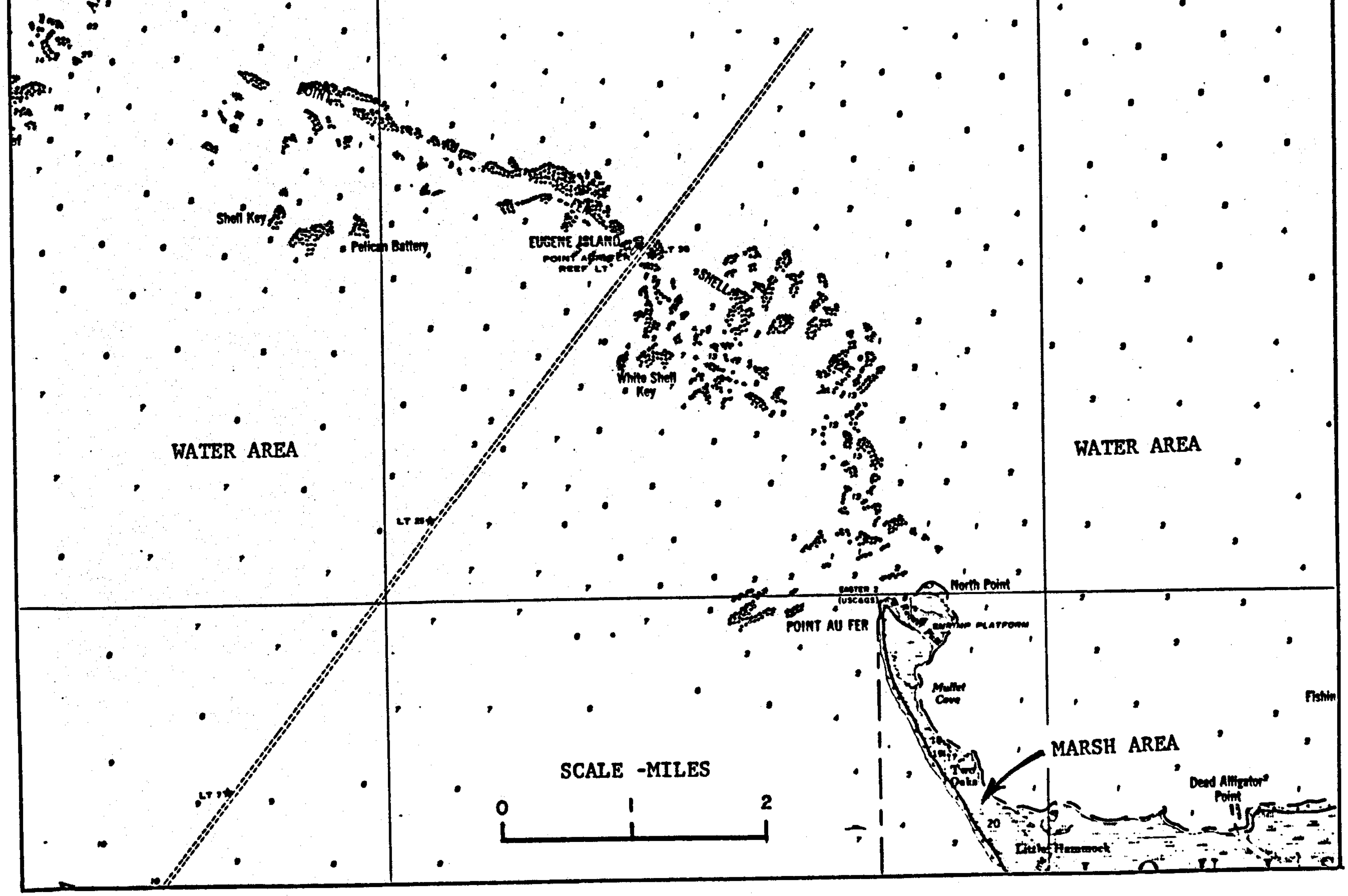
FIGURE 1

LOUISIANA

Location of Sixty-three Geopressured Prospect Areas Indicated by ERDA Contract E-(40-1)-4889

FIGURE 2
PHYSIOGRAPHIC MAP

EUGENE ISLAND BLOCK 16 PROSPECT



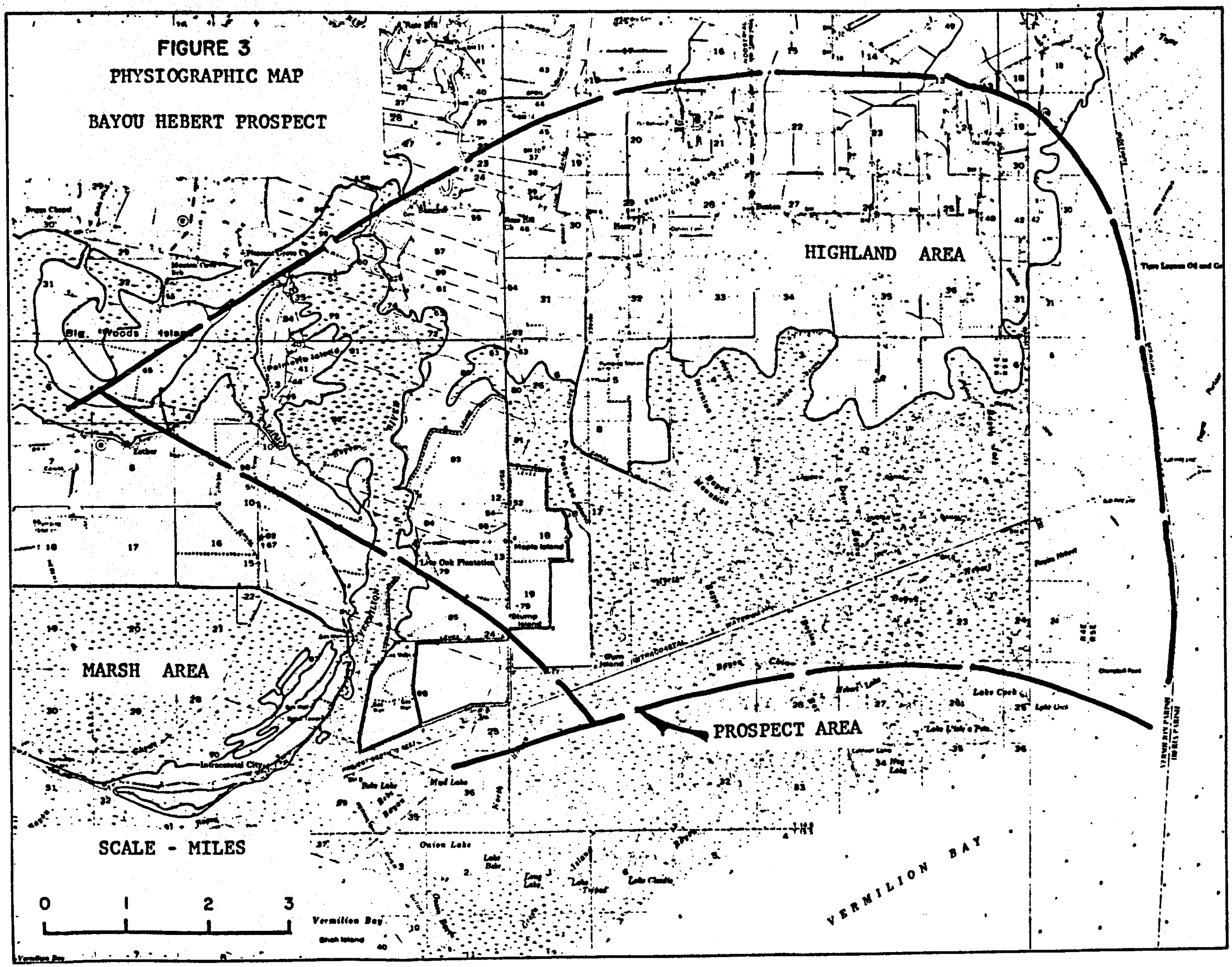


FIGURE 3
PHYSIOGRAPHIC MAP
BAYOU HEBERT PROSPECT
HIGHLAND AREA
MARSH AREA
PROSPECT AREA
VERMILION BAY
SCALE - MILES
0 1 2 3

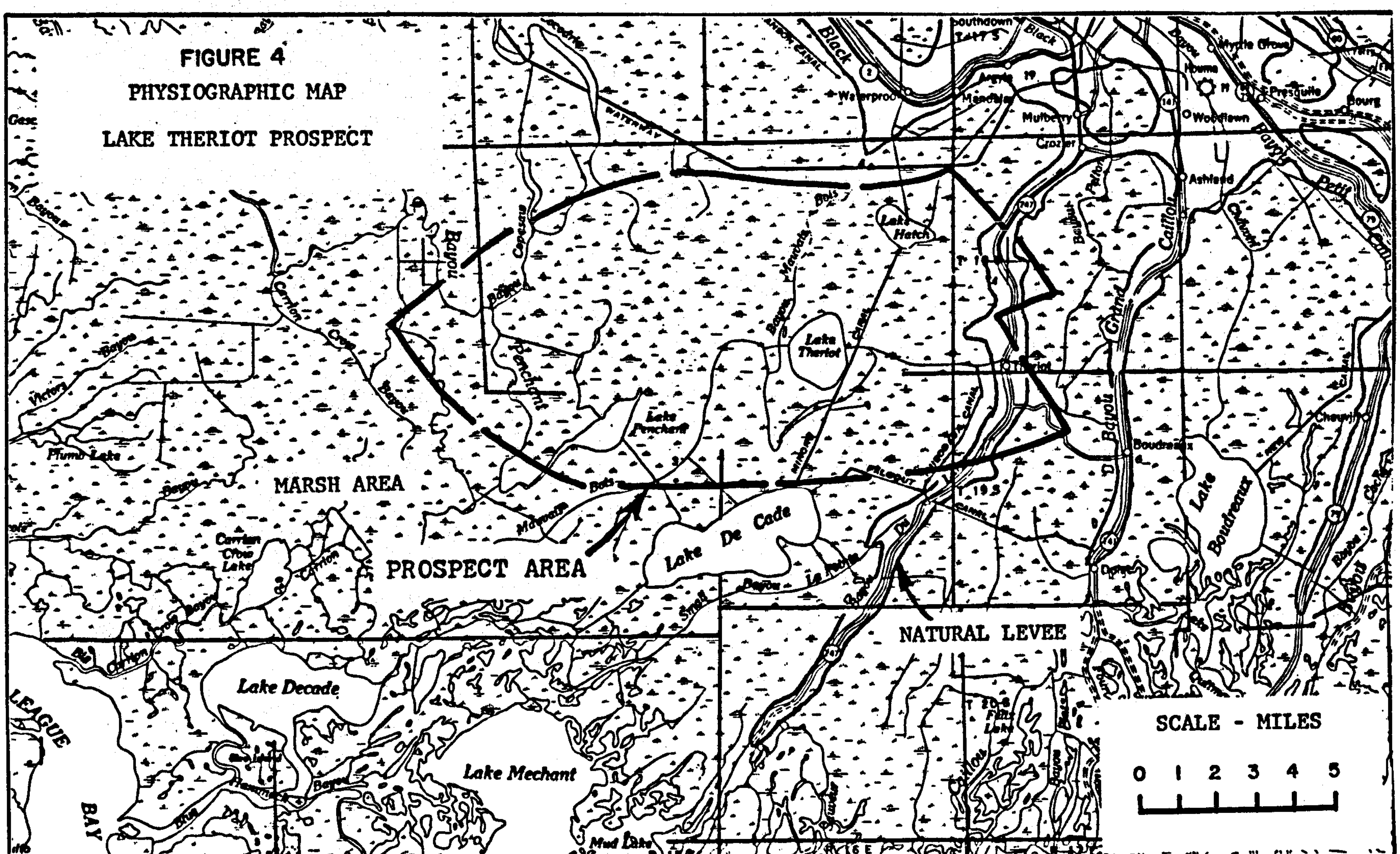


FIGURE 4
PHYSIOGRAPHIC MAP
LAKE THERIOT PROSPECT

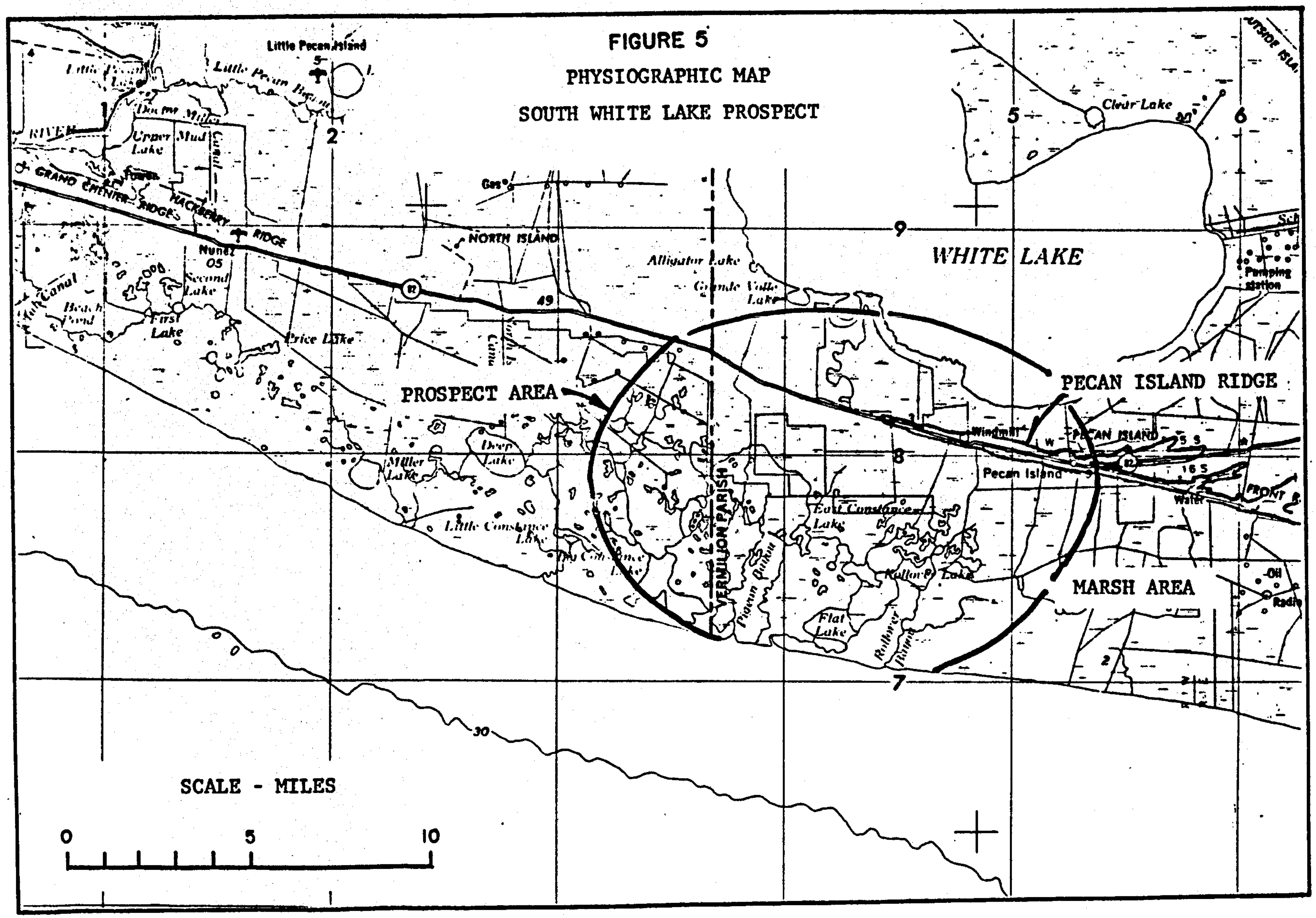


FIGURE 5
PHYSIOGRAPHIC MAP
SOUTH WHITE LAKE PROSPECT
Little Pecan Island
Upper Mud Lake
GRAND CHENIER RIDGE
HACKBERRY RIDGE
NORTH ISLAND
Alligator Lake
WHITE LAKE
Clear Lake
Price Lake
First Lake
Second Lake
PROSPECT AREA
PECAN ISLAND RIDGE
Pecan Island
Deep Lake
Miller Lake
Little Constance Lake
East Constance Lake
Flat Lake
VERMILION PARISH
Pumping station
Windmill
MARSH AREA
SCALE - MILES
0
5
10

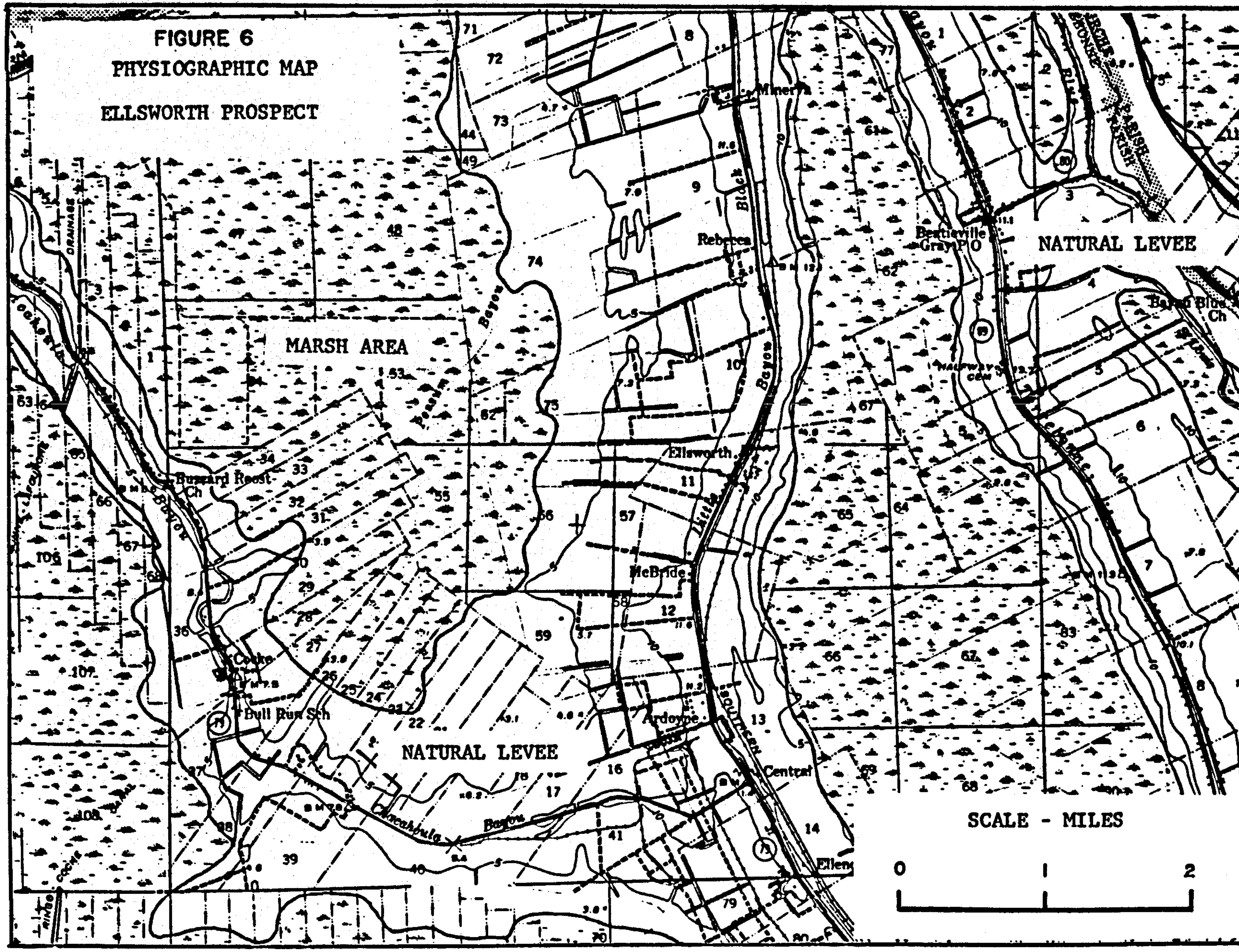


FIGURE 6
PHYSIOGRAPHIC MAP
ELLSWORTH PROSPECT

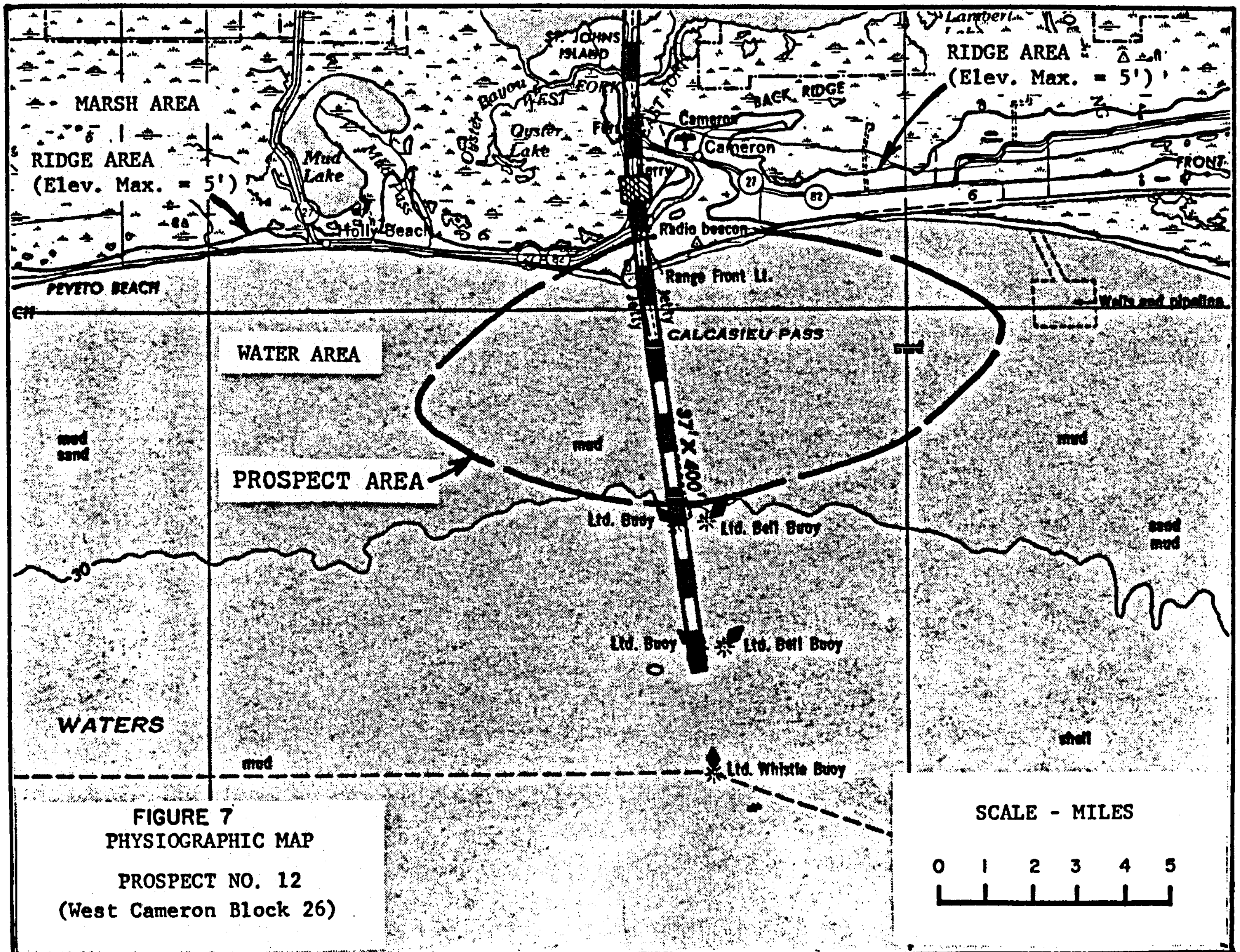


FIGURE 7
PHYSIOGRAPHIC MAP

PROSPECT NO. 12
(West Cameron Block 26)

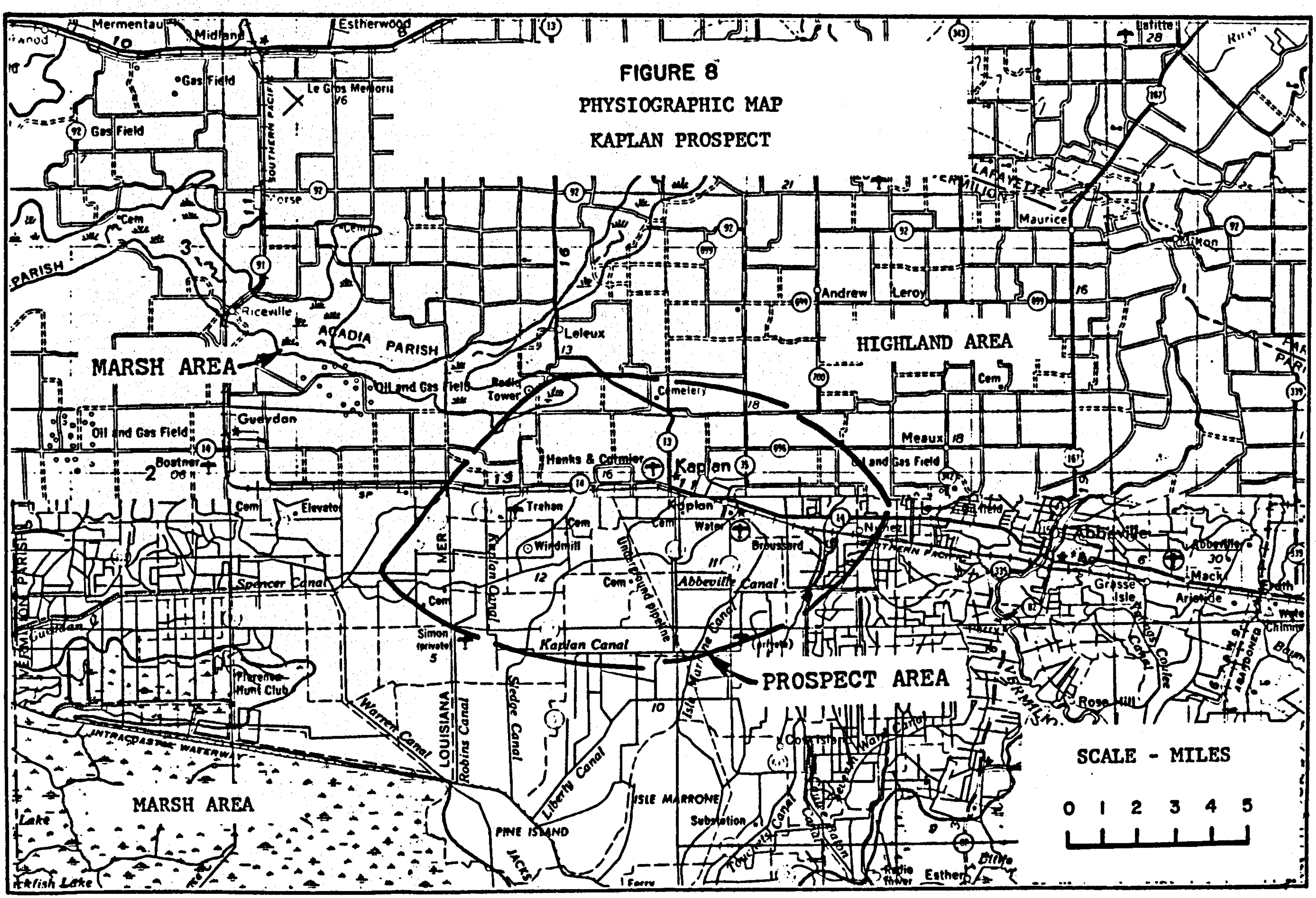


FIGURE 8
PHYSIOGRAPHIC MAP
KAPLAN PROSPECT

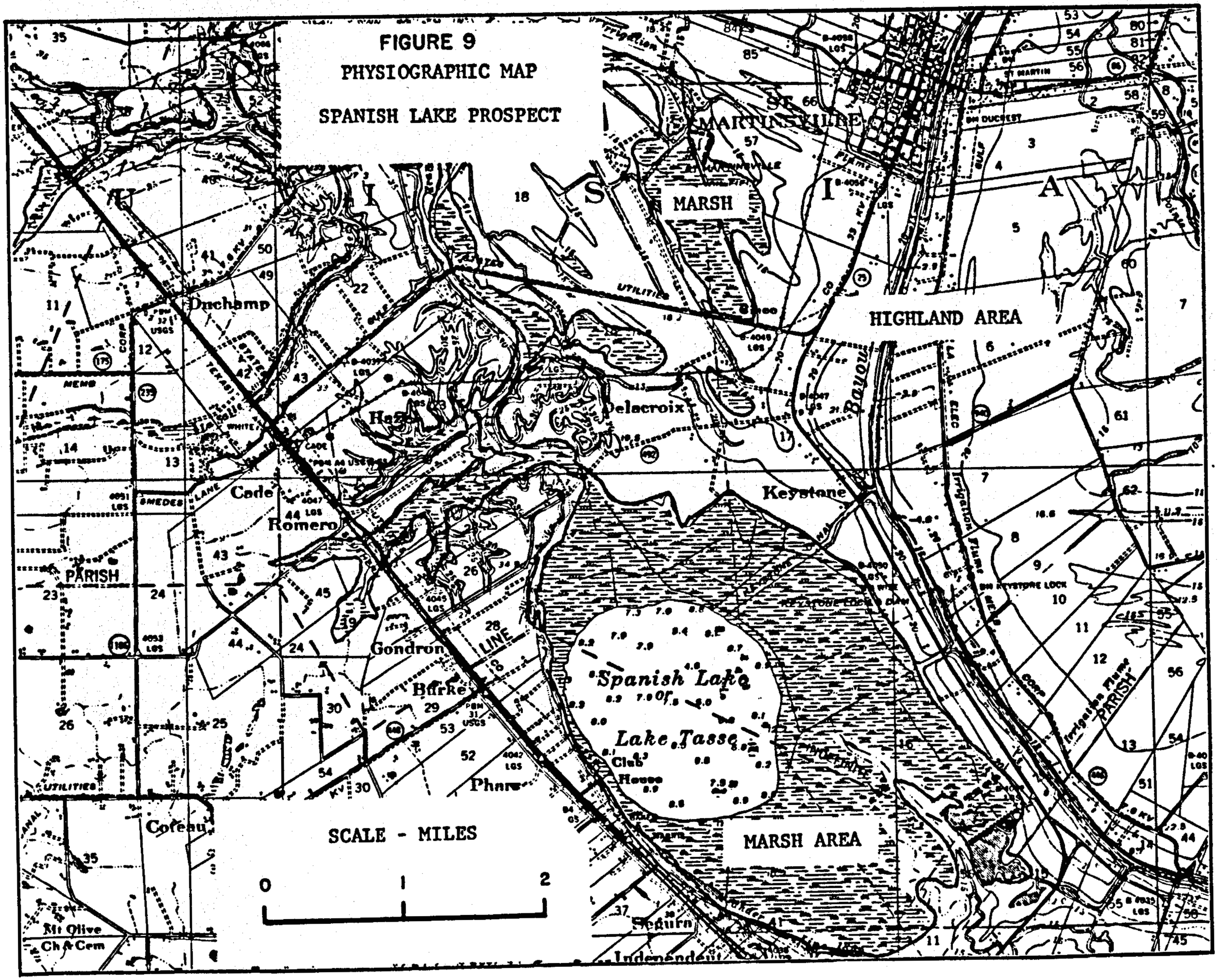


FIGURE 9
PHYSIOGRAPHIC MAP
SPANISH LAKE PROSPECT

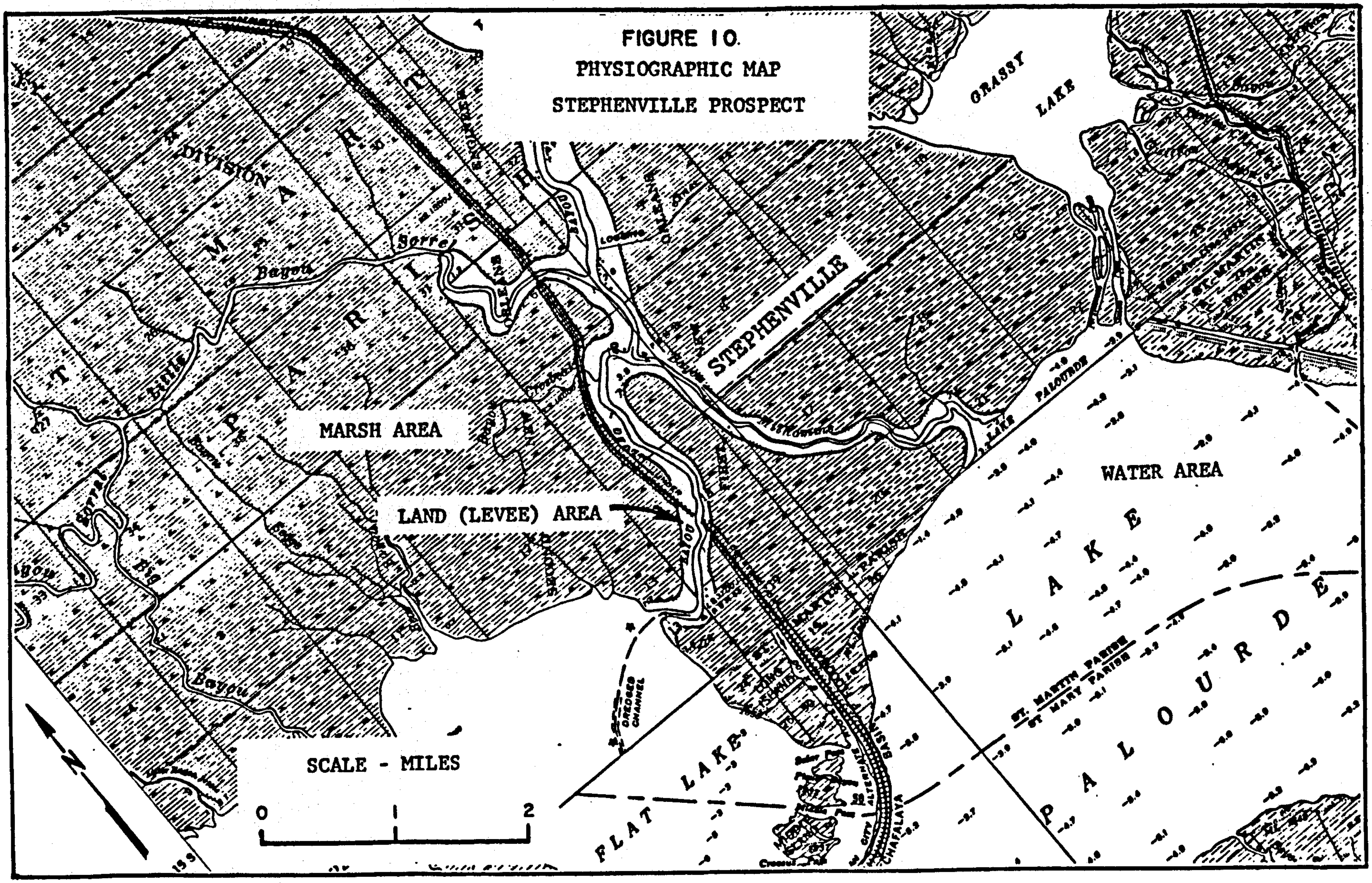


FIGURE 10.
PHYSIOGRAPHIC MAP
STEPHENVILLE PROSPECT
MARSH AREA
LAND (LEVEE) AREA
WATER AREA
STEPHENVILLE
GRASSY LAKE
LAKE PALOURDE
FLAT LAKE
DIVISION
ST. MARTIN PARISH
ST. MARY PARISH
DREDGED CHANNEL
SCALE - MILES
0
1
2
N

59

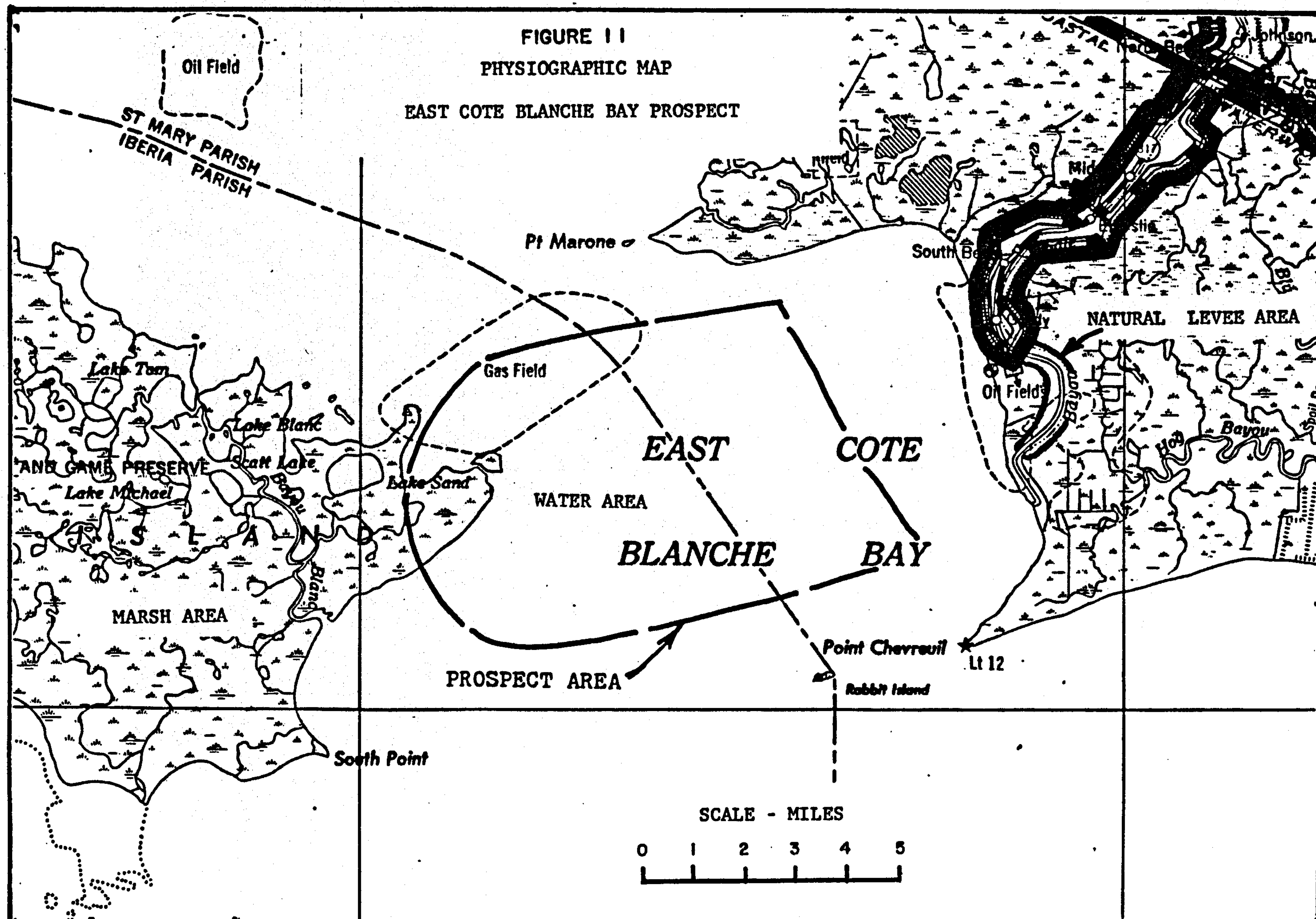


FIGURE 11

PHYSIOGRAPHIC MAP

EAST COTE BLANCHE BAY PROSPECT

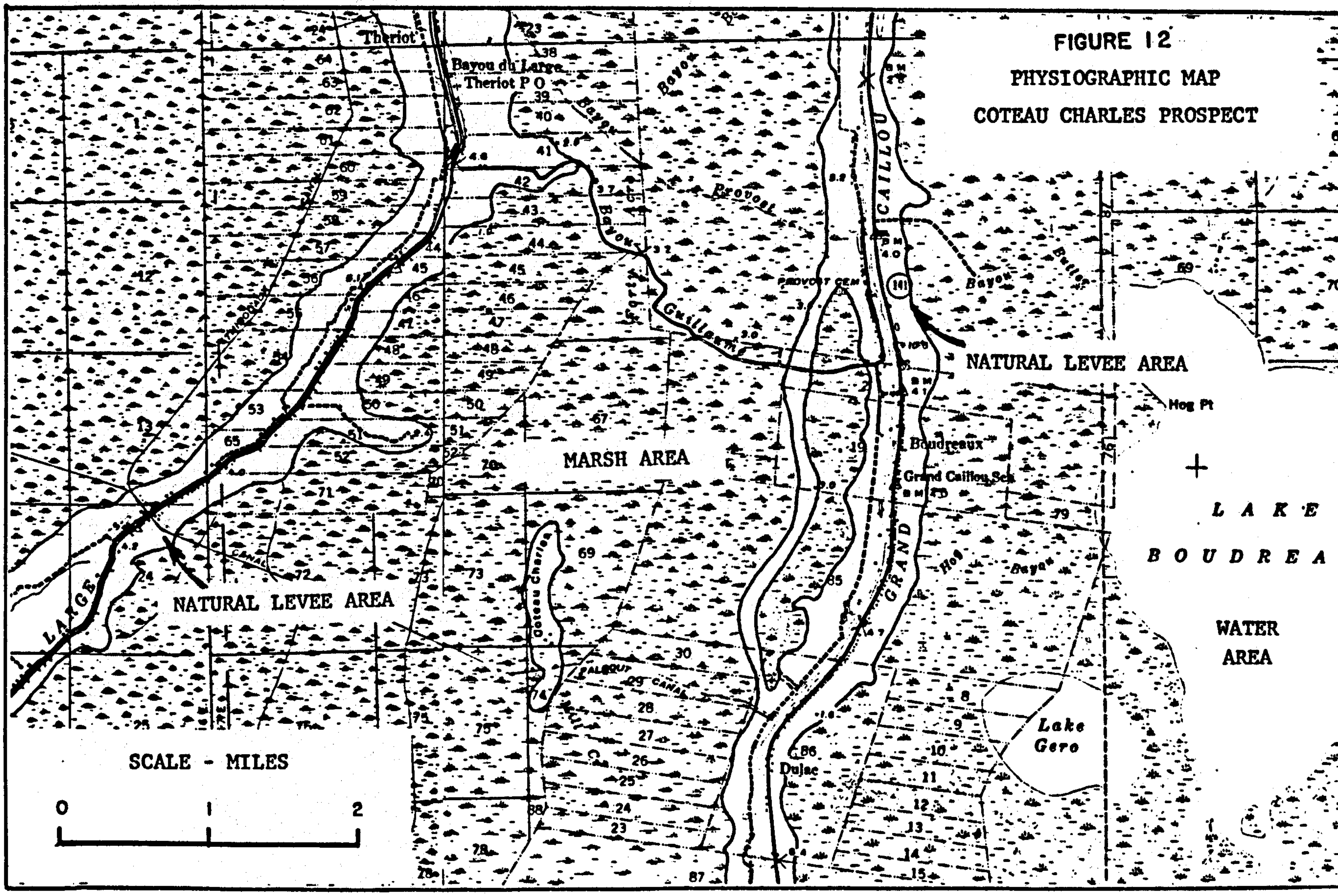
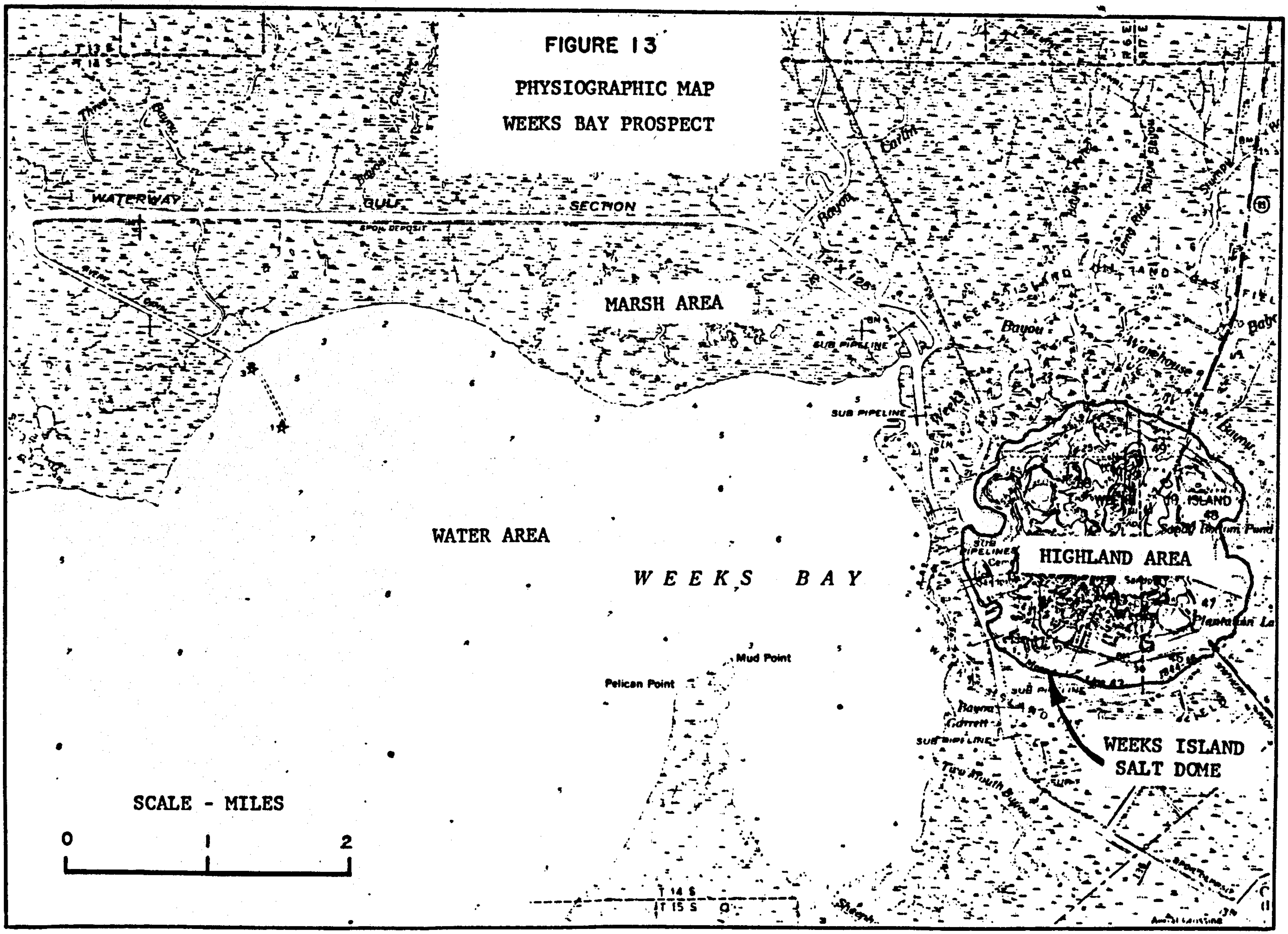


FIGURE 12
PHYSIOGRAPHIC MAP
COTEAU CHARLES PROSPECT
Theriot
Bayou du Large
Theriot P O
Bayou Provost
Bayou Guillaume
Bayou Butler
NATURAL LEVEE AREA
Hog Pt
Boudreaux
Grand Caillou Sch
MARSH AREA
LAKE BOUDREA
GRAND CAILLOU
Hog Bayou
WATER AREA
Lake Gero
Dulac
Coteau Charles
NATURAL LEVEE AREA
LARGE
SCALE - MILES
0
1
2

FIGURE 13

PHYSIOGRAPHIC MAP

WEEKS BAY PROSPECT



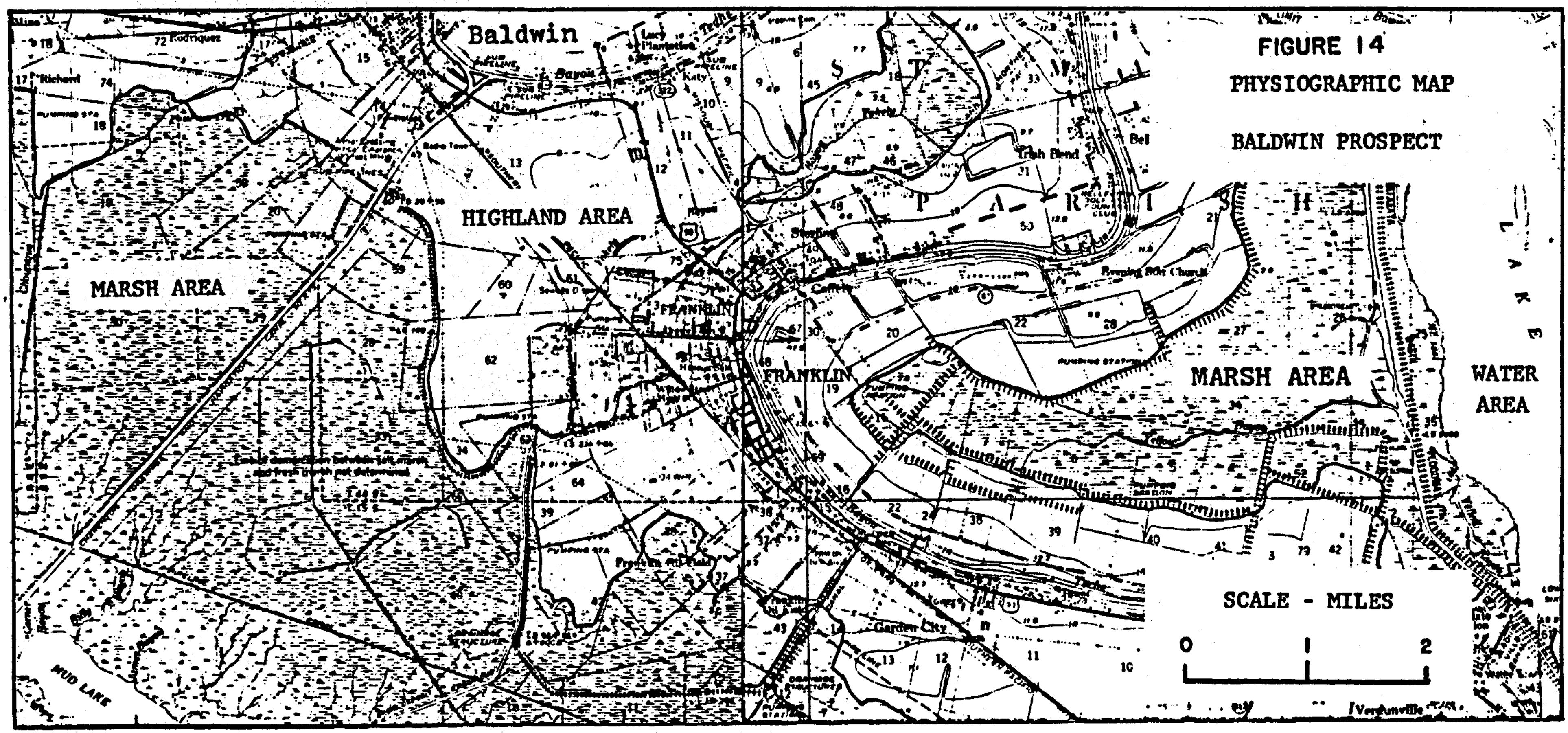


FIGURE 14
PHYSIOGRAPHIC MAP
BALDWIN PROSPECT

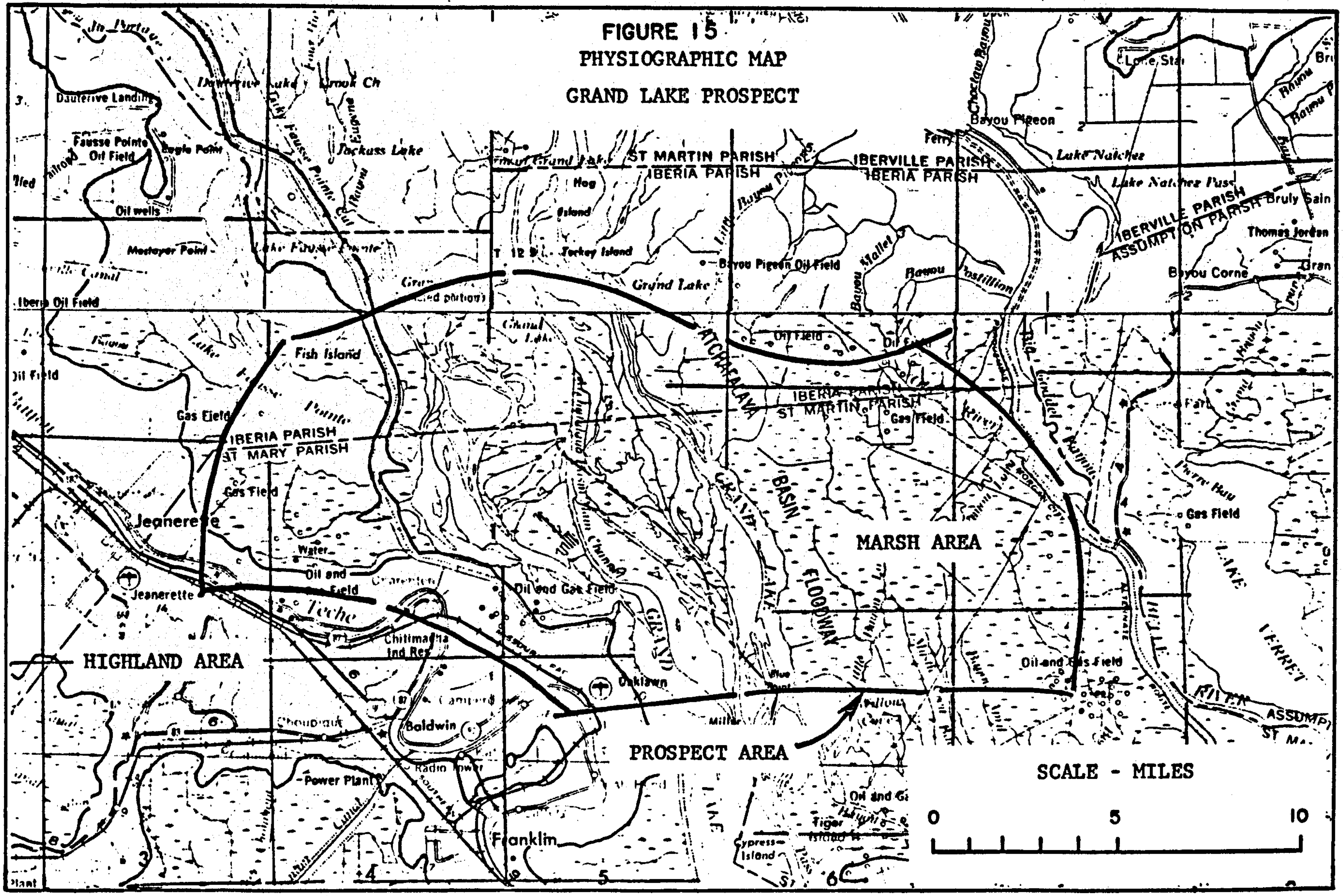


FIGURE 15
PHYSIOGRAPHIC MAP
GRAND LAKE PROSPECT

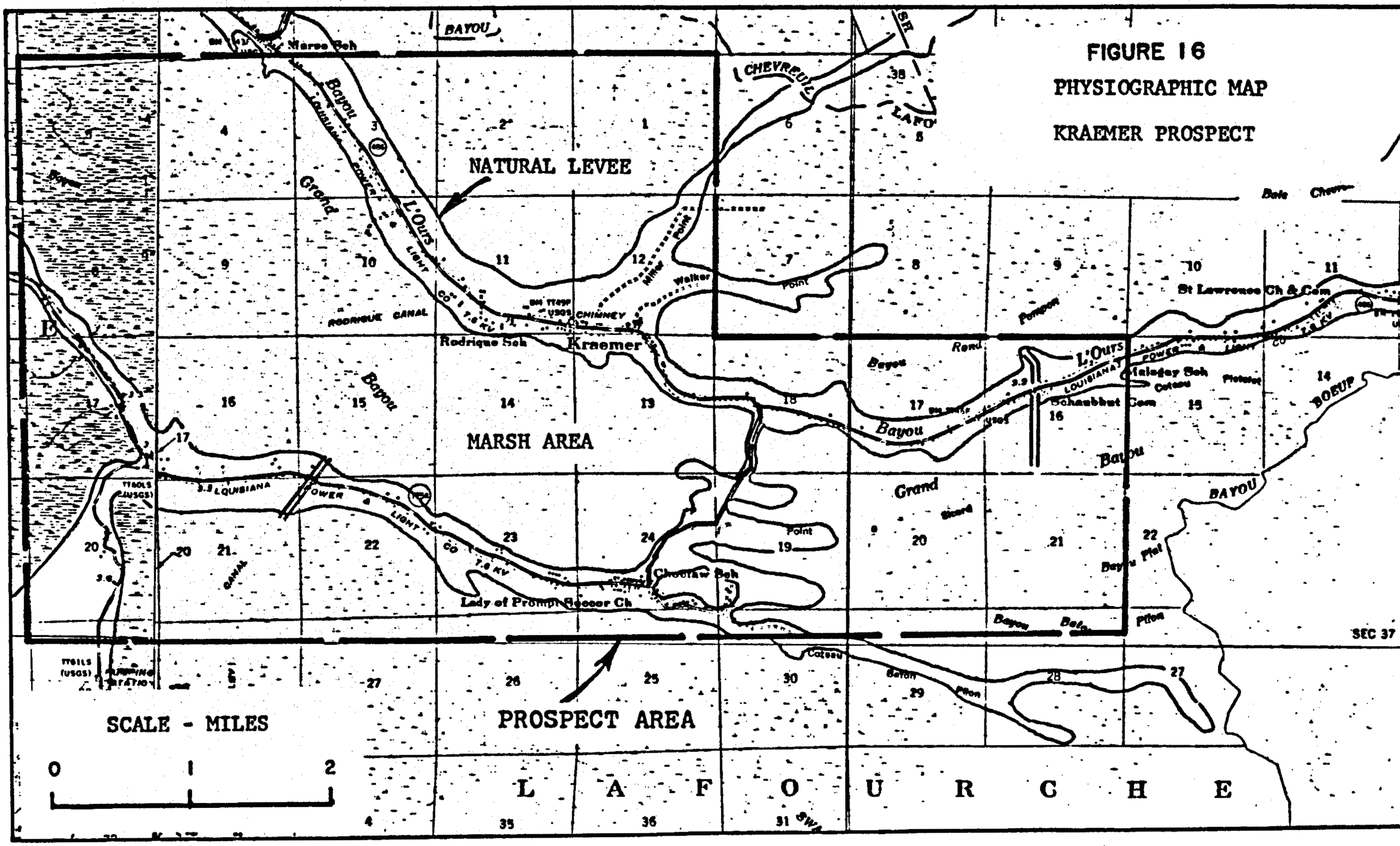


FIGURE 16

PHYSIOGRAPHIC MAP

KRAEMER PROSPECT

GEOPRESSURE ENERGY PROSPECTS
COASTAL LOUISIANA
FIGURE 17

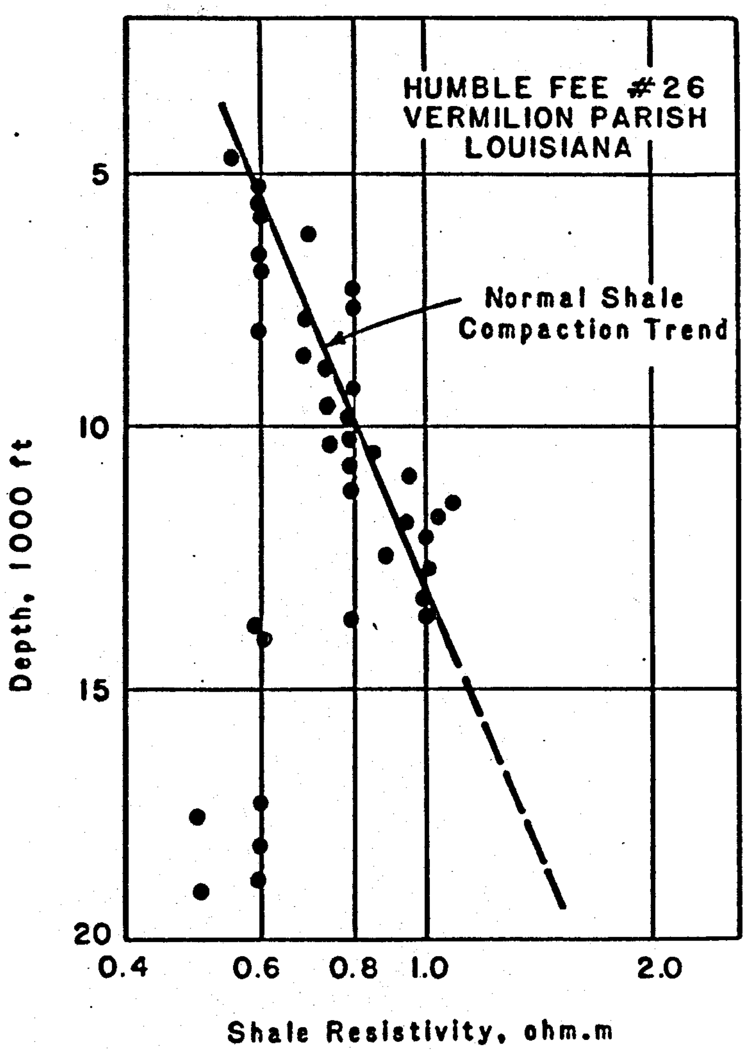


FIGURE 18

SHALE RESISTIVITY PLOT
FOR EXXON FEE NO. 26

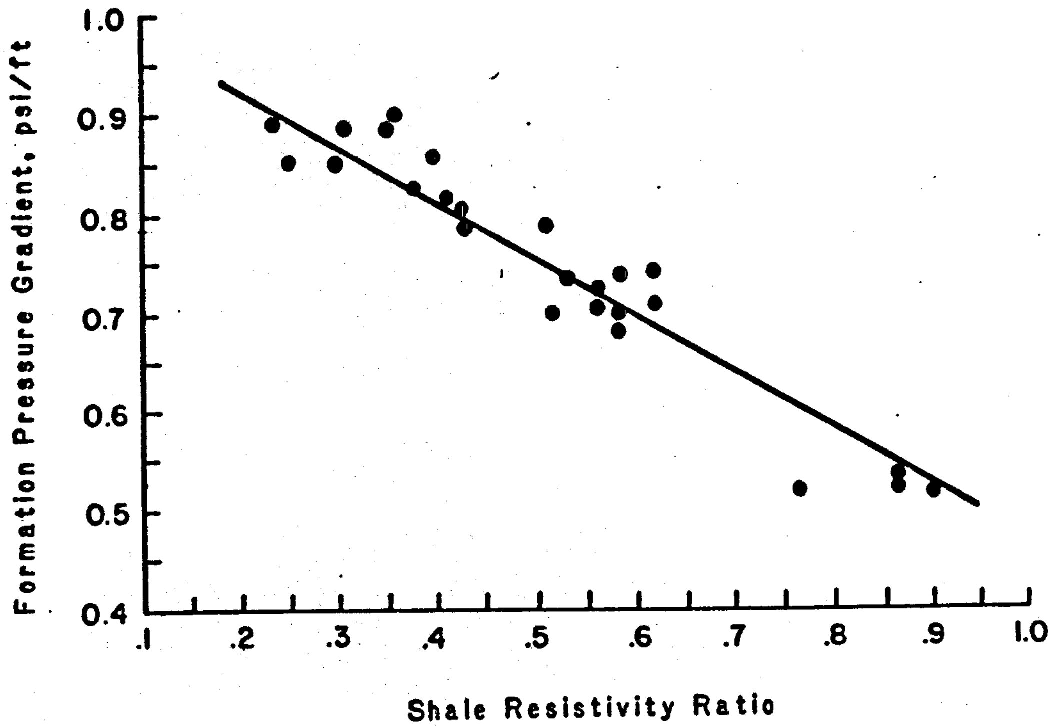


FIGURE 19

PRESSURES FROM SHALE RESISTIVITIES
(after Hottman and Johnson)

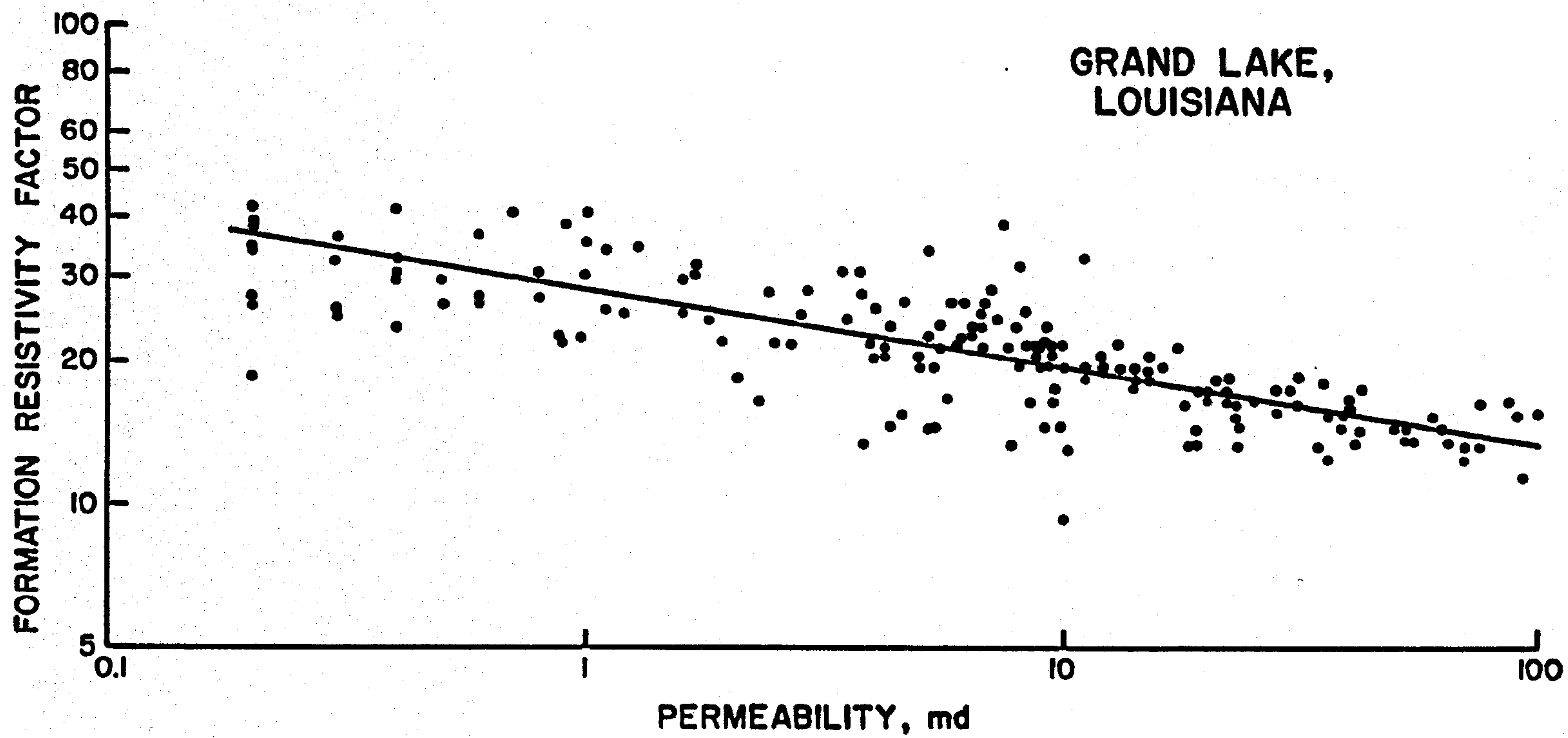
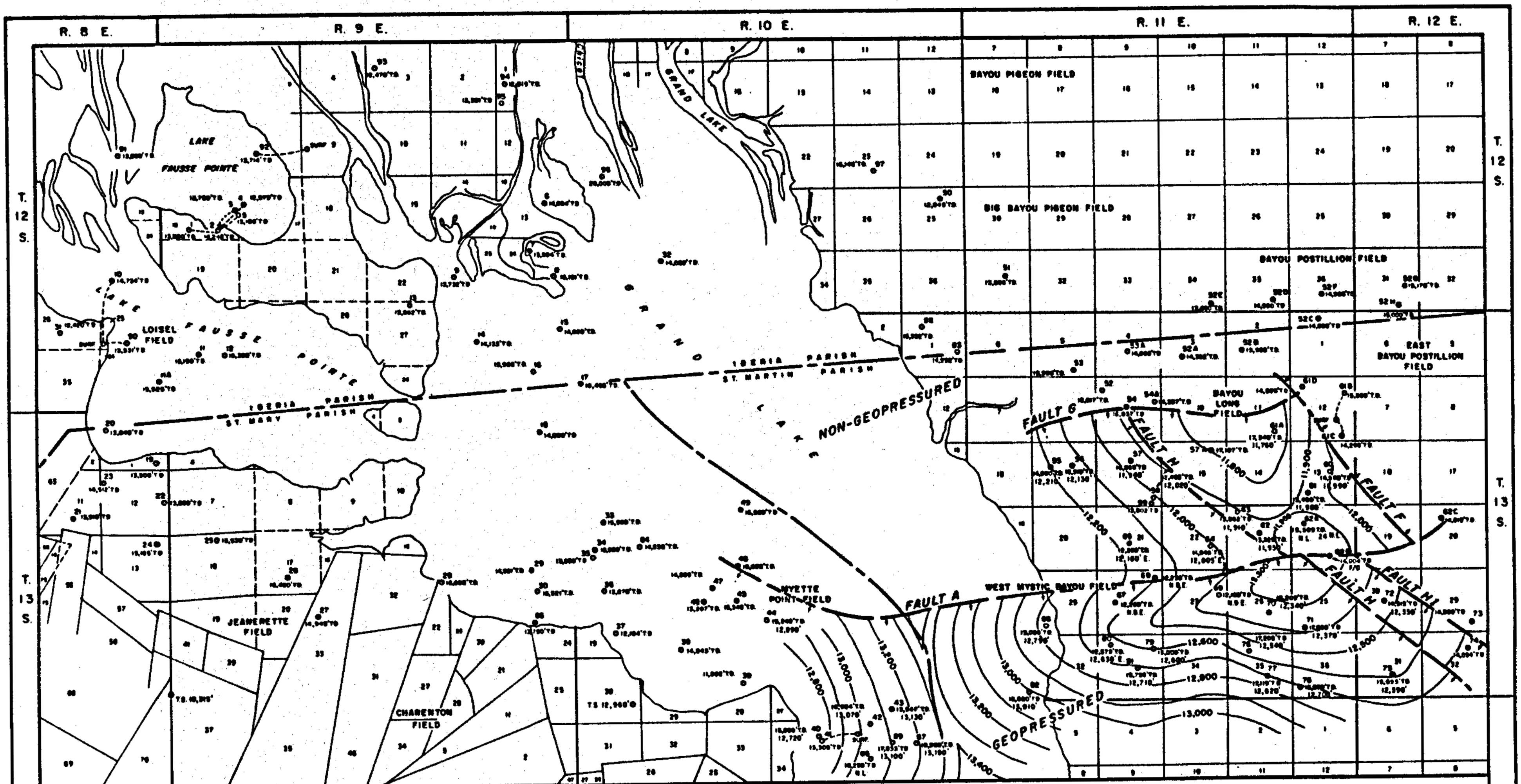


FIGURE 20. CORRELATION OF PERMEABILITY

FIGURE 21 THROUGH 30

GRAND LAKE PROSPECT



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GRAND LAKE GEOPRESSURE ENERGY PROSPECT
ST. MARY, IBERIA, ST. MARTIN PARISHES, LOUISIANA

FIGURE 21

STRUCTURE MAP

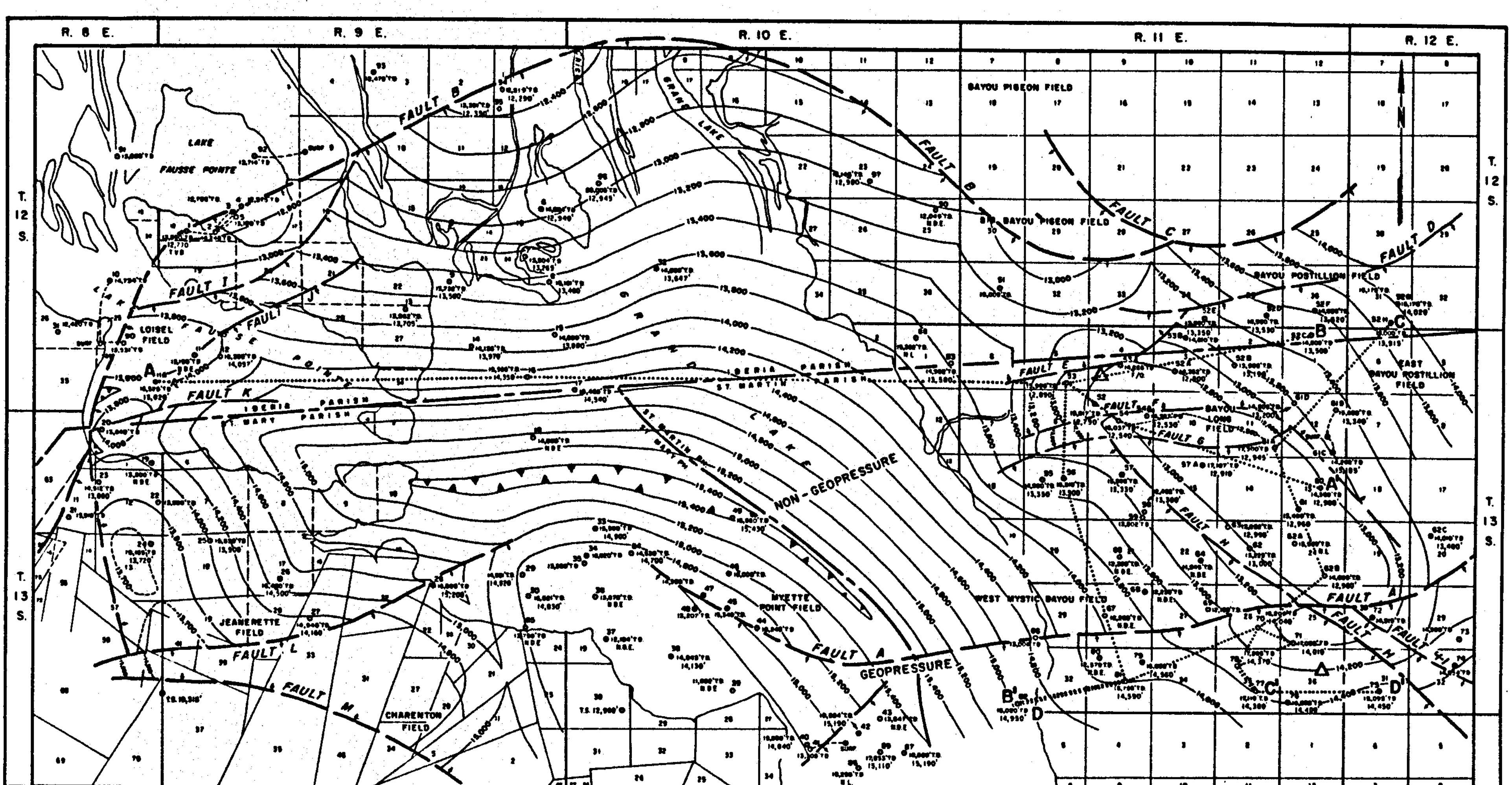
MARGINULINA ASCENIONENSIS MARKER

CONTOUR INTERVAL: 100'

EXPLANATION

o[10]	Well Location & Identification Number	N.D.E.	Not Deep Enough
14,500' T.D.	Total Depth	N.L.	No Log
12,300'	Datum Point / Top of Interval Inspected	E.	Estimated Point
120'	Total Sand Value	F/O	Faulted Out
110'+	Actual Sand Value (Entire Interval Not Penetrated)	T.S.	Top Salt
B.H./SURF.	Bottom Hole / Surface Location	T.V.D.	True Vertical Depth
△	Geopressure Well Sites Proposed		

SCALE - FEET
4000 0 4000 8000



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ST. MARY, IBERIA, ST. MARTIN PARISHES, LOUISIANA

T. 14 S.

FIGURE 22

STRUCTURE MAP

PLANULINA 6 SAND

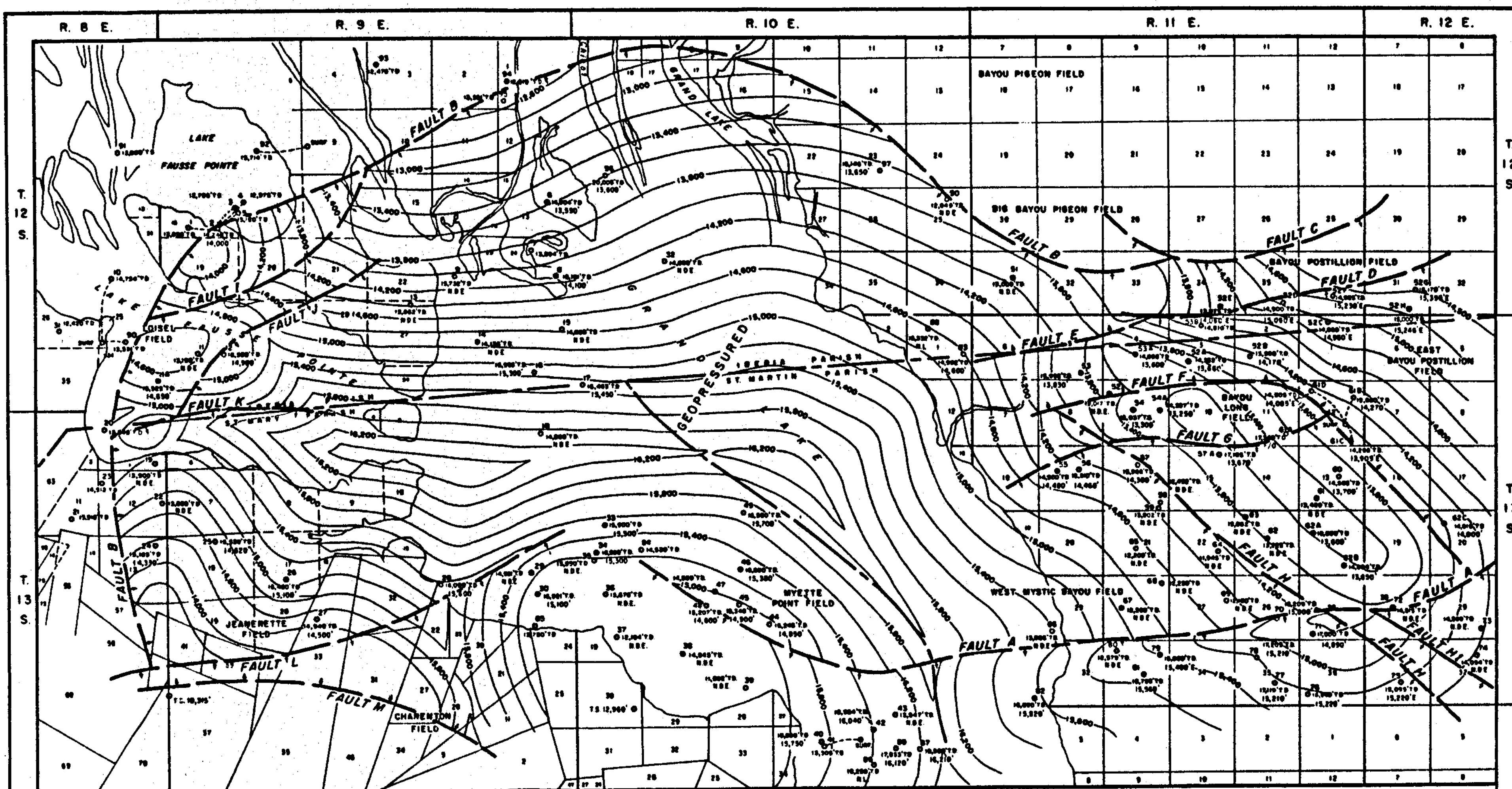
CONTOUR INTERVAL: 200'

EXPLANATION

o[18]	Well Location & Identification Number	N.D.E.	Not Deep Enough	A-A'	Location, East-West Stratigraphic Section
14,900' T.D.	Total Depth	N.L.	No Log	B-B'	Location, North-South Stratigraphic Section
15,300'	Datum Point/Top of Interval Isopached	E.	Estimated Point	C-C'	Location, East-West Stratigraphic Section
125'	Total Sand Value	F/O	Faulted Out	D-D'	Location, North-South Stratigraphic Section
110'+	Actual Sand Value (Entire Interval Not Penetrated)	T.S.	Top Salt		
B.H./SURF.	Bottom Hole/Surface Location	T.V.D.	True Vertical Depth		
△	Geopressure Well Sites Proposed	....	Line Of Section		

SCALE - FEET

R. 8 E. | R. 9 E. | R. 10 E. | R. 11 E. | R. 12 E.



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GRAND LAKE GEOPRESSURE ENERGY PROSPECT
ST. MARY, IBERIA, ST. MARTIN PARISHES, LOUISIANA

FIGURE 23

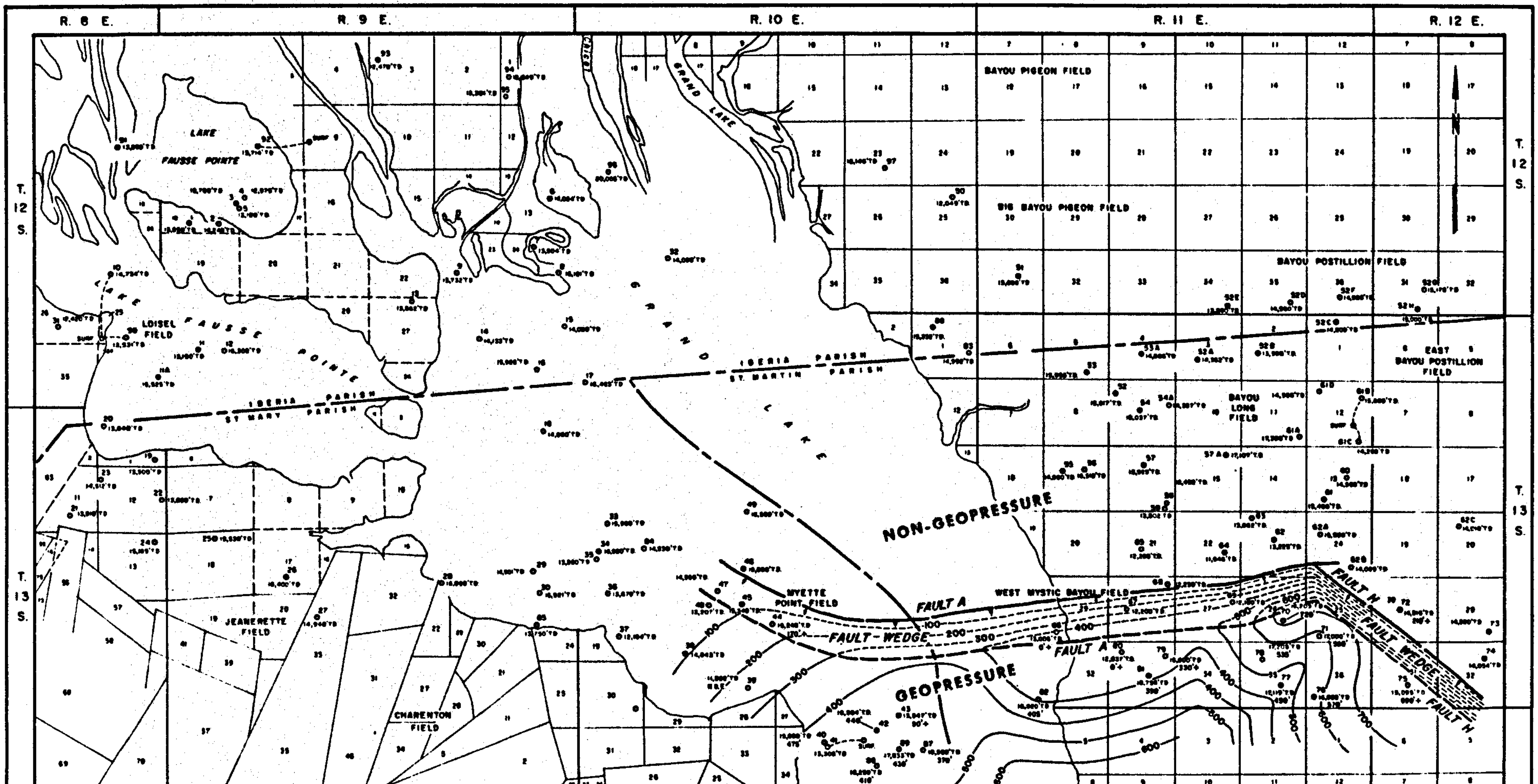
STRUCTURE MAP
PLANULINA MARKER

CONTOUR INTERVAL: 200'

EXPLANATION

- Well Location & Identification Number
- 14,000' T.D. — Total Depth
- 15,300' — Datum Point / Top of Interval Isopached
- 125' — Total Sand Value
- 110'+ — Actual Sand Value (Entire Interval Not Penetrated)
- B.H./SURF. — Bottom Hole / Surface Location
- △ — Geopressure Well Sites Proposed
- N.D.E. — Not Deep Enough
- N.L. — No Log
- E. — Estimated Point
- F/O — Faulted Out
- T.S. — Top Salt
- T.V.D. — True Vertical Depth

SCALE - FEET



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GRAND LAKE GEOPRESSURE ENERGY PROSPECT

ST. MARY, IBERIA, ST. MARTIN PARISHES, LOUISIANA

FIGURE 24

NET SAND ISOPACH MAP

INTERVAL BETWEEN MARGINULINA ASCENSIONENSIS MARKER & PLANULINA MARKER

CONTOUR INTERVAL: 100'

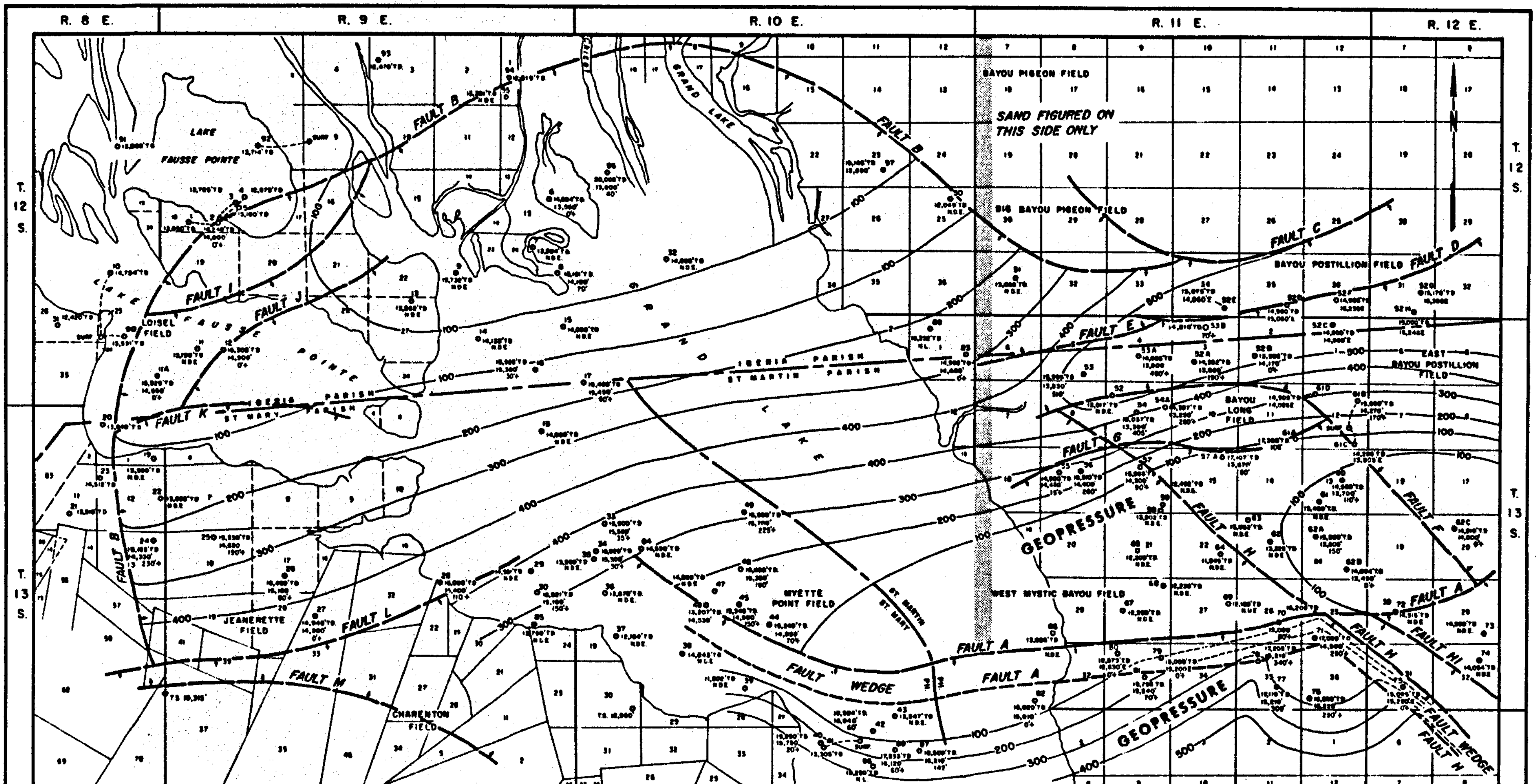
EXPLANATION

o[18]	Well Location & Identification Number	N.D.E.	Not Deep Enough
10,500' T.D.	Total Depth	N.L.	No Log
10,300'	Datum Point / Top of Interval Isopached	E.	Estimated Point
125'	Total Sand Value	F/O	Faulted Out
110'+	Actual Sand Value (Entire Interval Not Penetrated)	T.S.	Top Salt
B.H./SURF.	Bottom Hole / Surface Location	T.V.D.	True Vertical Depth
△	Geopressure Well Sites Proposed		

SCALE - FEET 4000 0 4000 8000

T. 14 S.

R. 8 E. R. 9 E. R. 10 E. R. 11 E. R. 12 E.



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GRAND LAKE GEOPRESSURE ENERGY PROSPECT
ST. MARY, IBERIA, ST. MARTIN PARISHES, LOUISIANA

FIGURE 25

NET SAND ISOPACH MAP

INTERVAL BETWEEN PLANULINA MARKER & CORRELATION POINT 9

CONTOUR INTERVAL: 100'

EXPLANATION

○[15]	Well Location & Identification Number	N.D.E.	Not Deep Enough
14,500' T.D.	Total Depth	N.L.	No Log
13,300'	Datum Point / Top of Interval Isopached	E.	Estimated Point
125'	Total Sand Value	F/O	Faulted Out
110'+	Actual Sand Value (Entire Interval Not Penetrated)	T.S.	Top Salt
B.H./SURF.	Bottom Hole / Surface Location	T.V.D.	True Vertical Depth
△	Geopressure Well Sites Proposed		

SCALE - FEET

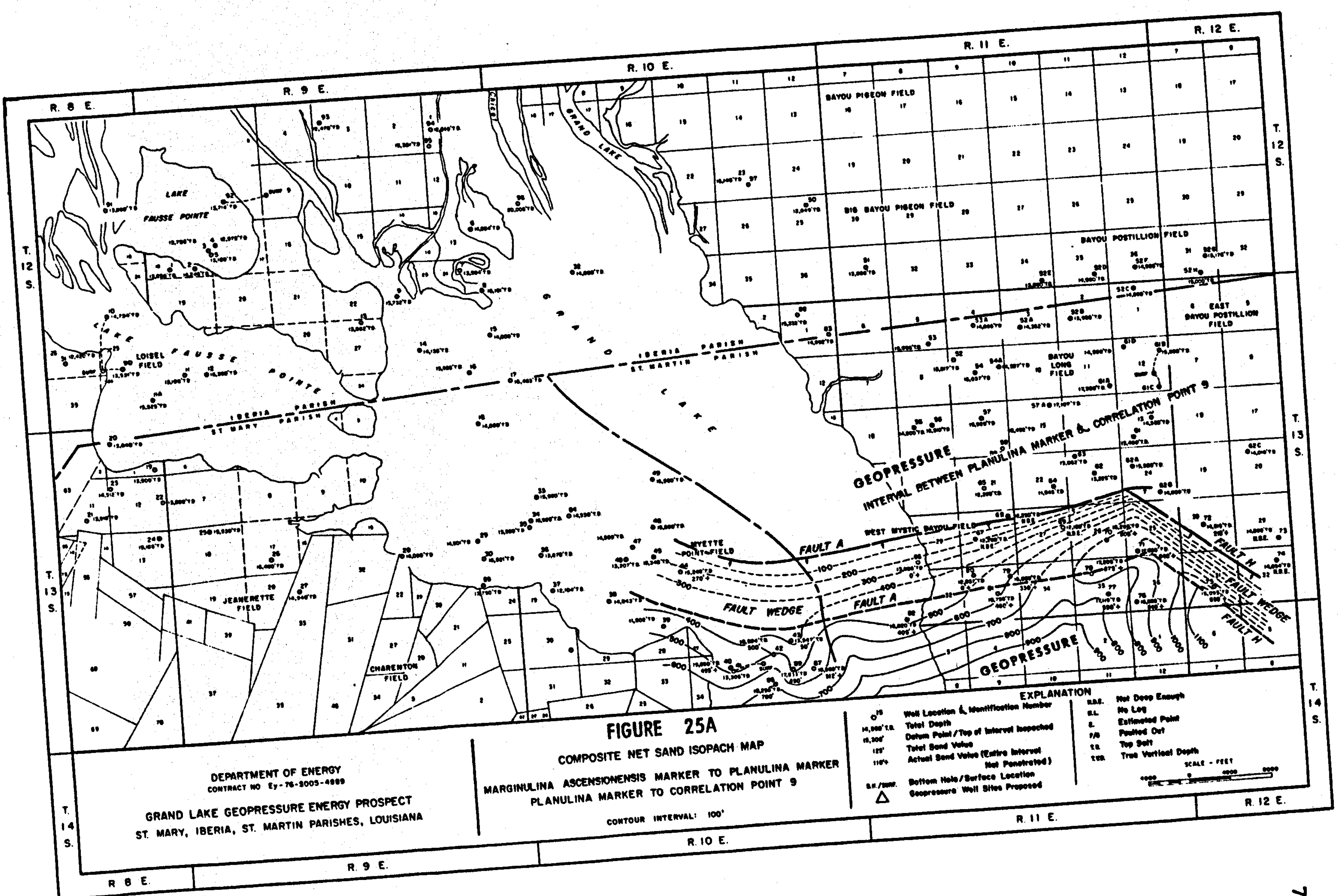
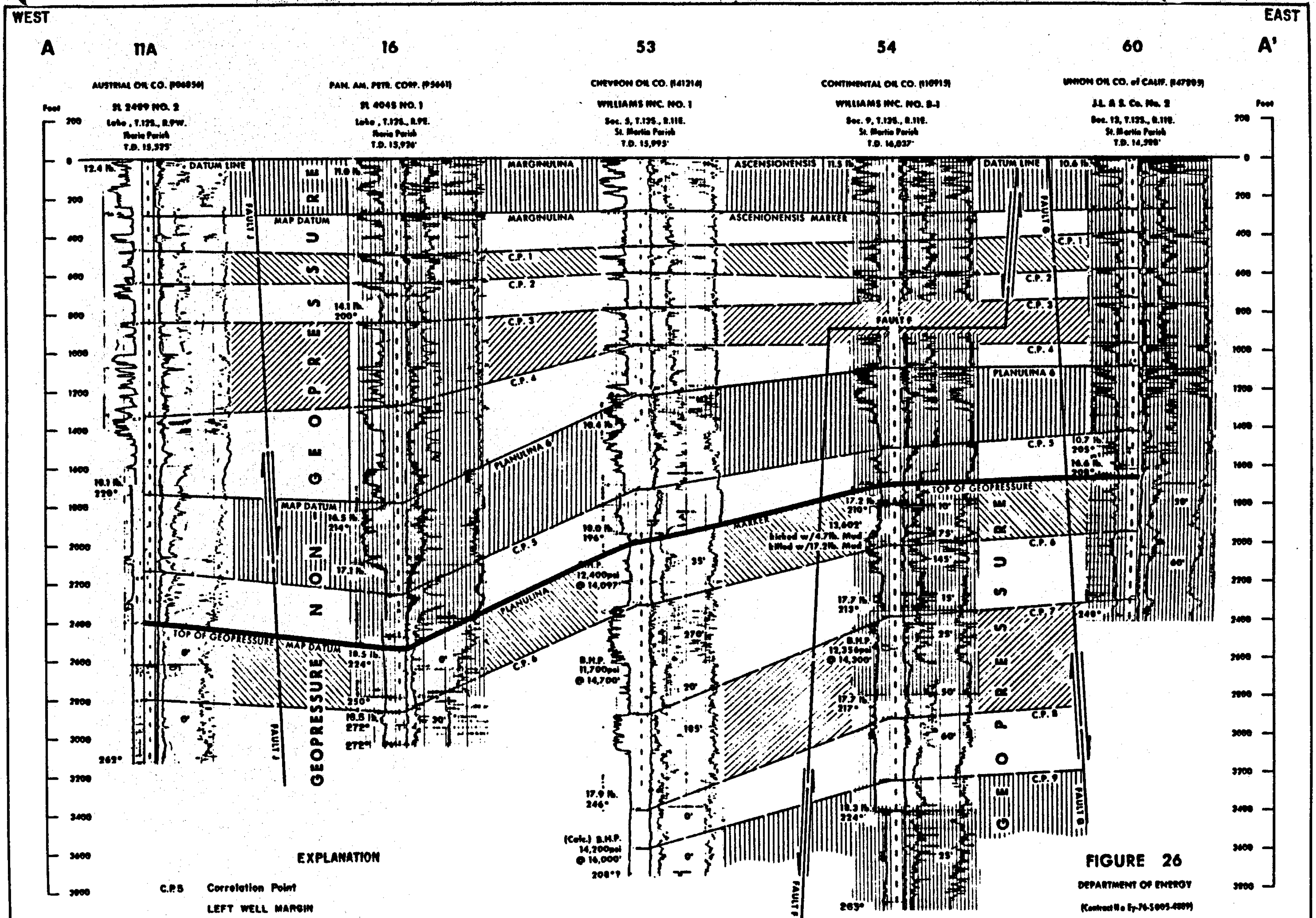


FIGURE 25A

COMPOSITE NET SAND ISOPACH MAP

MARGINULINA ASCENSIONENSIS MARKER TO PLANULINA MARKER
PLANULINA MARKER TO CORRELATION POINT 9



EXPLANATION

C.P.5	Correlation Point
	LEFT WELL MARGIN
17.5 lb.	Mud Weight at Start of Electric Log Run
260°	Measured Bottom Hole Temperature at Bottom of Electric Log Run
14,283 psi	Measured Bottom Hole Pressure
	RIGHT WELL MARGIN
126'	Total Sand Between Correlation Points

FIGURE 26

DEPARTMENT OF ENERGY

GRAND LAKE GEOPRESSURE ENERGY PROSPECT

ST. MARY, IBERIA & ST. MARTIN PARISHES, LOUISIANA

EAST-WEST STRATIGRAPHIC SECTION A-A'

HORIZONTAL SCALE: NONE

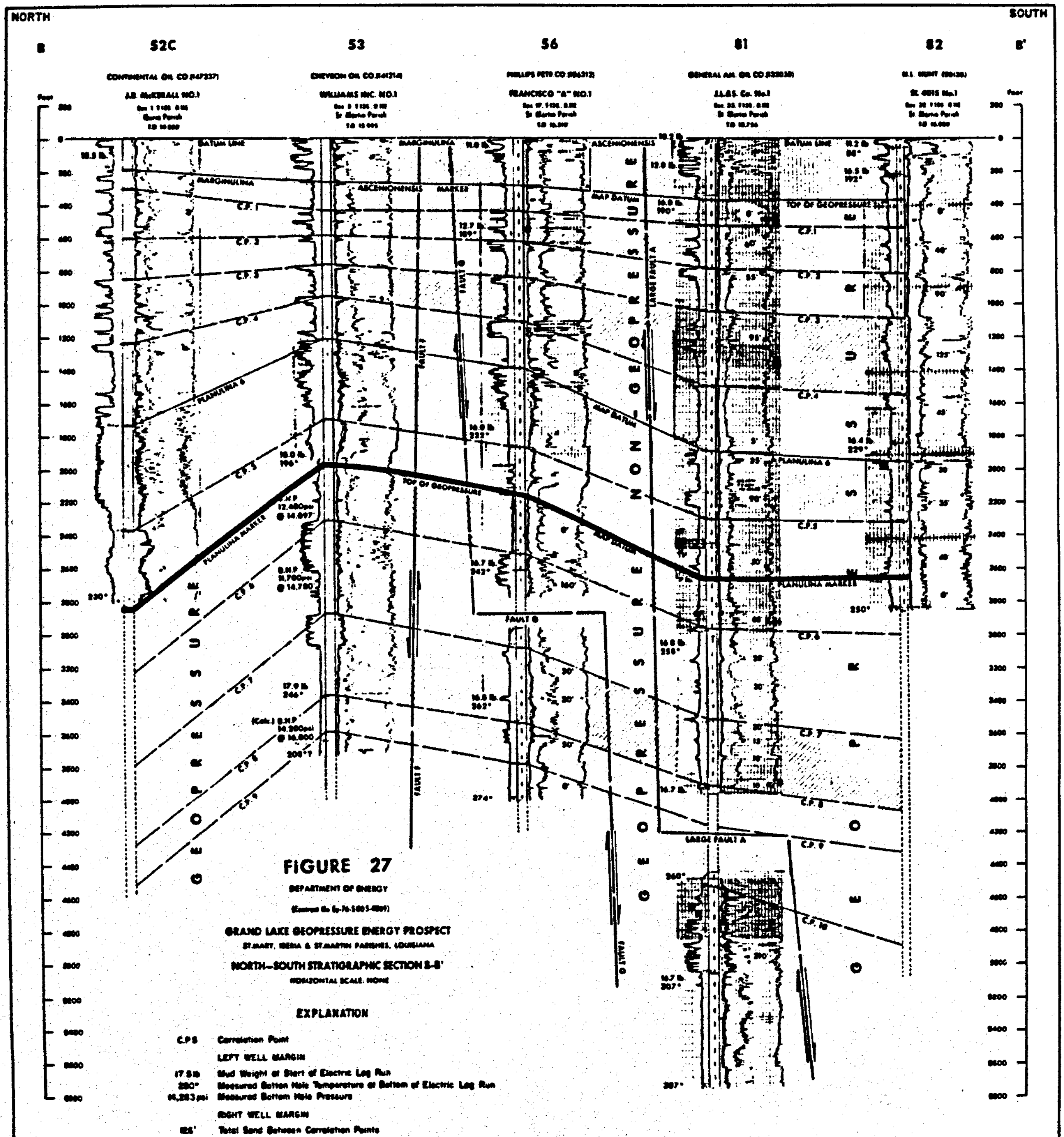


FIGURE 27
DEPARTMENT OF ENERGY
GRAND LAKE GEOPRESSURE ENERGY PROSPECT
ST. MARY, IBERIA & ST. MARTIN PARISHES, LOUISIANA
NORTH–SOUTH STRATIGRAPHIC SECTION B-B'
HORIZONTAL SCALE: NONE

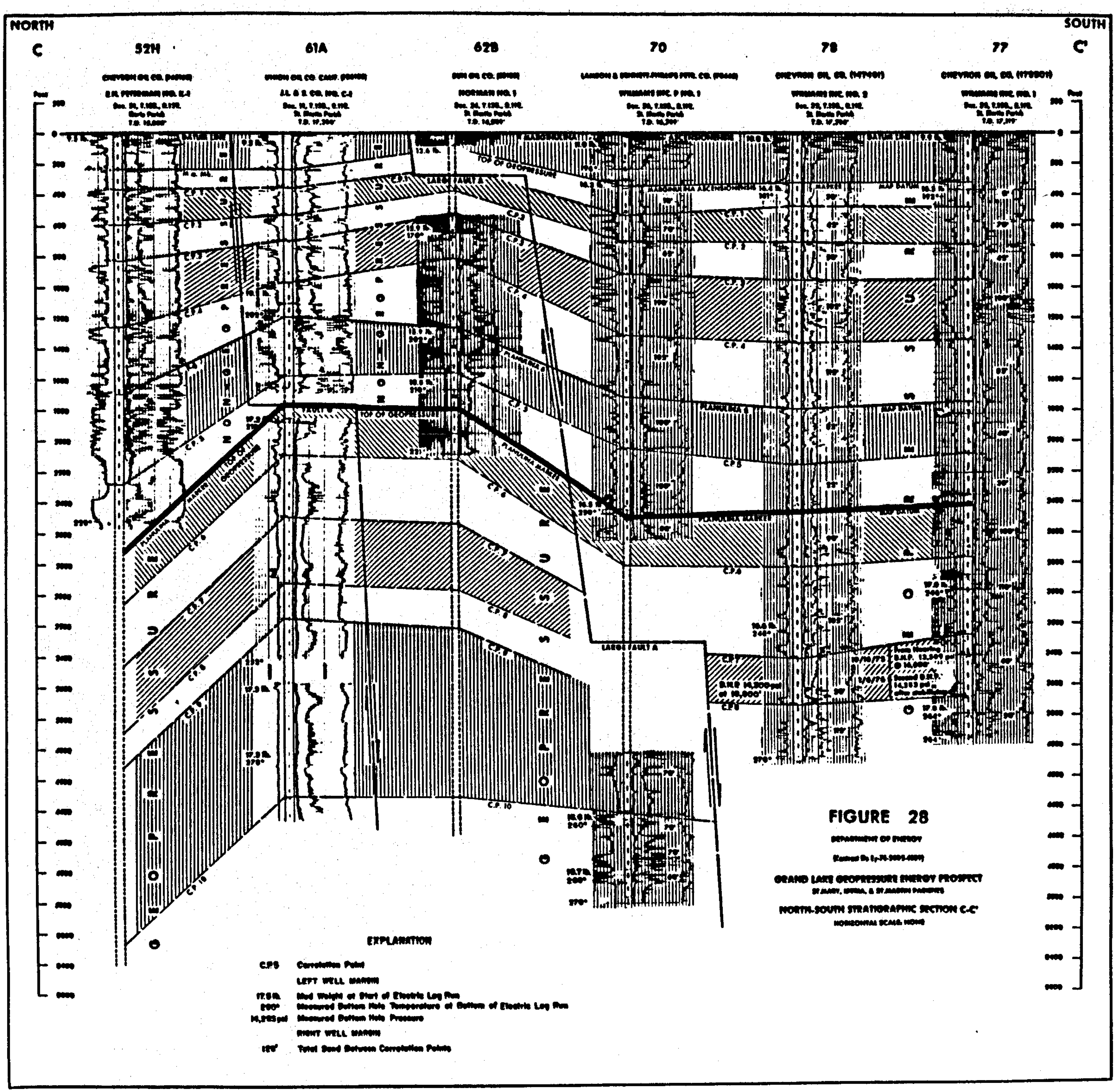


FIGURE 28

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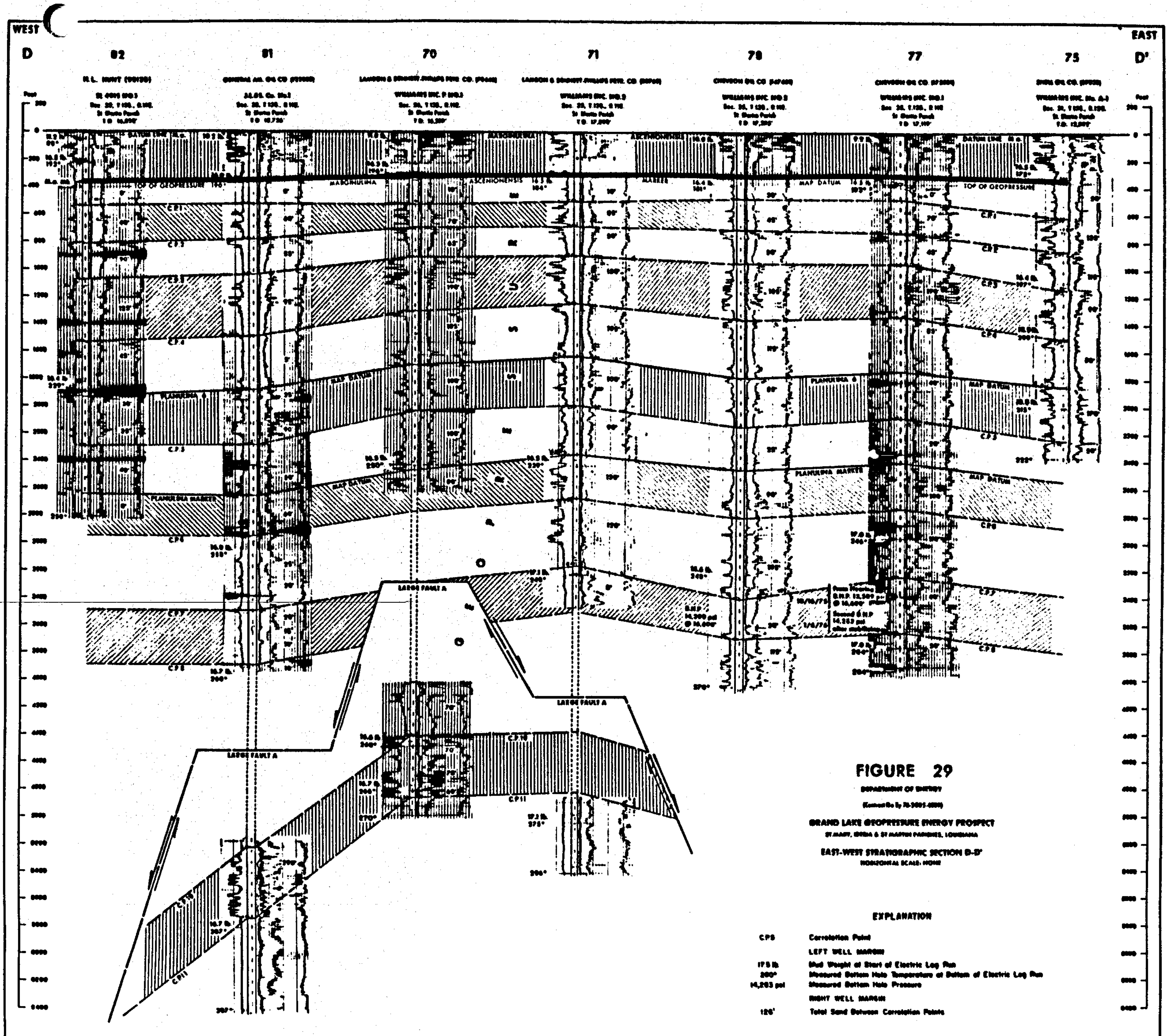
GRAND LAKE GEOPRESSURE ENERGY PROSPECT

NORTH-SOUTH STRATIGRAPHIC SECTION C-C'

HORIZONTAL SCALE: NONE



WEST
EAST
D
D'
82
81
70
71
78
77
75
Feet
Feet
LARGE FAULT A
LARGE FAULT A
LARGE FAULT A
FIGURE 29
DEPARTMENT OF ENERGY
GRAND LAKE GEOPRESSURE ENERGY PROSPECT
ST. MARY, IBERIA & ST MARTIN PARISHES, LOUISIANA
EAST-WEST STRATIGRAPHIC SECTION D-D'
HORIZONTAL SCALE: NONE
EXPLANATION
C.P.8 Correlation Point
LEFT WELL MARGIN
17.5 lb. Mud Weight at Start of Electric Log Run
200° Measured Bottom Hole Temperature at Bottom of Electric Log Run
14,283 psi Measured Bottom Hole Pressure
RIGHT WELL MARGIN
126' Total Sand Between Correlation Points

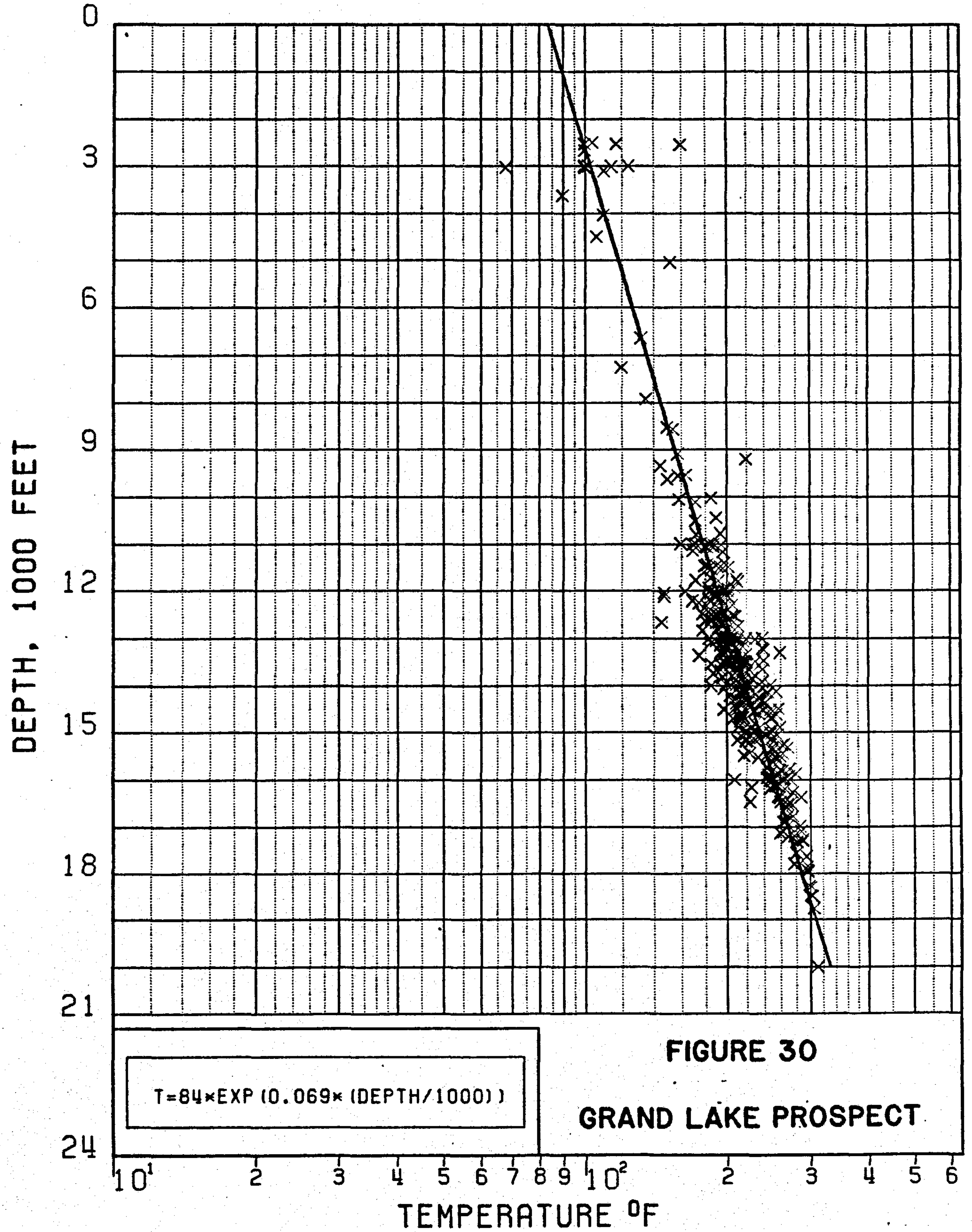
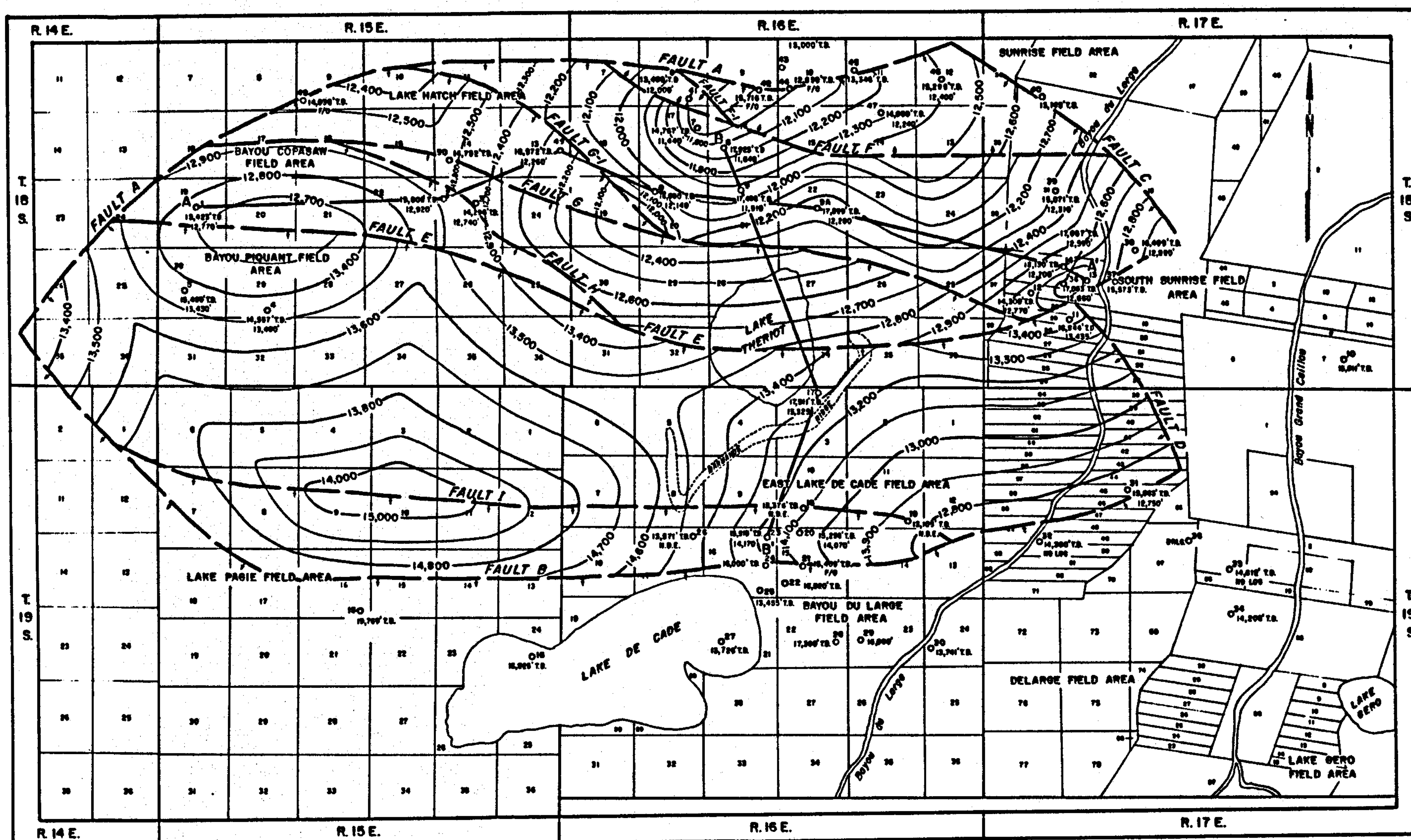


FIGURE 30

GRAND LAKE PROSPECT

FIGURE 31 THROUGH 40

LAKE THERIOT PROSPECT



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LAKE THERIOT GEOPRESSURE ENERGY PROSPECT
TERREBONNE PARISH, LOUISIANA

FIGURE 31

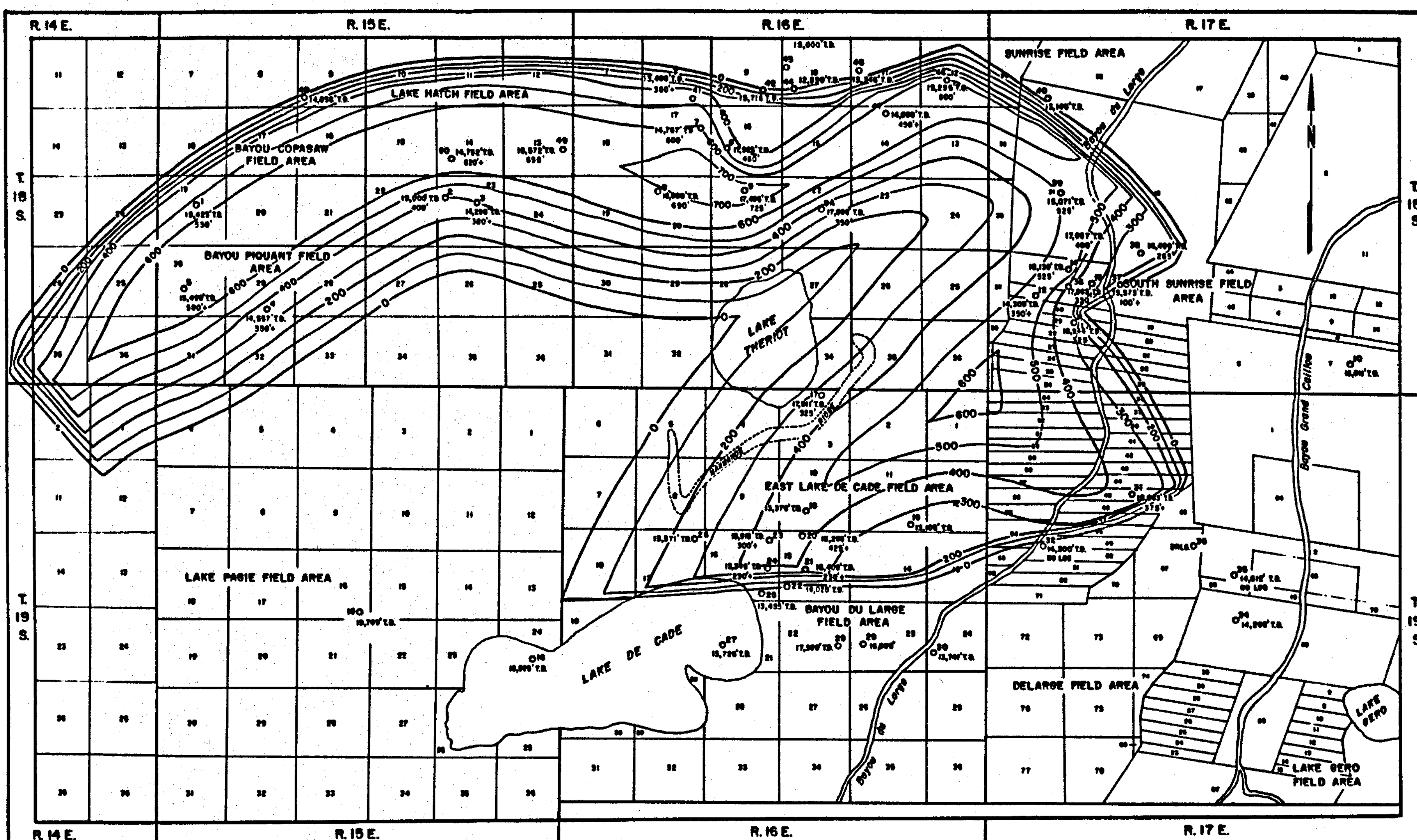
STRUCTURE MAP
TOP STRATIGRAPHIC INTERVAL "A"

CONTOUR INTERVAL 100'

EXPLANATION

o[29]	Well Location & Identification Number
13,740'T.D.	Total Depth
10,300'	Datum Point
300'	Total Sand Value
279+	Actual Sand Value (Entire Interval Not Penetrated)
E	Estimated Point
N.D.E.	Not Deep Enough
N.L.	No Log
B.H./S.L.	Bottom Hole / Surface Location
F/O	Faulted Out

SCALE - MILES



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LAKE THERIOT GEOPRESSURE ENERGY PROSPECT
TERREBONNE PARISH, LOUISIANA

FIGURE 32

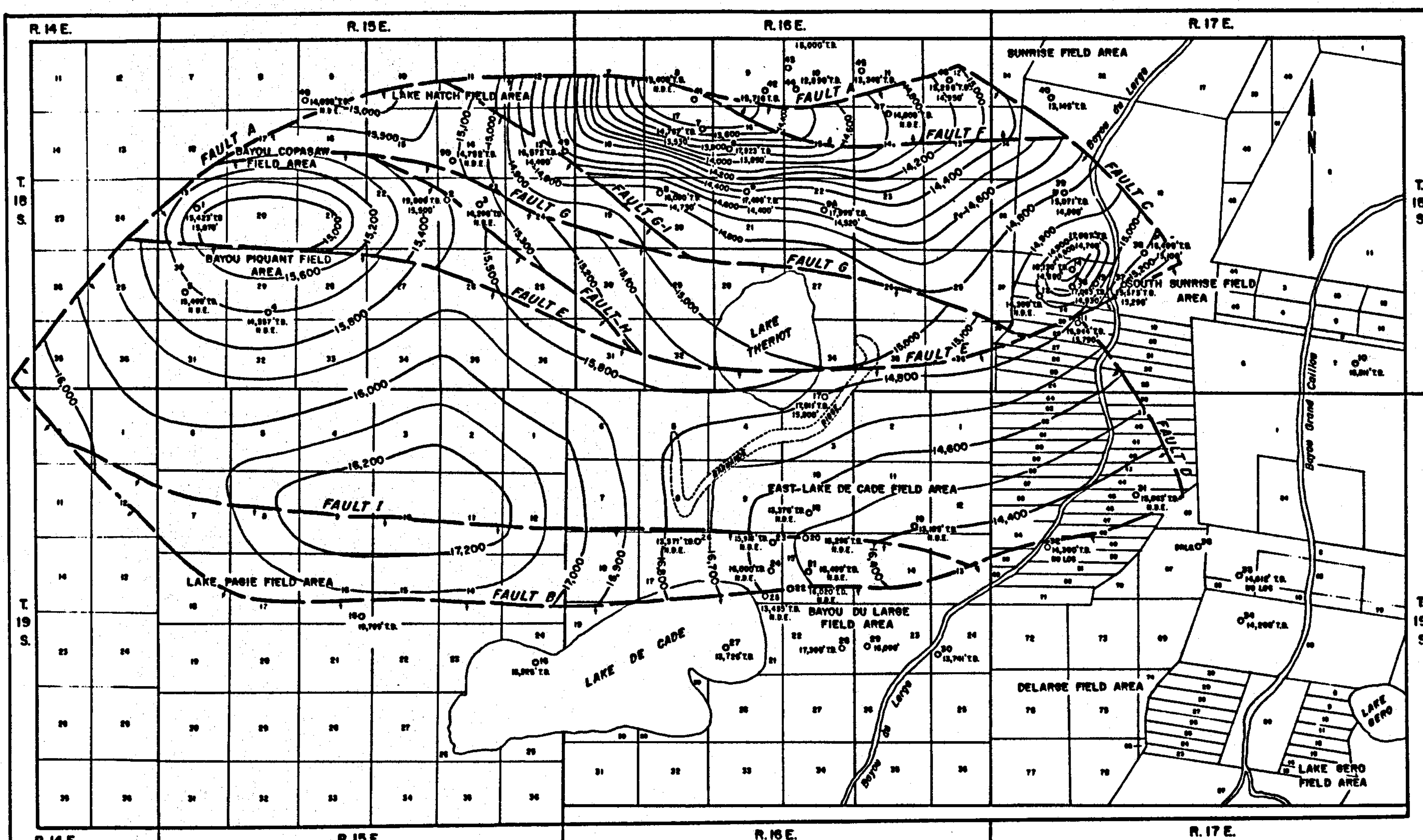
NET SAND ISOPACH MAP
STRATIGRAPHIC INTERVAL "A"

CONTOUR INTERVAL: 100'

EXPLANATION

- Well Location & Identification Number
- Total Depth
- Datum Point
- Total Sand Value
- Actual Sand Value (Entire Interval Not Penetrated)
- Estimated Point
- N.D.E. Not Deep Enough
- N.L. No Log
- B.H./S.L. Bottom Hole / Surface Location
- F/O Faulted Out

SCALE - MILES



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LAKE THERIOT GEOPRESSURE ENERGY PROSPECT
TERREBONNE PARISH, LOUISIANA

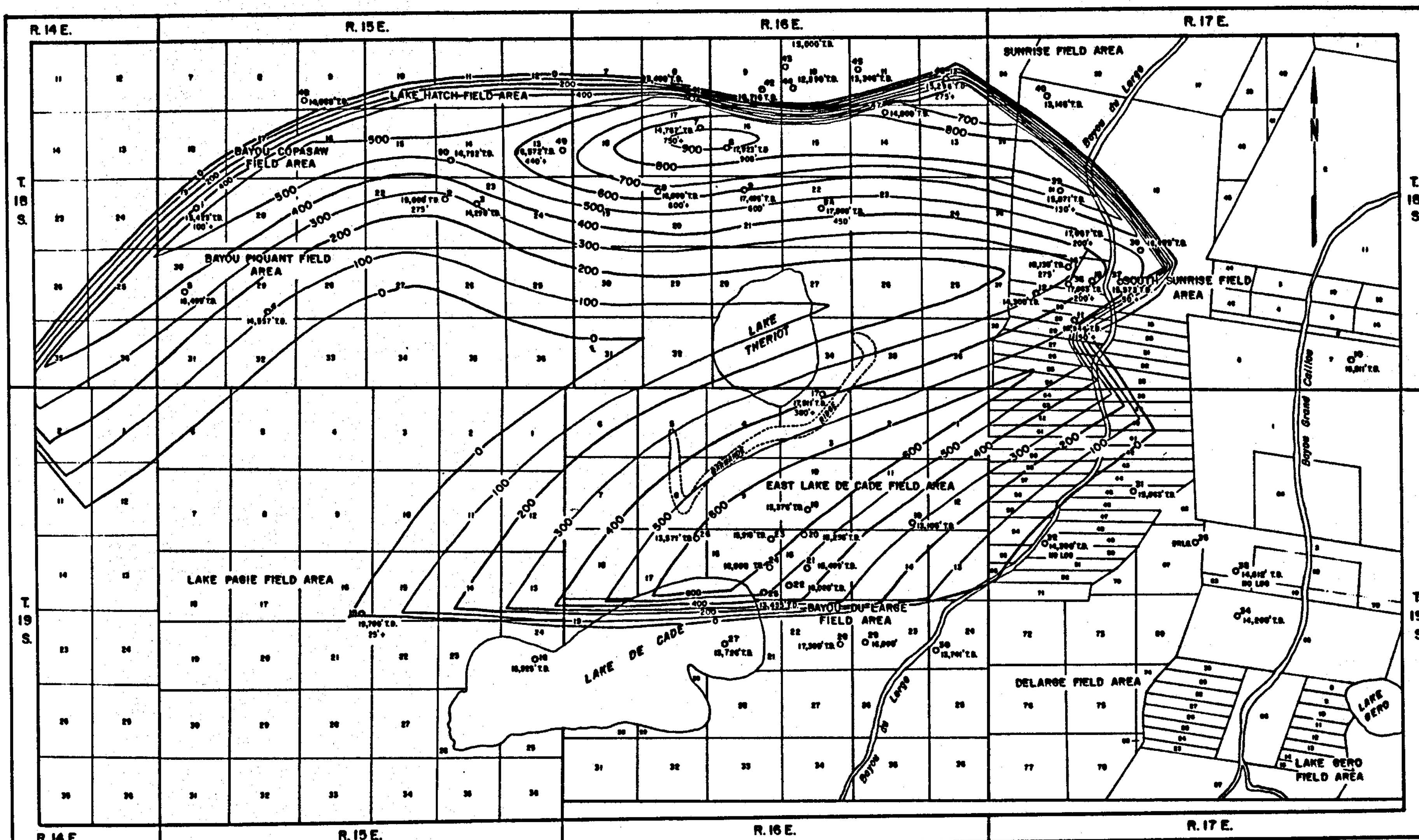
FIGURE 33

STRUCTURE MAP
TOP STRATIGRAPHIC INTERVAL "B"
CONTOUR INTERVAL: 100'

EXPLANATION

o[20]	Well Location & Identification Number
13,700'T.D.	Total Depth
10,300'	Datum Point
300'	Total Sand Value
275+	Actual Sand Value (Entire Interval Not Penetrated)
E	Estimated Point
N.D.E.	Not Deep Enough
N.L.	No Log
B.H./S.L.	Bottom Hole / Surface Location
F/O	Faulted Out

SCALE - MILES



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LAKE THERIOT GEOPRESSURE ENERGY PROSPECT
TERREBONNE PARISH, LOUISIANA

FIGURE 34

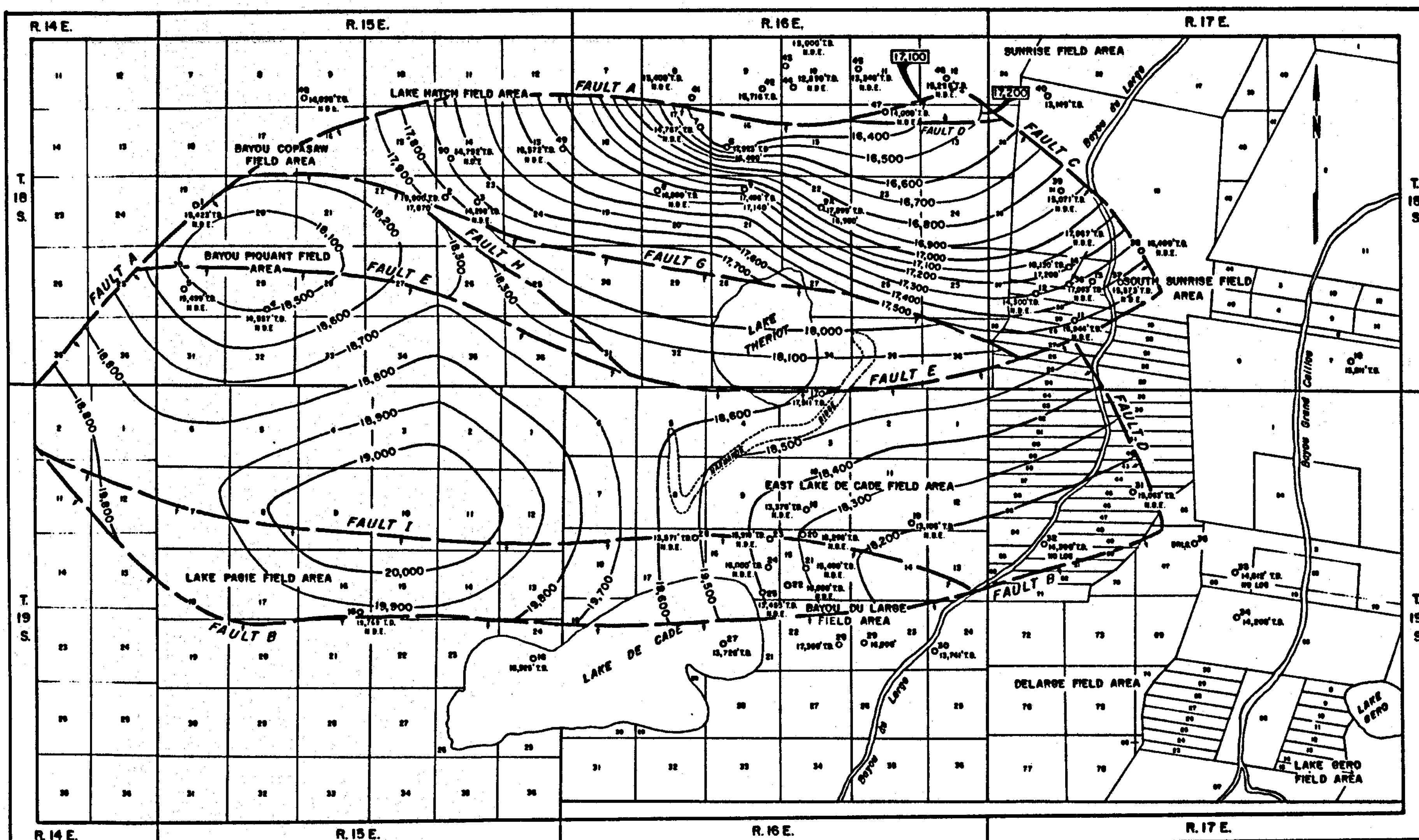
NET SAND ISOPACH MAP
STRATIGRAPHIC INTERVAL "B"

CONTOUR INTERVAL: 100'

EXPLANATION

O[29]	Well Location & Identification Number
13,740'T.D.	Total Depth
16,302'	Datum Point
300'	Total Sand Value
275+	Actual Sand Value (Entire Interval Not Penetrated)
E	Estimated Point
N.D.E.	Not Deep Enough
N.L.	No Log
B.H./S.L.	Bottom Hole / Surface Location
F/O	Faulted Out

SCALE - MILES



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LAKE THERIOT GEOPRESSURE ENERGY PROSPECT

TERREBONNE PARISH, LOUISIANA

FIGURE 35

STRUCTURE MAP

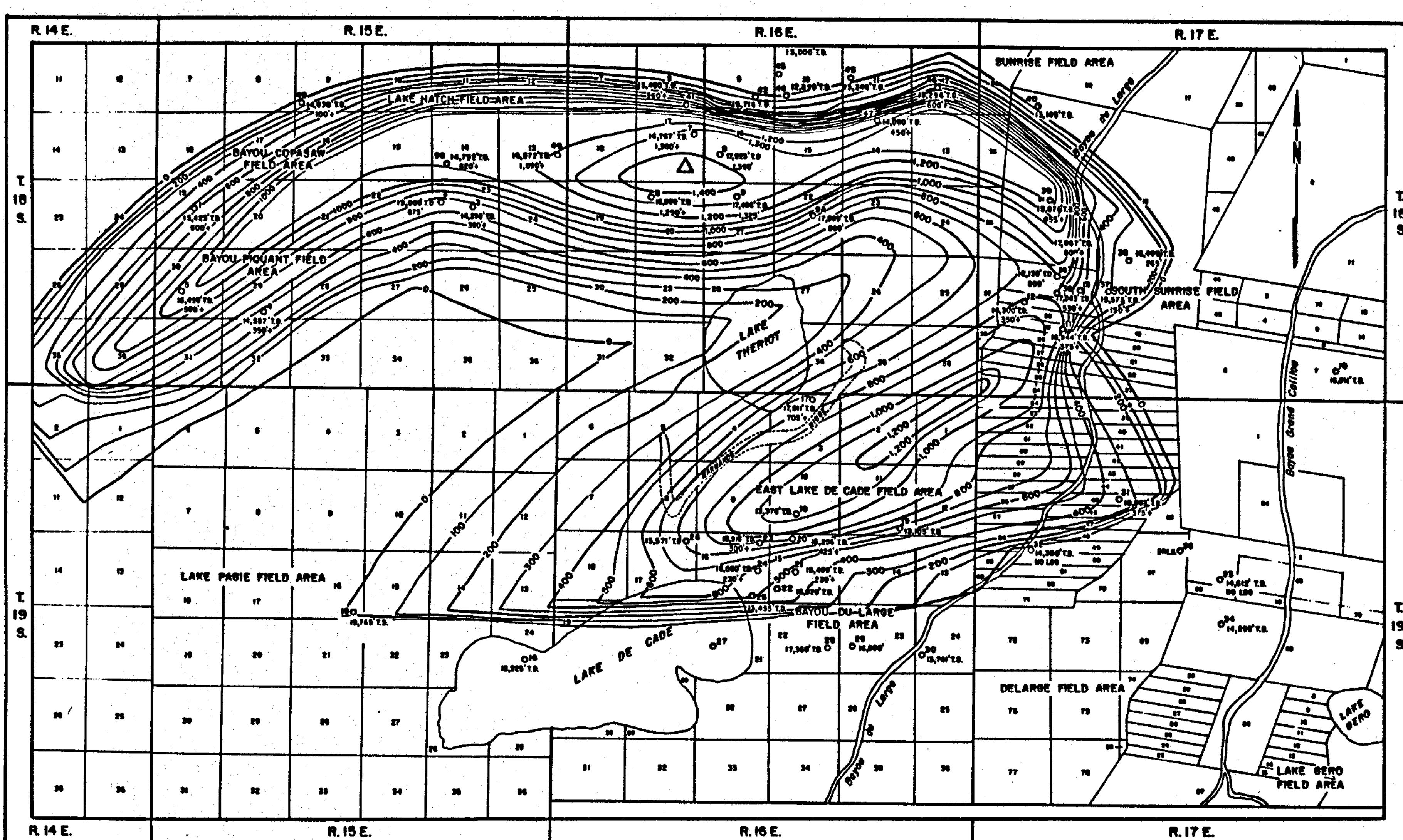
BASE STRATIGRAPHIC INTERVAL "B"

CONTOUR INTERVAL: 100'

EXPLANATION

O[20]	Well Location & Identification Number
13,740' T.D.	Total Depth
16,300'	Datum Point
390'	Total Sand Value
279+	Actual Sand Value (Entire Interval Not Penetrated)
E	Estimated Point
N.D.E.	Not Deep Enough
N.L.	No Log
B.H./S.L.	Bottom Hole / Surface Location
F/O	Faulted Out

SCALE - MILES



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LAKE THERIOT GEOPRESSURE ENERGY PROSPECT

TERREBONNE PARISH, LOUISIANA

FIGURE 36

COMPOSITE NET SAND ISOPACH MAP

STRATIGRAPHIC INTERVALS "A" & "B"

CONTOUR INTERVAL: 100'

EXPLANATION

o[29]	Well Location & Identification Number
13,740'T.D.	Total Depth
10,300'	Datum Point
300'	Total Sand Value
275+	Actual Sand Value (Entire Interval Not Penetrated)
E	Estimated Point
N.D.E.	Not Deep Enough
N.L.	No Log
B.H./S.L.	Bottom Hole / Surface Location
F/O	Faulted Out
△	Proposed Test Site

SCALE - MILES

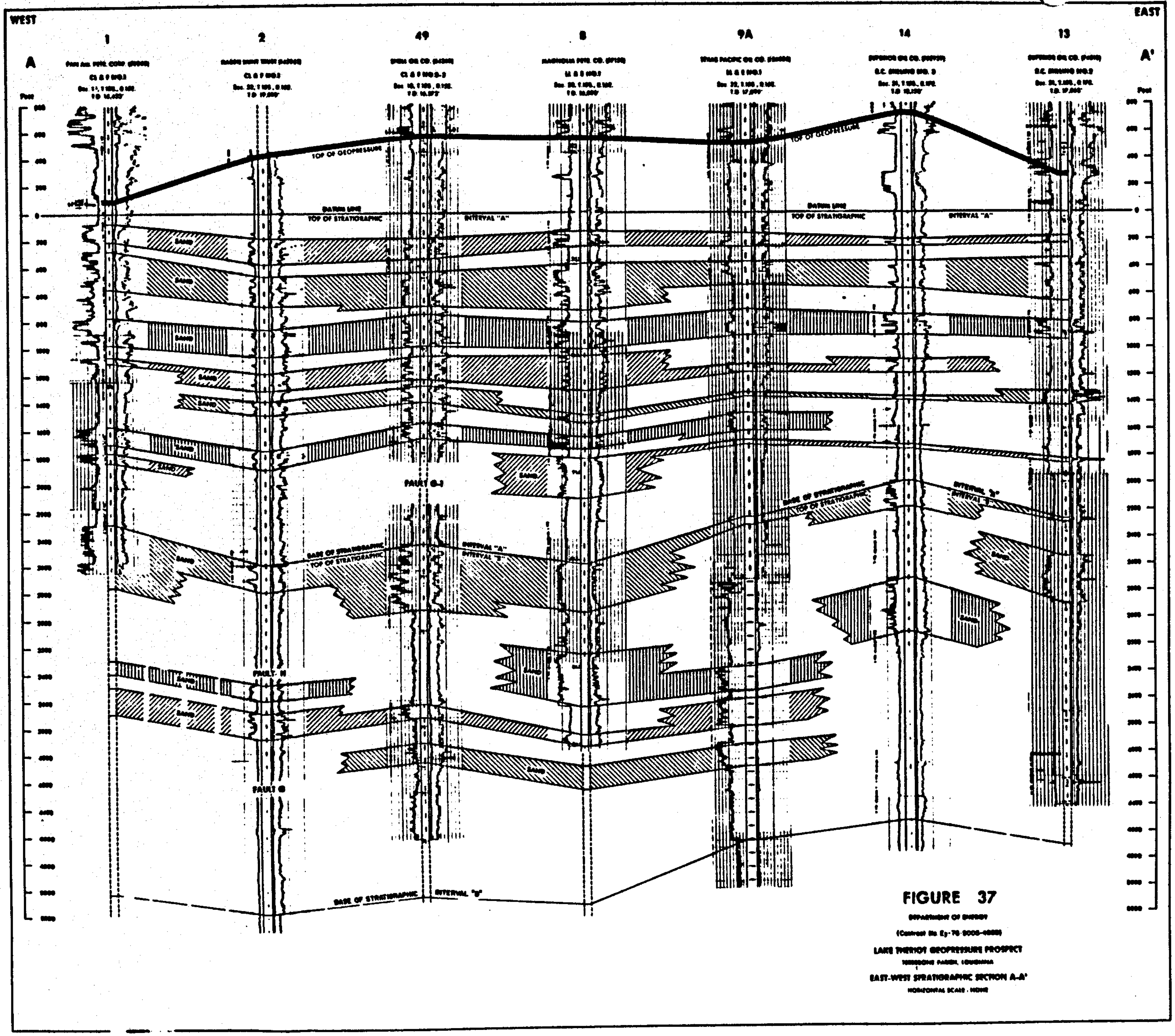

FIGURE 37

EAST-WEST STRATIGRAPHIC SECTION A-A'

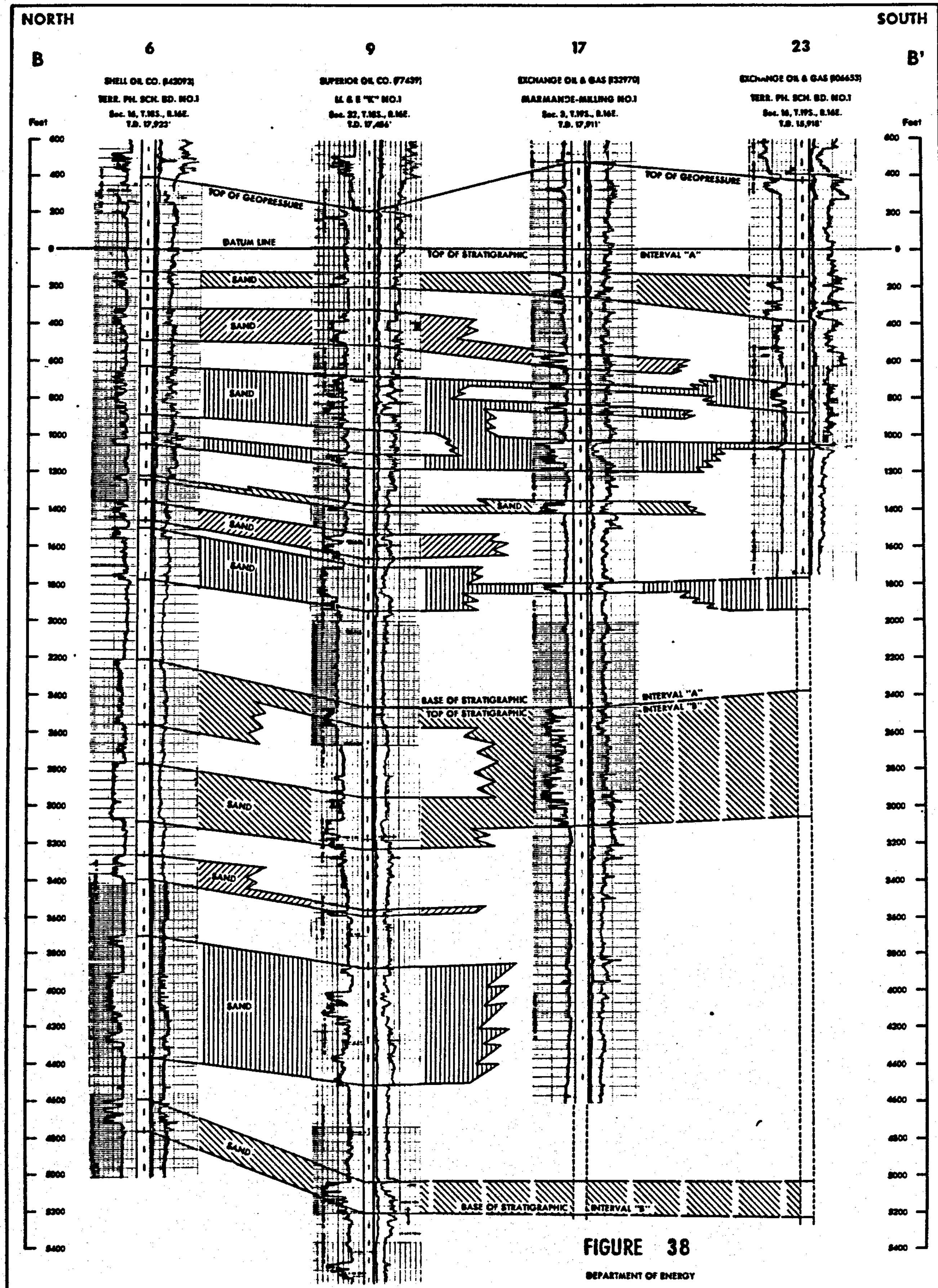

FIGURE 38

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LAKE THERIOT GEOPRESSURE PROSPECT

TERREBONE PARISH, LOUISIANA

NORTH-SOUTH STRATIGRAPHIC SECTION B-B'

HORIZONTAL SCALE : NONE

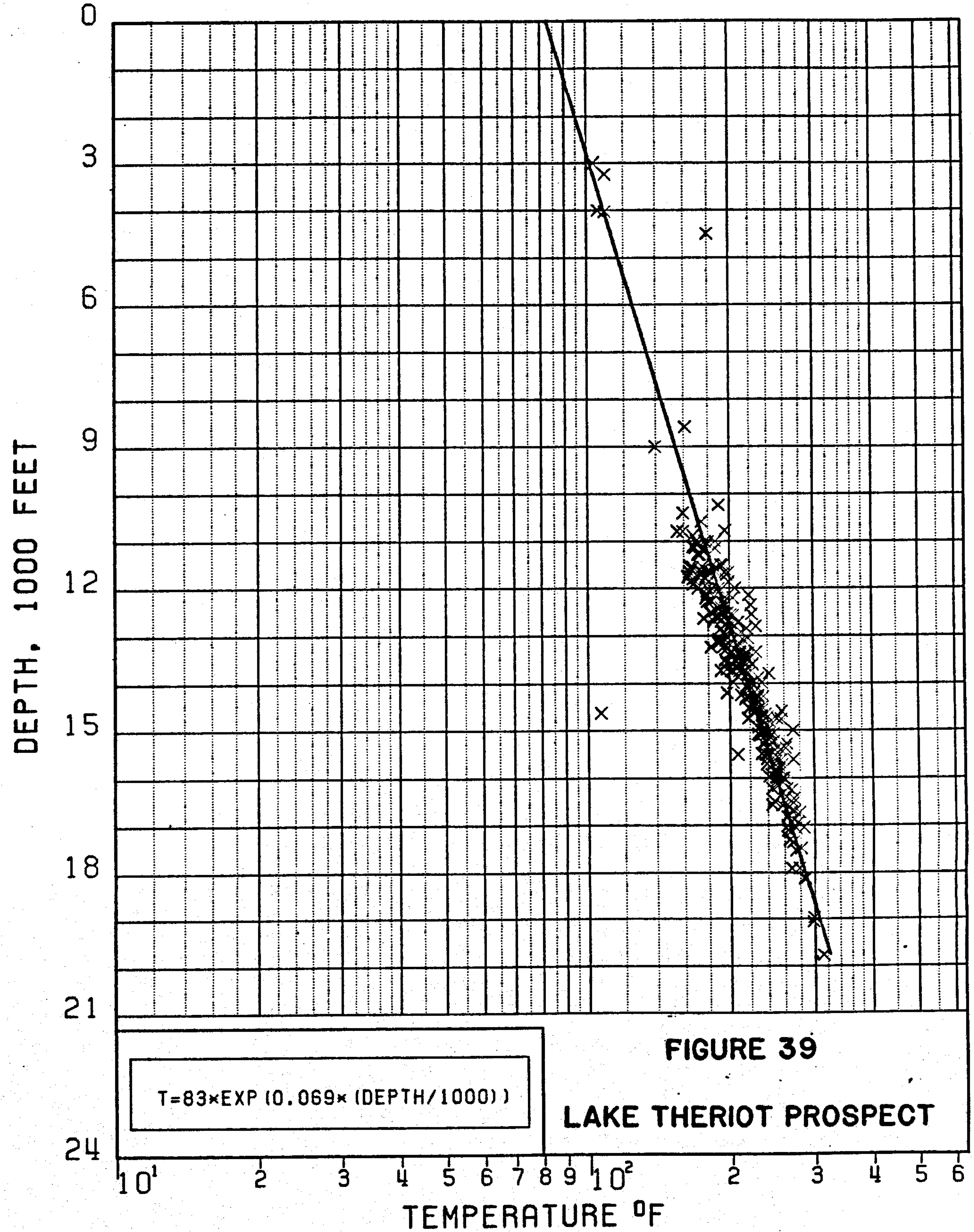
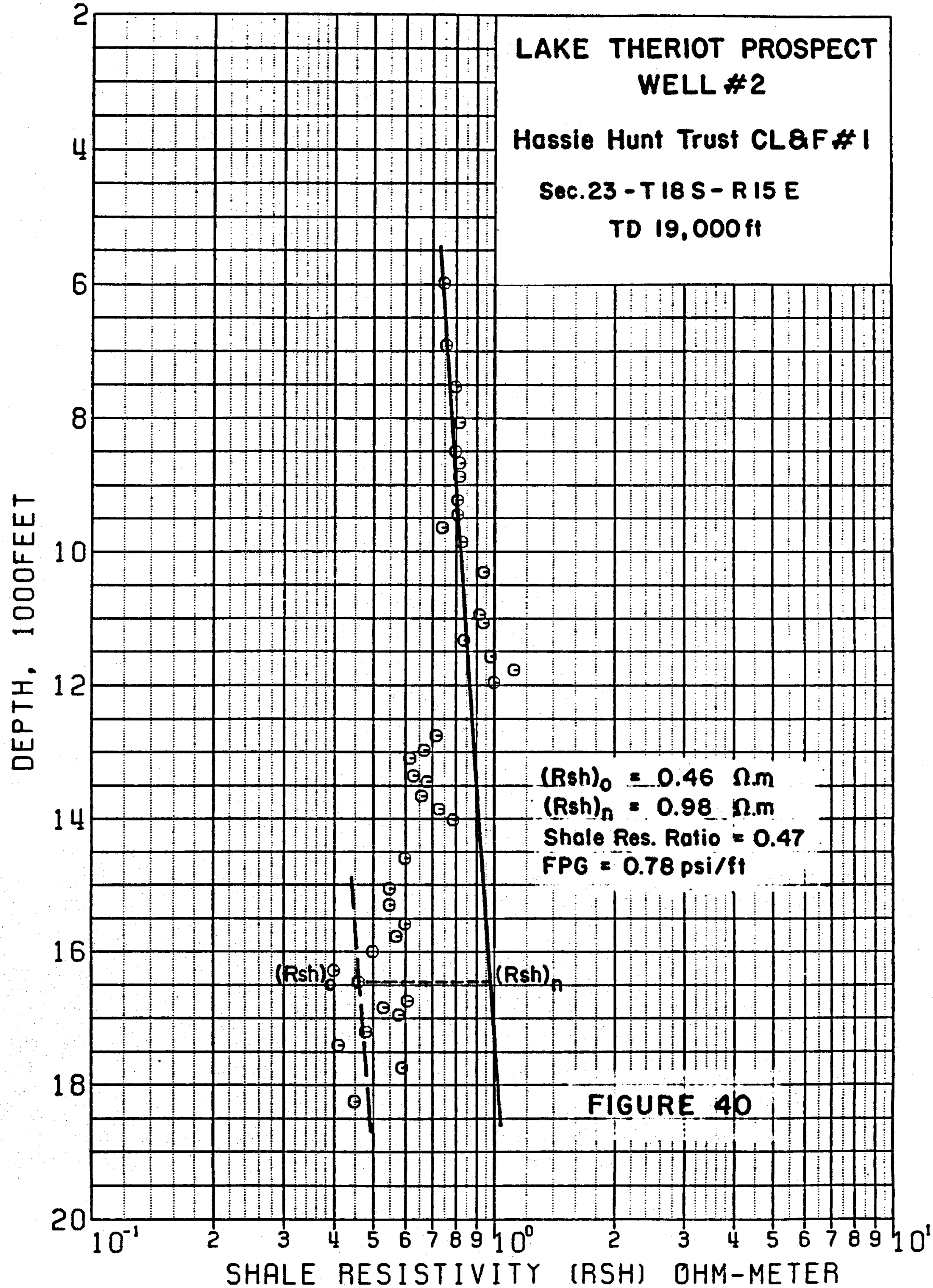


FIGURE 39

LAKE THERIOT PROSPECT



LAKE THERIOT PROSPECT
WELL #2
Hassie Hunt Trust CL&F #1
Sec. 23 - T 18 S - R 15 E
TD 19,000 ft
(Rsh)o = 0.46 Ω.m
(Rsh)n = 0.98 Ω.m
Shale Res. Ratio = 0.47
FPG = 0.78 psi/ft
(Rsh)o
(Rsh)n
DEPTH, 1000FEET
SHALE RESISTIVITY (RSH) OHM-METER

FIGURE 40

FIGURE 41 THROUGH 53

BAYOU HEBERT PROSPECT

DEPARTMENT OF ENERGY
(CONTRACT NO. Ey-76-S005-4889)

BAYOU HEBERT GEOPRESSURE ENERGY PROSPECT
VERMILION & IBERIA PARISHES, LOUISIANA

FIGURE 41

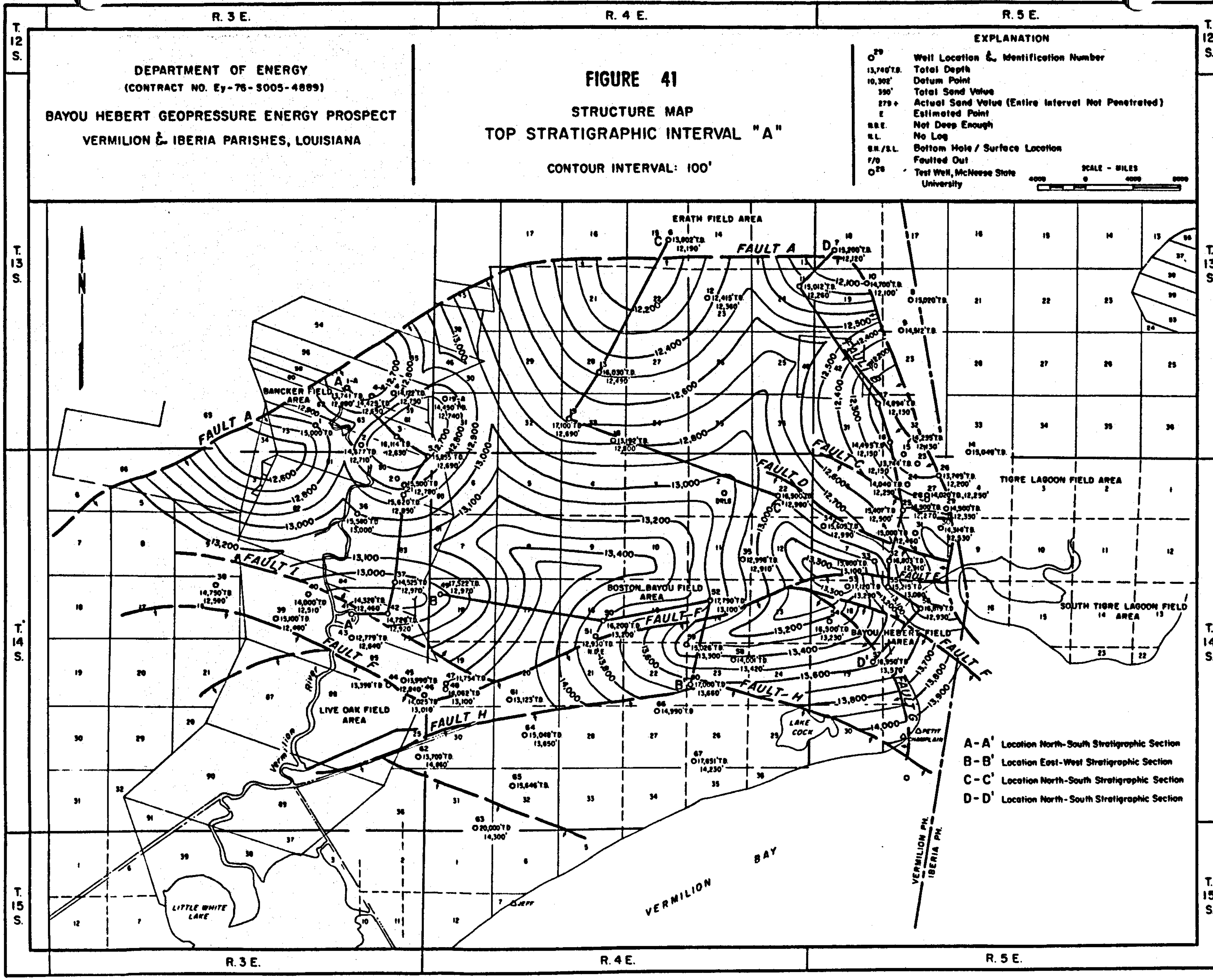
STRUCTURE MAP
TOP STRATIGRAPHIC INTERVAL "A"

CONTOUR INTERVAL: 100'

EXPLANATION

O[29]	Well Location & Identification Number
13,740' T.D.	Total Depth
10,302'	Datum Point
390'	Total Sand Value
279 +	Actual Sand Value (Entire Interval Not Penetrated)
E	Estimated Point
N.D.E.	Not Deep Enough
N.L.	No Log
B.H./S.L.	Bottom Hole / Surface Location
F/O	Faulted Out
O[28]	Test Well, McNeese State University

SCALE - MILES



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BAYOU HEBERT GEOPRESSURE ENERGY PROSPECT
VERMILION & IBERIA PARISHES, LOUISIANA

FIGURE 42

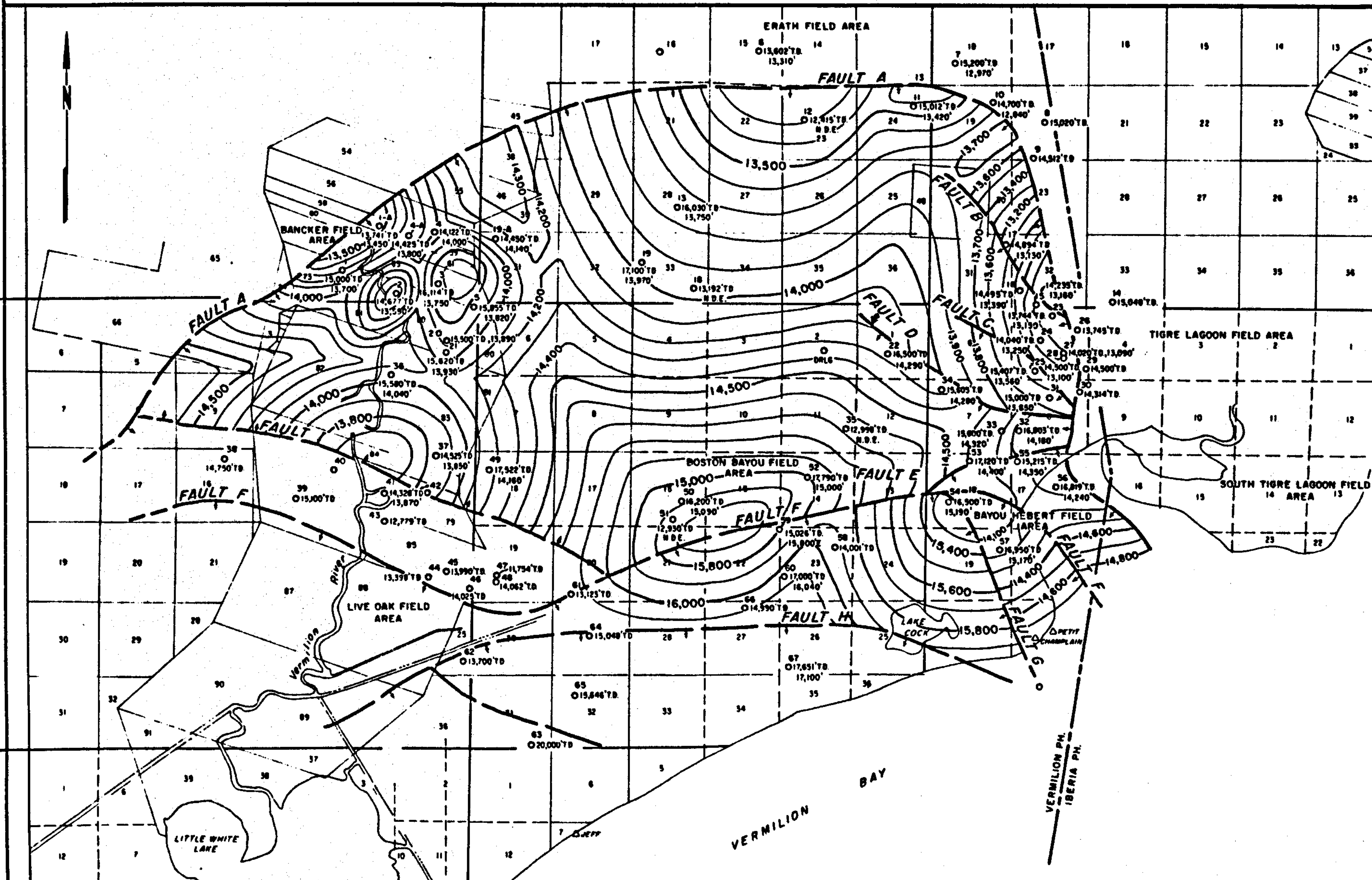
STRUCTURE MAP
BASE STRATIGRAPHIC INTERVAL "A"

CONTOUR INTERVAL 100'

EXPLANATION

o 29	Well Location & Identification Number
15,740' T.D.	Total Depth
10,302'	Datum Point
350'	Total Sand Value
279+	Actual Sand Value (Entire Interval Not Penetrated)
E	Estimated Point
N.D.E.	Not Deep Enough
N.L.	No Log
BH/S.L.	Bottom Hole / Surface Location
F/O	Faulted Out

SCALE - MILES



R. 3 E. R. 4 E. R. 5 E.

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BAYOU HEBERT GEOPRESSURE ENERGY PROSPECT
VERMILION & IBERIA PARISHES, LOUISIANA

FIGURE 43

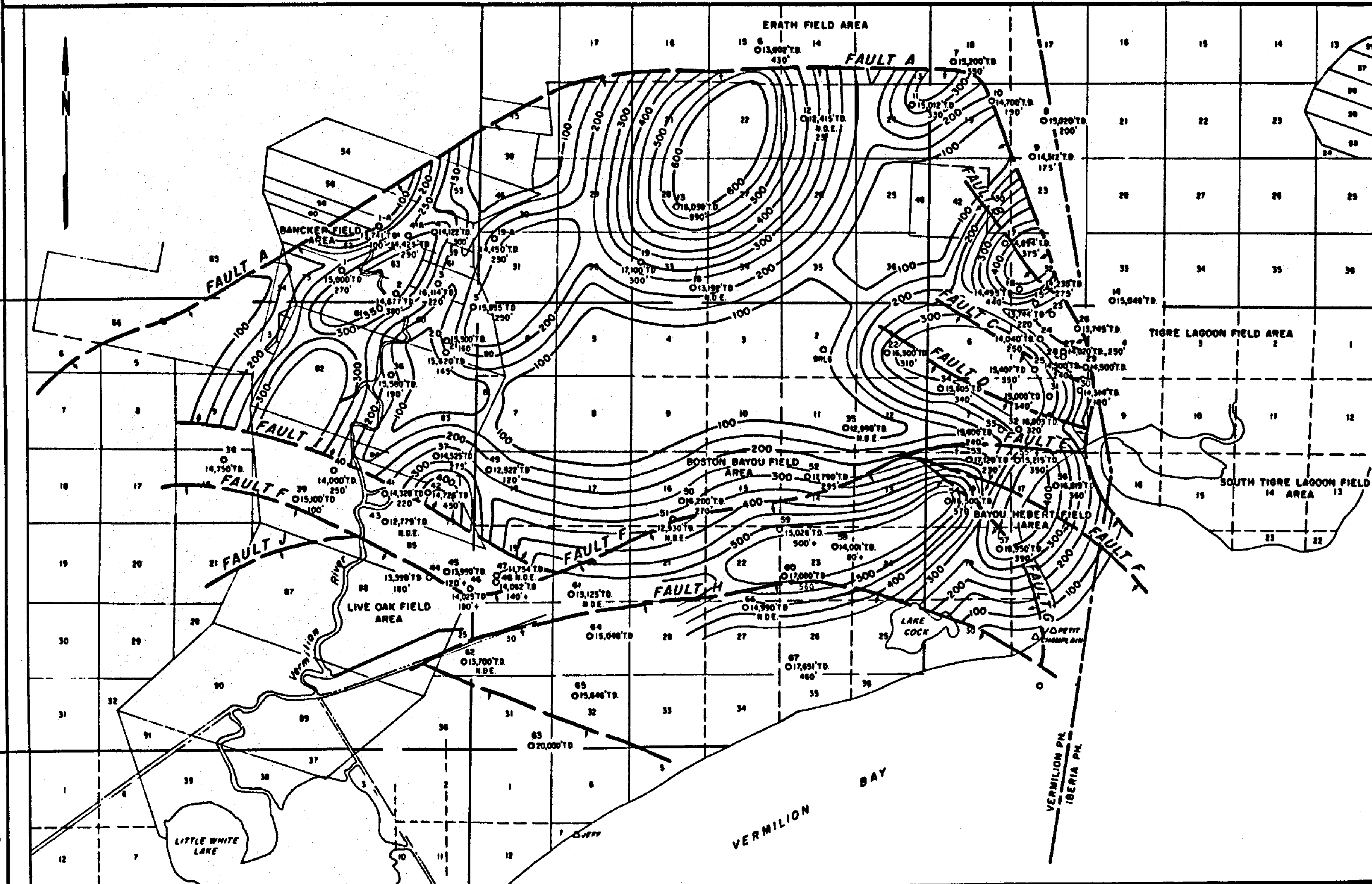
NET SAND ISOPACH MAP
STRATIGRAPHIC INTERVAL "A"

CONTOUR INTERVAL: 50'

EXPLANATION

O^{29}	Well Location & Identification Number
13,740' T.D.	Total Depth
10,302'	Datum Point
350'	Total Sand Value
279 +	Actual Sand Value (Entire Interval Not Penetrated)
E	Estimated Point
N.D.E.	Not Deep Enough
N.L.	No Log
B.H./S.L.	Bottom Hole / Surface Location
F/O	Faulted Out

SCALE - MILES



R. 3 E. R. 4 E. R. 5 E.

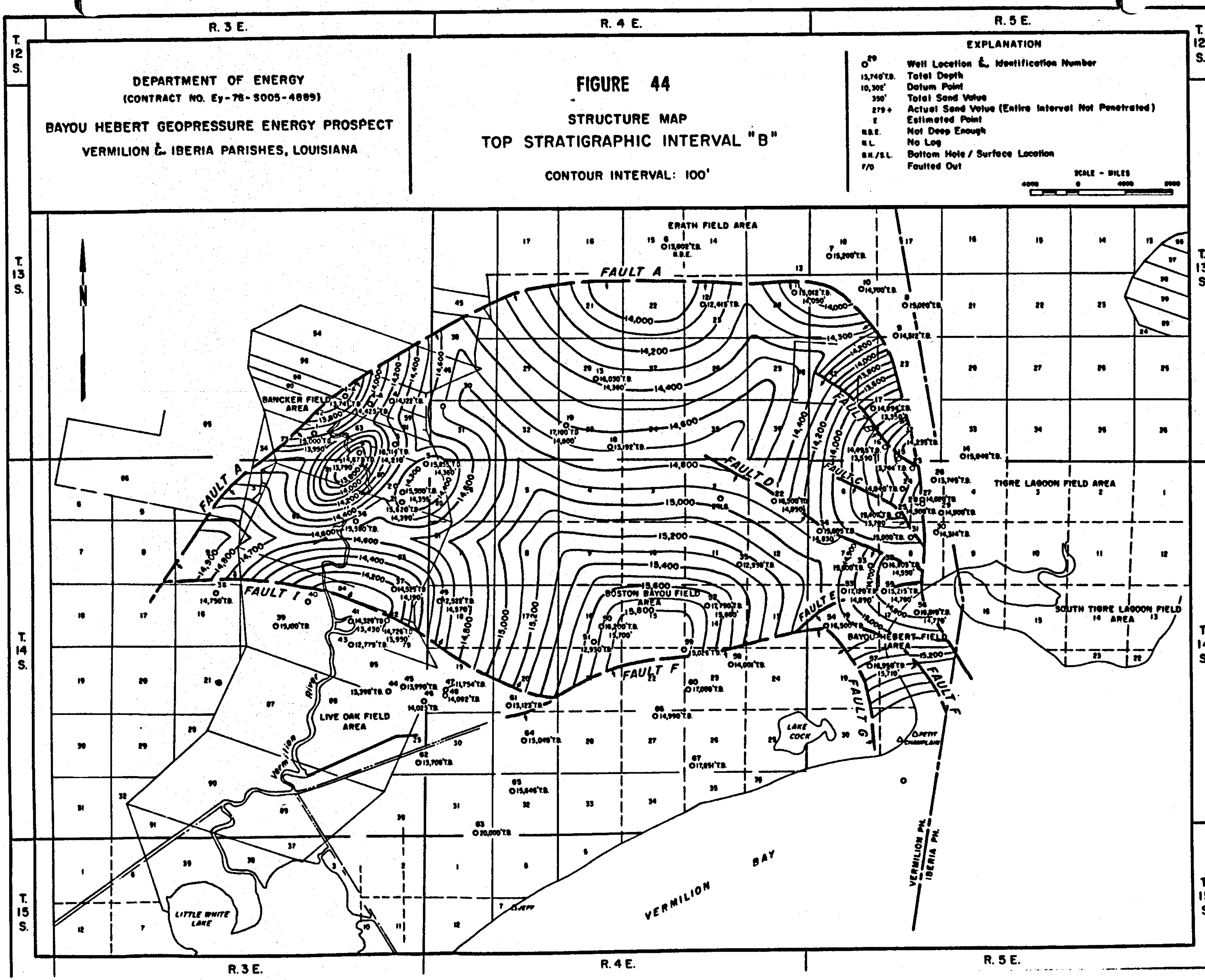


FIGURE 44
STRUCTURE MAP
TOP STRATIGRAPHIC INTERVAL "B"
CONTOUR INTERVAL: 100'

R. 3 E. | R. 4 E. | R. 5 E.

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(CONTRACT NO. Ey-76-S005-4889)

BAYOU HEBERT GEOPRESSURE ENERGY PROSPECT
VERMILION & IBERIA PARISHES, LOUISIANA

FIGURE 45

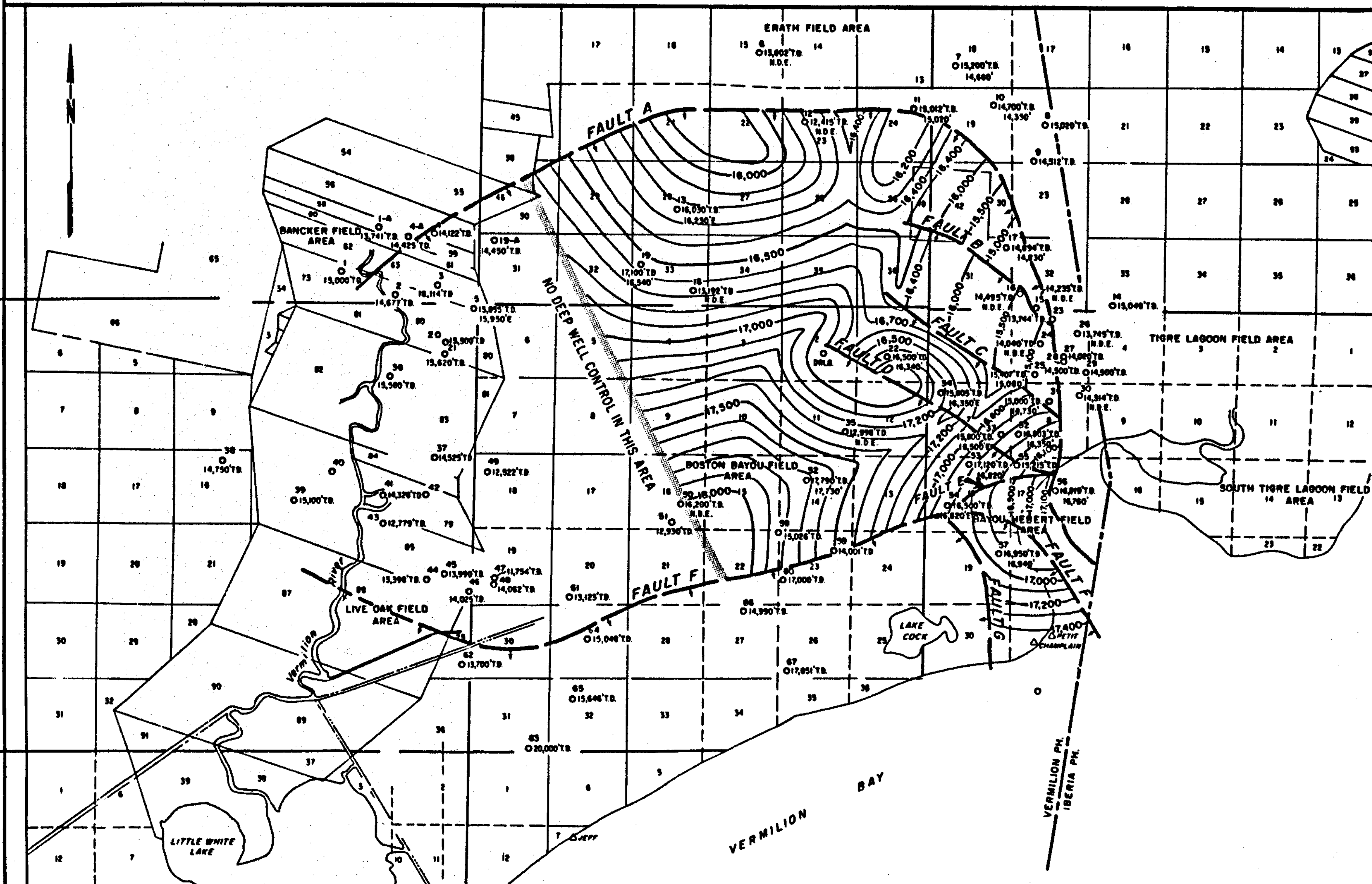
STRUCTURE MAP
BASE STRATIGRAPHIC INTERVAL "B"

CONTOUR INTERVAL : 100'

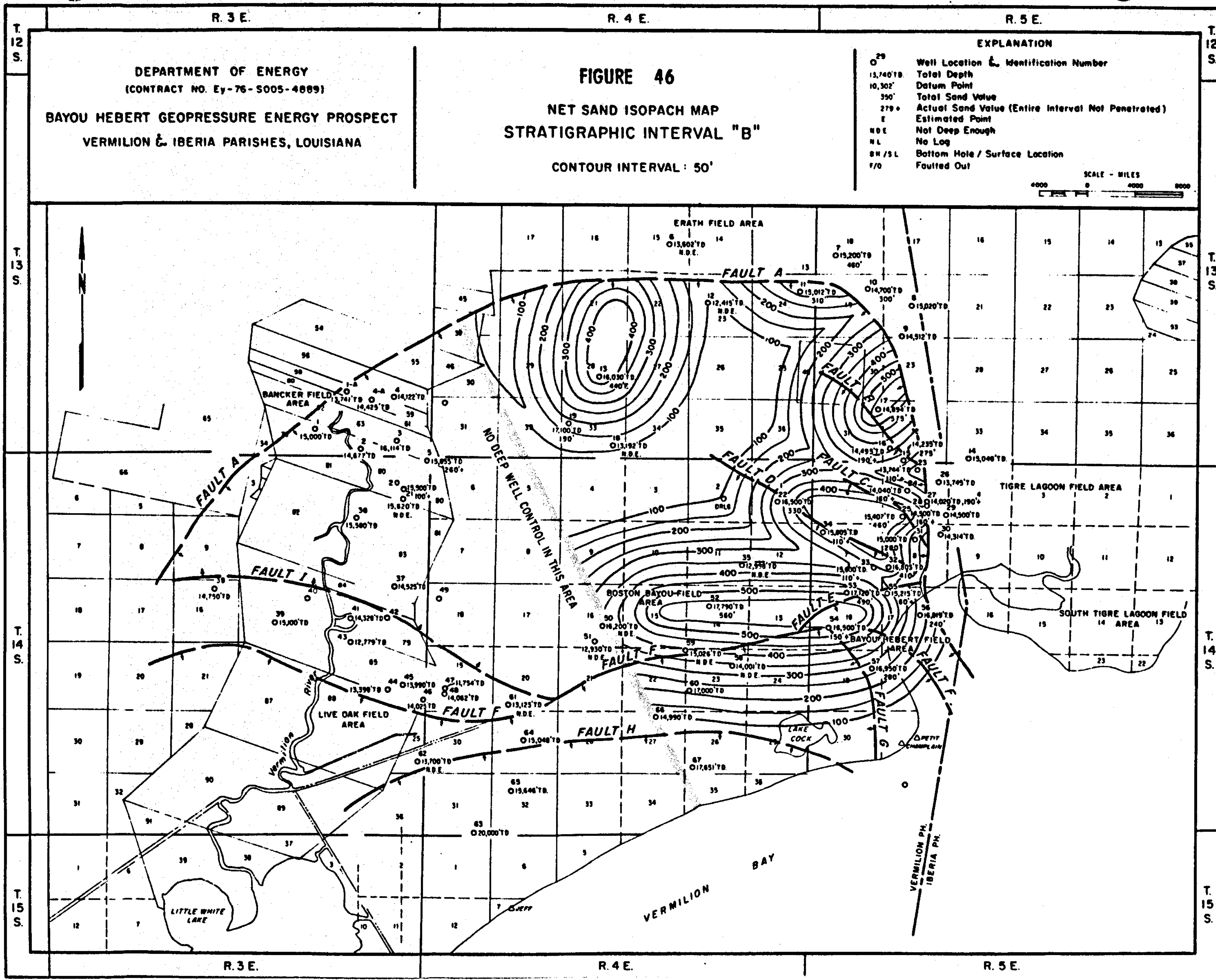
EXPLANATION

O[29]	Well Location & Identification Number
13,740' T.D.	Total Depth
10,302'	Datum Point
350'	Total Sand Value
279 +	Actual Sand Value (Entire Interval Not Penetrated)
E	Estimated Point
N.D.E.	Not Deep Enough
N.L.	No Log
BH./S.L.	Bottom Hole / Surface Location
F/O	Faulted Out

SCALE - MILES



R. 3 E. | R. 4 E. | R. 5 E.


DEPARTMENT OF ENERGY
(CONTRACT NO. Ey-76-S005-4889)
BAYOU HEBERT GEOPRESSURE ENERGY PROSPECT
VERMILION & IBERIA PARISHES, LOUISIANA
FIGURE 46
NET SAND ISOPACH MAP
STRATIGRAPHIC INTERVAL "B"
CONTOUR INTERVAL: 50'
EXPLANATION
Well Location & Identification Number
Total Depth
Datum Point
Total Sand Value
Actual Sand Value (Entire Interval Not Penetrated)
Estimated Point
Not Deep Enough
No Log
Bottom Hole / Surface Location
Faulted Out
SCALE - MILES
R. 3 E.
R. 4 E.
R. 5 E.
T. 12 S.
T. 13 S.
T. 14 S.
T. 15 S.
ERATH FIELD AREA
FAULT A
FAULT C
FAULT D
FAULT E
FAULT F
FAULT G
FAULT H
FAULT I
BANCKER FIELD AREA
NO DEEP WELL CONTROL IN THIS AREA
BOSTON BAYOU FIELD AREA
TIGRE LAGOON FIELD AREA
SOUTH TIGRE LAGOON FIELD AREA
BAYOU HEBERT FIELD AREA
LIVE OAK FIELD AREA
Vermilion River
LAKE COCK
PETIT CHAMPLAIN
VERMILION PH.
IBERIA PH.
VERMILION BAY
LITTLE WHITE LAKE
JEFF

R. 3 E. | R. 4 E. | R. 5 E.

DEPARTMENT OF ENERGY
(CONTRACT NO. Ey-76-S005-4889)

BAYOU HEBERT GEOPRESSURE ENERGY PROSPECT
VERMILION & IBERIA PARISHES, LOUISIANA

FIGURE 47

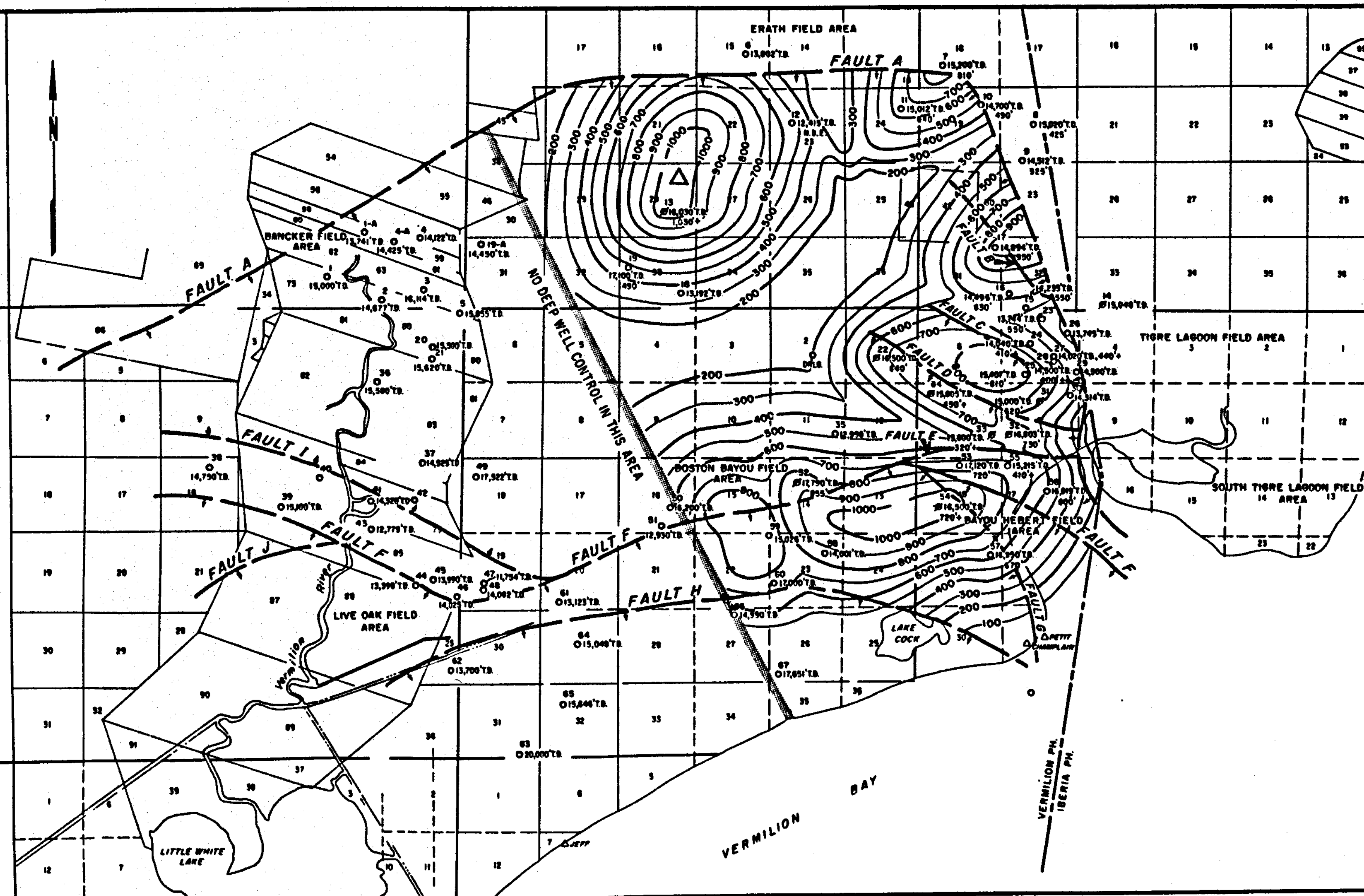
COMPOSITE NET SAND ISOPACH MAP
STRATIGRAPHIC INTERVALS "A" & "B"

CONTOUR INTERVAL: 100'

EXPLANATION

O[29]	Well Location & Identification Number
13,740' T.D.	Total Depth
10,302'	Datum Point
350'	Total Sand Value
279 +	Actual Sand Value (Entire Interval Not Penetrated)
E	Estimated Point
N.D.E.	Not Deep Enough
N.L.	No Log
B.H./S.L.	Bottom Hole / Surface Location
F/O	Faulted Out
△	Geopressure Well Site Proposed

SCALE - MILES



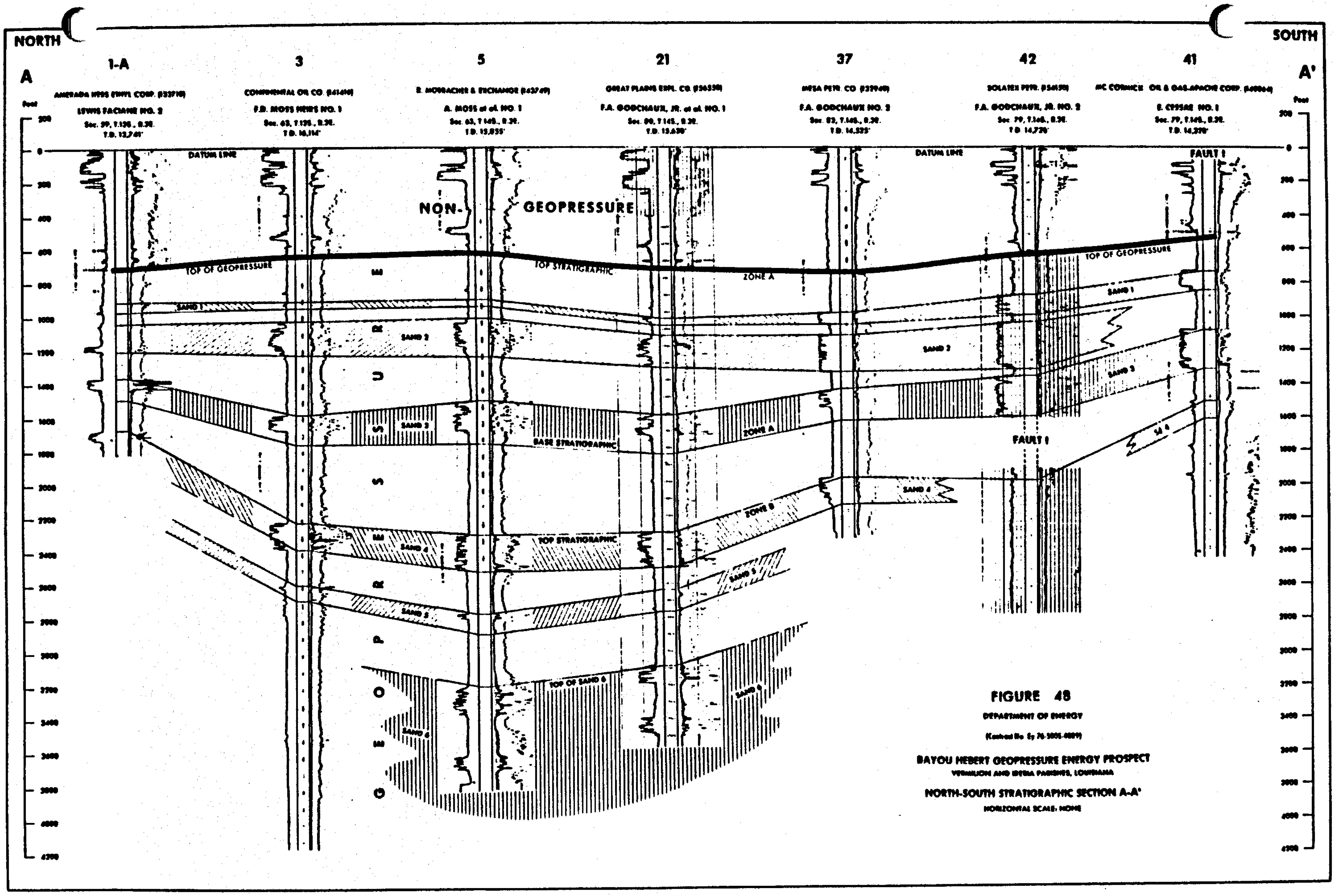


FIGURE 48

DEPARTMENT OF ENERGY

BAYOU HEBERT GEOPRESSURE ENERGY PROSPECT

VERMILION AND IBERIA PARISHES, LOUISIANA

NORTH-SOUTH STRATIGRAPHIC SECTION A-A'

HORIZONTAL SCALE: NONE

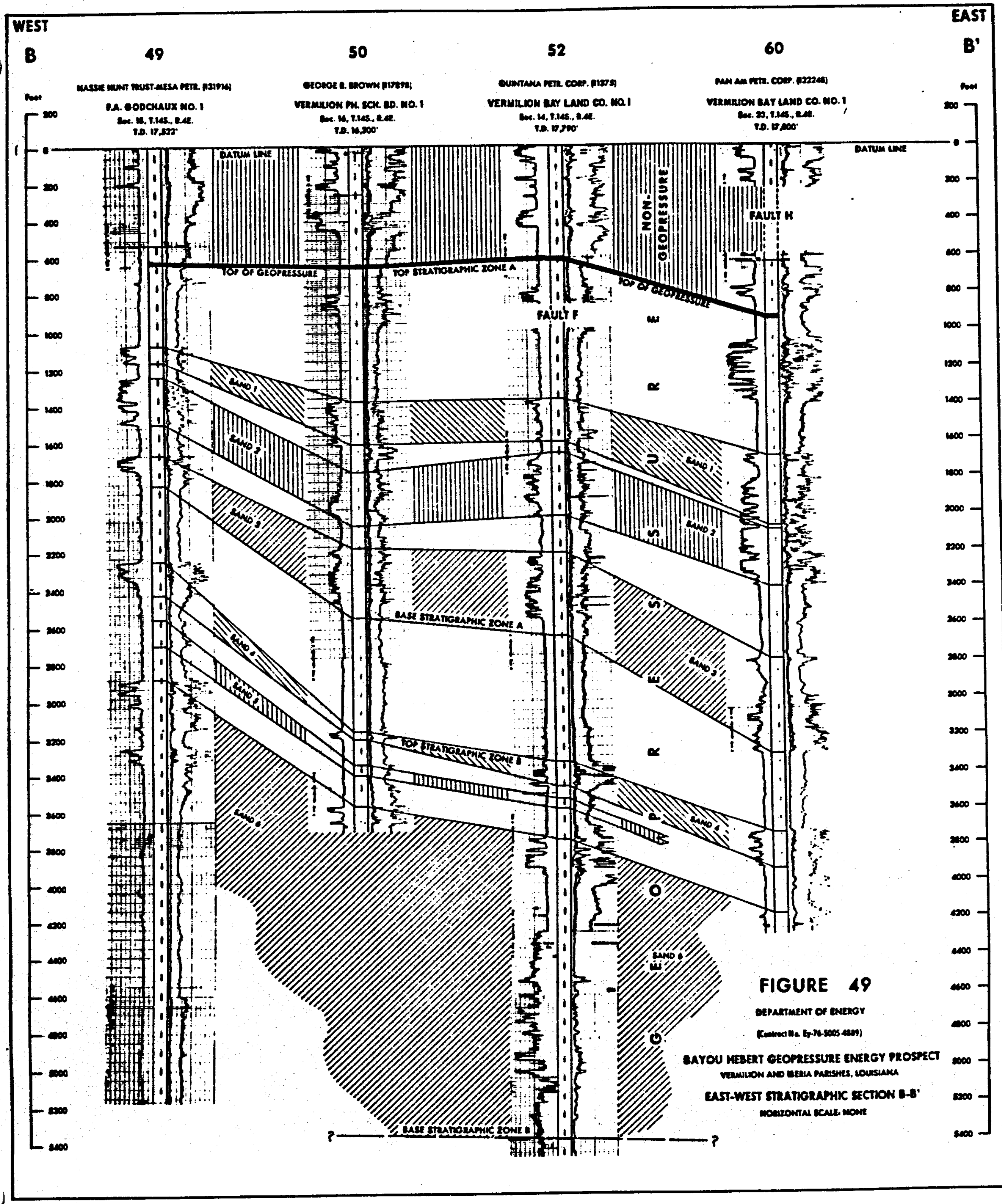


FIGURE 49

DEPARTMENT OF ENERGY

(Contract No. Ey-76-S005-4889)

BAYOU HEBERT GEOPRESSURE ENERGY PROSPECT

VERMILION AND IBERIA PARISHES, LOUISIANA

EAST-WEST STRATIGRAPHIC SECTION B-B'

HORIZONTAL SCALE: NONE

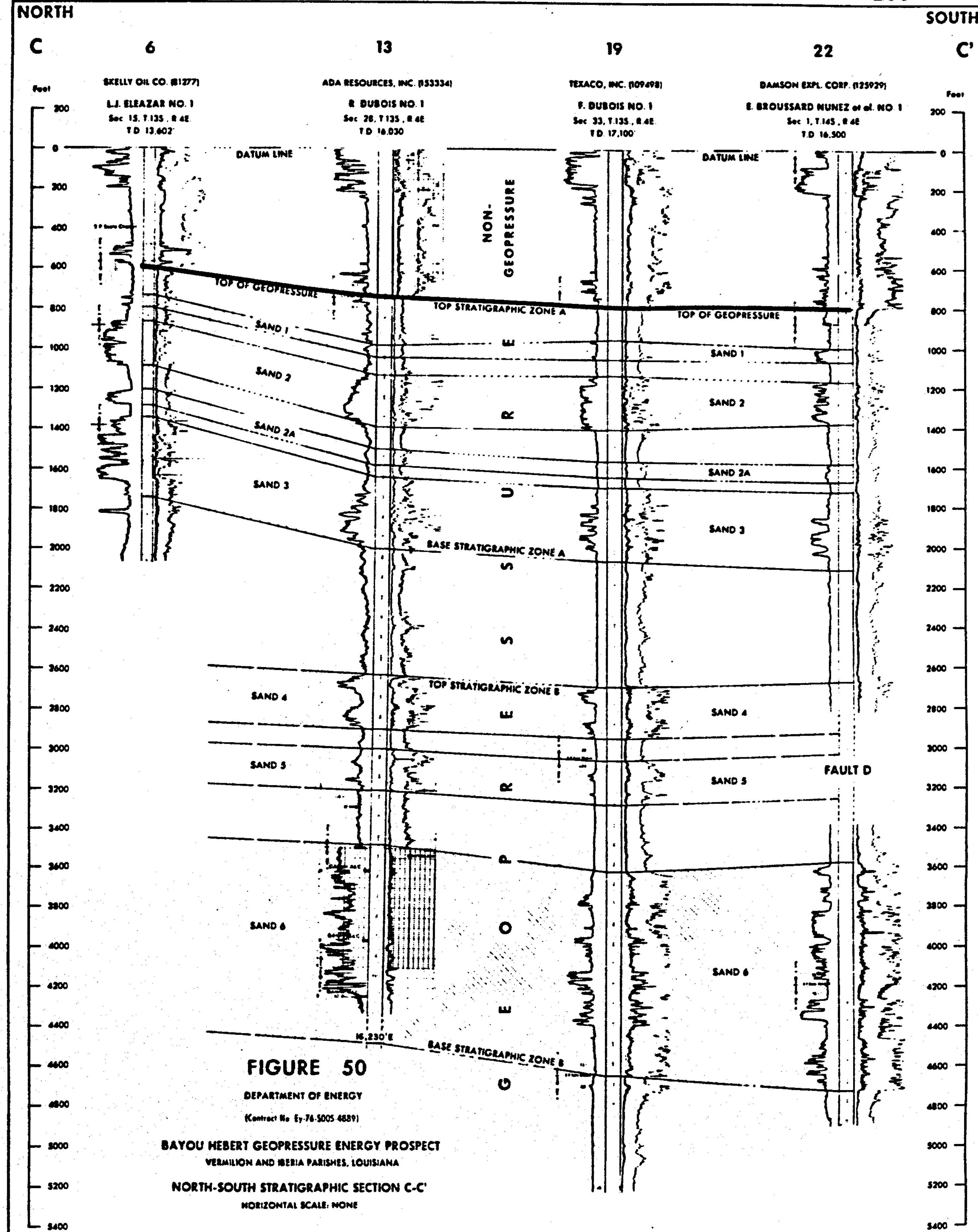


FIGURE 50

DEPARTMENT OF ENERGY

(Contract No. Ey-76-S005-4889)

BAYOU HEBERT GEOPRESSURE ENERGY PROSPECT

VERMILION AND IBERIA PARISHES, LOUISIANA

NORTH-SOUTH STRATIGRAPHIC SECTION C-C'

HORIZONTAL SCALE: NONE

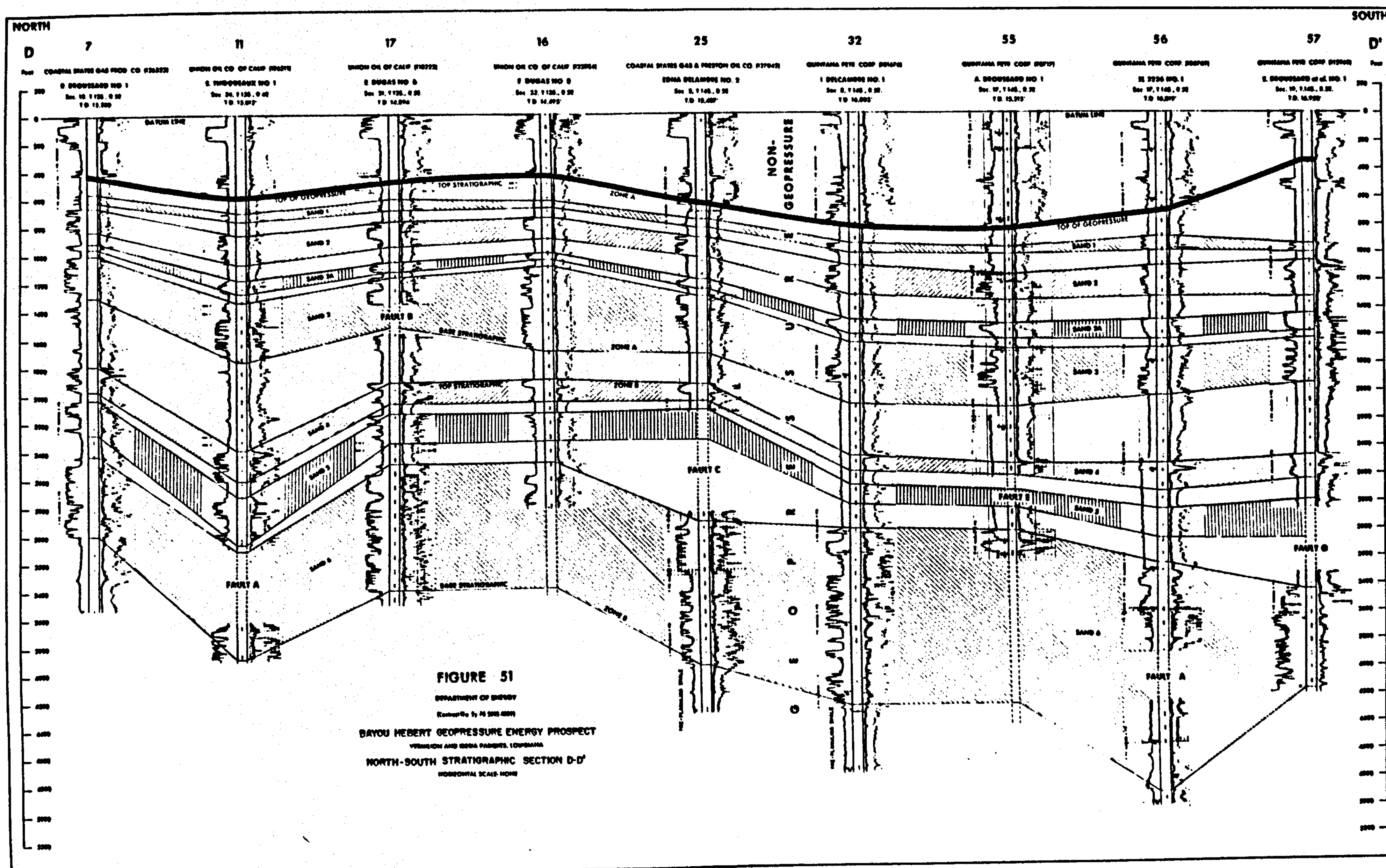


FIGURE 51

DEPARTMENT OF ENERGY

BAYOU HEBERT GEOPRESSURE ENERGY PROSPECT

VERMILION AND IBERIA PARISHES, LOUISIANA

NORTH-SOUTH STRATIGRAPHIC SECTION D-D'

HORIZONTAL SCALE-NONE

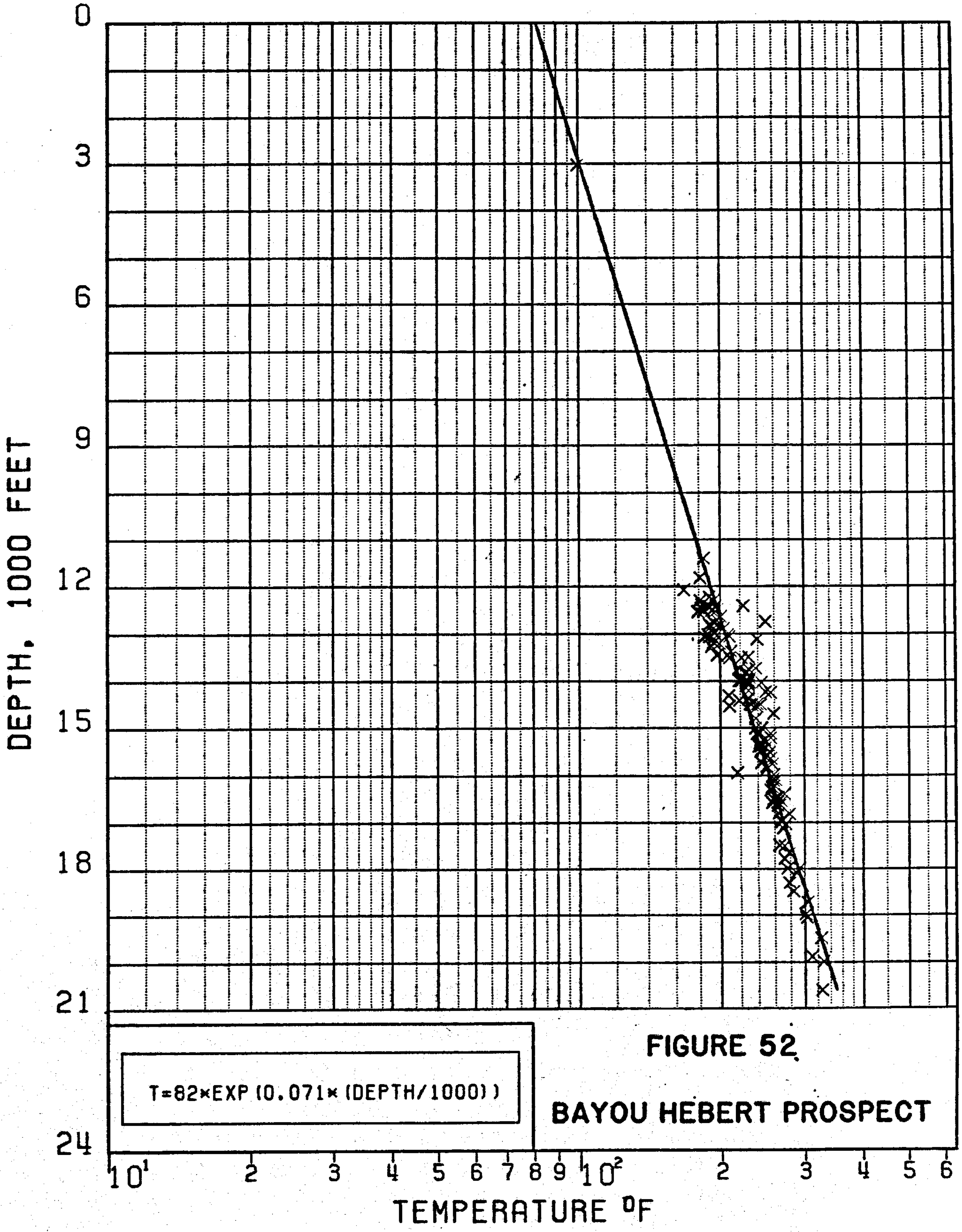


FIGURE 52

BAYOU HEBERT PROSPECT

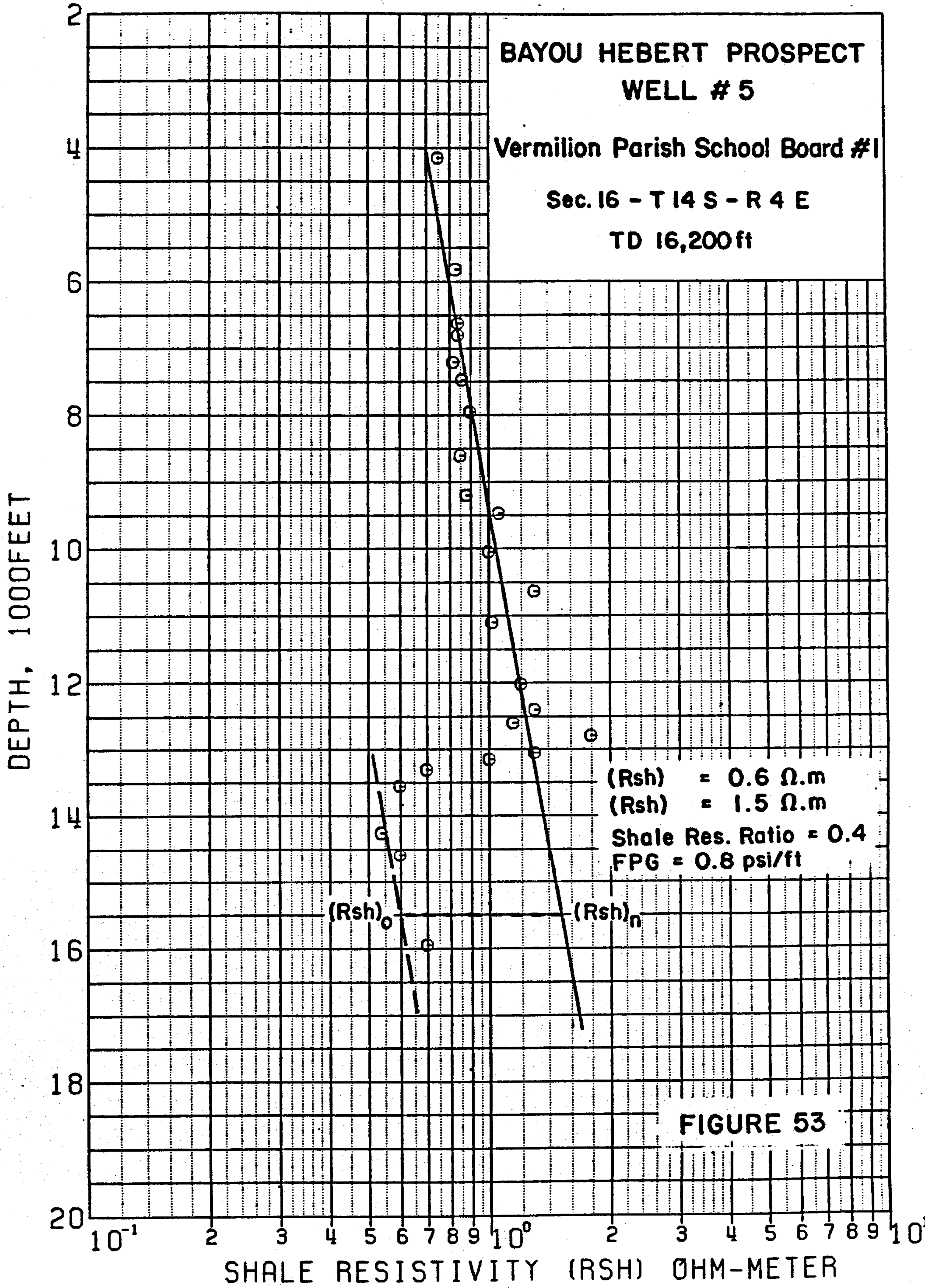
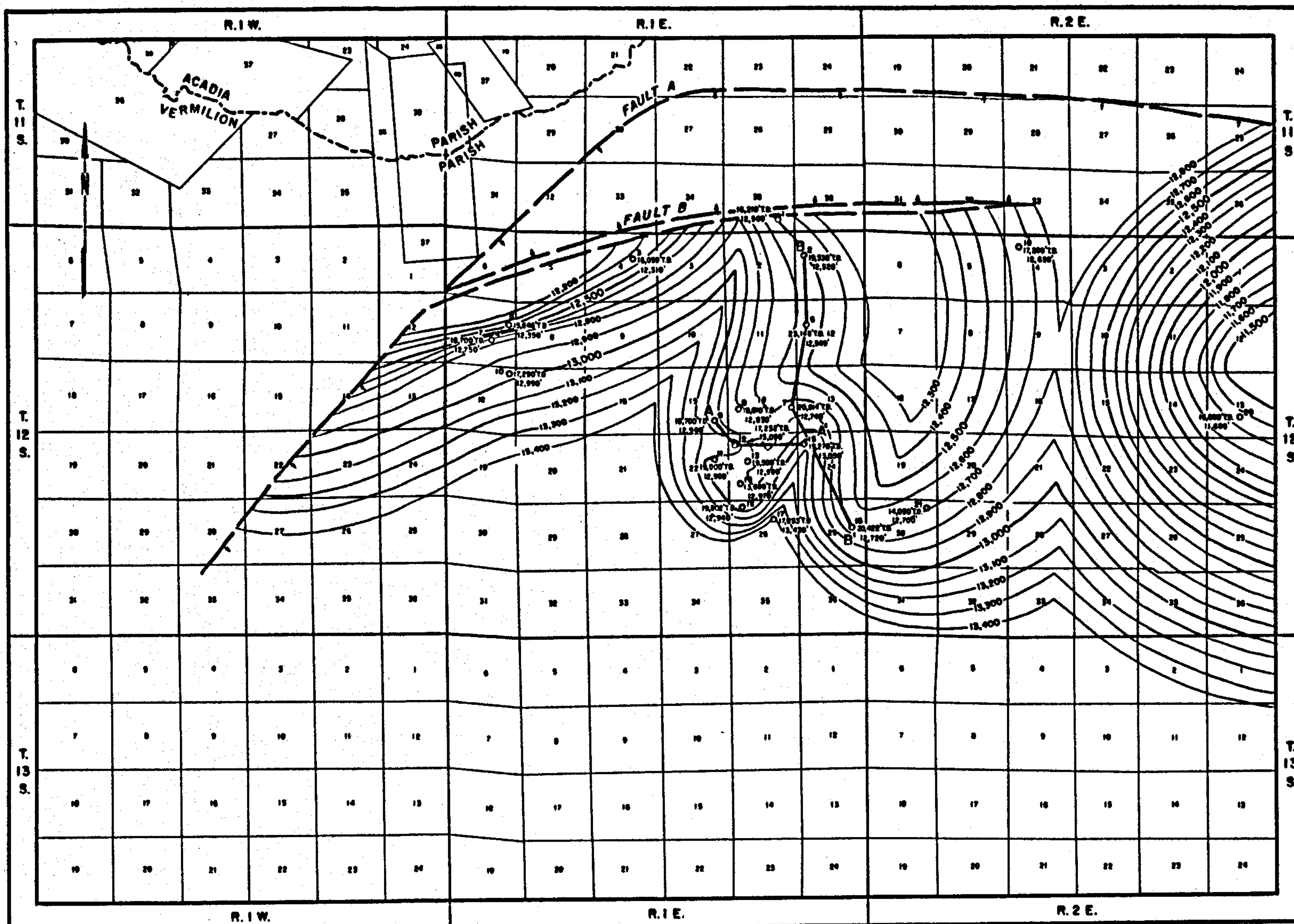

BAYOU HEBERT PROSPECT
WELL # 5
Vermilion Parish School Board #1
Sec. 16 - T 14 S - R 4 E
TD 16,200 ft
(Rsh) = 0.6 Ω.m
(Rsh) = 1.5 Ω.m
Shale Res. Ratio = 0.4
FPG = 0.8 psi/ft
(Rsh)o
(Rsh)n
DEPTH, 1000FEET
SHALE RESISTIVITY (RSH) OHM-METER

FIGURE 53

FIGURE 54 THROUGH 68

KAPLAN PROSPECT



DEPARTMENT OF ENERGY
(CONTRACT NO. Ey-76-S005-4889)

KAPLAN GEOPRESSURE ENERGY PROSPECT
VERMILION & ACADIA PARISHES, LOUISIANA

FIGURE 54

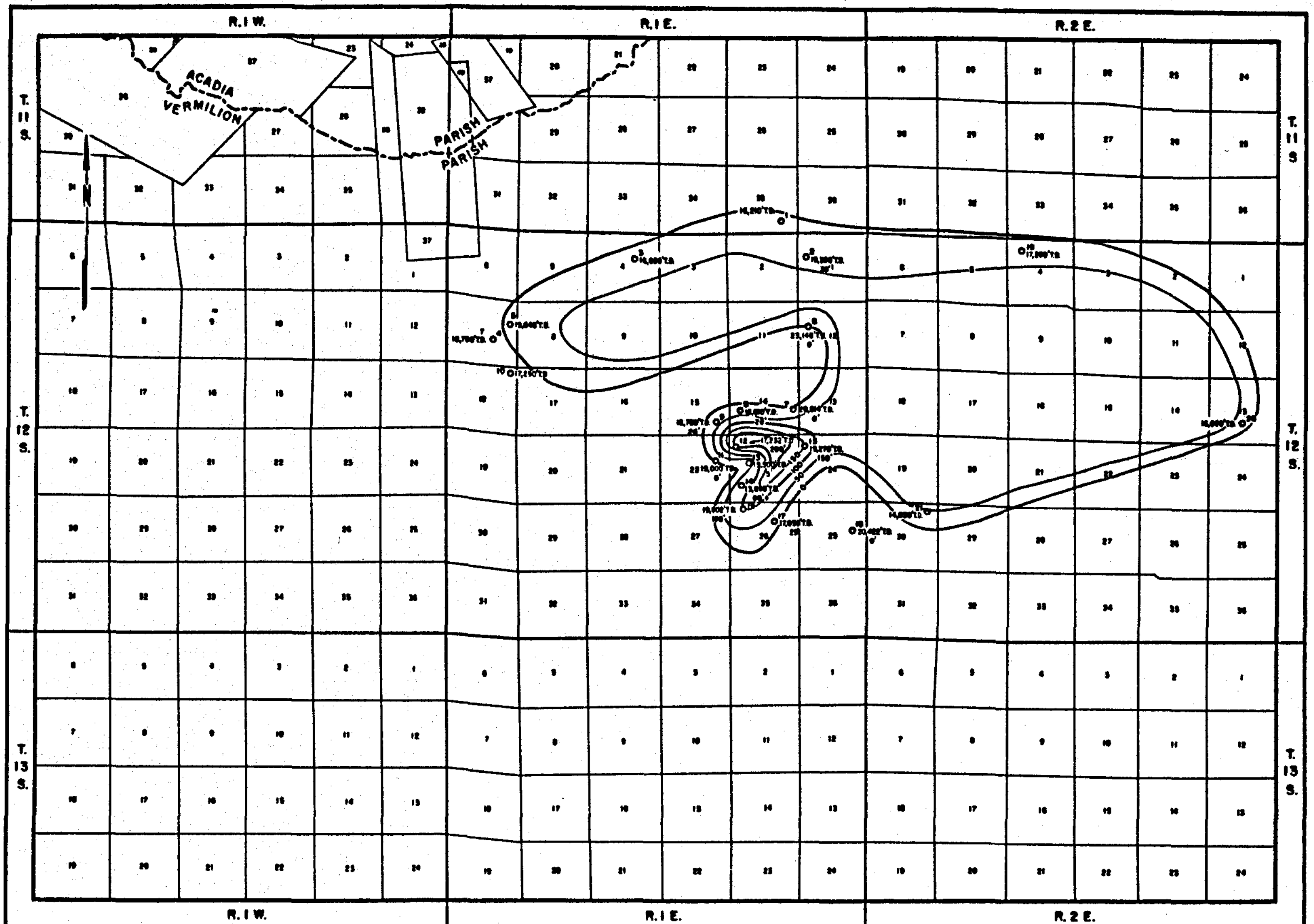
STRUCTURE MAP
TOP STRATIGRAPHIC INTERVAL "A"

CONTOUR INTERVAL: 100'

EXPLANATION

O[29]	Well Location & Identification Number
12,700'T.D.	Total Depth
-8,302'	Datum Point
350'	Total Sand Value
275+	Actual Sand Value (Entire Interval Not Penetrated)
E	Estimated Point
N.D.E.	Not Deep Enough
N.L.	No Log
B.H./S.L.	Bottom Hole / Surface Location
F/O	Faulted Out

SCALE - MILES



DEPARTMENT OF ENERGY
(CONTRACT NO. EY-76-S005-4889)

KAPLAN GEOPRESSURE ENERGY PROSPECT

VERMILION & ACADIA PARISHES, LOUISIANA

FIGURE 55

NET SAND ISOPACH MAP

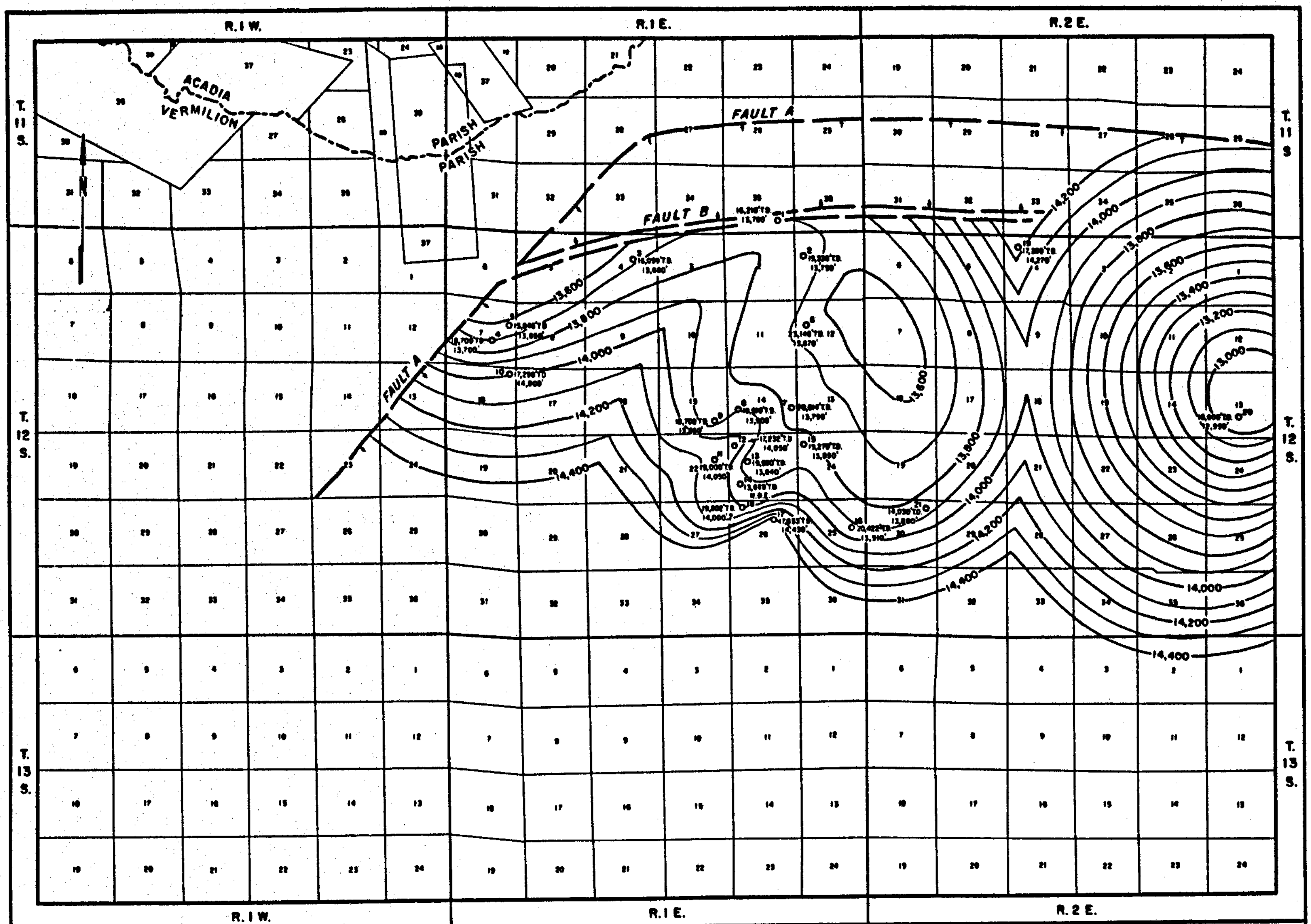
STRATIGRAPHIC INTERVAL "A"

CONTOUR INTERVAL: 50'

EXPLANATION

O[29]	Well Location & Identification Number
13,740'T.D.	Total Depth
10,302'	Datum Point
280'	Total Sand Value
279+	Actual Sand Value (Entire Interval Not Penetrated)
E	Estimated Point
N.D.E.	Not Deep Enough
N.L.	No Log
B.H./S.L.	Bottom Hole / Surface Location
F/O	Faulted Out

SCALE - MILES



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KAPLAN GEOPRESSURE ENERGY PROSPECT

VERMILION & ACADIA PARISHES, LOUISIANA

FIGURE 56

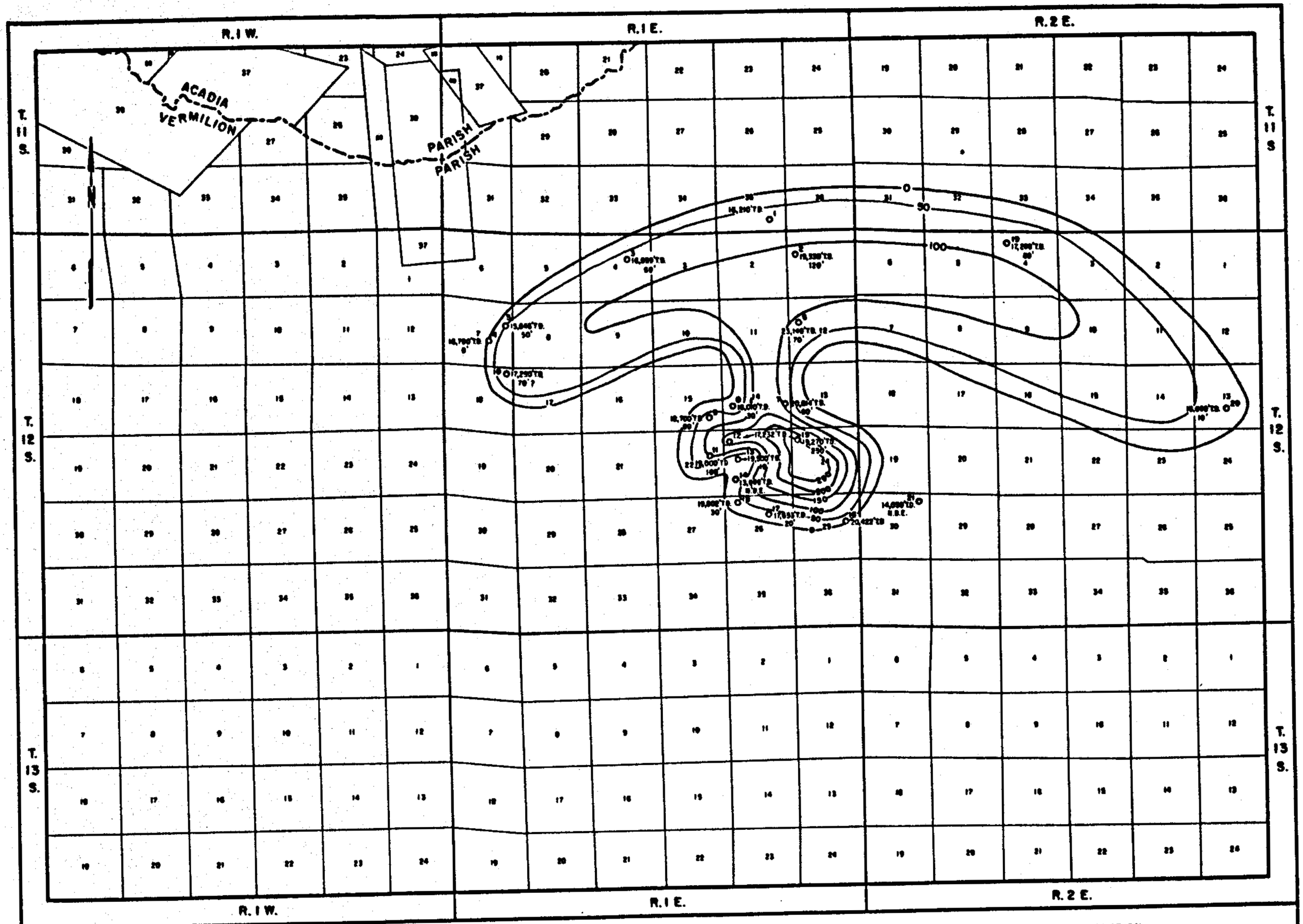
STRUCTURE MAP
TOP STRATIGRAPHIC INTERVAL "B"

CONTOUR INTERVAL: 100'

EXPLANATION

O[29]	Well Location & Identification Number
13,740' T.D.	Total Depth
-9,302'	Datum Point
250'	Total Sand Value
279+	Actual Sand Value (Entire Interval Not Penetrated)
E	Estimated Point
N.D.E.	Not Deep Enough
N.L.	No Log
B.H./S.L.	Bottom Hole / Surface Location
F/O	Faulted Out

SCALE - MILES



DEPARTMENT OF ENERGY
(CONTRACT NO. Ey-76-S005-4889)

KAPLAN GEOPRESSURE ENERGY PROSPECT
VERMILION & ACADIA PARISHES, LOUISIANA

FIGURE 57

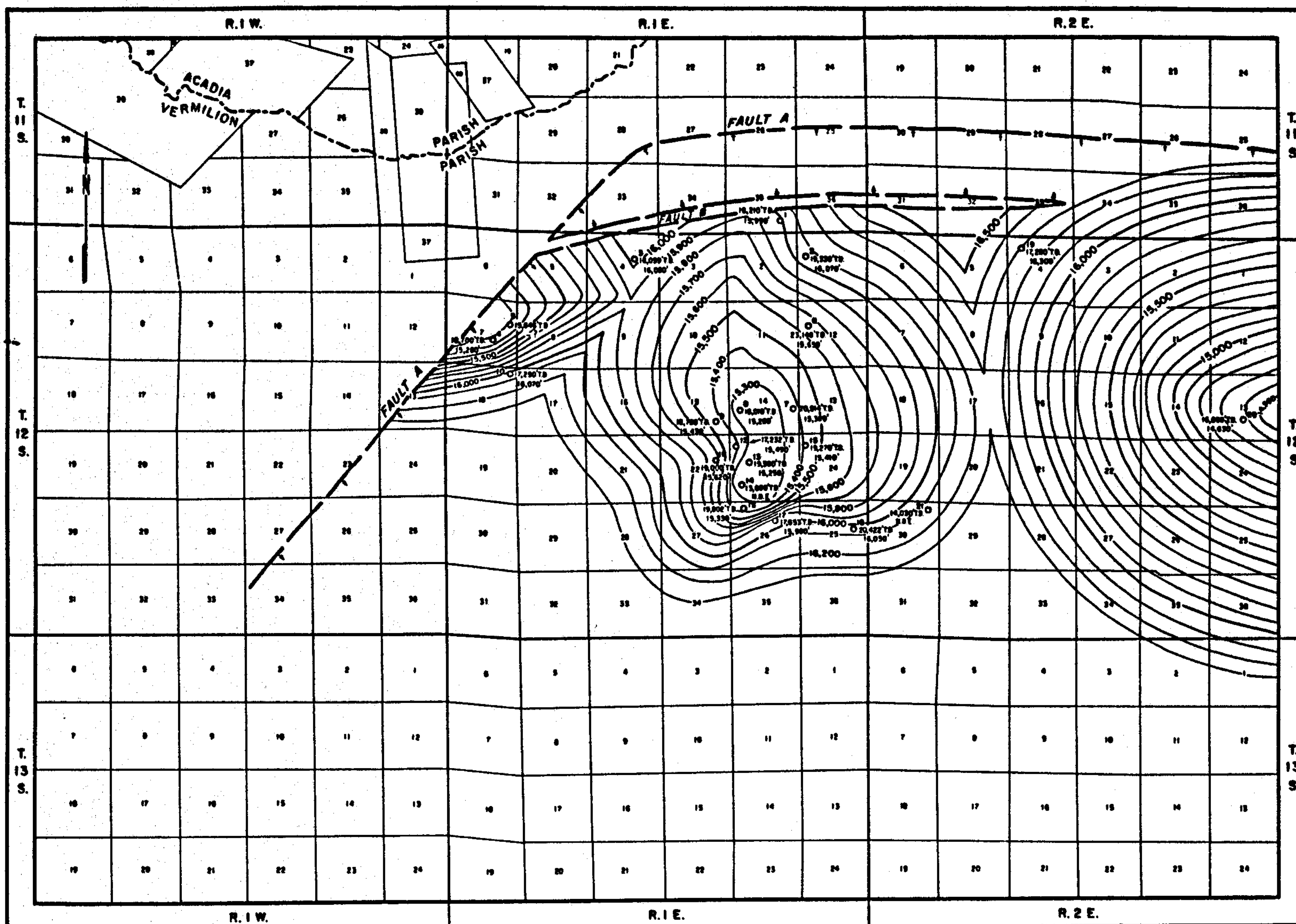
NET SAND ISOPACH MAP
STRATIGRAPHIC INTERVAL "B"

CONTOUR INTERVAL: 50'

EXPLANATION

O[29]	Well Location & Identification Number
13,740'T.D.	Total Depth
-9,302'	Datum Point
350'	Total Sand Value
270+	Actual Sand Value (Entire Interval Not Penetrated)
E	Estimated Point
N.D.E.	Not Deep Enough
N.L.	No Log
B.H./S.L.	Bottom Hole / Surface Location
F/O	Faulted Out

SCALE - MILES



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KAPLAN GEOPRESSURE ENERGY PROSPECT

VERMILION & ACADIA PARISHES, LOUISIANA

FIGURE 58

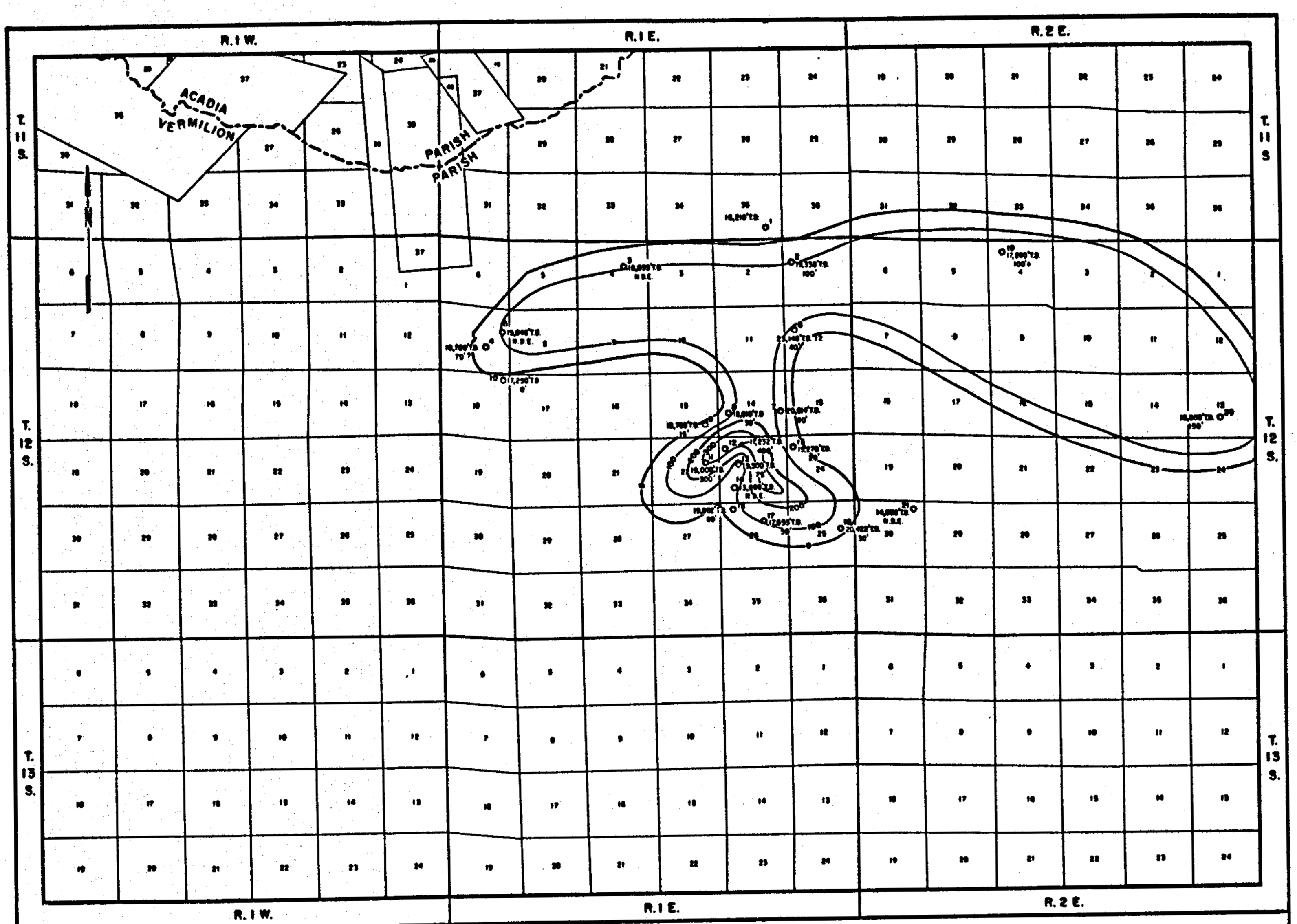
STRUCTURE MAP
TOP STRATIGRAPHIC INTERVAL "C"

CONTOUR INTERVAL: 100'

EXPLANATION

O[29]	Well Location & Identification Number
13,740'TD	Total Depth
-9,302'	Datum Point
350'	Total Sand Value
279+	Actual Sand Value (Entire Interval Not Penetrated)
E	Estimated Point
N.D.E.	Not Deep Enough
N.L.	No Log
B.H./S.L.	Bottom Hole / Surface Location
F/O	Faulted Out

SCALE - MILES



DEPARTMENT OF ENERGY
(CONTRACT NO. Ey-76-S005-4889)

KAPLAN GEOPRESSURE ENERGY PROSPECT
VERMILION & ACADIA PARISHES, LOUISIANA

FIGURE 59

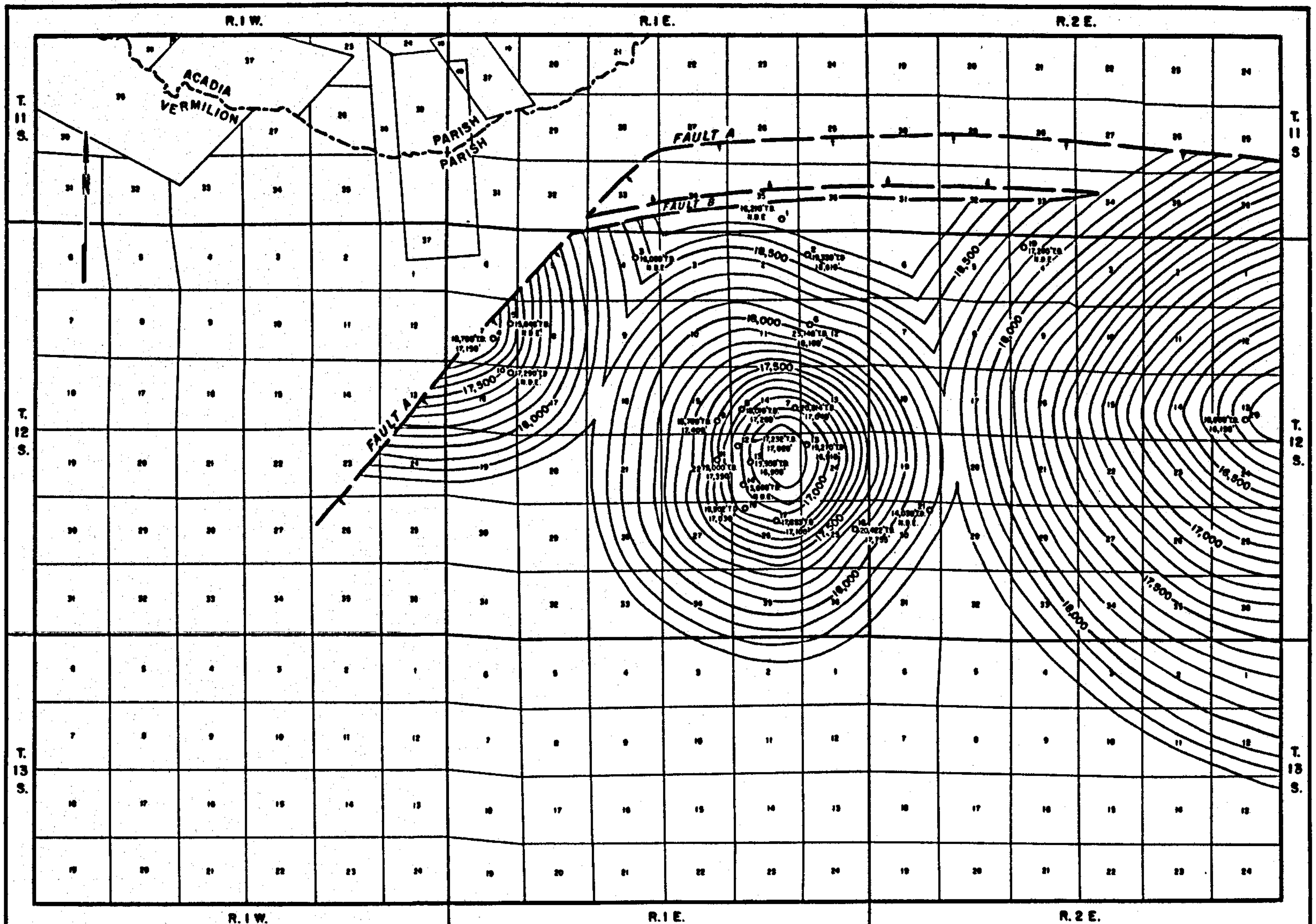
NET SAND ISOPACH MAP
STRATIGRAPHIC INTERVAL "C"

CONTOUR INTERVAL: 100'

EXPLANATION

O 29	Well Location & Identification Number
13,749'T.D.	Total Depth
10,302'	Datum Point
390'	Total Sand Value
279+	Actual Sand Value (Entire Interval Not Penetrated)
E	Estimated Point
N.D.E.	Not Deep Enough
N.L.	No Log
B.H./S.L.	Bottom Hole / Surface Location
F/O	Faulted Out

SCALE - MILES



DEPARTMENT OF ENERGY
(CONTRACT NO. Ey-76-S-05-4889)

KAPLAN GEOPRESSURE ENERGY PROSPECT

VERMILION & ACADIA PARISHES, LOUISIANA

FIGURE 60

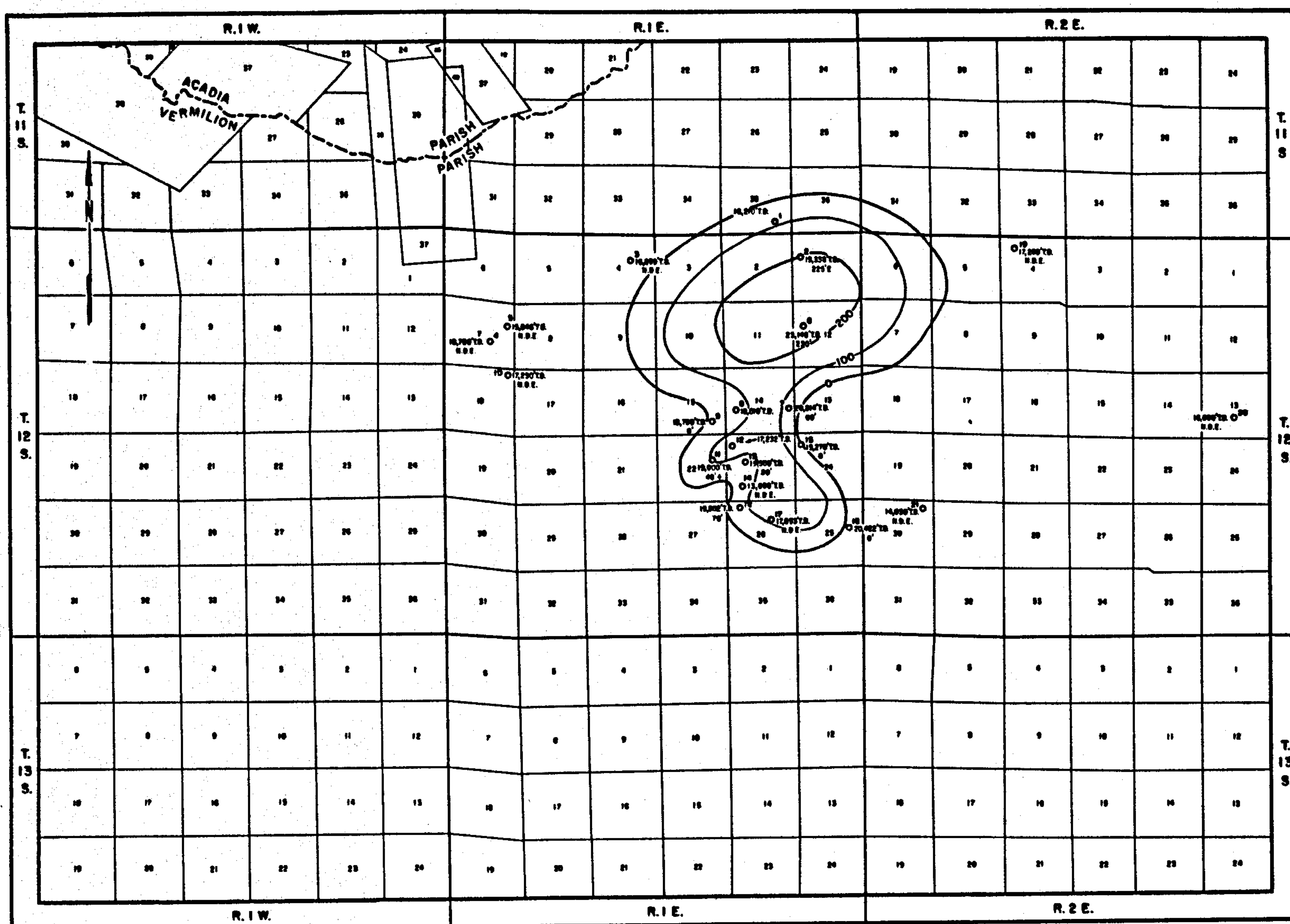
STRUCTURE MAP
TOP STRATIGRAPHIC INTERVAL "D"

CONTOUR INTERVAL: 100'

EXPLANATION

O[29]	Well Location & Identification Number
13,746'T.D.	Total Depth
'9,302'	Datum Point
350'	Total Sand Value
279+	Actual Sand Value (Entire Interval Not Penetrated)
E	Estimated Point
N.D.E.	Not Deep Enough
N.L.	No Log
B.H./S.L.	Bottom Hole / Surface Location
F/O	Faulted Out

SCALE - MILES



DEPARTMENT OF ENERGY
(CONTRACT NO. EY-76-S-05-4889)

KAPLAN GEOPRESSURE ENERGY PROSPECT
VERMILION & ACADIA PARISHES, LOUISIANA

FIGURE 61

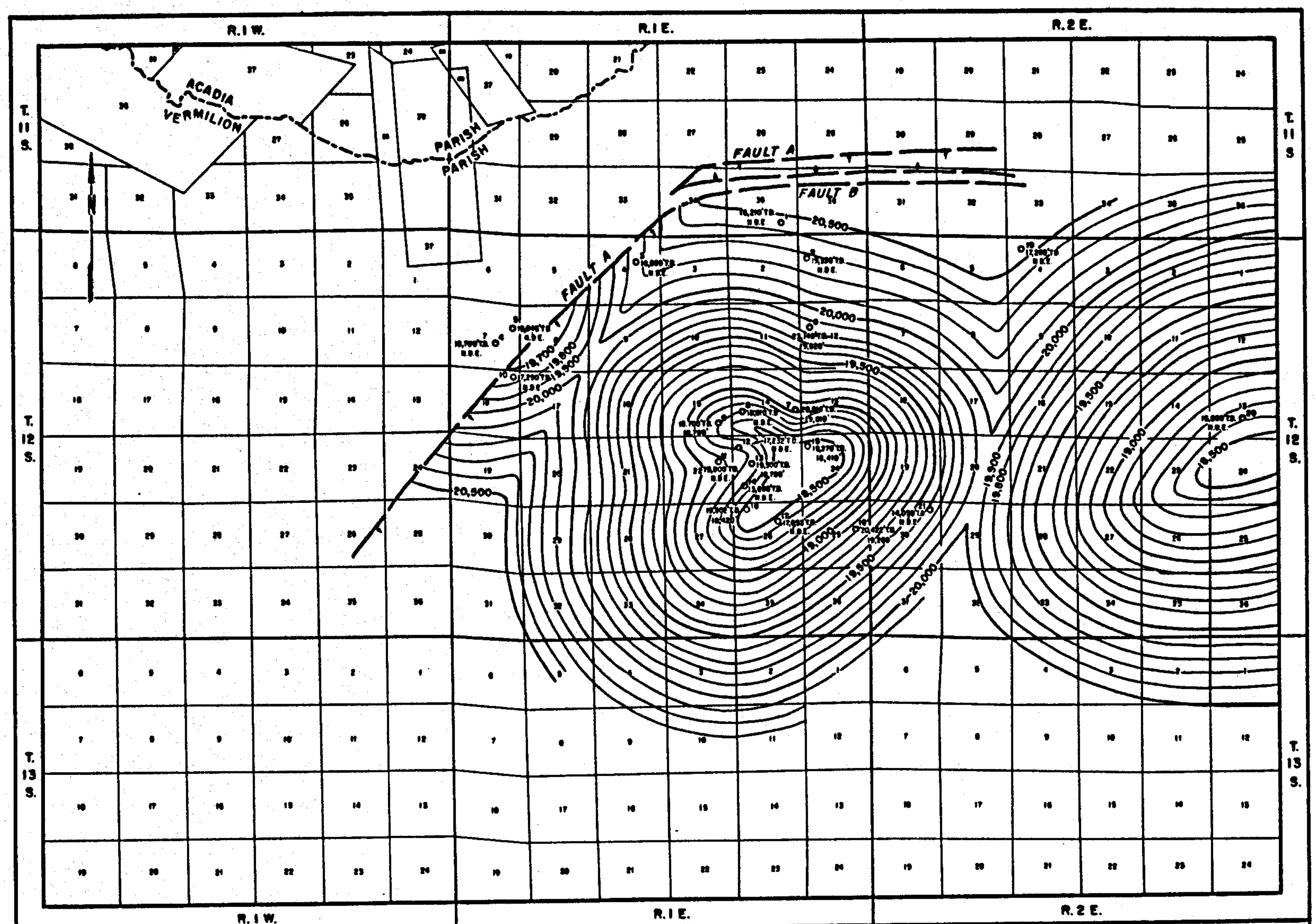
NET SAND ISOPACH MAP
STRATIGRAPHIC INTERVAL "D"

CONTOUR INTERVAL: 100'

EXPLANATION

O[20]	Well Location & Identification Number
13,700'T.D.	Total Depth
10,300'	Datum Point
350'	Total Sand Value
270+	Actual Sand Value (Entire Interval Not Penetrated)
E	Estimated Point
N.D.E.	Not Deep Enough
N.L.	No Log
B.H./S.L.	Bottom Hole / Surface Location
F/O	Faulted Out

SCALE - MILES



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KAPLAN GEOPRESSURE ENERGY PROSPECT
VERMILION & ACADIA PARISHES, LOUISIANA

FIGURE 62

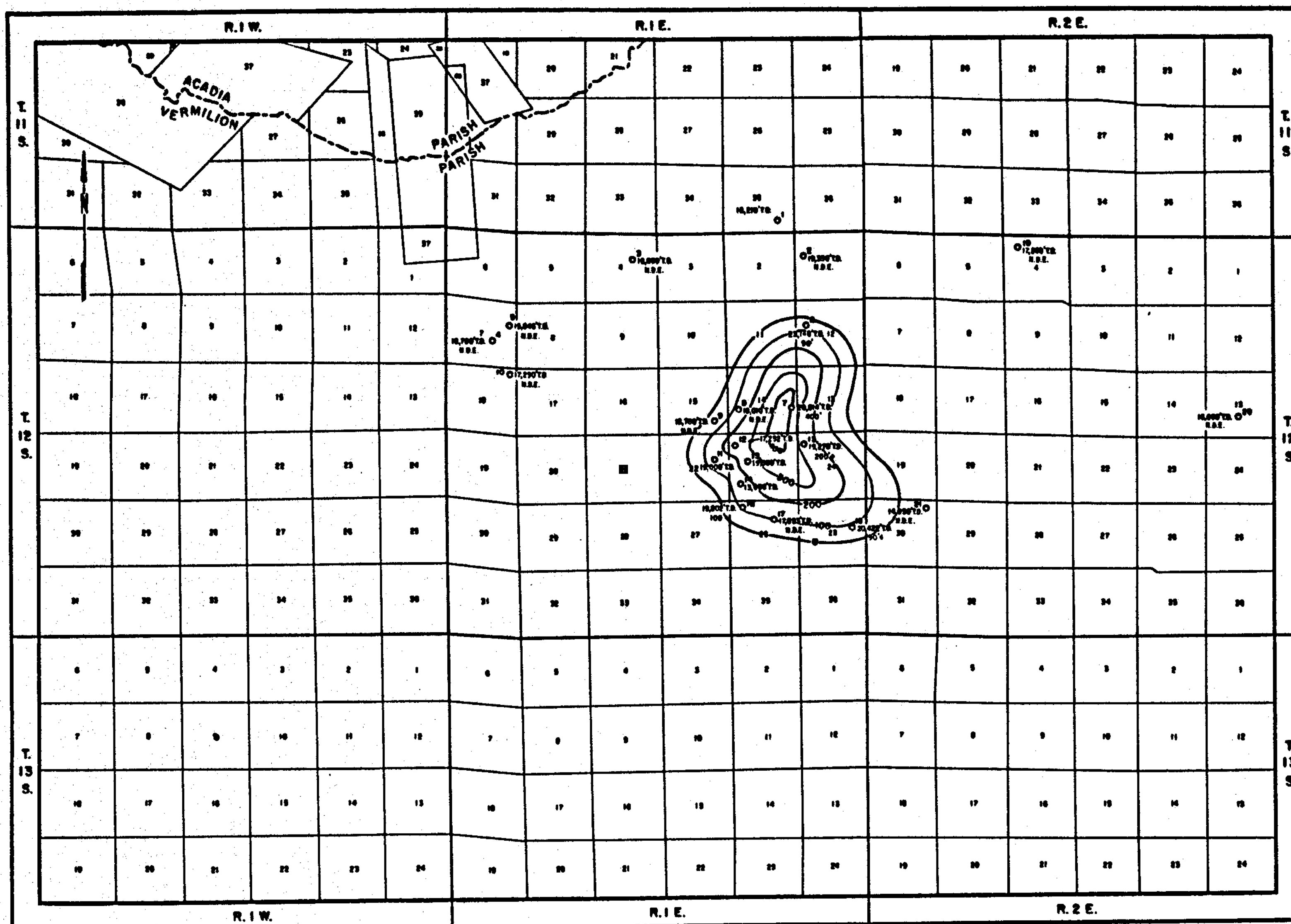
STRUCTURE MAP
TOP STRATIGRAPHIC INTERVAL "E"

CONTOUR INTERVAL: 100'

EXPLANATION

○[29]	Well Location & Identification Number
13,740'T.D.	Total Depth
10,302'	Datum Point
350'	Total Sand Value
270+	Actual Sand Value (Entire Interval Not Penetrated)
E	Estimated Point
N.D.E.	Not Deep Enough
N.L.	No Log
B.H./S.L.	Bottom Hole / Surface Location
F/O	Faulted Out

SCALE - MILES



DEPARTMENT OF ENERGY
(CONTRACT NO. Ey-76-S005-4889)

KAPLAN GEOPRESSURE ENERGY PROSPECT
VERMILION & ACADIA PARISHES, LOUISIANA

FIGURE 63

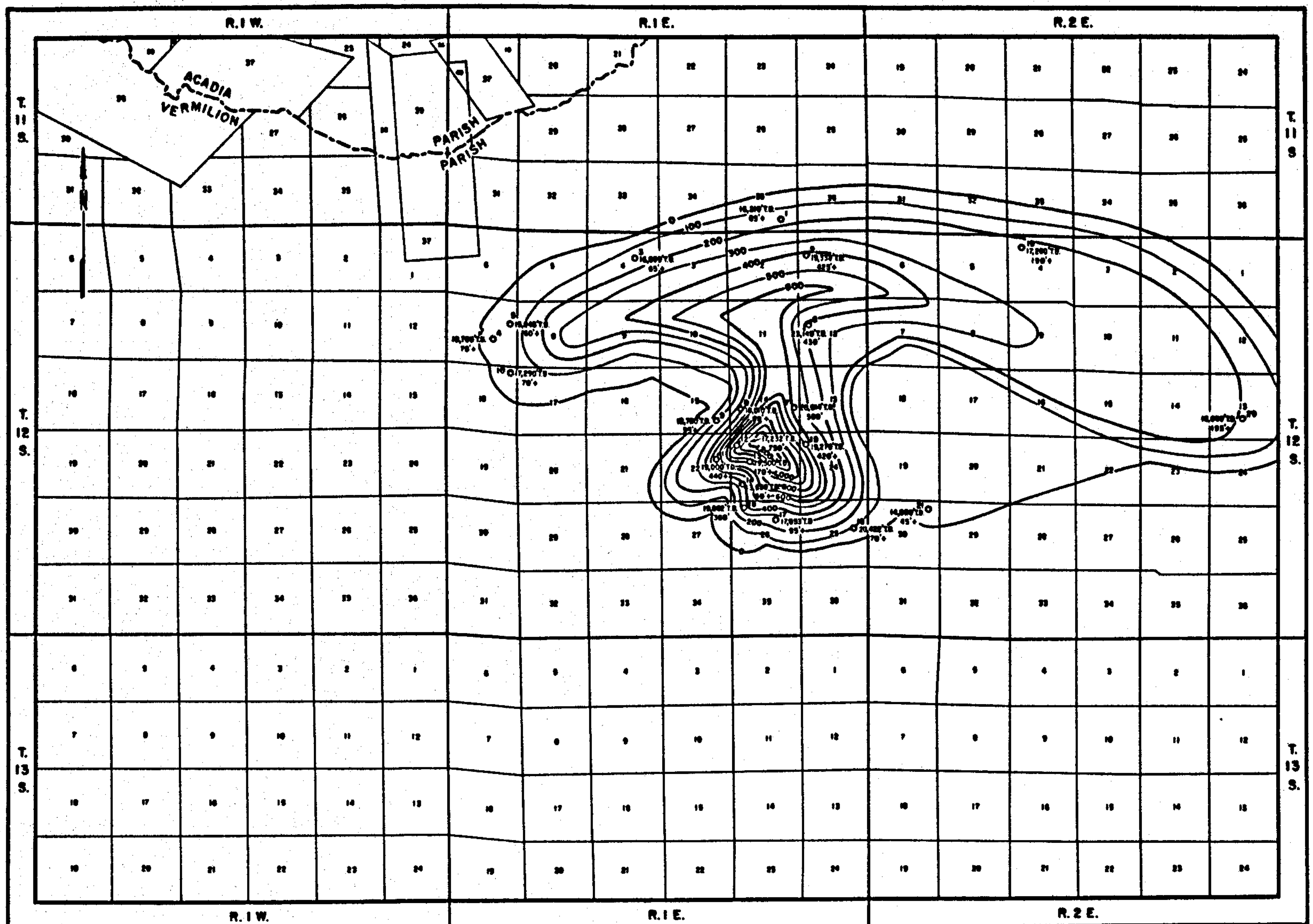
NET SAND ISOPACH MAP
STRATIGRAPHIC INTERVAL "E"

CONTOUR INTERVAL: 100'

EXPLANATION

O[29]	Well Location & Identification Number
13,740'T.D.	Total Depth
10,300'	Datum Point
350'	Total Sand Value
279+	Actual Sand Value (Entire Interval Not Penetrated)
E	Estimated Point
N.D.E.	Not Deep Enough
N.L.	No Log
B.H./S.L.	Bottom Hole / Surface Location
F/O	Faulted Out

SCALE - MILES



DEPARTMENT OF ENERGY
(CONTRACT NO. EY-76-S005-4889)

KAPLAN GEOPRESSURE ENERGY PROSPECT
VERMILION & ACADIA PARISHES, LOUISIANA

FIGURE 64

COMPOSITE NET SAND ISOPACH MAP
STRATIGRAPHIC INTERVALS "A"+"B"+"C"+"D"+"E"

CONTOUR INTERVAL: 100'

EXPLANATION

O[29]	Well Location & Identification Number
13,740'T.D.	Total Depth
10,302'	Datum Point
350'	Total Sand Value
270+	Actual Sand Value (Entire Interval Not Penetrated)
E	Estimated Point
N.D.E.	Not Deep Enough
N.L.	No Log
B.H./S.L.	Bottom Hole / Surface Location
F/O	Faulted Out

SCALE - MILES

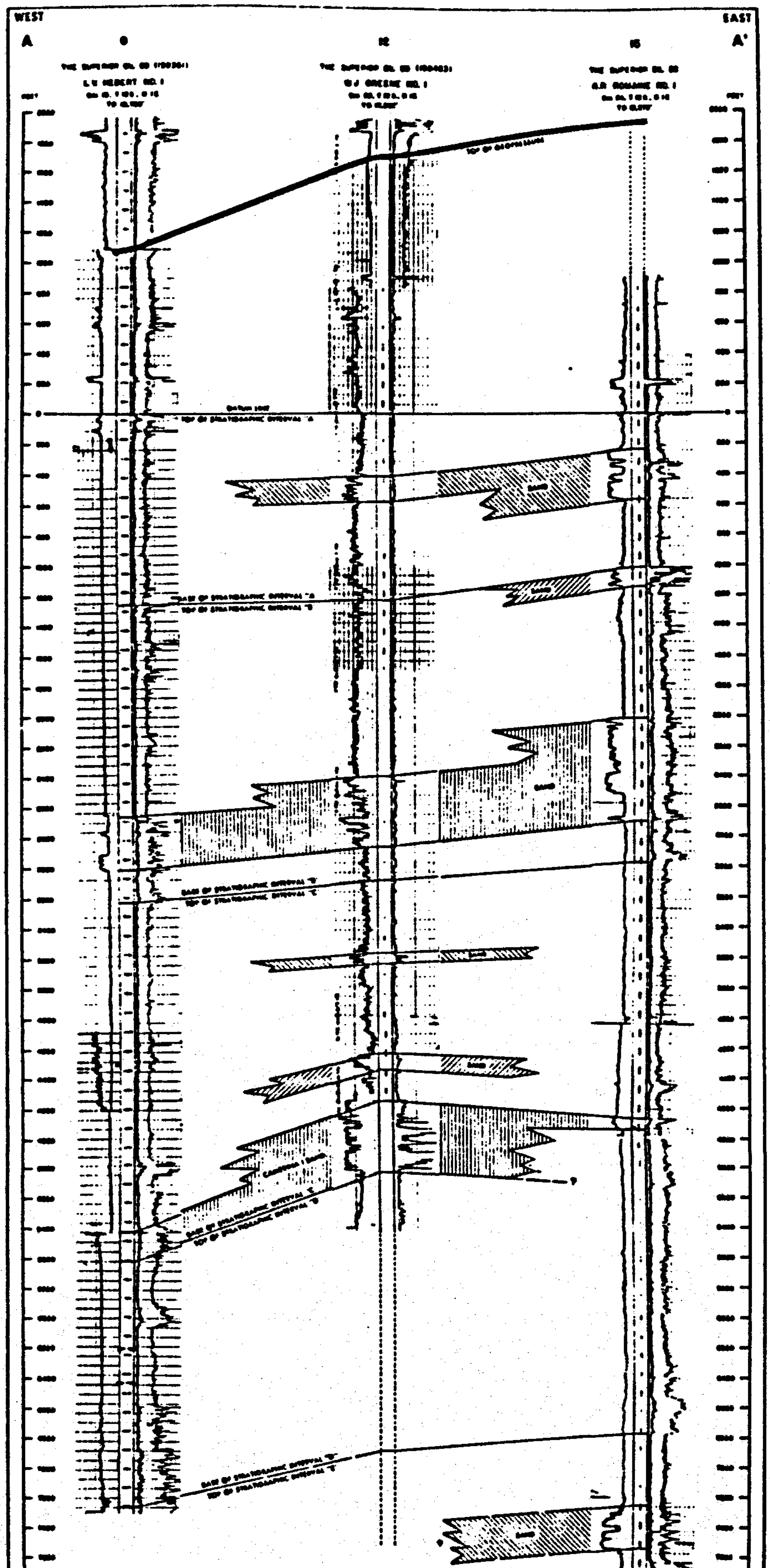


FIGURE 65

DEPARTMENT OF ENERGY

KAPLAN GEOPRESSURE PROSPECT

EAST-WEST STRATIGRAPHIC SECTION A-A'

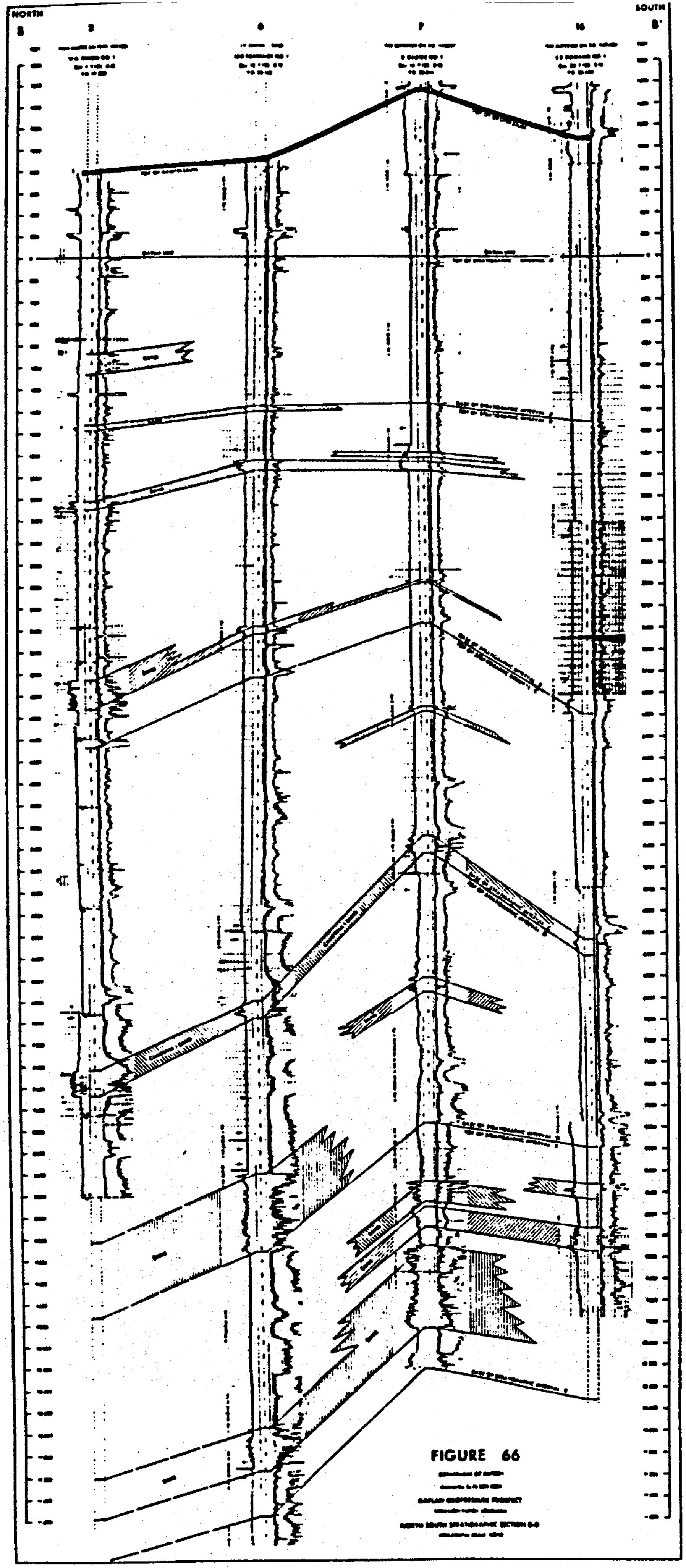


FIGURE 66

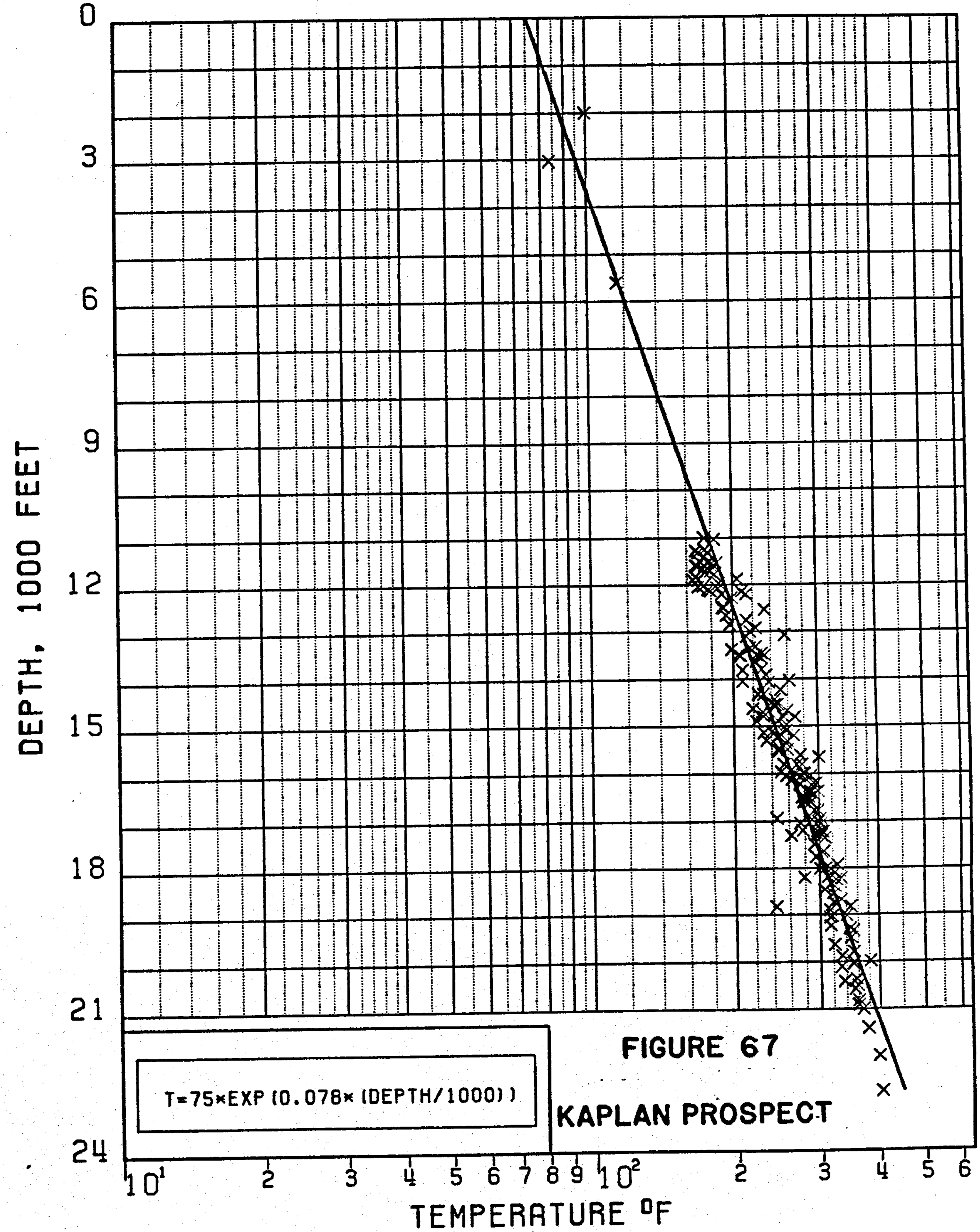


FIGURE 67

KAPLAN PROSPECT

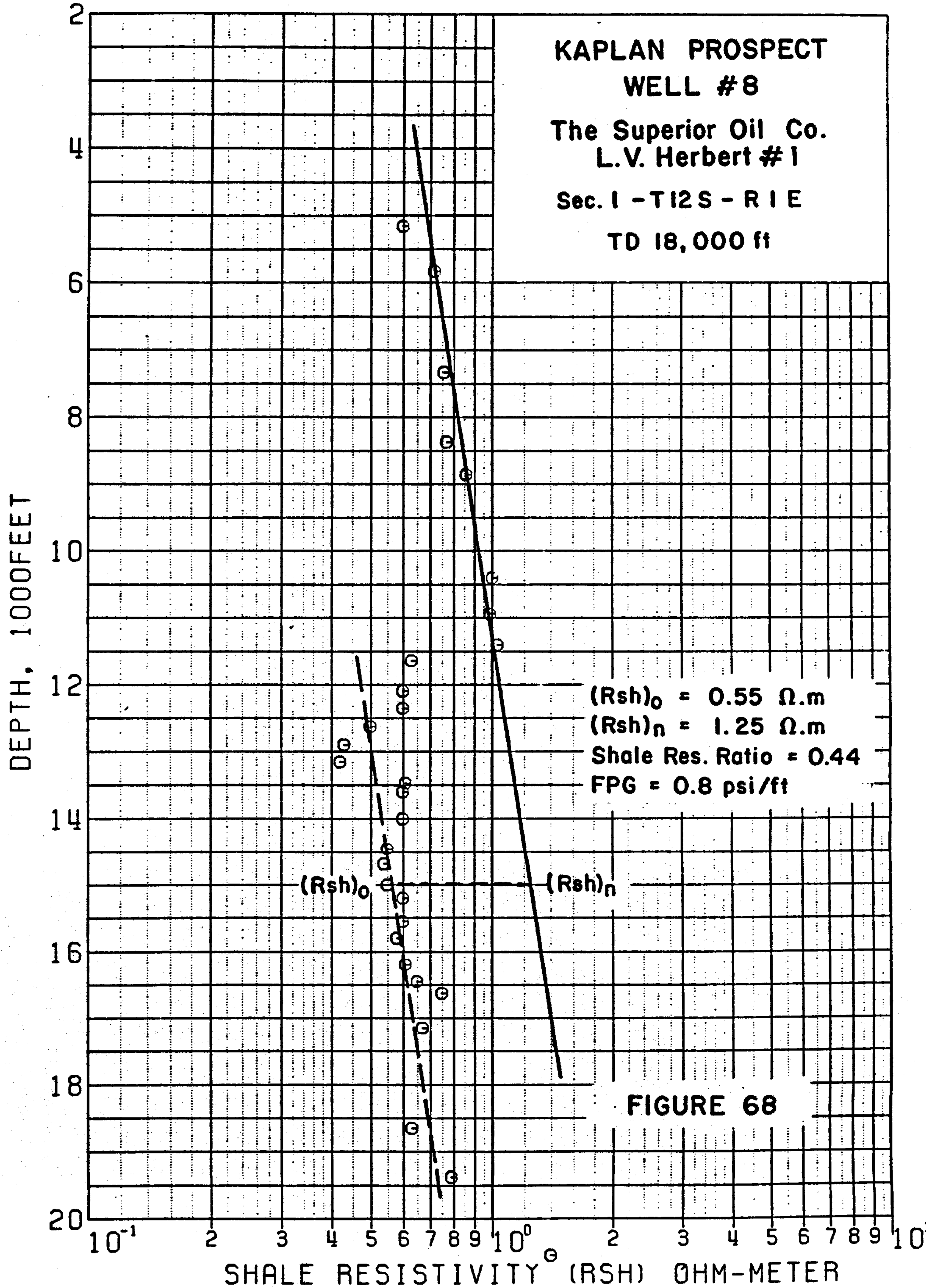
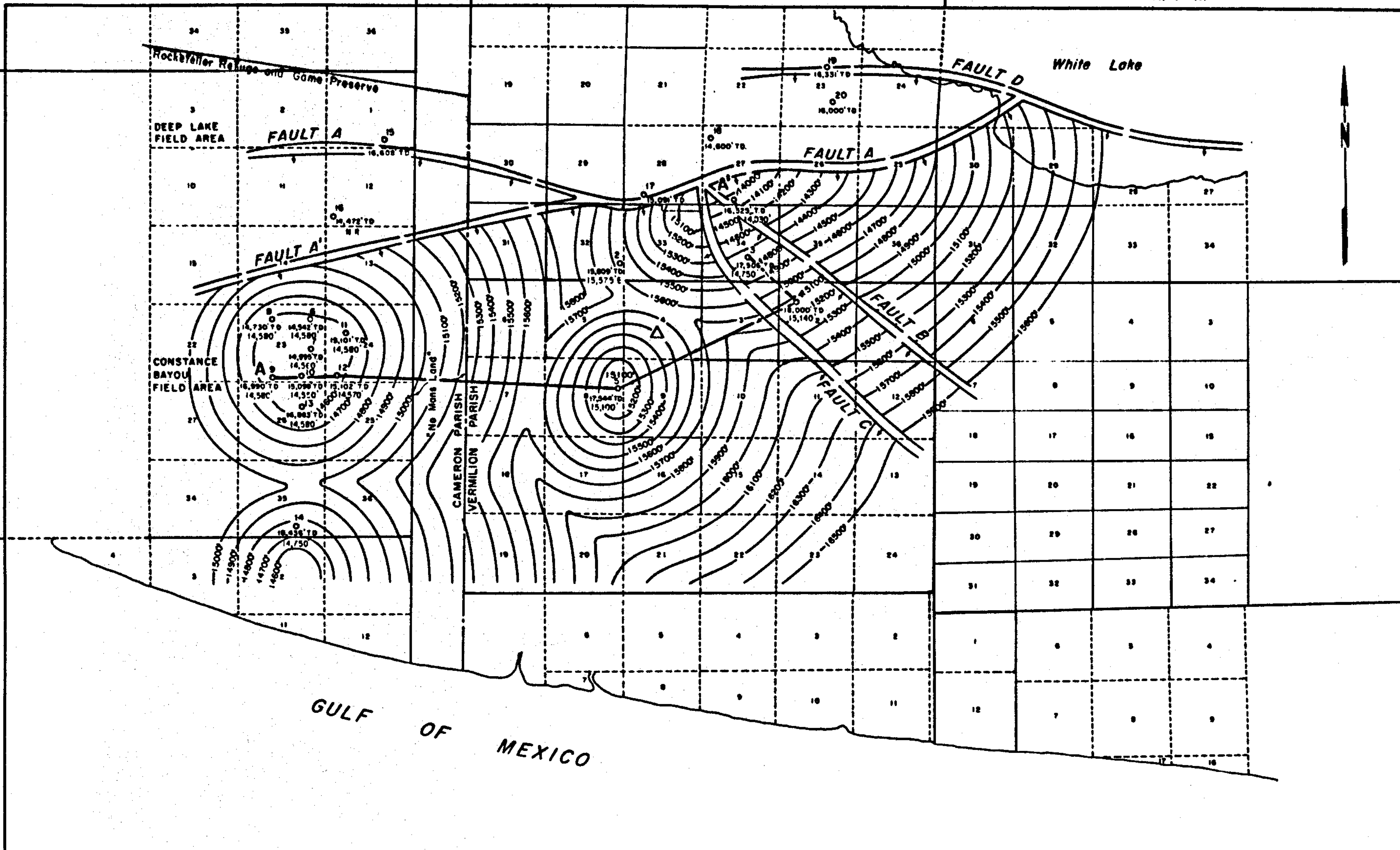

KAPLAN PROSPECT
WELL #8
The Superior Oil Co.
L.V. Herbert #1
Sec. 1 - T12S - R1E
TD 18,000 ft
(Rsh)o = 0.55 Ω.m
(Rsh)n = 1.25 Ω.m
Shale Res. Ratio = 0.44
FPG = 0.8 psi/ft
(Rsh)o
(Rsh)n
DEPTH, 1000FEET
2
4
6
8
10
12
14
16
18
20
10^-1
2
3
4
5
6
7
8
9
10^0
2
3
4
5
6
7
8
9
10^1
SHALE RESISTIVITY (RSH) OHM-METER

FIGURE 68

FIGURE 69 THROUGH 77

SOUTH WHITE LAKE PROSPECT



DEPARTMENT OF ENERGY
(CONTRACT NO EY-76-S005-4889)
SOUTH WHITE LAKE GEOPRESSURE ENERGY PROSPECT
CAMERON and VERMILION PARISHES, LOUISIANA

FIGURE 69

STRUCTURE MAP
TOP DISCORBIS "B" ZONE
CONTOUR INTERVAL: 100'

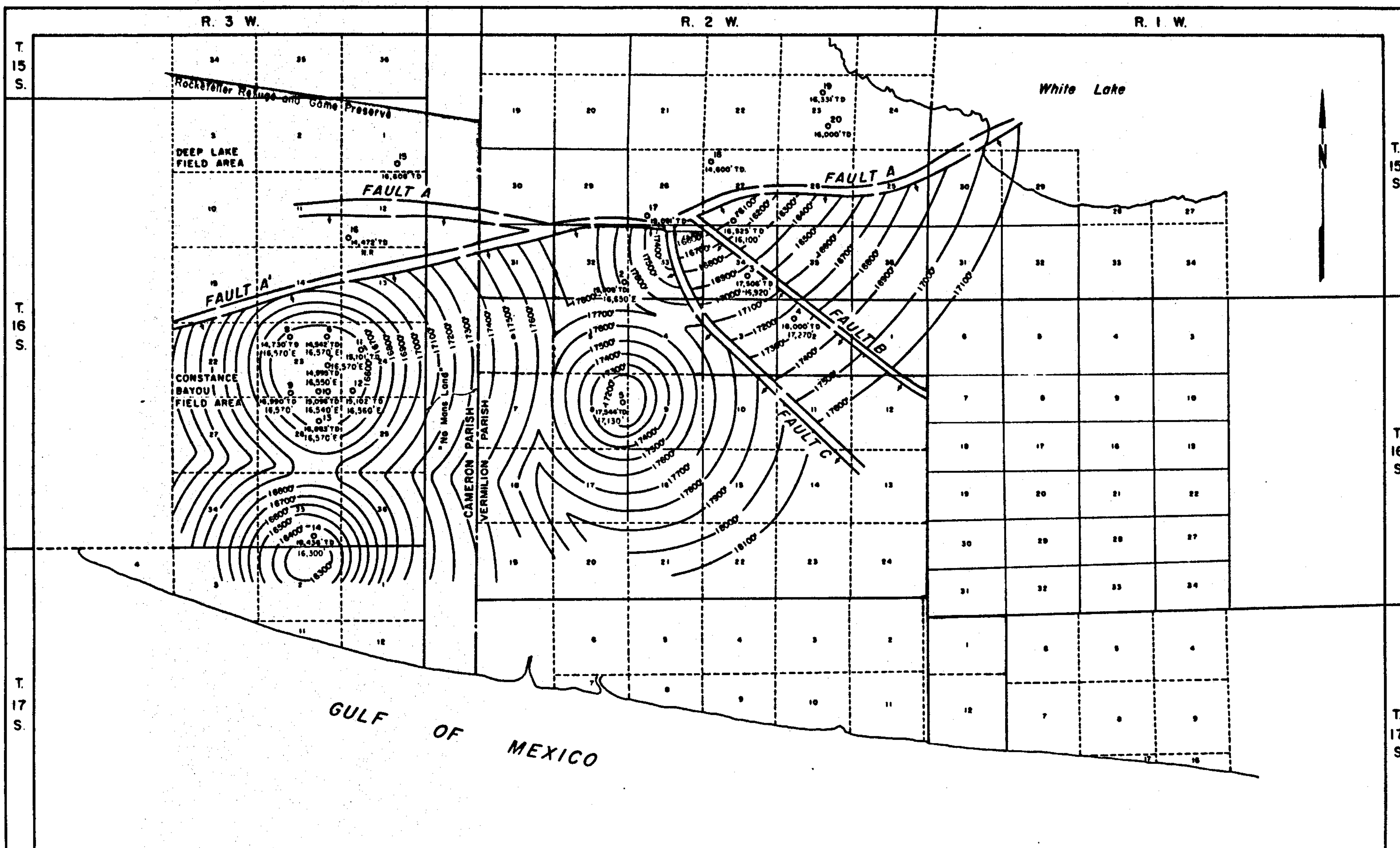
EXPLANATION

39	Well Location & Identification Number
13,703' TD	Total Depth
1480'	Datum Point (E-Estimated)
55+	Actual Sand Value (Entire Interval Not Penetrated)
68'	Total Sand Value
N D E	Not Deep Enough
F/O	Faulted Out
△	Proposed Well Location

A-A' Location, East-West Stratigraphic Section

SCALE - FEET 4000 0 4000 8000

R. 3 W. R. 2 W. R. I W.



DEPARTMENT OF ENERGY
(CONTRACT NO EY-76-S005-4889)
SOUTH WHITE LAKE GEOPRESSURE ENERGY PROSPECT
CAMERON and VERMILION PARISHES, LOUISIANA

FIGURE 70

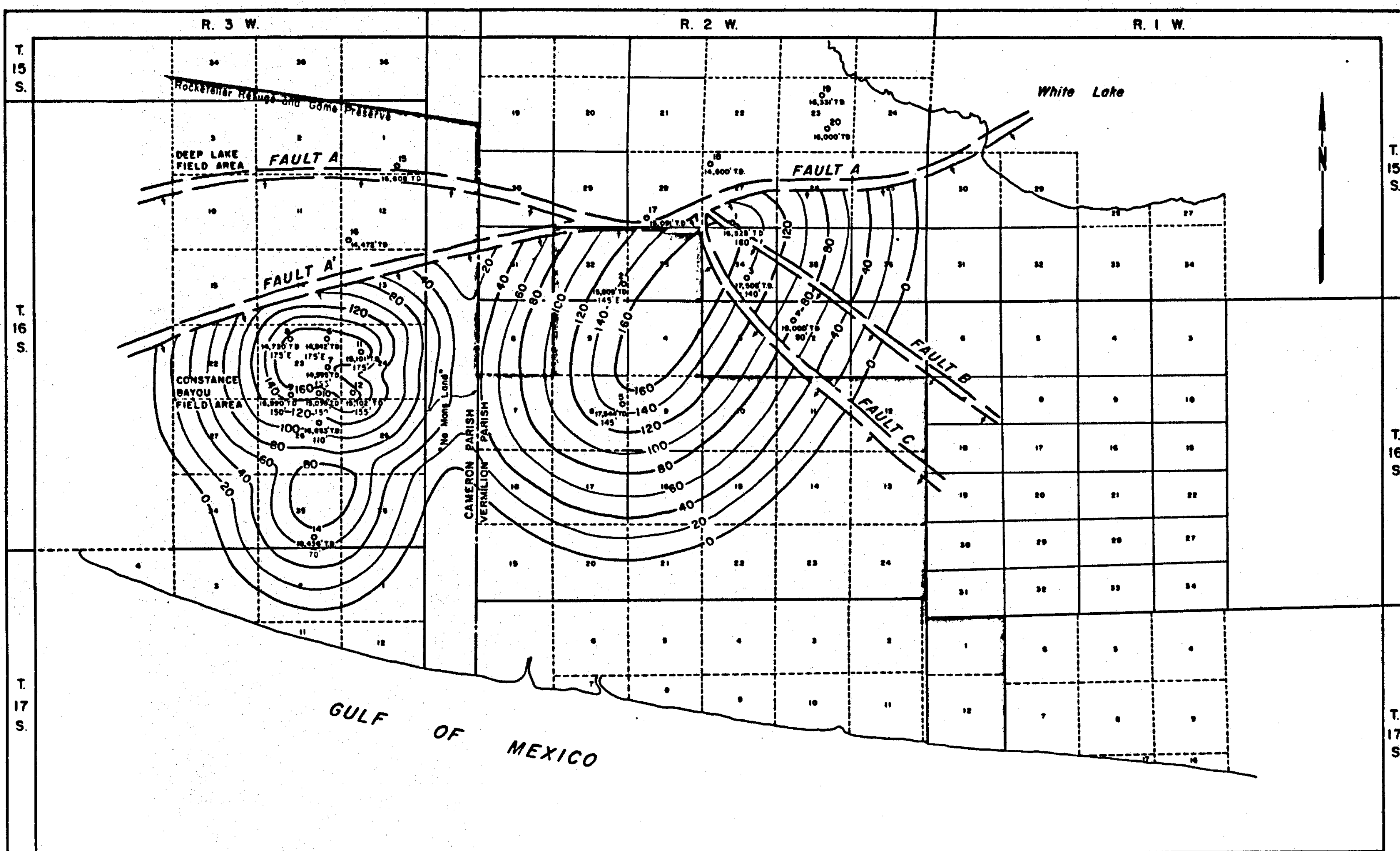
STRUCTURE MAP
BASE DISCORBIS "B" ZONE
CONTOUR INTERVAL: 100'

EXPLANATION

39 o	Well Location & Identification Number
13,703' TD	Total Depth
1480'	Datum Point (E-Estimated)
55+	Actual Sand Value (Entire Interval Not Penetrated)
68'	Total Sand Value
N D E	Not Deep Enough
F/O	Faulted Out

SCALE - FEET
4000 0 4000 8000

R. 3 W. R. 2 W. R. 1 W.



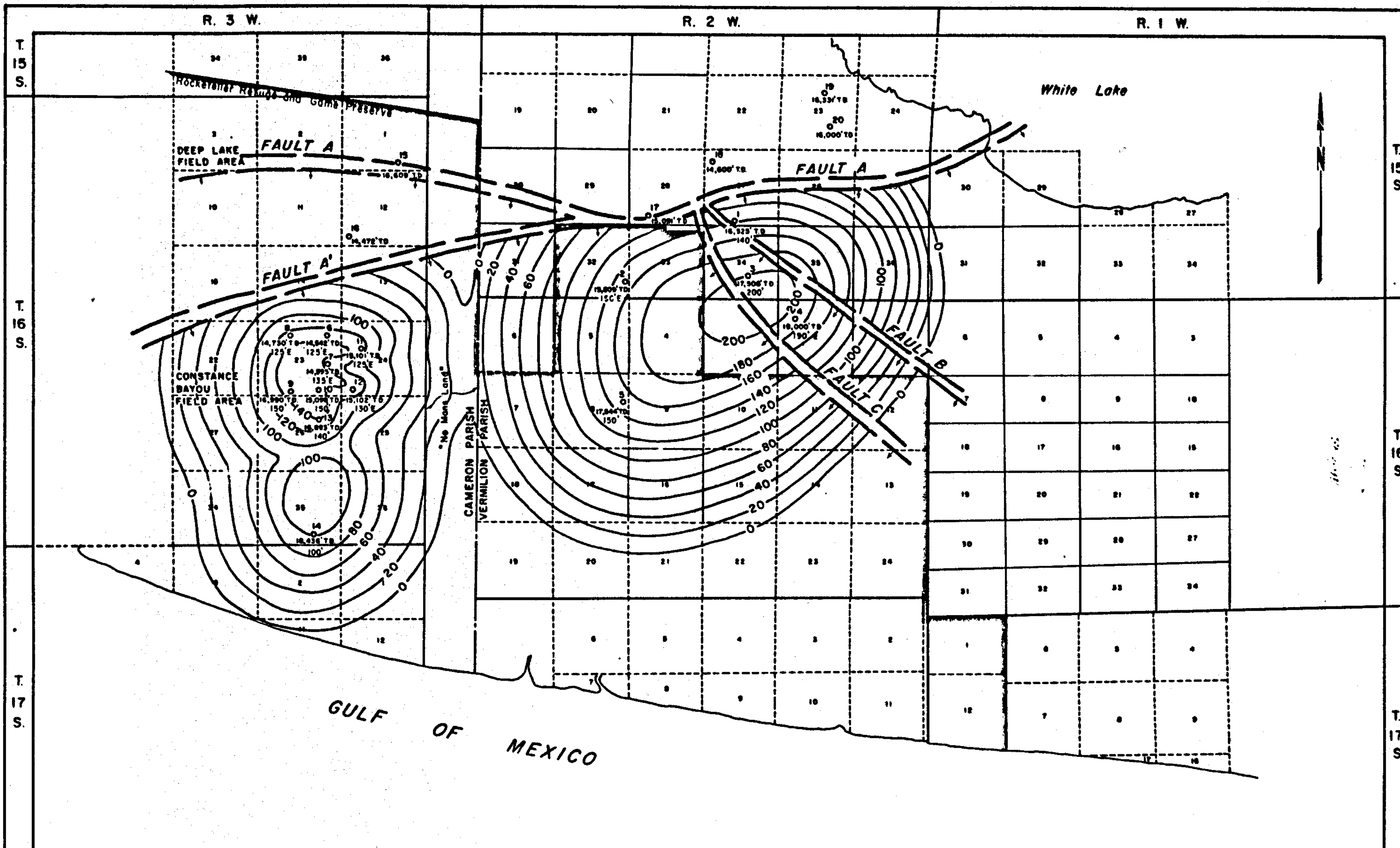
DEPARTMENT OF ENERGY
(CONTRACT NO EY-76-S005-4889)
SOUTH WHITE LAKE GEOPRESSURE ENERGY PROSPECT
CAMERON and VERMILION PARISHES, LOUISIANA

FIGURE 71
NET SAND ISOPACH MAP
SAND "I"
CONTOUR INTERVAL: 20'

EXPLANATION

39 o	Well Location & Identification Number
13,705' T.D.	Total Depth
1480'	Datum Point (E-Estimated)
55+	Actual Sand Value (Entire Interval Not Penetrated)
68'	Total Sand Value
N.D.E.	Not Deep Enough
F/O	Faulted Out

SCALE - FEET
4000 0 4000 8000



DEPARTMENT OF ENERGY
(CONTRACT NO EY-76-S005-4889)
SOUTH WHITE LAKE GEOPRESSURE ENERGY PROSPECT
CAMERON and VERMILION PARISHES, LOUISIANA

FIGURE 72

NET SAND ISOPACH MAP

SAND "2"

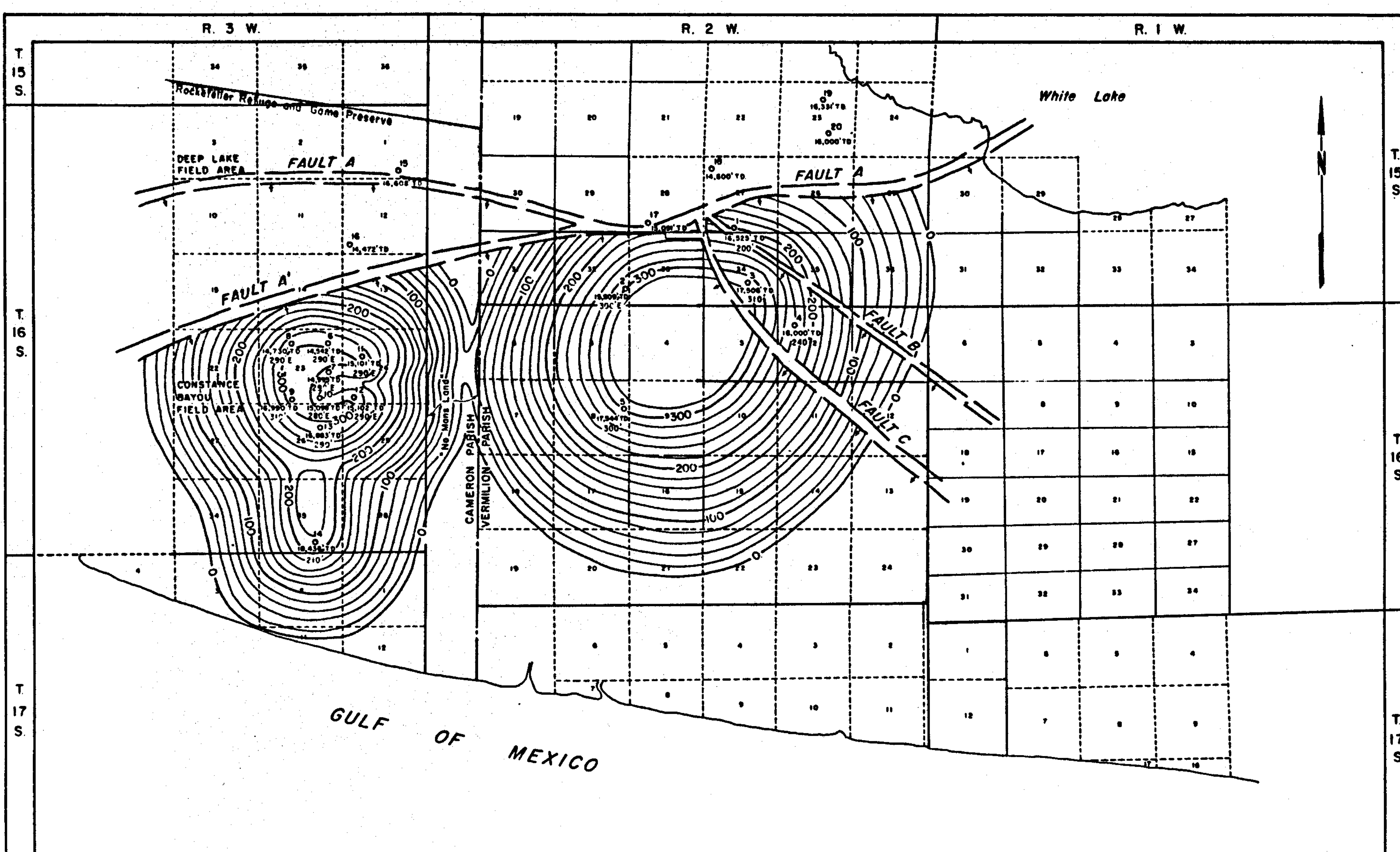
CONTOUR INTERVAL: 20'

EXPLANATION

39 o	Well Location & Identification Number
13,703' T.D.	Total Depth
1480'	Datum Point (E-Estimated)
55+	Actual Sand Value (Entire Interval Not Penetrated)
68'	Total Sand Value
N.D.E	Not Deep Enough
F/O	Faulted Out

SCALE - FEET: 4000 0 4000 8000

R. 3 W. R. 2 W. R. 1 W.



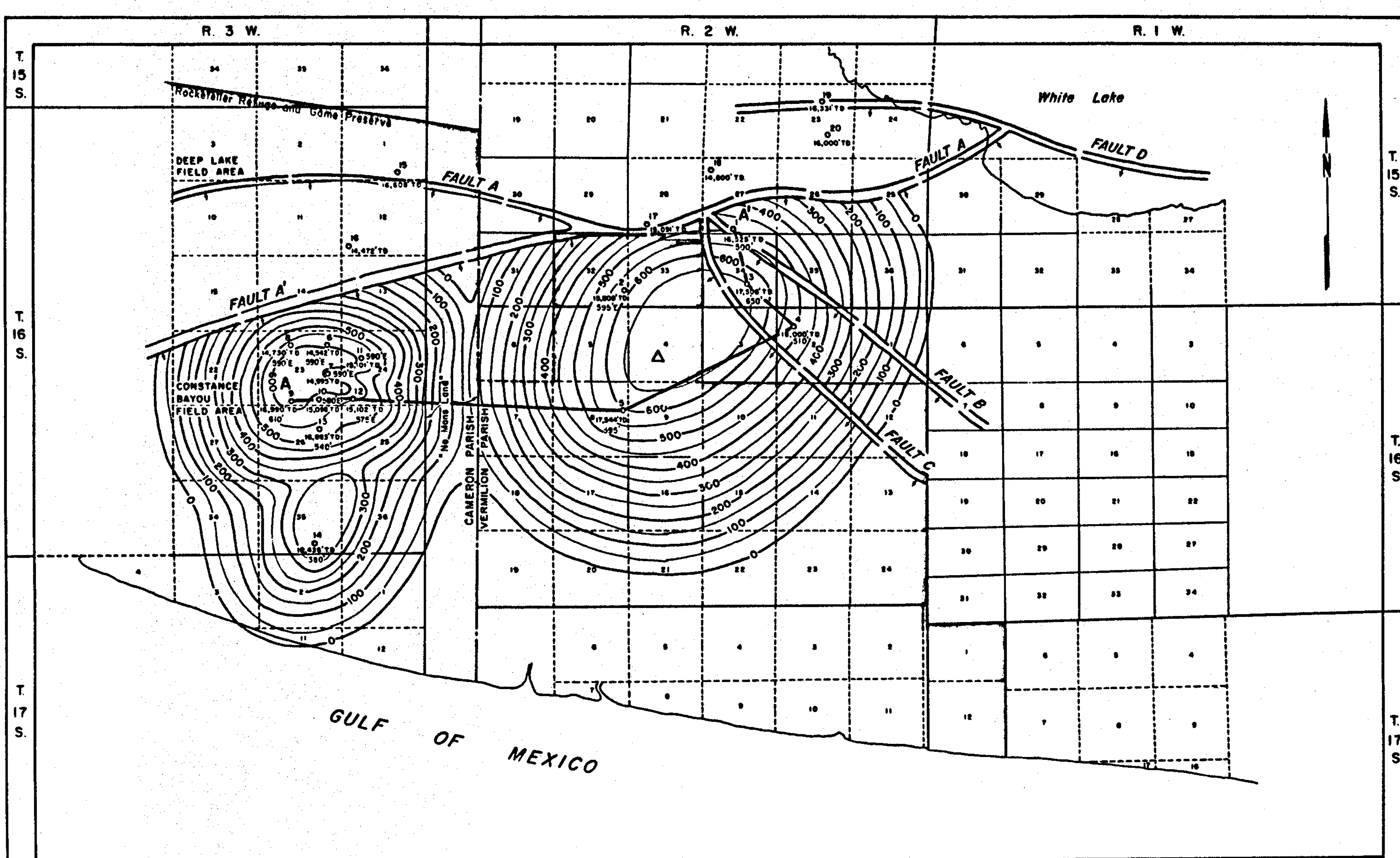
DEPARTMENT OF ENERGY
(CONTRACT NO EY-76-S005-4889)
SOUTH WHITE LAKE GEOPRESSURE ENERGY PROSPECT
CAMERON and VERMILION PARISHES, LOUISIANA

FIGURE 73
NET SAND ISOPACH MAP
SAND "3"
CONTOUR INTERVAL: 20'

EXPLANATION

39 o	Well Location & Identification Number
13,703' T.D.	Total Depth
1480'	Datum Point (E-Estimated)
55+	Actual Sand Value (Entire Interval Not Penetrated)
68'	Total Sand Value
N.D.E.	Not Deep Enough
F/O	Faulted Out

SCALE - FEET
4000 0 4000 8000



DEPARTMENT OF ENERGY
(CONTRACT NO EY-76-S005-4889)
SOUTH WHITE LAKE GEOPRESSURE ENERGY PROSPECT
CAMERON and VERMILION PARISHES, LOUISIANA

FIGURE 74

NET SAND ISOPACH MAP
SANDS 1, 2, & 3

CONTOUR INTERVAL: 50'

EXPLANATION

- 39 o — Well Location & Identification Number
- 13,703' T.D. — Total Depth
- 1480' — Datum Point (E-Estimated)
- 55+ — Actual Sand Value (Entire Interval Not Penetrated)
- 68' — Total Sand Value
- N.D.E. — Net Deep Enough
- F/O — Faulted Out
- △ — Proposed Well Location
- A-A' — Location, East-West Stratigraphic Section

SCALE - FEET: 4000 0 4000 8000

R. 3 W. R. 2 W. R. 1 W.

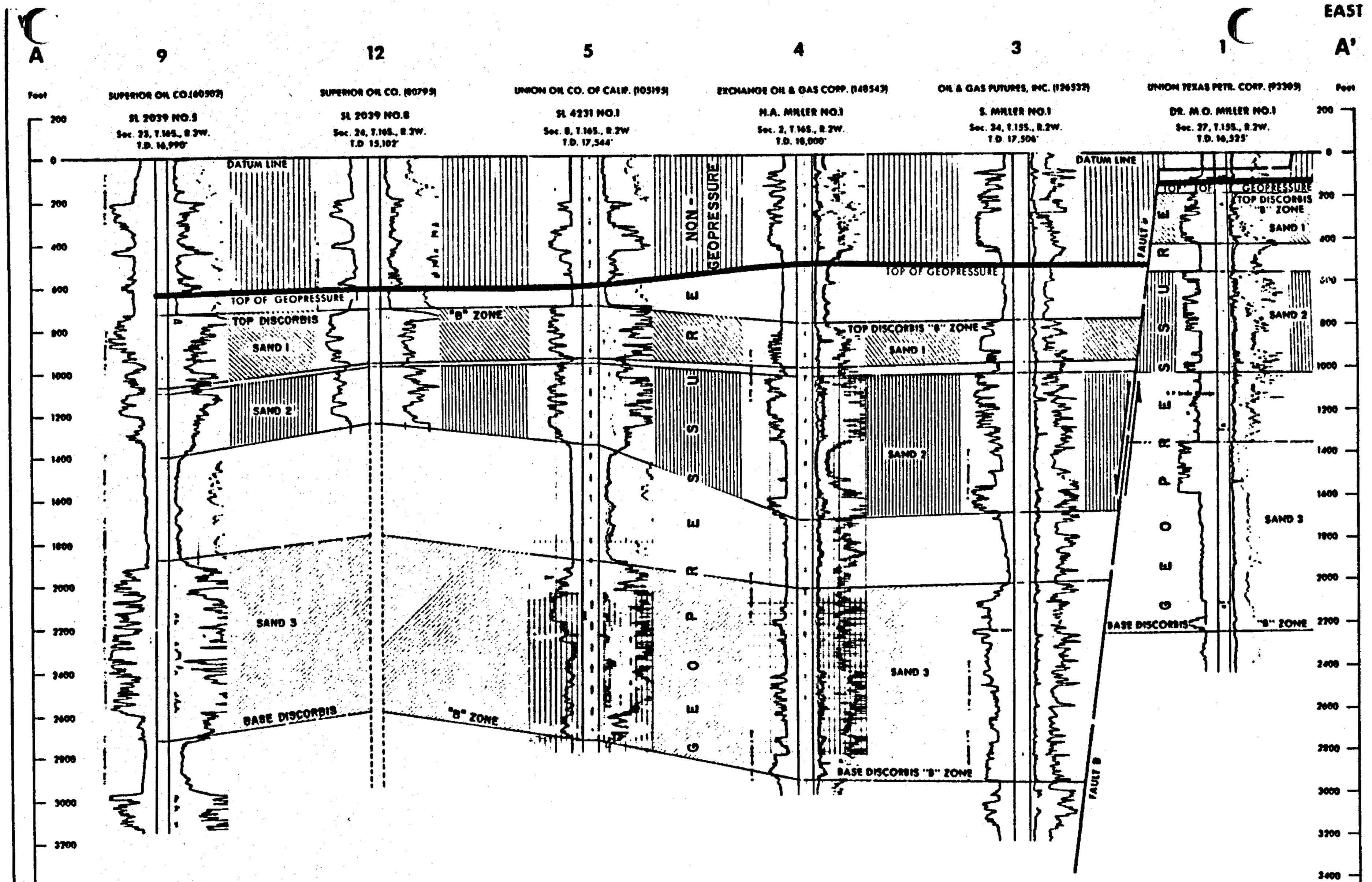


FIGURE 75

DEPARTMENT OF ENERGY

(Contract No. Ey-76-S005-4889)

SOUTH WHITE LAKE GEOPRESSURE ENERGY PROSPECT

CAMERON AND VERMILION PARISHES, LOUISIANA

EAST-WEST STRATIGRAPHIC SECTION A-A'

HORIZONTAL SCALE: NONE

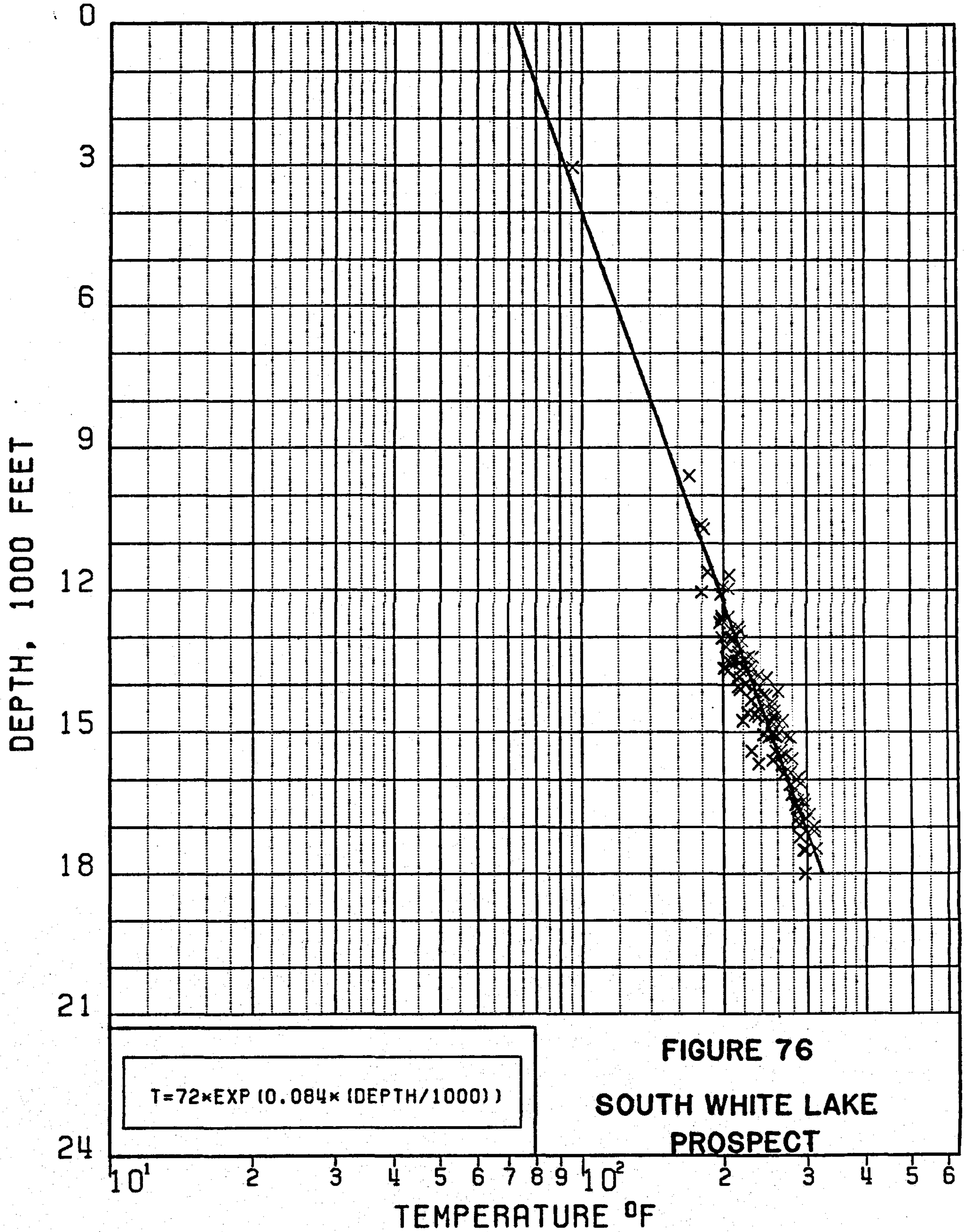


FIGURE 76

SOUTH WHITE LAKE PROSPECT

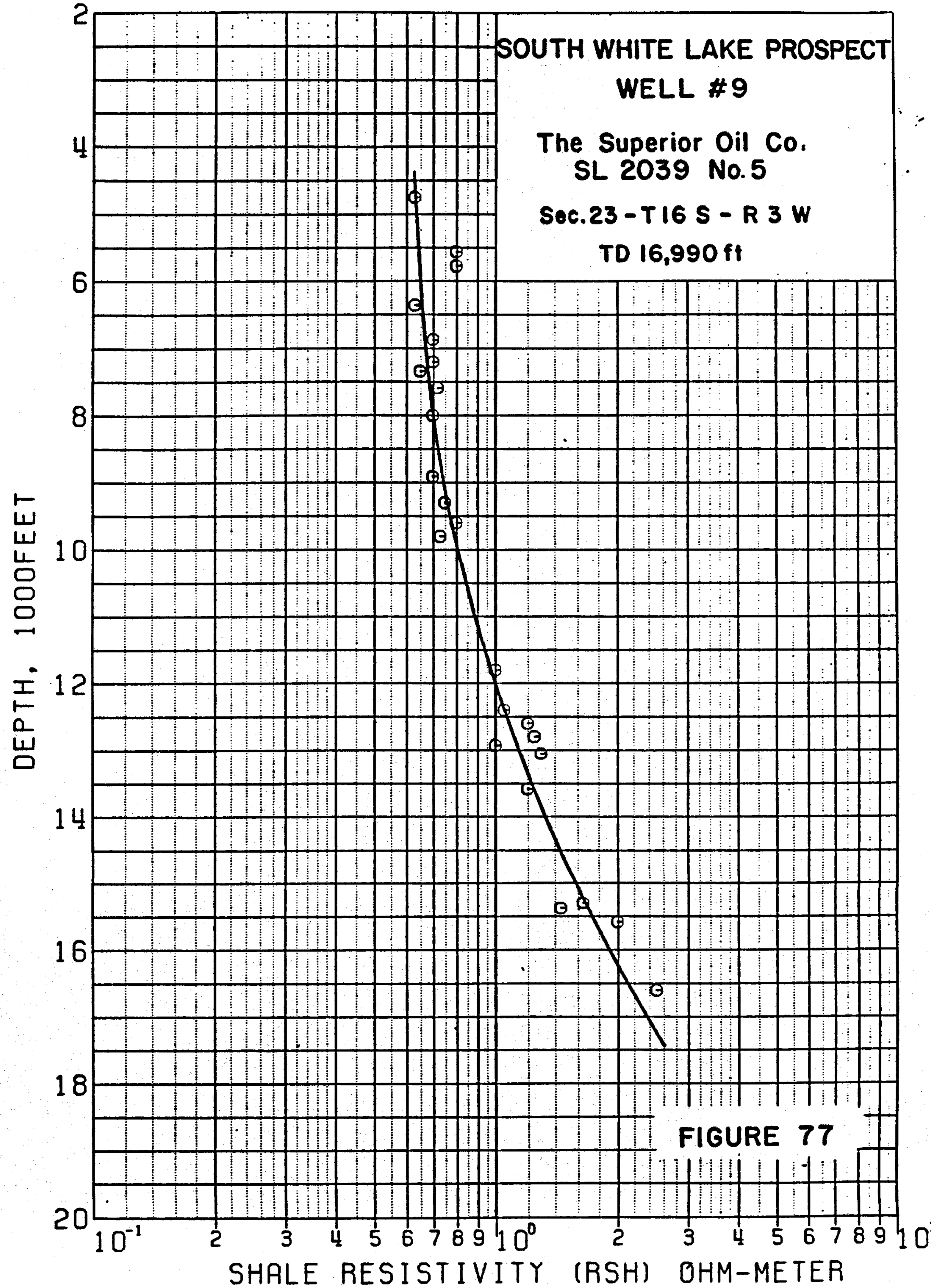

SOUTH WHITE LAKE PROSPECT
WELL #9
The Superior Oil Co.
SL 2039 No. 5
Sec. 23 - T 16 S - R 3 W
TD 16,990 ft
DEPTH, 1000FEET
2
4
6
8
10
12
14
16
18
20
10^{-1}
2
3
4
5
6
7
8
9
10^{0}
2
3
4
5
6
7
8
9
10^{1}
SHALE RESISTIVITY (RSH) OHM-METER

FIGURE 77

FIGURE 78 THROUGH 87

TUSCALOOSA TREND

AND

SOLITUDE POINT PROSPECT

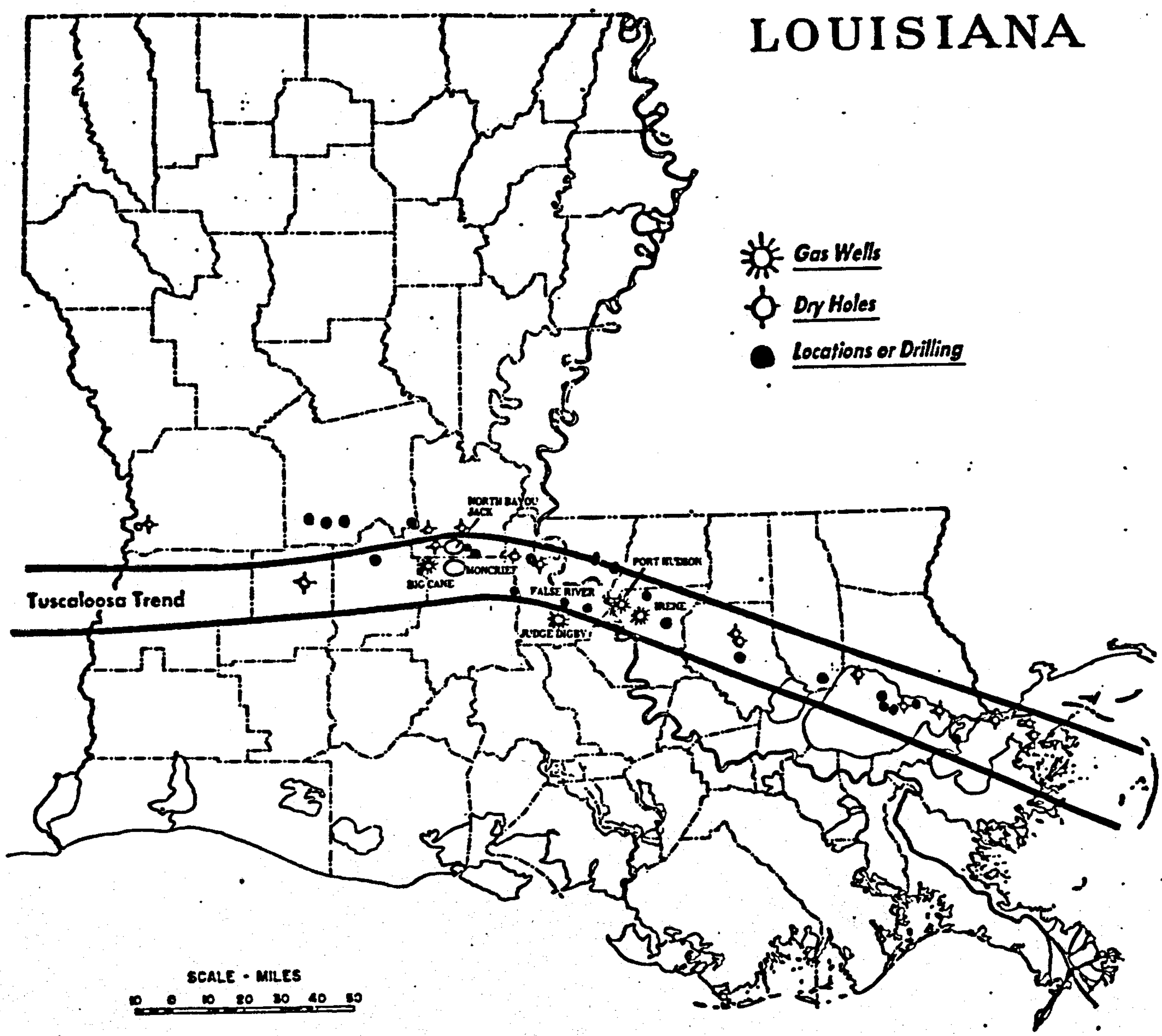
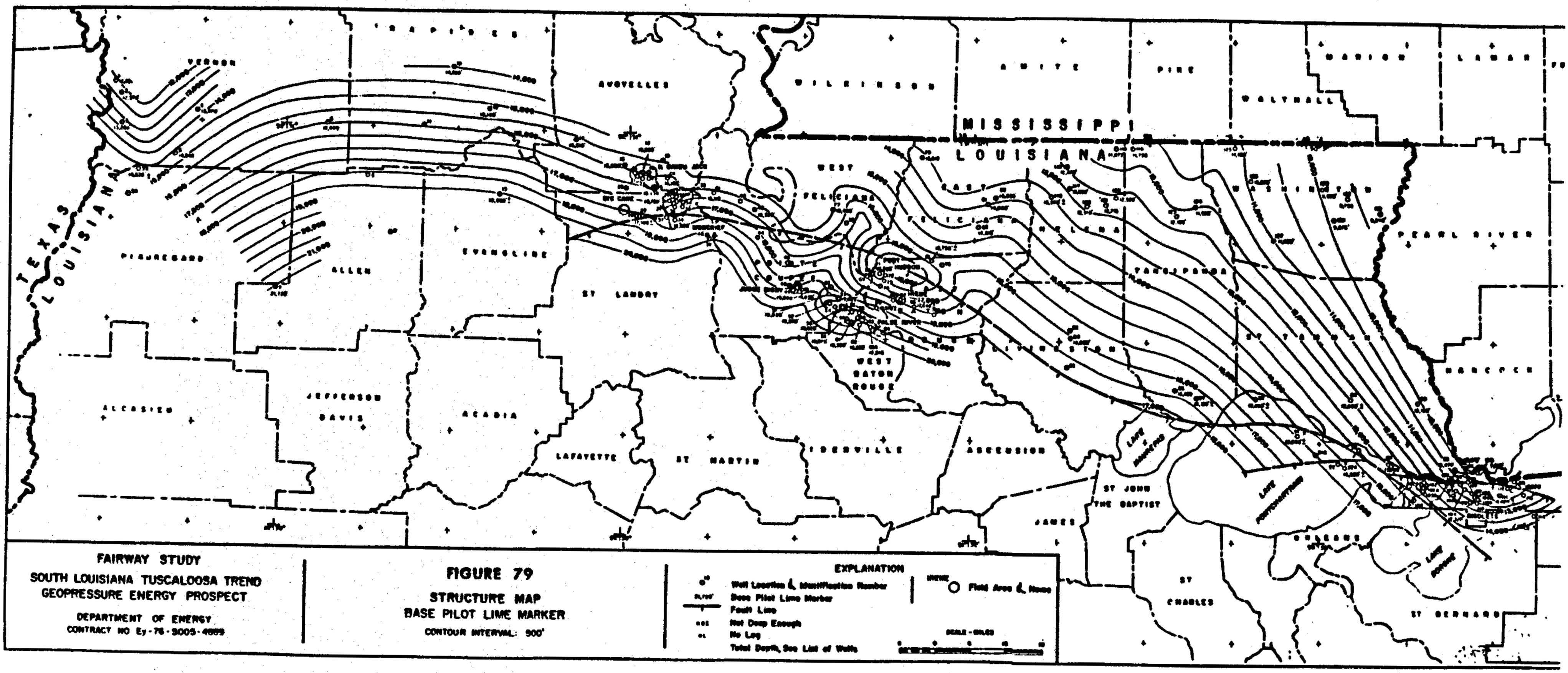


FIGURE 78

LOUISIANA MAP
SHOWING TUSCALOOSA TREND



FAIRWAY STUDY
SOUTH LOUISIANA TUSCALOOSA TREND
GEOPRESSURE ENERGY PROSPECT

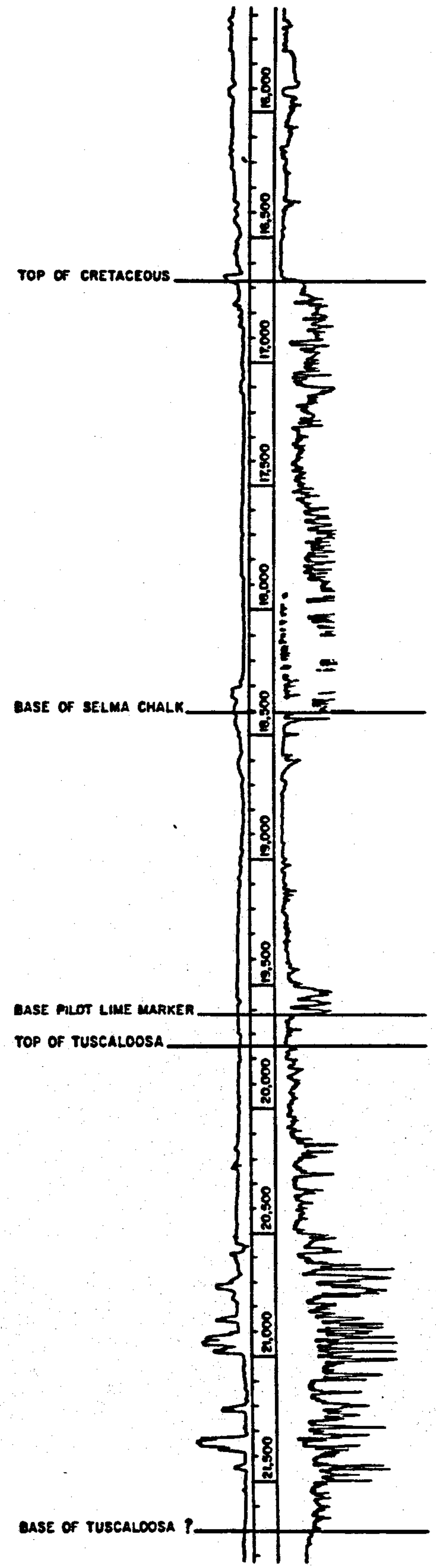
DEPARTMENT OF ENERGY
CONTRACT NO Ey-76-S005-4889

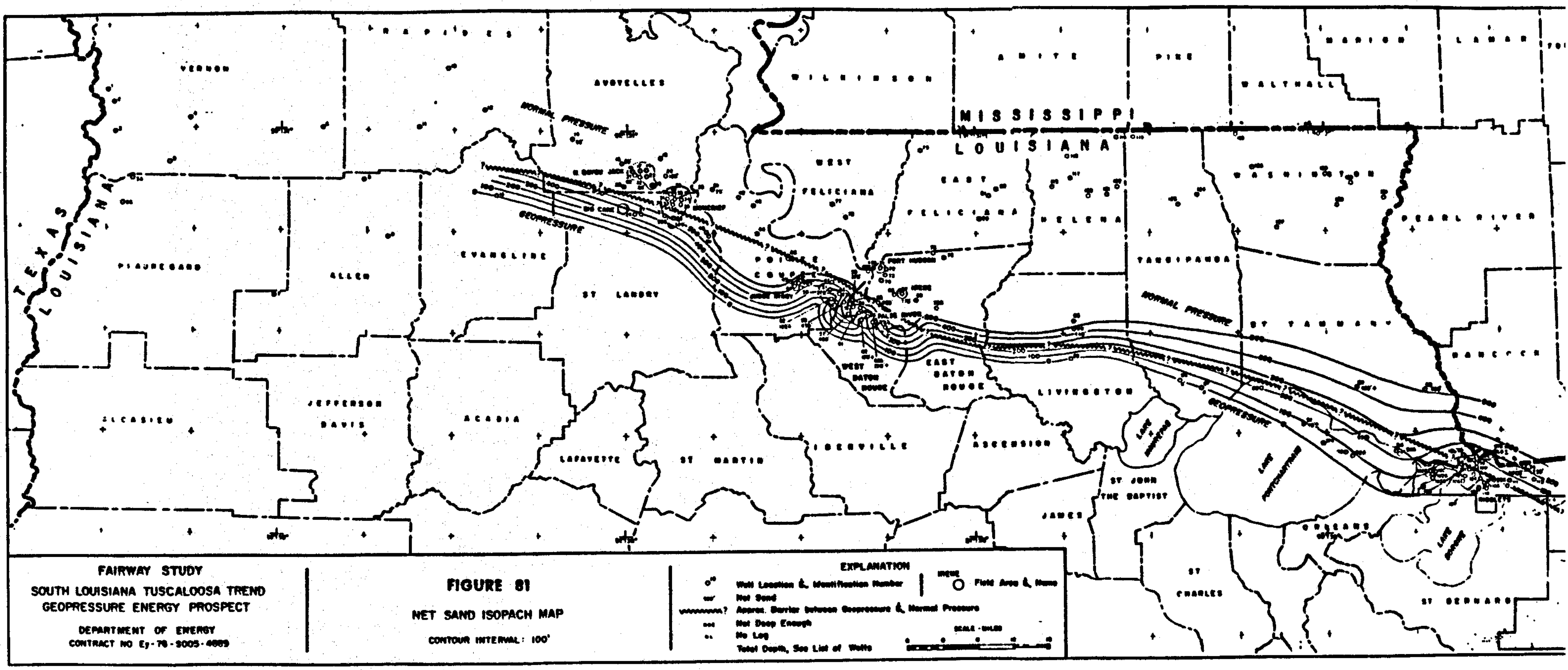
FIGURE 79

STRUCTURE MAP
BASE PILOT LIME MARKER
CONTOUR INTERVAL: 500'

FIGURE 80

TYPICAL LOG OF THE TUSCALOOSA TREND





FAIRWAY STUDY
SOUTH LOUISIANA TUSCALOOSA TREND
GEOPRESSURE ENERGY PROSPECT

DEPARTMENT OF ENERGY
CONTRACT NO EY-76-S-05-4889

FIGURE 81

NET SAND ISOPACH MAP

CONTOUR INTERVAL: 100'

DEPARTMENT OF ENERGY

CONTRACT NO. Ey-76-S-05-4890

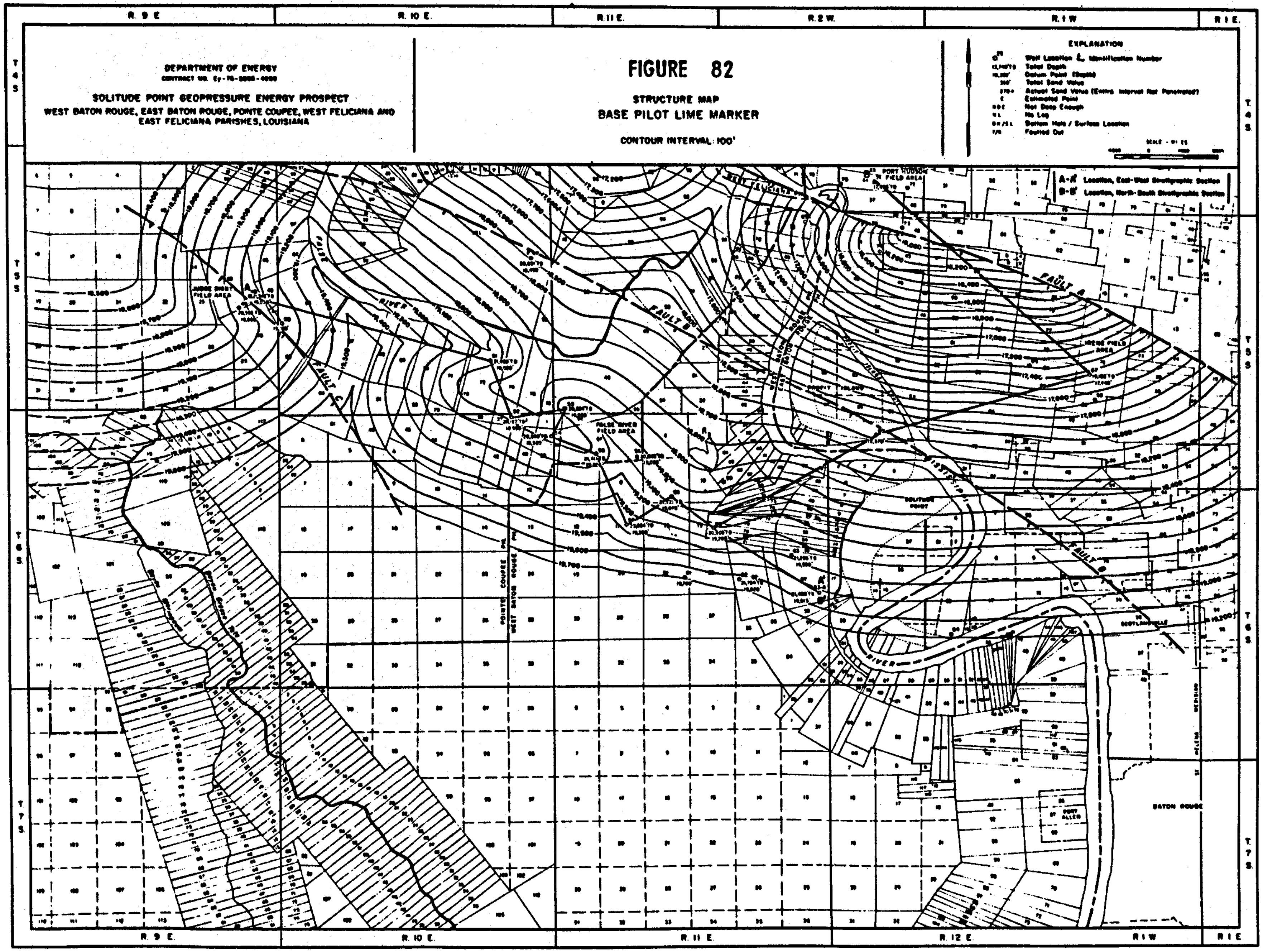
SOLITUDE POINT GEOPRESSURE ENERGY PROSPECT

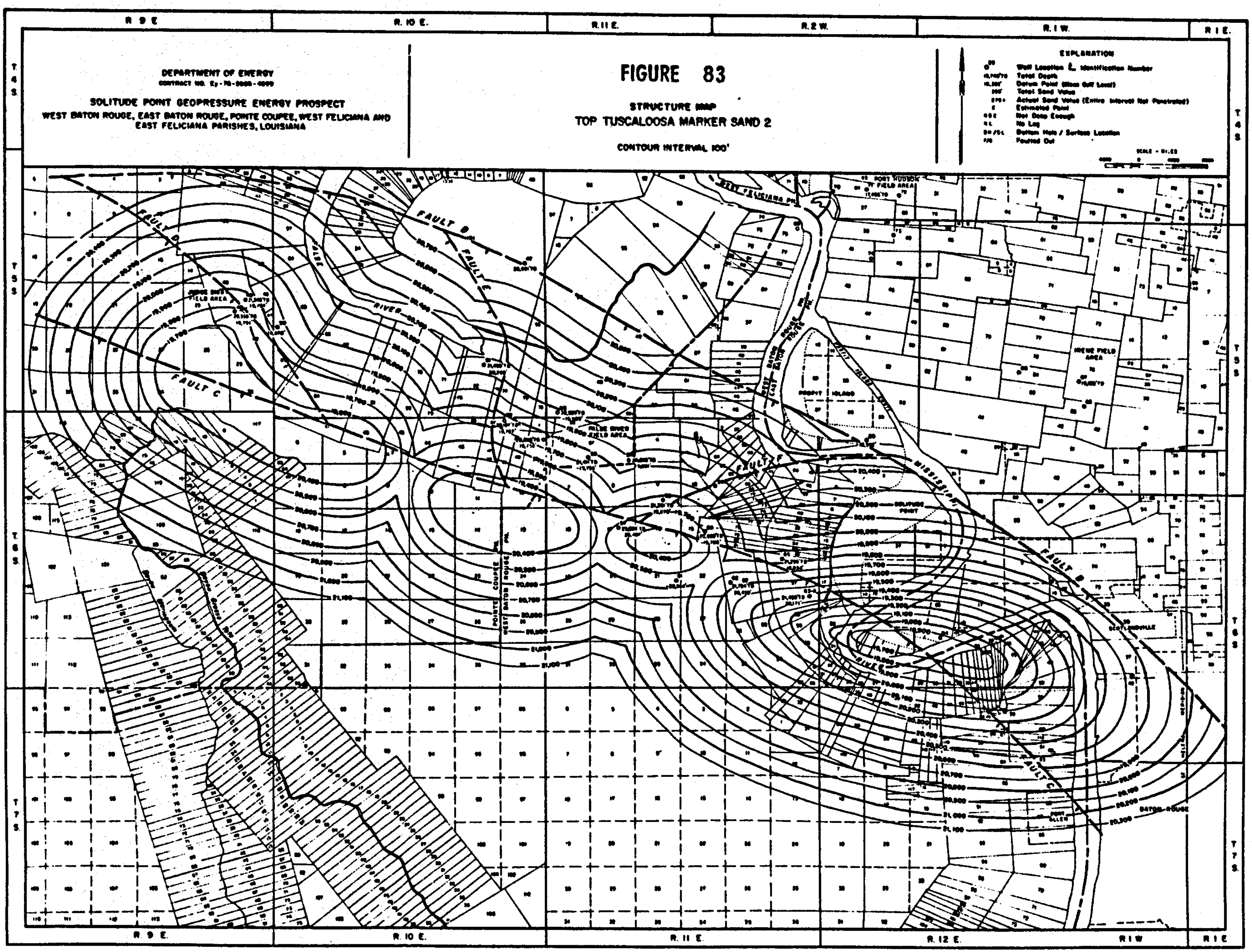
WEST BATON ROUGE, EAST BATON ROUGE, POINTE COUPEE, WEST FELICIANA AND EAST FELICIANA PARISHES, LOUISIANA

FIGURE 82

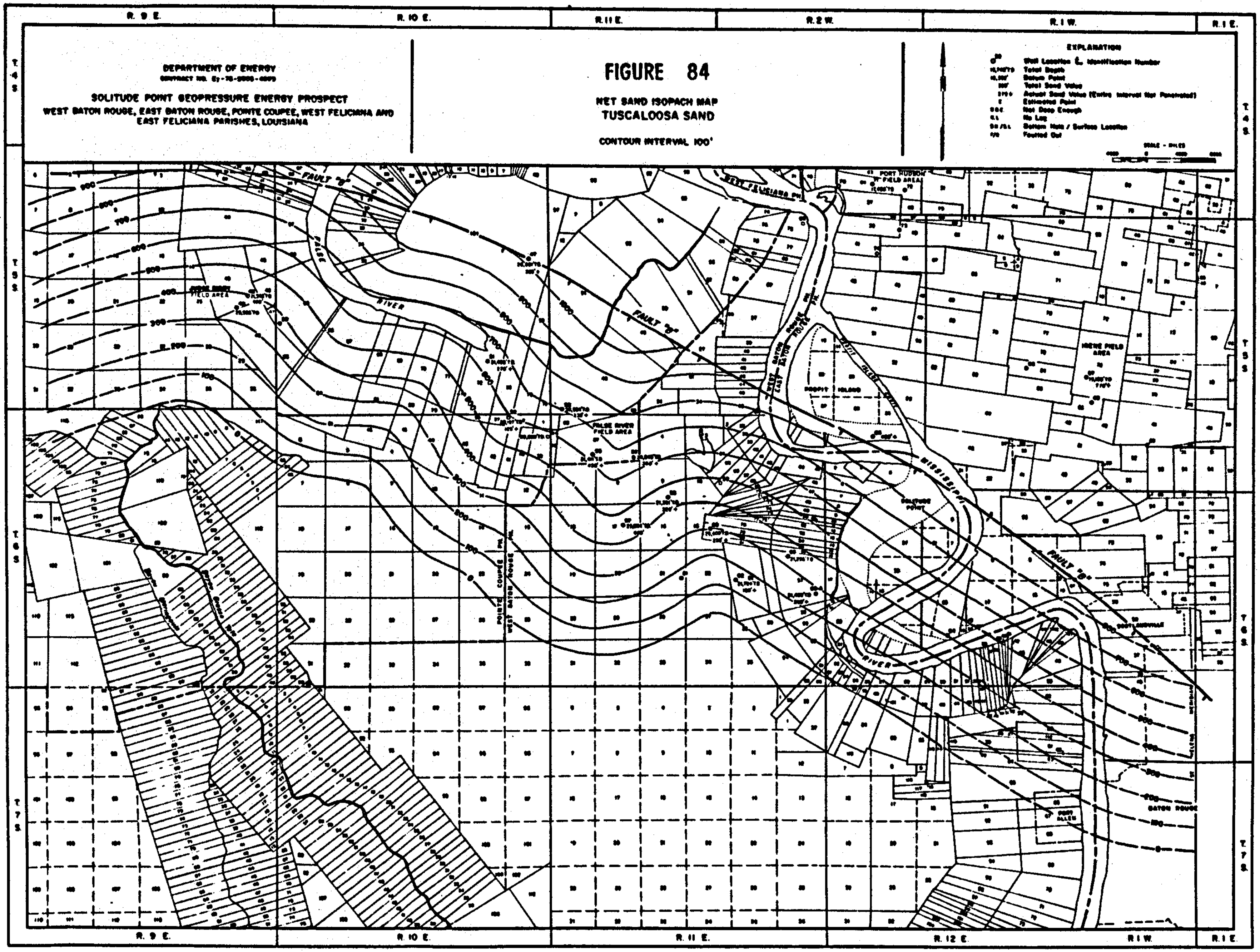
STRUCTURE MAP BASE PILOT LIME MARKER

CONTOUR INTERVAL: 100'





DEPARTMENT OF ENERGY
SOLITUDE POINT GEOPRESSURE ENERGY PROSPECT
WEST BATON ROUGE, EAST BATON ROUGE, POINTE COUPEE, WEST FELICIANA AND EAST FELICIANA PARISHES, LOUISIANA
FIGURE 83
STRUCTURE MAP
TOP TUSCALOOSA MARKER SAND 2
CONTOUR INTERVAL 100'
EXPLANATION
R. 9 E.
R. 10 E.
R. 11 E.
R. 12 E.
R. 2 W.
R. 1 W.
R. 1 E.
T. 4 S.
T. 5 S.
T. 6 S.
T. 7 S.
FAULT B
FAULT C
FAULT D
FAULT E
FAULT F
SOLITUDE POINT
BATON ROUGE
SCOTLANDVILLE



DEPARTMENT OF ENERGY
SOLITUDE POINT GEOPRESSURE ENERGY PROSPECT
WEST BATON ROUGE, EAST BATON ROUGE, POINTE COUPEE, WEST FELICIANA AND EAST FELICIANA PARISHES, LOUISIANA
FIGURE 84
NET SAND ISOPACH MAP
TUSCALOOSA SAND
CONTOUR INTERVAL 100'
EXPLANATION
R. 9 E.
R. 10 E.
R. 11 E.
R. 2 W.
R. 1 W.
R. 1 E.
R. 12 E.
T. 4 S.
T. 5 S.
T. 6 S.
T. 7 S.
FAULT "B"
FALSE RIVER
MISSISSIPPI
SOLITUDE POINT
FALSE RIVER FIELD AREA
PROFIT ISLAND
RIVER

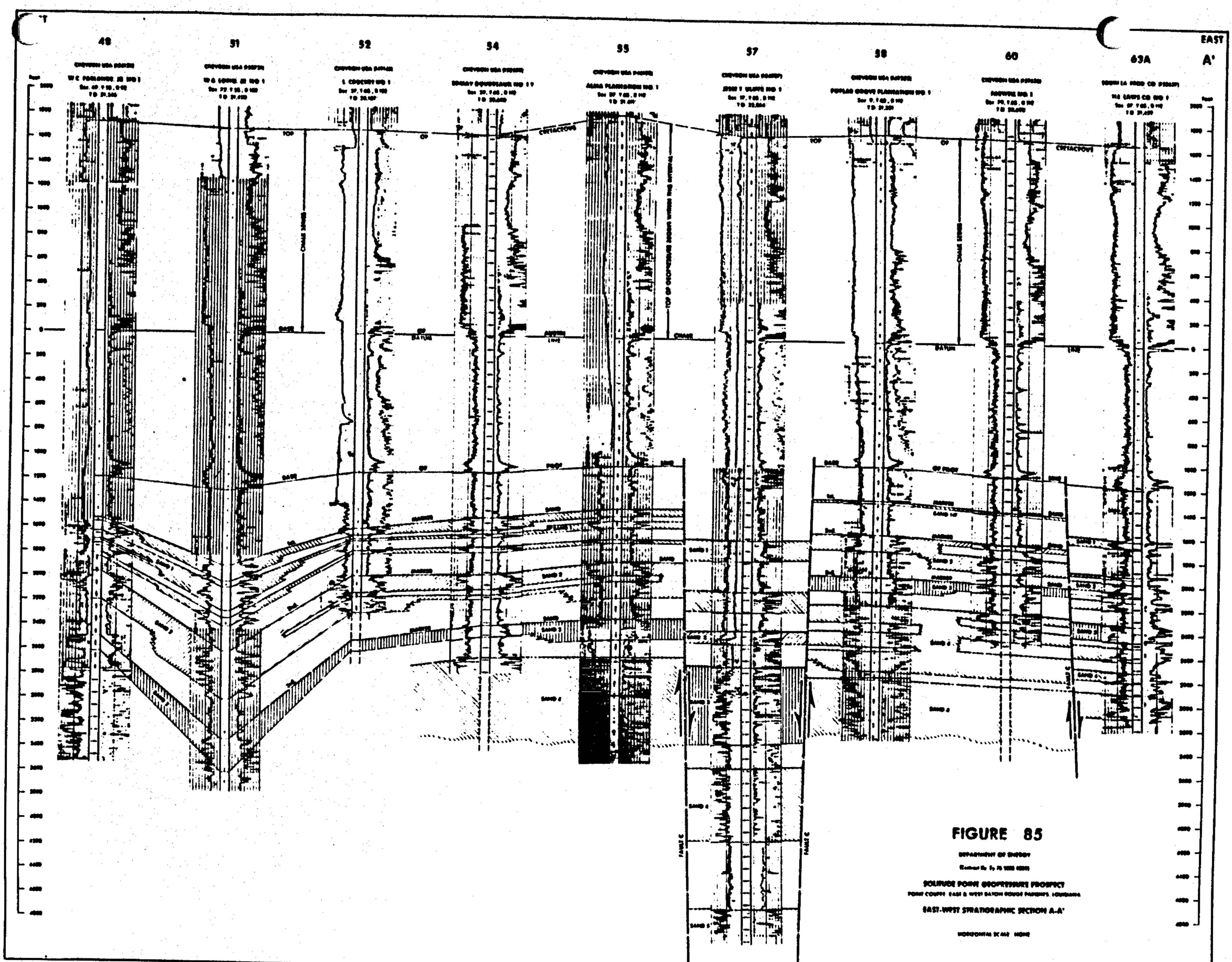


FIGURE 85

DEPARTMENT OF ENERGY

SOLITUDE POINT GEOPRESSURE PROSPECT

POINT COUPEE, EAST & WEST BATON ROUGE PARISHES, LOUISIANA

EAST-WEST STRATIGRAPHIC SECTION A-A'

HORIZONTAL SCALE NONE

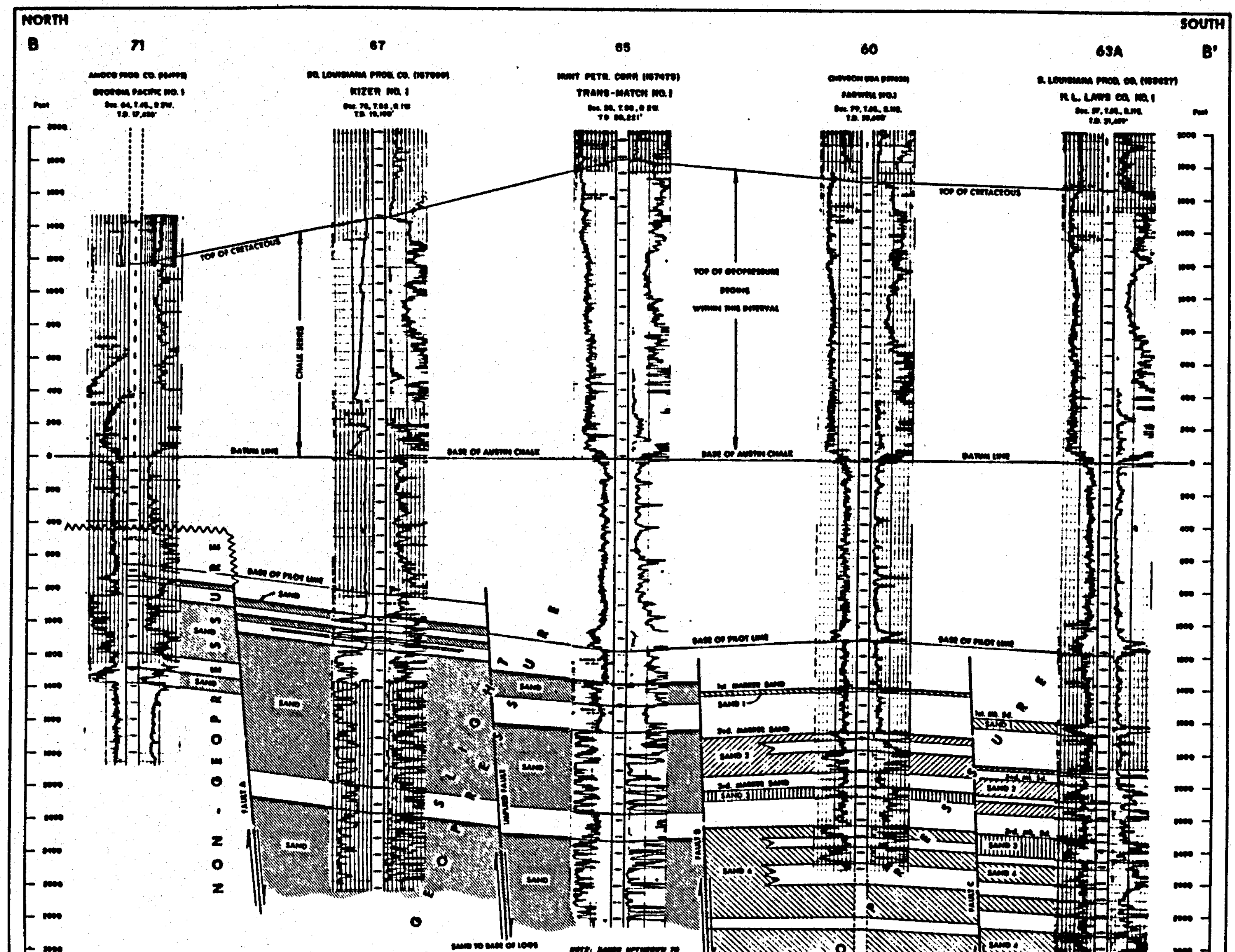


FIGURE 86

DEPARTMENT OF ENERGY

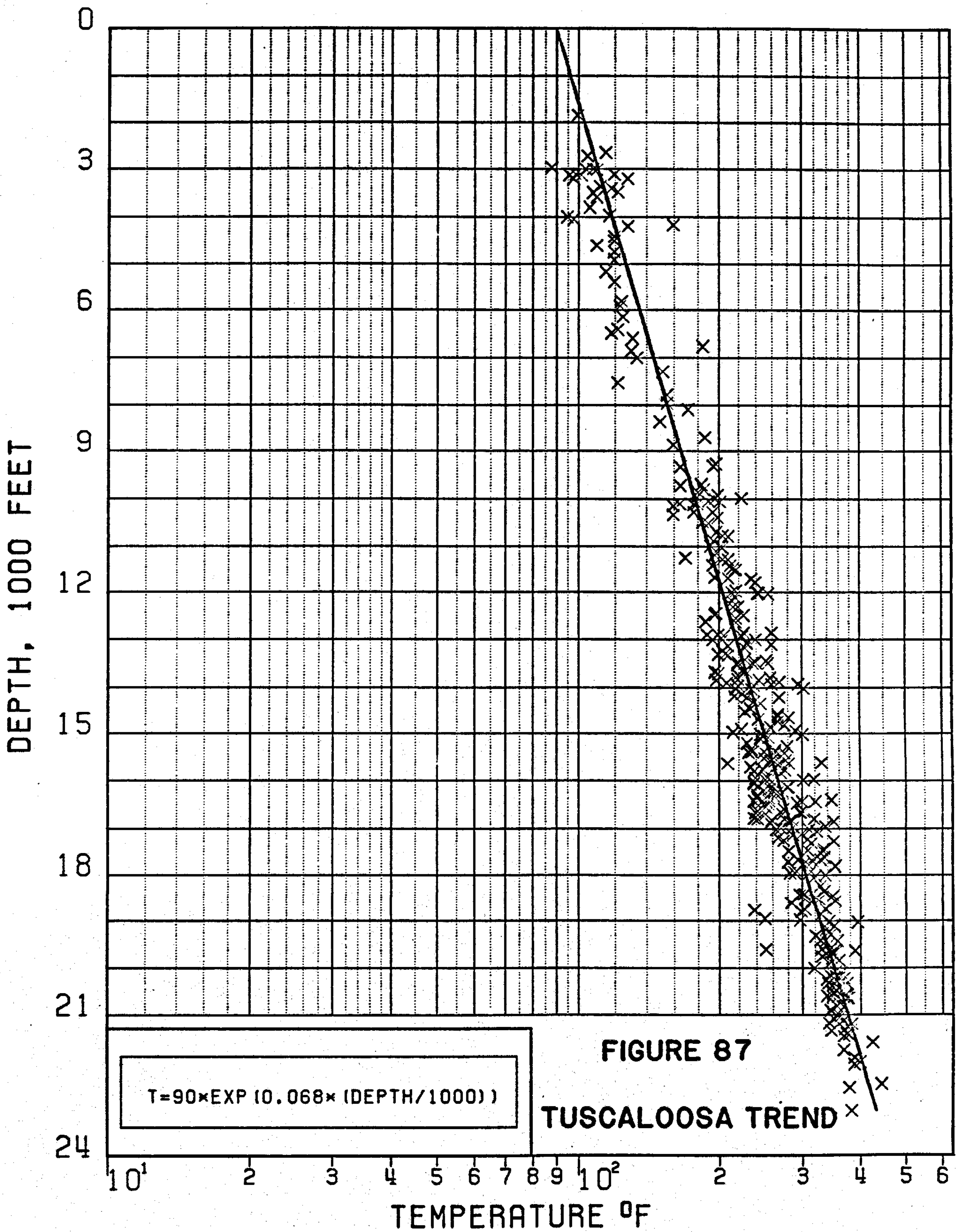
(Contract No. [illegible])

SOLITUDE POINT GEOPRESSURE PROSPECT

POINTE COUPEE, EAST & WEST BATON ROUGE PARISHES, LOUISIANA

NORTH-SOUTH STRATIGRAPHIC SECTION B-B'

HORIZONTAL SCALE: NONE



T=90×EXP (0.068× (DEPTH/1000))
FIGURE 87
TUSCALOOSA TREND
DEPTH, 1000 FEET
0
3
6
9
12
15
18
21
24
10¹
2
3
4
5
6
7
8
9
10²
2
3
4
5
6
TEMPERATURE °F

APPENDIX I

Appendix I

POTENTIAL GEOPRESSURE GEOTHERMAL AREAS IN SOUTHERN LOUISIANA

(Identified under ERDA Contract E-(40-1) - 4889)

Area Number	Parish	Approximate Location Twp.	& Rge.	Size of Area with Geopressured well control (Sq. Mi.)
1	Calcasieu	10S	10W	27
2	Vermilion	17S	1E	67
3	Vermilion & Cameron	15S	2W	51
4	Cameron	14S	5W	60
5	Acadia	10S	1W	24
6	Jefferson Davis	10S	5W	24
7	Vermilion	11S	3E	42
8	Calcasieu	8S	8W	11
9	Cameron	12S	7W	45
10	Cameron	Block 12		90
11	Cameron	Block 9		27
12	Cameron	Block 26		54
13	Cameron	12S	3W	30
14	Vermilion	12S	1E	96
15	Vermilion	14S	3E	48
16	Vermilion	14S	4E	72
17	Iberville	9S	13E	48
18	Lafayette	10S	5E	36
19	St. Martin	11S	6E	84
20	Iberia	13S	7E	60
21	Iberia & St. Mary	12S	9E	49
22	St. Martin & Assumption	13S	12E	42
23	St. Mary	14S	9E	60
24	Iberia & St. Mary	14S	6E	55
25	St. Mary	16S	8E	28
26	St. Mary	16S	10E	96
27	St. Martin	15S	13E	54
28	St. Mary	18S	12E	40
29	St. Mary	Block 16		54
30	Terrebonne	20S	12E	132
31	Iberia	Block 3		60
32	St. James & Assumption	13S	15E	72
33	St. James & St. John the Baptist	13S	18E	72
34	Lafourche	14S	17E	40
35	St. Charles	13S	21E	48

(Continued)

Appendix I
(Continued)

Area Number	Parish	Approximate Location Twp. & Rge.		Size of Area with Geopressured well control (Sq. Mi.)
36	St. Charles & Jefferson	14S	22E	36
37	St. Charles & Jefferson	16S	22E	30
38	Lafourche	16S	19E	30
39	Terrebonne & Lafourche	16S	16E	84
40	Terrebonne	18S	15E	48
41	Terrebonne	19S	17E	40
42	Lafourche	19S	20E	36
43	Jefferson	19S	24E	25
44	Lafourche	20S	21E	40
45	St. Bernard	14S	15E	180
46	St. Bernard	15S	14E	36
47	St. Bernard	15S	16E	36
48	St. Bernard	16S	15E	36
49	St. Bernard & Plaquemines	17S	25E	80
50	Plaquemines	19S	25E	42
51	Plaquemines	20S	27E	20
52	St. Bernard & Plaquemines	19S	17E	50
53	Plaquemines	21S	31E	36
54	Plaquemines	22S	21E	32
55	Terrebonne	Ship Shoal Block 46		54
56	Terrebonne	22S	16E	35
57	Terrebonne	18S	17E	30
58	Lafourche	20S	23E	24
59	Plaquemines	S. Pass Block 21		32
60	Plaquemines	Main Pass Block 66		21
61	Plaquemines	Main Pass Block 14		24
62	St. Bernard	Chandeleur Sound Block 56		36
63	Terrebonne	S. Timbalier Block 13		35

APPENDIX II

Appendix II
Calculation of Total Available Energy

II.1 TOTAL WATER PRODUCTION

This is the volume of water that would be produced if the prospect were to be produced from it existing pressure (p_i) down to abandonment pressure (p_{ab}). The initial aquifer pressure in psig is given by:

$$p_i = 0.052 \rho D \qquad (1)$$

where D is the prospect's geopressured zone average depth in feet and ρ is the average mud weight in ppg used to drill the geopressured interval. The values of ρ and D are part of the "Data Base" collected under ERDA contract E-(40-1)-4889, and stored on magnetic tape.

The abandonment pressure is the aquifer pressure at which the production rate (q) will drop below an economic limit q_{ab}. P_{ab} is given by:

$$p_{ab} = p_s + p_{hyd} + p_f + \Delta p \qquad (2)$$

p_s is the surface flowing pressure, p_s is kept constant at the lowest value possible in order to maximize the flow rate hence the gas energy. P_{hyd} is the water hydrostatic pressure and is given by:

$$p_{hyd} + 0.052 \rho_w D \qquad (3)$$

where ρ_w is the water density.

p_f is the friction pressure losses at abandonment flowrate q_{ab}. The friction losses are calcultated assuming single phase flow (all water). This assumption has been justified in a previous study. The pressure loss due to friction is given by:

$$p_f = f \rho_w \left(\frac{\ell}{d}\right) \left(\frac{v^2}{2g}\right) \qquad (4)$$

where:

ρ_w is the density of the water
ℓ is the tubing length,
d is the tubing diameter,
v is the flow velocity, and
f is the friction factor which is expressed by

$$f = \left[\frac{1}{1.74-2\ \log_{10}\left(\frac{2\varepsilon}{d} + \frac{18.7}{R\sqrt{f}}\right)}\right]^2 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (5)$$

R and ε are Reynold's number and the pioe roughness respectively. Note that equation (5) could be solved for f by trial and error procedure.

The pressure drawdown Δp is given by the equation of steady-state radial flow of compressible liquids in bounded drainage areas:

$$\Delta p + q_{ab}\ \mu\ \ln\left[\left(\frac{r_e}{r_w}\right)-0.5\right]/7.08\ kh$$

where:

- μ is the water viscosity, cp
- q_{ab} is the abandonment flow rate, B/D
- r_e is the aquifer drainage radius, ft
- r_w is the wellbore radius, ft
- k is the aquifer permeability, darcies
- and h is the aquifer thickness, ft.

The total water production in barrels (W_p) is calculated from the equation:

$$W_p = 4.96\text{x}10^6\ Ah\phi\ C(p_i-p_{ab}) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (6)$$

where:

- A is the aquifer area, sq. mi
- H is the aquifer thickness, ft
- ϕ is the aquifer porosity
- and C is the water compressibility, psi^{-1}

II.2 TOTAL GAS PRODUCTION AND GAS ENERGY

The total gas production is the volume of solution gas in SCF that would be produced with the water if the water contains the maximum amount of gas in the aquifer. The amounts of solution gas were obtained as a function of pressure from the data of Culberson and McKetta. The equation used for the calculation is:

$$G_p = W_p \, [(R_s)_i + (R_s)_{ab}]/2 \quad \text{.......................... (7)}$$

where:

G_p = gas produced, SCF
W_p = water produced, bbls
$(R_s)_i$ = solution gas at initial pressure, SCF/bbl
$(R_s)_{ab}$ = solution at abandonment pressure, SCF/bbl.

This equation uses the water production calculated in the previous equation. It assumes that the solution gas varies linearly with pressure and that the average solution gas is $[(R_s)i + (R_s)_{ab}]/2$

The gas energy is the product of G_p and the gas heat content. Assuming methane, the value will be approximately 1000 Btu/SCF.

II.3 GEOTHERMAL ENERGY PRODUCTION

This represents the heat content of the produced water down to an assumed lower temperature of 120°F. It was also assumed that the producing temperature of the water was defined by:

$$T = 70 + \text{Grad. } D \quad \text{.................................. (8)}$$

where D is the aquifer depth and Grad is the prospect geothermal gradient stored as part of the "data base". The equation used for the calculation is:

$$\text{Thermal BTU} = 350 \cdot W_p \cdot (T-120) \cdot \eta_{th} \quad \text{.............. (9)}$$

where:

W_p = water produced, bbls
T = surface producing temperature, °F
and η_{th} = the conversion efficiency

II.4 TOTAL ENERGY

The total energy available is the sum of gas energy and geothermal energy. A listing of the computer program used to calculate the total energy available form each prospect is attached. In these calculations, the following values were used:

water salinity= 30,000 ppm
water viscosity = 0.3 cp
water compressibility = $20 \times 10^{-6} psi^{-1}$
Aquifer porosity = 25%
Aquifer permeability = 100 md
Well drainage are = 2000 acres
Well drainage radius = 5267 ft
Wellbore diameter = 5-1/2"
Flowing surface pressure + 500 psig
Flowrate at abandonment = 20,000 B/D
Geothermal energy conversion efficiency = 5%

It is important to realize that the above are realistic average values. The purpose of the calculation is to rank the prospects according to total energy available, the use of average values is thus acceptable.

LISTING OF COMPUTER PROGRAM
USED TO CALCULATE AVAILABLE ENERGY

```
$JOB PEVEAZ     PAGES=10
      INTEGER D,H,ATOT
      REAL K,KT
      PS=500.
      C=20.E-6
      CH4BTU=1000.
      PHI=0.25
      K=0.1
      XO=5267.
      RW=0.25
      VISC=0.3
      TE=120.
      QA=20000.
      KT=350.
      SALIN=30000.
      EFFEX=.05
      RHOW=8.55
      WRITE(6,400)
  400 FORMAT('1ID          N          TOTEN          CH4EV          THERM
     1  D')
      WRITE(6,700)
  700 FORMAT(' ')
      DO 10 I=1,63
      READ(5,100,END=600)ID,D,H,GRADT,RHO,ATOT
  100 FORMAT(5X,I2,5X,I5,5X,I4,5X,F6.4,5X,F4.1,5X,I3)
      PI=.052*D*RHO
      T=D*GRADT+70.
      KH=K*H
      A=7.212E-5*XO*XO
      VOL=7758.*A*H*PHI
      N=640*ATOT/A
C     CALC ABANDONMENT PRESSURE PA
C     PF IS FRICTION PRES DRAW IS PRES. DRAWDOWN FOR QA
      CALL FRCFAC(RW,RHOW,VISC,QA,FF)
      V=6.5E-5*QA/(3.1416*RW*RW)
      DEN=7.48*RHO
      PF=FF*DEN*V*V*(D/(2*RW))/9273.6
      DRAW=QA*VISC*(ALOG(XO/RW)-0.5)/(7.08*KH)
      PHYD=0.052*RHOW*D
      PA=PS+PF+DRAW+PHYD
C     CALC GAS SOLUBILITY RSW
      CALL CH4H2O(T,PI,SALIN,RSWI)
      CALL CH4H2O(T,PA,SALIN,RSWA)
      RSW=(RSWI+RSWA)/2.
C     WATER VOLUME CALCULATION AND ENERGY CALC
      DV=C*VOL*(PI-PA)
      IF(DV.GT.0.)GO TO 200
      CH4EN=0.
      THERM=0.
      GO TO 300
  200 CH4EN=DV*CH4BTU*RSW*N/1.E12
      THERM=DV*KT*EFFEX*(T-TE)*N/1.E12
  300 TOTEN=CH4EN+THERM
      WRITE(6,500)ID,N,TOTEN,CH4EN,THERM,D
  500 FORMAT(' ',I2,7X,I2,7X,F6.2,7X,F6.2,7X,F5.2,7X,I5)
   10 CONTINUE
  600 STOP
      END

      SUBROUTINE CH4H2O(T,P,SALIN,RSW)
```

(CONTINUED)

LISTING OF COMPUTER PROGRAM
USED TO CALCULATE AVAILABLE ENERGY

```
C      THIS SUBROUTINE CALCULATES THE SOLUBILITY OF METHANE IN WATER AS A
C      FUNCTION OF TEMPERATURE AND PRESSURE AS BASED ON THE DATA GIVEN BY
C      CULBERSON AND MCKETTA (1951) FOR PRESSURES UP TO 10,000 PSIA AND
C      TEMPERATURES TO 340 DEGREES FAHRENHEIT.
C
C      T IS TEMPERATURE IN DEGREES FAHRENHEIT
C      P IS PRESSURE IN PSIA
C      RSW IS SOLUBILITY IN SCF/BBLS
C      M IS SOLUBILITY IN MOLE FRACTION METHANE
C      SALIN IS THE WATER SALINITY IN PPM
C
       REAL M
       CORFAC=10.**((SALIN*1.E-06)*(1.463*ALOG10(T)-5.2))
       IF(P.GT.4000)GO TO 10
       A=(1.8082E-3)*P-(1.5826E-7)*P**2+(3.611E-11)*P*(P-4000)**2
       B=(-9.3613E-6)*P+(8.7899E-10)*P**2-(1.4692E-13)*P*(P-4000)**2
       C=(2.3958E-8)*P-(1.9569E-12)*P**2+(6.4377E-17)*P*(P-4000)**2
       GO TO 20
    10 A=-0.028865+SQRT(8.332E-4+(P+361.86)/195)
       B=-0.014064-(2.3294E-6)*P
       C=3.1311E-5+(8.302E-9)*P
    20 M=(A+B*T+C*T**2)*1.E-3
       RSW=7374.2*(M/(1-M))*CORFAC
       RETURN
       END

       SUBROUTINE FRCFAC(RW,RHO,VISC,Q,FF)
C
       A=3.141592654*RW*RW
       V=6.5E-05*Q/A
       D=24*RW
       RN=926*RHO*V*D/VISC
       FI=0.01
       ROUGH=0.00015
       DO 10 I=1,200
       FT=FI+0.0001
       DN=1.74-2*ALOG10((ROUGH/RW)+18.7/(RN*SQRT(FT)))
       FF=(1/DN)**2
       PERC=ABS(100.*(FT-FF)/FF)
       IF(ABS(PERC).LE.2.)GO TO 100
    10 CONTINUE
   100 RETURN
       END

$ENTRY
```

APPENDIX III

WELLS USED IN GRAND LAKE PROSPECT EVALUATION

Appendix III

WELLS USED IN GRAND LAKE PROSPECT EVALUATION

Map No.	Well Identification
1.	King Resources Co. (130224)* J L & S #2 Sec. 18, T12S, R9E TD 13,850'
2.	Whitestone Petr. Corp. (126669) J L & S #1 Sec. 18, T12S, R8E TD 14,248'
3.	King Resources Co. (127991) S. L. 5174 #1 Sec. 18, T12S, R9E TD 12,785'
4.	Whitestone Petr. Corp. (127991) S. L. 5174 #1A Sec. 18, T12S, R9E TD 12,975'
5.	King Resources Co. (127991) S. L. 5174 #1A Sec. 18 T12S, R9E TD 13,180'
6.	Union Oil Co. of Calif. (100929) S. L. 4064 #1 Sec. --, T12S, R9E TD 14,004'
7.	Kilroy Co. of Texas (139704) S. L. 5790 #1 Sec. 24, T12S, R9E TD 13,504'
8.	Coastal Prod. Co. (138141) S. L. 5620 #1 Sec. --, T12S, R9E TD 16,101'
9.	Lamson, Bennett & Cole (60783) S. L. 2298 #1 Sec. 23, T12S, R9E TD 13,732'
10.	Union Texas Petr. (147011) S. L. 6222 #1 Sec. 25, T12S, R8E TD 14,743'
11.	General American Oil of Texas S.L. 3441 #1 (77855) Sec. --, T12S, R8E TD 13,190'
11A.	Austral Oil Co. (106856) S. L. 2489 #2 Sec. --, T12S, R9E TD 15,525'
12.	Houston Oil & Minerals Corp. S. L. 6224 #1 (146666) Sec. --, T12S, R9E TD 16,308'
13.	Oil Development of Utah (142263) Williams, Inc. #1 Sec. 27, T12S, R9E TD 13,862'
14.	Forman Expl. Co. (145298) S. L. 5827 #1 Sec. --, T12S, R9E TD 14,133'
15.	Pan American Petr. Corp. (100858) S. L. 4066 #1 Sec. --, T12S, R9E TD 14,000'
16.	Pan American Petr. Corp. (95661) S.L. 4054 #1 Sec. --, T12S, R9E TD 15,926'
17.	Atlantic Richfield Co. (147949) S. L. 6406 #1 Sec. --, T13S, R10E TD 16,463' (St. Mary Parish)
18.	Shell Oil Co.(62430) S.L. 2790 #1 Sec. --, T13S, R9E TD 14,000' Iberia & St. Mary Phs.
19.	MACPET (138623) Roane Estate #1 Sec. 1, T13S, R8E TD 13,500' St. Mary Parish
20.	E. A. Courtney (117120) S. L. 2489 #1 Sec. --, T13S, R8E TD 13,684'
21.	Texas Gulf Sulphur Co. (83857) E. J. Beaullieu #1 Sec. 11, T13S, R8E TD 13,918'
22.	W. B. McCarter, Jr., Inc. & Callery (126092) J. Randolph Roane et al #1 Sec. 12, T13S, R8E TD 13,800'
23.	Texas Gulf Sulphur Co. (113961) J. R. Roane #1 Sec. 12, T13S, R8E TD 14,512'
24.	Atlantic Refg. Co. (95833) Roane #4 Sec. 13, T13S, R8E TD 15,165'
25.	Atlantic Refg. Co. (88294) Adeline Sugar Factory Co. #18 Sec. 17, T13S, R9E TD 15,530'
26.	Atlantic Richfield Co. (119331) Adeline Sugar Factory Co. #23 Sec. 17, T13S, R9E TD 16,400'
27.	Atlantic Refg. Co. (102976) Adeline Sugar Factory Co. #22 Sec. 33, T13S, R9E TD 14,948'
28.	E. Allday (117062) M. Robicheaux #1 Sec. 22, T13S, R9E TD 16,008'
29.	Livingston Oil Co. (127554) S. L. 4696 #1 Sec. --, T13S, R9E TD 14,901'
30.	John W. Mecom (66781) S. L. 3003 #1 Sec. --, T13S, R9E TD 16,521'
31.	F. A. Callery, Inc. (94461) Frank Beaullieu Est. #1 Sec. 26, T12S, R8E TD 12,420' Iberia Parish
32.	George R. Brown-F.A. Callery S.L. 4066 #1 (107725) Sec. --, T12S, R10E TD 14,000'
33.	Texaco, Inc. (99038) S.L. 4014 #1 Sec. --, T13S, R10E TD 15,900' St. Mary Parish
34.	Southland Royalty Co. (147411) S.L. 2044#1 Sec. --, T13S, R10E TD 16,920'
35.	Angelina Corp. (124991) S. L. 2044 #1 Sec. --, T13S, R10E TD 13,550'
36.	Chevron Oil Co. (118373) S.L. 2044 #10 Sec. --, T13S, R10E TD 13,678'
37.	Atlantic Refg. Co. (31787) Grand Lake Ste. #1 Sec. 19, T13S, R10E TD 12,104'
38.	The California Co. (85343) S.L. 2044 #6 Sec. 29, T13S, R10E TD 14,843'
39.	Kerr-McGee Oil Ind., Inc. S. L. 2045 #1 (53943) Sec. 28, T13S, R10E TD 11,802'
40.	Sun Oil Co. (147176) S. L. 5706 #2 Sec. --, T13S, R10E TD 15,850'
41.	Sun Oil Co. (145414) S. L. 5706 #1 Sec. --, T13S, R10E TD 13,305'
42.	Union Oil Co. of Calif. S.L. 5706 #1 (141407) Sec. --, T13S, R10E TD 18,504'
43.	Pure Oil Co. (53268) S.L. 2043 #1 Sec. --, T13S, R10E TD 13,547'
44.	McCormick Oil & Gas Corp. S.L. 5705 #2 (139656) Sec. --, T13S, R10E TD 15,248'
45.	McCormick Oil & Gas Corp. S.L. 5705 #1 (138032) Sec. --, T13S, R10E TD 15,348'
46.	Pan American Petr. Corp. S.L. 4738 #1 (119784) Sec. --, T13S, R10E TD 18,000'
47.	McCormick Oil & Gas Corp. S.L. 2044 #2 (142326) Sec. --, T13S, R10E TD 14,559'
48.	McCormick Oil & Gas Corp.- Newmont Oil Co-Kilroy Co. of Texas-Southland Royalty & Edwin Cox (139266) S.L. 2044 #1 Sec. --, T13S, R10E TD 13,207'

*Office of Conservation Serial Number

Map No.	Well Identification
49.	Inexco Oil Co. (151173) S. L. 6583 #1 Sec. --, T13S, R10E TD 16,580'
50.	Union Oil Co. of Calif.(65311) Peterman #7 Sec. 25, T12S, R10E TD 12,049' Iberia Parish
51.	Union Oil Co. of Calif. (54093) E. H. Peterman #1 Sec. 31, T12S, R11E TD 13,008'
52.	Austral Oil Expl. Co., Inc. Williams, Inc.#1 (6971) Sec. 9, T13S, R11E TD 13,017' St. Martin Parish
52A.	Continental Oil Co. (149432) Williams, Inc. "A" #14 Sec. 3, T13S, R11E TD 14,362'
52B.	Continental Oil Co. (65526) Cocke & Goodrich #1 Sec. 2, T13S, R11E TD 13,985'
52C.	Continental Oil Co. (147337) J. K. McKerral #1 Sec. 1, T13S, R11E TD 14,800' - Iberia Parish
52D.	Exxon Co. (145987) J. L. Hodges #B-1 Sec. 35, T12S, R11E TD 14,900'
52E.	Continental Oil Co. (148600) Saltdome, Inc. #1 Sec. 34, T12S, R11E TD 13,880'
52F.	Chevron Oil Co. (144048) E. H. Peterman #C-2 Sec. 36, T12S, R11E TD 14,985'
52G.	Union Oil Co. of Calif. (127969) E. H. Peterman #2 Sec. 31, T12S, R12E TD 15,178'
52H.	Chevron Oil Co. (145160) E. H. Peterman #K-1 Sec. 31, T12S, R12E TD 15,000'
53.	Chevron Oil Co. (141214) Williams, Inc. #1 Sec. 5, T13S, R11E TD 15,995' St. Martin Parish
53A.	Continental Oil Co. (123187) Williams, Inc. #A-13 Sec. 4, T13S, R11E TD 14,666'
53B.	Continental Oil Co. (157638) Williams "A" #15 Sec. 3, T13S, R11E TD 14,810' Iberia Parish
54.	Continental Oil Co. (110915) Williams, Inc. #B-1 Sec. 9, T13S, R11E TD 16,037'- St. Martin Parish
54A.	Continental Oil Co. (131432) Williams, Inc. #B-2 Sec. 9, T13S, R11E TD 14,387'
55.	Continental Oil Co. (151127) Williams, Inc. "17" #1 Sec. 17, T13S, R11E TD 14,900'
56.	Phillips Petr. Co. (106312) Francisco "A" #1 Sec. 17, T13S, R11E TD 15,510'
57.	Continental Oil Co. (143046) St. Martin Sch. Brd. #1 Sec. 16, T13S, R11E TD 15,968'
57A.	Union Oil Co. of Calif. (134425) S.L. 5526 #1 Sec. 15, T13S, R11E TD 17,107'
58.	Humble Oil & Refg. Co. (33146) St. Martin Sch. Brd. #1 Sec. 16, T13S, R11E TD 12,492'
59.	J. R. Frankel (83283) St. Martin Sch. Brd. #1 Sec. 16, T13S, R11E TD 13,502'
60.	Union Oil Co. of Calif. (147805) J L & S #2 Sec. 13, T13S, R11E TD 14,588'
61.	Union Oil Co. of Calif. (148742) J L & S # 2 Sec. 13, T13S, R11E TD 13,480'
61A.	Union Oil Co. Of Calif. (136186) J L & S "C" #1 Sec. 11, T13S, R11E TD 17,300'
61B.	Chevron (123239) J L & S #1 Sec. 12, T13S, R11E TD 15,680'
61C.	Great Southern Oil & Gas (155557) J L & S #2 Sec. 12, T13S, R11E TD 14,288'
61D.	Chevron Oil Co. (151213) J L & S #2 Sec. 12, T13S, R11E TD 14,505'
62.	Occidental Petr. Corp. (112612) Dow Chemical Co. #2 Sec. 23, T13S, R11E TD 13,225'
62A.	Occidental Petr. Co. (13600) Dow Chemical Co. #1 Sec. 24, T13S, R11E TD 15,509'
62B.	Sun, Lyons & Logan (58183) Norman #1 Sec. 24, T13S, R11E TD 14,009'
62C.	C.F. Braun & Co. (155321) Williams, Inc. #1 Sec. 20, T13S, R12E TD 14,010'
63.	Kilroy Co. of Texas (87246) Dow Chemical Co. #1 Sec. 23, T13S, R11E TD 13,062'
64.	Lyons & Logan (85139) J. P. Miller #1 Sec. 22, T13S, R11E TD 11, 945'
65.	El Toro Expl. Co. - Forest Oil- Wewoka Expl. Co. (152526) Williams, Inc. #1 Sec. 21, T13S, R11E TD 12,200'
66.	Gulf Refg. Co. (61453) S.L. 2738 #1 Sec. 29, T13S, R11E TD 13,006'
67.	Skelly Oil Co. (80922) J L & S #A-1 Sec. 28, T13S, R11E TD 12,200'
68.	Union Oil Co. of Calif. (68610) J L & S #1 Sec. 28, T13S, R11E TD 12,230'
69.	Sun Oil Co. (63766) Williams, Inc. #1 Sec. 27, T13S, R11E TD 12,100'
70.	Lamson & Bennett & Phillips Petr. Co. (90446) Williams, Inc. #1 Sec. 26, T13S, R11E TD 16,209'
71.	Lamson & Bennett, Inc. & Philips Petr. Corp. (88760) Williams, Inc. #2 Sec. 25, T13S, R11E TD 17,000'
72.	Phillips Petr. Co. (125649) Williams "B" #1 Sec. 30, T13S, R12E TD 14,515'
73.	Sun Oil Co. (111178) Williams, Inc. #1 Sec. 29, T13S, R12E TD 14,500'
74.	Continental Oil Co. (88755) Drew Jones #1 Sec. 32, T13S, R12E TD 14,054'
75.	Shell Oil Co. (69220) Williams, Inc. #A-1 Sec. 31, T13S, R12E TD 13,002'
76.	Robert Mosbacher & Transco Expl. Co. (152005) Williams, Inc. #1 Sec. 36, T13S, R11E TD 16,888'
77.	Chevron Oil Co. (145501) Williams, Inc. #1 Sec. 35, T13S, R11E TD 17,119'
78.	Chevron Oil Co. (147461) Williams, Inc. #2 Sec. 35, T13S, R11E TD 17,205'
79.	General American Oil Co. of Texas (134672) J L & S #2 Sec. 33, T13S, R11E TD 15,000'
80.	Continental Oil Co. (45478) J L & S #A-1 Sec. 33, T13S, R11E TD 12,576'
81.	General American Oil Co. of Texas (132058) J L & S #1 Sec. 33, T13S, R11E TD 18,756'

Map No.	Well Identification
82.	H. L. Hunt (99135) S. L. 4015 #1 Sec. 32, T13S, R11E TD 16,020'
83.	Michael T. Halbouty-Union Texas Petr.-Chevron (146548) Williams, Inc. #1-A Sec. 1, T13S, R10E TD 14,992' Iberia Parish
84.	Kilroy Co. Of Texas (133996) S.L. 2044 #1 Sec. --, T13S, R10E TD 14,530' St. Mary Parish
85.	Shell Oil Co. (51495) S.L. 2296 #1 Sec. --, T13S, R9E TD 13,750'
86.	Union Oil Co. of Calif. S. L. 5706 #1 (153741) Sec. --, T13S, R10E TD 18,250'
87.	McMoran Expl. Co. (152140) S.L. 5706 #2 Sec. --, T13S, R10E TD 18,500'
88.	Inexco Oil Co. (153248) Beauillies #1 Sec. 1, T13S, R10E TD 15,332'
89.	McMoran Expl. Co. (148507) S.L. 5706 #1 Sec. --, T13S, R10E TD 17,833
90.	Miami Oil Prod., Inc. (138737) S. L. 5711 #1 Sec. 25, T12S, R8E TD 13,531' Iberia Parish
91.	Edwin L. Cox (141029) S.L. 5965 #1 Sec. --, T12S, R8E TD 13,000'
92.	Coastal States Gas (144277) S.L. 6096 #1 Sec. 9, T12S, R9E TD 13,714'
93.	Cabot Corp. (120736) Dow Chemical Co. #1 Sec. 3, T12S, R9E TD 12,470'
94.	Austral Oil Co. (58559) N. W. Bauer #1 Sec. 1 T12S, R9E TD 12,519'
95.	Terra Resources, Inc. (139356) C. W. Bauer #1 Sec. 1, T12S, R9E TD 13,301'
96.	Placid Oil Co. (135848) S.L. 5619 #1 Sec. --, T12S, R10E TD 20,000'
97.	Diamond Shamrock Oil & Gas Corp. J L & S #1 (141366) Sec. 23, T12S, R10E TD 16,144'

APPENDIX IV

WELLS USED IN LAKE THERIOT PROSPECT EVALUATION

Appendix IV

WELLS USED IN LAKE THERIOT PROSPECT EVALUATION

Map No.	Well Identification
1.	Pan American Petr. Corp. (52258)* CL&F No. 1 Sec. 19, T18S, R15E TD 15,423'
2.	Massie Hunt Trust (142852) CL&F No. 1 Sec. 23, T18S, R15E TD 19,000'
3.	Humble Oil & Refg. Co. (84541) CL&F "H" No.1 Sec. 23, T18S, R15E TD 14,298'
4.	Union Oil Co. of Calif. (93787) CL&F No. 1 Sec. 29, T18S, R15E TD 14,557'
5.	Shell Oil Co. (60175) CL&F No. C-1 Sec. 30, T18S, R15E TD 15,499'
6.	Shell Oil Co. (142093) Terr. Ph. Sch. Bd. No. 1 Sec. 16, T18S, R16E TD 17,923'
7.	Union Oil Co. of Calif. (95409) LL&E No. B-36 Sec. 17, T18S, R16E TD 14,767'
8.	Magnolia Petr. Co. (67153) LL&E No. 1 Sec. 20, T18S, R16E TD 16,080'
9.	The Superior Oil Co. (77439) LL&E "K" No. 1 Sec. 22, T18S, R16E TD 17,486'
9A.	Texas Pacific Oil Co. (156085) LL&E No. 1 Sec. 22, T18S, R16E TD 17,899'
10.	Texaco, Inc. (83704) Sarah Butler No. 1 Sec. 7, T18S, R17E TD 15,811'
11.	The Superior Oil Co. (91133) F. T. Beautrous No. 1 Sec. 29, T18S, R17E TD 16,944'
12.	Exchange Oil & Gas Corp. (14752) M.A.T. Marmande No. 1 Sec. 31, T18S, R17E TD 14,300'
13.	The Superior Oil Co. (94018) R. C. Milling No. 2 Sec. 31, T18S, R17E TD 17,063'
14.	The Superior Oil Co. (132939) R.C. Milling No. 3 Sec. 31, T18S, R17E TD 18,130'
15.	Pure Oil Co. (92812) Terre. Ph. Sch. Bd. No. 1 Sec. 16, T19S, R15E TD 19,769'
16.	Forest Oil Corp. (145452) SL 6197 No. 1 Sec. 24, T19S, R15E TD 16,525'
17.	Exchange Oil & Gas Co. (132970) Marmande-Milling No. 1 Sec. 3, T19S, R16E TD 17,911'
18.	La Terre Petr. Corp. (139428) La Terre Corp. No. 4 Sec. 10, T19S, R16E TD 13,376 '
19.	La Terre Petr. Corp. (143529) La Terre "H" No. 1 Sec. 11, T19S, R16E TD 13,105'
20.	La Terre Petr. Corp. (138680) La Terre No. 2 Sec. 15, T19S, R16E TD 15,256
21.	La Terre Petr. Corp. (137175) La Terre No. 2 Sec. 15, T19S, R16E TD 15,409'
22.	La Terre Petr. Corp. (138897) La Terre No. 1 Sec. 15, T19S, R16E TD 16,020
23.	Exchange Oil & Gas (106653) Terr. Ph. Sch. Bd. No. 1 Sec. 16, T19S, R16E TD 15,918'
24.	Exchange Oil & Gas (124398) Terr. Ph. Sch. Bd. No. 2 Sec. 16, T19S, R16E TD 13,346
25.	Exchange Oil & Gas (134727) Terr. Ph. Sch. Bd. No. 3 Sec. 16, T19S, R16E TD 13,455'
26.	La Terre Petr. Corp. (138678) La Terre No. C-1 Sec. 17, T19S, R16E TD 13,571'
27.	Exchange Oil & Gas (143648) SL 5992 No. 1 Sec. --, T19S, R16E TD 13,726'
28.	Tenneco (LaTerre)(137711) La Terre No. B-1 (No log) Sec. 22, T19S, R16E TD 17,360'
29.	La Terre Petr. Corp. (138677) Hebert et al No. 1 (No log) Sec. 23, T19S, R16E TD 16,000'
30.	Lynal, Inc. (150887) Cecelia Billiot No. 1 Sec. 24, T19S, R16E TD 13,741'
31.	Gulf Oil Corp. (97792) Boudreau No. 1 (No log) Sec. 45, T19S, R17E TD 15,063'
32.	The Calif. Co. (79586) Naquin No. 1 (No log) Sec. 49, T19S, R17E TD 14,300'
33.	Hunt Petr. Corp. (75095) Boudreaux No. 1 (No log) Sec. 2, T19S, R17E TD 14,612'
34.	Anson Petr. Corp. (91683) R. J. Boudreaux No. 1 Sec. 85, T19S, R17E TD 14,208'
35.	System Fuels, Inc. (161524) M.A.T. Marmande No. 1 (No log) Sec. 67, T19S, R17E TD Currently drilling
36.	Superior Oil Co. (79235) Robert C. Milling #1 Sec. 31, T18S, R17E TD 17,067
37.	Superior Oil Co. (101553) A. T. Marmande #1 Sec. 18, T18S, R17E TD 15,573'
38.	Tidewater Oil Co. (98966) Adam Brien #1 Sec. 18, T18S, R17E TD 16,409'
39.	Superior Oil Co. (75183) Wilson Guidry #1 Sec. 31, T18S, R17E TD 15,071'
40.	Trice Production Co. (71199) South Coast #1 Sec. 31, T18S, R17E TD 13,145'
41.	The LA. Land & Expl. Co. LL&E Fee #3 (146618) Sec. 8, T18S, R16E TD 13,400'
42.	Union Oil Co. of Calif. LL&E Un. 2 #1 (63278) Sec. 9, T18S, R16E TD 15,716
43.	Union Oil of Calif. (Austral) LL&E Un. 3 #1 (66382) Sec. 10, T18S, R16E TD 15,000'
44.	Union Oil Co. of Calif. LL&E #1 (60543) Sec. 10, T18S, R16E TD 12,850'
45.	Argo Oil Corp. (65447) Southdown Sugar #1 Sec. 11, T18S, R16E TD 13,346'
46.	Superior Oil Co. (76483) Southdown Sugar #A-2 Sec. 12, T18S, R16E TD 15,269'
47.	Whitestone Petr. Corp. Southdown Corp. #1 (120693) Sec. 14, T18S, R16E TD 14,000'
48.	Monterey Oil & Argo Oil C.L. & F. #1 (65319) Sec. 9, T18S, R15E TD 14,038'
49.	Shell Oil Co. (64368) C.L. & F. #B-3 Sec. 13, T18S, R15E TD 16,572'
50.	Texas Pacific Coal & Oil Co. C. L. & F. #B-1 (67624) Sec. 14, T18S, R15E TD 14,752'

* Department of Conservation Serial Number

APPENDIX V

WELLS USED IN BAYOU HEBERT PROSPECT EVALUATION

Appendix V

WELLS USED IN BAYOU HEBERT PROSPECT EVALUATION

Map No.	Well Identification
1.	Union Oil & Gas of LA. (60849)* L.M. Wise #1 Sec. 73, T13S, R3E TD 15,000' No information
1A.	[illegible]a Hess-Ethyl Corp. Lewis Faciane #2 (153718) Sec. 59, T13S, R3E TD 13,741' Not on PI
2.	Amerada Hess-Ethyl Corp. J.P. Thibodaux #1 (159000) Sec. 72, T13S, R3E TD 14,677' Not on PI
3.	Continental Oil Co. (141416) F.D. Moss Heirs #1 Sec. 63, T13S, R3E TD 16,114' Not on PI
4.	Austral Oil Co. (114478) U. Richard Est. #1 Sec. 57, T13S, R3E TD 14,122' Not on PI
4A.	Amerada Hess-Ethyl Corp. Lewis Faciane #3 (160277) Sec. 59, T13S, R3E TD 14,425' Not on PI
5.	R. Mosbacher & Exchange A. Moss et al #1 (143749) Sec. 63, T14S, R3E TD 15,855' No information
6.	Skelly Oil Co. (81277) L.J. Eleazer #1 Sec. 15, T13S, R4E TD 13,602' 12,068-74 TP 810# BH = 4775 106 BCPD 145 MCFD
7.	Coastal States Gas Prod. Co. R. Broussard #1 (126523) Sec. 18, T13S, R5E TD 15,200' Not on PI
8.	Emerald Oil Co. (115607) Landry-Meaux #1 Sec. 20, T13S, R5E TD 15,020' No information
9.	Franks Petr. (153011) F. Dugas "A" #1 Sec. 20, T13S, R5E TD 14,512' Not on PI
10.	Franks Petr. (148226) C. Dugas et al #1 Sec. 19, T13S, R5E TD 14,700' Perf. 12,054-080 BHP 3300# TP = 400# SITP = 500#
11.	Union Oil Co. of Calif. (10621) S. Thibodeaux #1 Sec. 24, T13S, R4E TD 15,012' No information
12.	Dynamic Expl., Inc. (158111) E. Dugas #1 Sec. 23, T13S, R4E TD 12,415' Not on PI
13.	Ada Resources, Inc. (153334) K. Dubois #1 Sec. 28, T13S, R4E TD 16,030' Not on PI
14.	Union Oil Co. of Calif. B. Planters #B-1 (96959) Sec. 33, T13S, R5E TD 15,048' Not on PI
15.	Union Oil Co. of Calif. E. Dugas #7 (128020) Sec. 32, T13S, R5E TD 14,235' 14,235-249 1 PF = 184 BCPD MCF = 9,400
16.	Union Oil Co. of Calif. E. Dugas #8 (133884) Sec. 32, T13S, R5E TD 14,495' 11,644-655 = 1 PF = 118 BOPD 4000 MCF 11,181-189' = TP = 3000# CP = 750#
17.	Union Oil Co. of Calif. E. Dugas #6 (116223) Sec. 31, T13S, R5E TD 14,894' 11,658-666' TP = 3425# SITP = 3500# 72 BCPD 4650 MCF Core @ 13823-14906 Rec 22 SWC 12,046-12,070' TP = 1850# SITP = 4000#
18.	Monterey Oil Co. (78802) S.J. Leblanc #1 Sec. 33, T13S, R4E TD 13,192' No information
19.	Texaco, Inc. (109498) F. Dubois #1 Sec. 33, T13S, R4E TD 17,100' No information
19A.	Ada Oil Exploration Corp. Dr. A. Hebert #1 (161816) Sec. 31, T13S, R4E TD 14,450' No information
20.	Hilliard Oil & Gas, Inc. & Solatex (152888) C.J. Lequex #1 Sec. 80, T14S, R3E TD 15,500' Not on PI
21.	Great Plains Expl. Co.(156558) F.A. Godchaux,Jr., et al #1 Sec. 80, T14S, R3E TD 15,620' Not on PI
22.	Damson Expl. Corp. (125929) E. Broussard Nunez et al #1 Sec. 1, T14S, R4E TD 16,500' Not on Fish
23.	Union Oil Co. of Calif. E.E. Broussard #9 (126936) Sec. 5, T14S, R5E TD 13,744' Perf. 13,352'-79' TP = 8400# SWC @ 11,642'-58' (Rec 7') No details
24.	Union Oil Co. of Calif. E. Broussard #6 (125427) Sec. 5, T14S, R5E TD 14,040' No information
25.	Coastal States Gas & Preston Oil Co. (127042) Edna Delcambre #2 Sec. 5, T14S, R5E TD 15,407' 12,297-328 TP = 4850# Test @ 12,332' Rec 54 cu/ft & Gas 250 cc Cond. 1500 CL Filtrate 3000 ppm
26.	Coastal States Gas & Columbia Gas (133361) T.L. Lee#1 Sec. 5, T14S, R5E TD 13,745' Perf. 13034-52 TP = 5957# SITP = 9155# Cores 12210-13400 No details - Test @ 13046' Rec 84 cu/ft gas 500 cc Dist 2300 cc Water 100 cc mud 6500 ppm 13050-52' TP = 3600#
27.	Coastal States Gas (130090) E. Delcambre #4 Sec. 5, T14S, R5E TD 14,020' 17168-83 TP - 9200# Test 17168-83 IFP = 9168# FFP = 9202# Test #2 17168-83 IFP = 10301# FFP = 10344# Test #3 17168-83 TP = 11400# SITP = 12000#
28.	Coastal States & Preston Oil E. Delcambre et al #1 (121964) Sec. 5, T14S, R5E TD 14,500' Not on PI
29.	Coastal States & Preston Oil E. Delcambre et al #3 (128610) Sec. 5, T14S, R5E TD 14,500' No information
30.	Coastal States-Preston Oil I. Delcambre et al #1 (123791) Sec. 8, T14S, R5E TD 14,314' Core @ 11593-11670 - No details
31.	Lamar Hunt (131310) E. Delcambre #1 Sec. 8, T14S, R3E TD 15,000' No information
32.	Quintana Petr. Corp. (101676) I. Delcambre #1 Sec. 8, T14S, R5E TD 16,803' No information
33.	Martin Expl. Corp. (153778) Delcambre #1 Sec. 7, T14S, R5E TD 15,600' Not on Fish
34.	Texas Gas Expl. Corp. (145703) E. Delcambre #1 Sec. 7, T14S, R5E TD 15,605' No information
35.	British American Oil Prod. Co. D. Primeaux #1 (85976) Sec. 11, T14S, R4E TD 12,998' Not on PI

Map No.	Well Identification
36.	Union Oil Co. of Calif. F.A. Godchaux #1 (126339) Sec. 83, T14S, R3E TD 15,580' Not on PI
37.	Mesa Petr. Co. (132940) F.A. Godchaux #2 Sec. 83, T14S, R3E TD 14,525' No information
38.	Sun Oil Co. (57629) Verm Ph. Sch. Bd. #1 Sec. 16, T14S, R3E TD 14,750' Core @ 12048-260 Rec 9 of 12 SWC NS No details
39.	Kilroy Co. of Texas (103885) Roy Lee #1 Sec. 86, T14S, R3E TD 15,100' Perf. 12049-54 TP 3600# SITP = 3783# Test 12188' Rec 25 CFT Gas 300 cc cond. 1200 cc mud Test 12063 Rec 78 CFT Gas 270 cc cond.1250 cc mud
40.	Amerada Hess-Ethyl Corp. E.M. Cessae #1 (158541) Sec. 86, T14S, R3E TD 14,000' Not on PI
41.	McCormick Oil & Gas-Apache Corp. E. Cessae #1 (140864) Sec. 79, T14S, R3E TD 14,328' Perf. 11685-694 Flowed Water Small amount of gas
42.	Solatex Petr. (154150) F.A. Godchaux, Jr. #2 Sec. 79, T14S, R3E TD 14,726' Not on PI
43.	Houston Oil Co. (58519) Godchaux #6 Sec. 85, T14S, R3E TD 12,779' Core @ 11995-12386 Rec 6 SWC - NS
44.	Houston Oil Co. of Tex (51309) F.A. Godchaux et al #2 Sec. 85, T14S, R3E TD 13,398' Perf. 12846 - SW
45.	George R. Brown (102217) F.A. Godchaux #2 Sec. 85, T14S, R3E TD 13,990' 13688-704' IFP = 88 BCPD - 2895 MCF TP = 7300# Core @ 12748-757 - No details
46.	George R. Brown (82998) F.A. Godchaux #1 Sec. 24, T14S, R3E TD 14,025' 13689 -701 IFP = 158 BCPD 2883 MCF TP = 7625# SITP = 9300#
47.	Glasscock-Chapman-Chambers & Kennedy (97320) F.A. Godchaux #1 Sec. 19, T14S, R4E TD 11,754' No information
48.	Bradco Oil & Gas Co. (123384) F.A. Godchaux #1 Sec. 19, T14S, R4E TD 14,062' Perf 13820-24 TP = 7748# SITP = 10317# Rec on Test = SW
49.	Hassie Hunt Trust-Mesa Petr. F.A. Godchaux #1 (131916) Sec. 18, T14S, R4E TD 17,522' Core @ 13045-15630 (Rec 30 SWC) No details
50.	George R. Brown (117898) Verm. Ph. Sch. Bd. #1 Sec. 16, T14S, R4E TD 16,200' Not on Fish
51.	Newhall Ld & Farming Co. Verm. Ph. Sch. Bd. #1 (157948) Sec. 16, T14S, R4E TD 12,930' Not on PI
52.	Quintana Petr. Corp. (113754) Verm.Bay Ld. Co. #1 Sec. 14, T14S, R4E TD 17,790' No information
53.	Quintana Petr. Corp. (107861) I. Delcambre #2 Sec. 18, T14S, R5E TD 17,120' Perf. 15314-24' TP = 8280# Perf. 15314-24' TP = 9900#
54.	Delta Energy (147982) E. Delcambre et al #1 Sec. 18, T14S, R5E TD 16,500' No information
55.	Quintana Petr. Corp. (98717) A. Broussard #1 Sec. 17, T14S, R5E TD 15,215' 15114-137' TP 9020# 15114-137' TP 8335# SITP = 10110# 15114-137' TP 9380#
56.	Quintana Petr. Corp. (105769) S.L. 3236 #1 Sec. 17, T14S, R5E TD 16,819' No information
57.	Quintana Petr. Corp. (115968) E. Broussard et al #1 Sec. 19, T14S, R5E TD 16,950' 15718-841 TP = 8175# 13220' Gas Show
58.	Phillips Petr. Co. (52319) Coastal A-1 Sec. 23, T14S, R14E TD 14,001' Core @ 12172-12651 No details
59.	Lumson Bennett & Cole (5750) Nugier Unit #1 Sec. 15, T14S, R4E TD 15,026' Core @ 13156-613 Core @ 13774-14029 Core @ 14414-512
60.	Pan Am Petr. Corp. (122248) Verm. Bay Ld. Co. #1 Sec. 23, T14S, R4E TD 17,000' No information
61.	Ballard & Cordell (86193) Stovall #1 Sec. 20, T14S, R4E TD 13,123' Not on PI
62.	LaSalle Oil Co. - E.L. Cox F. Stovall #1 (102918) Sec. 25, T14S, R3E TD 13,700' Not on PI
63.	Chevron Oil Co. (143219) Stovall Est. #1 Sec. 31, T14S, R4E TD 20,000' No information
64.	George R. Brown-Philips Petr. Stovall #A-1 (65983) Sec. 29, T14S, R4E TD 15,048' Core @ 12713-13192 Rec 9 of 9 SW No details on cores
65.	Louisiana Ld & Expl. Co. F.W. Stovall #1 (86420) Sec. 32, T14S, R4E TD 15,646' DST #1 12942-953 Rec SW
66.	Fifteen Oil Co-Bel Oil Co. Caldwell Land #1 (66350) Sec. 27, T14S, R4E TD 14,990' Not on PI
67.	Continental Oil Co. (139246) Verm Bay Ld. Co. #1 Sec. 26, T14S, R4E TD 17,651' No pressure information No test information

APPENDIX VI

WELLS USED IN KAPLAN PROSPECT

Appendix VI
WELLS USED IN KAPLAN PROSPECT

Map No.	Well Identification	Map No.	Well Identification
1.	The Superior Oil Co. (157706)* A. Simon #1 Sec. 35, T11S, R1E TD 16,210'	12.	The Superior Oil Co. (150483) W.J. Greene #1 Sec. 23, T12S, R1E TD 17,232'
2.	Pan American Petr. (101188) U.A. Simon #1 Sec. 1, T12S, R1E TD 19,338'	13.	The Superior Oil Co. (161919) B.T. Broussard #2 Sec. 23, T12S, R1E TD 19,500'
3.	The Superior Oil Co. (103449) A. Broussard #1 Sec. 4, T12S, R1E TD 16,059'	14.	Gulf Oil Corp. (81774) Ambrois Trahan #1 Sec. 23, T12S, R1E TD 13,688'
4.	Union Oil Co. of Calif. A.A. Absire #1 (148491) Sec. 7, T12S, R1E TD 18,700'	15.	The Superior Oil Co. A.R. Romaine #1 Sec. 24, T12S, R1E TD 19,270'
5.	Union Oil Co. of Calif. E.B. Meaux #1 (156939) Sec. 7, T12S, R1E TD 15,646'	16.	The Superior Oil Co. (149456) L.S. Romaine #1 Sec. 25, T12S, R1E TD 20,422'
6.	J.P. Owen (112938) Leo Fontenot #1 Sec. 12, T12S, R1E TD 23, 148'	17.	Midwest Oil Co. (101410) Enix Hebert Faulk #1A Sec. 26, T12S, R1E TD 17,653'
7.	The Superior Oil Co. (143007) E. Dartez #1 Sec. 14, T12S, R1E TD 20,814'	18.	The Superior Oil Co. (147983) A. Trahan #1 Sec. 26, T12S, R1E TD 19,802'
8.	The Superior Oil Co. (154761) W.L. Dartez #1 Sec. 14, T12S, R1E TD 18,010	19.	Sohio Petroleum (77153) P.S. Bracquet #1 Sec. 4, T12S, R2E TD 17,280'
9.	The Superior Oil Co. (159351) L.V. Hebert #1 Sec. 15, T12S, R1E TD 18,700'	20.	Texaco, Inc. (93215) C.L. Huntsberry #1 Sec. 13, T12S, R2E TD 16,600'
10.	Union Oil Co. of Calif.(160113) Robert Trahan et al #1 Sec. 18, T12S, R1E TD 17,290'	21.	Gulf Oil Corp. (86421) A.J. Marceaux #1 Sec. 30, T12S, R2E TD 14,030'
11.	The Superior Oil Co. (154088) B.T. Broussard #1 Sec. 22, T12S, R1E TD 19,000'		

* Office of Conservation Serial Number.

APPENDIX VII

WELLS USED IN THE EVALUATION OF SOUTH WHITE LAKE PROSPECT

APPENDIX VII

WELLS USED IN THE EVALUATION OF SOUTH WHITE LAKE PROSPECT

Map No.	Well Identification	Map No.	Well Identification
1.	Union Texas Petr.Corp. (93305)* Dr. M.O. Miller No. 1 Sec. 27, T15S, R2W TD 16,525'	11.	Superior Oil Co. (61622) S.L. 2039 No. 6 Sec. 24, T16S, R3W TD 15,101'
2.	Union Oil Co. of Calif.(101286) S.L. 4082 No. 1 Sec. 32, T15S, R2W TD 15,809' (Did not log to TD)	12.	Superior Oil Co. (80795) S.L. 2039 No. 8 Sec. 24, T16S, R3W TD 15,102'
3.	Oil & Gas Futures, Inc.(126532) S. Miller No. 1 Sec. 34, T15S, R2W TD 17,506'	13.	Superior Oil Co. (82071) S.L. 2039 No. 9 Sec. 26, T16S, R3W TD 16,883'
4.	Exchange Oil & Gas Corp. M.A. Miller No. 1 (148543) Sec. 2, T16S, R2W TD 18,000'	14.	Pan Am Petr. Corp. (105377) S.L. 4210 No. 1 Sec. 35, T16S, R3W TD 18,436'
5.	Union Oil Co. of Calif. (105195) S.L. 4231 No. 1 Sec. 8, T16S, R2W TD 17,544'	15.	Shell Oil Co. (101336) S.L. 4081 No. 1 Sec. 1, T16S, R3W TD 16,608'
6.	Superior Oil Co. (46720) S.L. 2039 No. 1 Sec. 23, T16S, R3W TD 14,542'	16.	Sinclair Oil & Gas (107438) S.L. 4081 No. 1 Sec. 12, T16S, R3W TD 14,472'
7.	Superior Oil Co. (53646) S.L. 2039 No. 2 Sec. 23, T16S, R3W TD 14,995'	17.	Van Dyke Oil Co. (123963) Lionel Theriot No.1 Sec. 28, T15S, R2W TD 15,091'
8.	Superior Oil Co. (59188) S.L. 2039 No. 4 Sec. 23, T16S, R3W TD 14,730'	18.	Bradco Oil & Gas (127754) Dr. M. O. Miller No. 1 Sec. 27, T15S, R2W TD 14,600'
9.	Superior Oil Co. (60502) S.L. 2039 No. 5 Sec. 23, T16S, R3W TD 16,990'	19.	David S. Thayer et al (75953) Dr. Martin O. Miller No. 1 Sec. 23, T15S, R2W TD 16,331'
10.	Superior Oil Co. (64937) S.L. 2039 No. 7 Sec. 23, T16S, R3W TD 15,098'	20.	Bradco Oil & Gas (128987) Dr. M.O. Miller No. 2 Sec. 23, T15S, R2W TD 16,000'

* Conservation Department Serial Number.

APPENDIX VIII

WELLS USED IN THE TUSCALOOSA TREND AND SOLITUDE POINTE PROSPECT STUDIES

Appendix VIII
WELLS USED IN THE TUSCALOOSA TREND AND SOLITUDE POINTE PROSPECT STUDIES

Map No.	Well Identification
1.	Lamar Hunt (140226)* Boise Southern #1 Sec. 4, T1N, R11W TD 16,406'
2.	Gulf Oil Corp. (136974) Lawrence L. McAlpin #1 Sec. 15, T1N, R11W TD 15,391'
3.	Dixel Resources, Inc. (152728) R. Poe #1 Sec. 9, T1S, R11W TD 14,050'
3A.	Union Oil of Calif. Kirby Lumber Co. #1 Sec. 19, T2S, R10W TD 18,906'
4.	Pan American Petr. Corp.(87841) Pitre-Graham #1 Sec. 2, T1S, R9W TD 15,041'
5.	Atlantic Richfield Co. (142623) Harry H. Burns #1 Sec. 1, T2S, R9W TD 14,930'
6.	Pan American Petr. Corp.(98515) W. T. Burton Ind. #1 Sec. 4, T1S, R5W TD 17,627'
7.	Tesoro Petr. & M. Halbouty(143620) Walker Estate #1 Sec. 30, T5S, R6W TD 23,431'
8.	Shell Oil Co. (157850)** LaBoKay #1 Sec. 16, T2S, R4W TD 18,548'
9.	The Anschutz Corp.`(152953) Powell Lbr. Co. #2 Sec. 5, T4S, R3W TD 22,025'
10.	Hunt Petr. Corp. (141200) Langston #1 Sec. 13, T2N, R2W TD 22,476'
11.	Gulf Oil Corp ( )** Wilson & Johnson #1 Sec. 32, T1N, R4W TD
12.	Gulf Oil Corp. (131322) Chaseland Plantation #1 Sec. 1, T1N, R1W TD 18,020'
13.	Shell Oil Co. (156171)** Martin Development Corp. #1 Sec. 32, T2S, R1E TD 20,100'
14.	Chevron Oil Co. (142032) Sterling C. Bain #1 Sec. 15, T1S, R3E TD 17,500'
15.	Gulf Oil Corp. (154890) Wright #1 Sec. 1, T2S, R4E TD 18,441'
16.	W.A. Moncrief (157624) M.J. Ducote #1 Sec. 8, T2S, R5E TD 16,640'
17.	W. A. Moncrief(Gulf)(149939) Roy O. Martin, Jr. #A-1 Sec. 9, T2S, R5E TD 19,011'
18.	W.A. Moncrief (159142) Roy O. Martin #D-1 Sec. 35, T1S, R5E TD 17,030'
19.	W.A. Moncrief (157471) Floyd A. Bordelon #1 Sec. 10, T2S, R5E TD 16,418'
20.	Sabine Prod. et al (159624) Goudeau #1 Sec. 26, T2S, R4E TD
21.	Gulf Oil Corp. (156539) Roy O. Martin, Jr. #A-2 Sec. 17, T2S, R5E TD 16,679'
22.	W.A. Moncrief (Gulf)(158482) Roy O. Martin, Jr. #A-3 Sec. 16, T2S, R5E TD 16,800'
23.	W.A. Moncrief (Gulf)(159604) Luke Firmin #1 Sec. 15, T2S, R5E TD 16,420'
24.	Gulf Oil Corp. (155768) Roy O. Martin, Jr. #C-1 Sec. 18, T2S, R5E TD 18,529'
25.	W.A. Moncrief (Gulf)(154571) Roy O. Martin, Jr. #1-B Sec. 23, T2S, R5E TD 16,780'
26.	Shell Oil Co. (161039) W.C. Fisher #1 Sec. 10, T3S, R4E TD
27.	Shell Oil Co. (157476)** Hagger #1 Sec. 11, T3S, R4E TD 19,692'
28.	Gulf Oil Corp. (155177) Thistlethwaite #1 Sec. 31, T2S, R5E TD 17,282'
29.	Shell Oil Co. (159870) Leopold Realty #1 Sec. 28, T2S, R6E TD 16,800'
30.	Gulf Oil Corp. (157914) Turner Lbr. Co. #3 Sec. 33, T2S, R6E TD 16,900'
31.	Gulf Oil Corp. (158592) Turner Lbr. Co. #4 Sec. 6, T3S, R6E TD 17,268'
32.	Gulf Oil Corp. (156713) Turner Lbr. Co. #2 Sec. 5, T3S, R6E TD 17,390'
33.	W.A. Moncrief (Gulf)(152612) Turner Lbr. Co. #1 Sec. 4, T3S, R6E TD 17,867'
34.	Gulf Oil Corp. (156712) Thistlethwaite #2 Sec. 3, T3S, R6E TD 17,505'
35.	Shell Oil Co. (162058) Woodland Plantation #1 Sec. 3, T3S, R6E TD
36.	Shell Oil Co. (156179) Turner Lbr. Co. #2 Sec. 8, T3S, R6E TD (Location)
37.	Shell Oil Co. (158694) Meyers #1 Sec. 17, T3S, R6E TD 19,964'
38.	Shell Oil Co. (153385) Turner Lbr. Co. #1 Sec. 20, T3S, R6E TD 20,170'
39.	Shell Oil Co. (161773) Jarrell #1 Sec. 13, T3S, R7E TD
40.	Shell Oil Co. (159625) Woolfe #1 Sec. 13, T3S, R7E TD 15,707'
41.	W. A. Moncrief (Gulf) (154435) D.W. Rice #1 Sec. 57, T2S, R7E TD 20,210'
42.	W.A. Moncrief (160943)** Robert E. Lee #1 Sec. 38, T3S, R8E TD 17,293'
43.	Gulf Oil Corp. (157273)** Arnold Hess #1 Sec. 65, T3S, R8E TD 18,000'
44.	Amoco Prod. Co. (158005) Brown #1 Sec. 82, T4S, R8E TD
45.	Chevron USA (160876) Waggley #1 Sec. 23, T5S, R9E TD
46.	Amoco Prod. Co. (160808) Hurst #1 Sec. 55, T4S, R9E TD
47.	Natomas (157132) J. E. Jumonville #1 Sec. 101, T5S, R10E TD 20,031'
48.	Chevron USA (154126) W.C. Parlange, Jr. #1 Sec. 49, T5S, R9E TD 31,346'
49.	Chevron USA (156849) W.C. Parlange, Jr. #2 Sec. 49, T5S, R9E TD 20,556'
50.	Chevron USA (159997) LeBlanc-Lejeune #1 Sec. 65, T5S, R10E TD

* Office of Conservation Serial Number

** Well Log Not Released

Map No.	Well Identification
51.	Chevron USA (150731) W.A. Lorio, Jr. #1 Sec. 72, T5S, R10E TD 21,450'
52.	Chevron USA (149146) L. Crochet #1 Sec. 37, T6S, R10E TD 20,187'
53.	Chevron USA (152472) Alma Plantation #3 Sec. 48, T5S, R11E TD 20,504'
54.	Chevron USA (158508) Edmay Boudreaux # Sec. 39, T6S, R11E TD 20,600'
55.	Chevron USA (146108) Alma Plantation #1 Sec. 87, T6S, R11E TD 21,411'
56.	Chevron USA (154865) Alma Plantation #2 Sec. 87, T6S, R11E TD 20,845'
57.	Chevron USA (154087) Jesse T. Ulmer #1 Sec. 17, T6S, R11E TD 23,064'
58.	Chevron USA (149322) Poplar Grove Plantation #1 Sec. 9, T6S, R11E TD 21,321'
59.	Chevron USA (161731) Crowley #1 Sec. 66, T6S, R11E TD
60.	Chevron USA (159626) Farwell #1 Sec. 79, T6S, R11E TD 20,600'
61.	LL&E (159088) Kissner #1 Sec. 21, T6S, R11E TD
62.	South Louisiana Prod. Co.(150801) J.R. Morris Heirs #1 Sec. 82, T6S, R11E TD 21,794'
63.	Chevron USA (156290) Ashland Plantation #1 Sec. 57, T6S, R11E TD 21,296'
63A.	South Louisiana Prod. Co.(153627) H.L. Laws Co. #1 Sec. 57, T6S, R11E TD 21,459'
64.	Marathon Oil Co. (159391) J. Burton LeBlanc #1 Sec. 63, T6S, R1W TD
65.	Hunt Petr. Corp. (157475) Trans-Match #1 Sec. 26, T5S, R2W TD 20,221'
66.	Slapco (162167) Baxter #1 Sec. 84, T5S, R1W TD
67.	South Louisiana Prod. Co.(157899) Kizer #1 Sec. 76, T5S, R1W TD 19,180'
68.	South Louisiana Prod.Co.(162166) La. Training Inst. #1(SL 6884) Sec. 86, T5S, R1W TD
69.	Texaco, Inc. (162008) S.L. 7590 #1 Sec. 75, T5S, R11E TD
70.	B. T. A. Corp. (161329) Georgia Pacific #1 Sec. 64, T4S, R2W TD
71.	Amoco Prod. Co. (154992) Georgia Pacific #1 Sec. 64, T4S, R2W TD 17,456'
72.	Amoco Prod.Co. (158860)** Talmadge Bickham #1 Sec. 36, T4S, R2W TD
73.	Amoco Prod. Co. (158299)** C. B. Pennington #1 Sec. 38, T5S, R2W TD
74.	Amoco Prod. Co. (160731) C. B. Pennington #2 Sec. 41, T5S, R2W TD
75.	CNG-Pennington (158986)** Irma Fulkerson #1 Sec. 16, T4S, R1W TD 16,410'
76.	CNG-Pennington (161393) Speeg #1 Sec. 41, T4S, R1W TD
76A.	Shell Oil Co. (158761) Tranchina #1 Sec. 51, T5S, R1E TD
77.	W. A. Moncrief (160947) E.L. Butler #1 Sec. 66, T2S, R3W TD 15,961'
78.	W. A. Moncrief (160728)** Rosedown Plantation #1 Sec. 100, T3S, R2W TD 18,760'
79.	Clement & Stover (156407) Henry Tolusso #1 Sec. 58, T1S, R1W TD 13,895'
80.	Phillips Petr. Co. (137563) A.A. Jones #1 Sec. 76, T3S, R2E TD 18,819'
81.	United Prod. Co., Inc.(89672) Boy Scouts of America #1 Sec. 41, T2S, R2E TD 15,071'
82.	Cockrell Corp. (131394) Randolph Pipes, Sr. #1 Sec. 81, T2S, R3E TD 15,020'
83.	Shell Oil Co. (157520)** Crown-Zellerbach #2 Sec. 7, T6S, R3E TD 17,927'
84.	Shell Oil Co. (154965) Crown Zellerbach #1 Sec. 20, T6S, R5E TD 18,218'
85.	Natomas North America (159985) Crown Zellerbach #2 Sec. 1, T7S, R5E TD
86.	Murphy Oil Corp. (144869) William T. Joyce #1 Sec. 5, T8S, R8E TD 19,040'
87.	South Louisiana Prod. Co. Joyce Foundation #1 (158907)** Sec. --, T8S, R9E TD 22,074'
88.	Cities Service Oil Corp. S.L. 7177 #1 (156431)** W. Lk. Pontchartrain Blk. 2 TD 19,129'
89.	Hassie Hunt Trust (136552) Currie #1 Sec. 8, T8S, R13E TD 21,349'
90.	Sun Oil Co. (52961) Poitevent Favre #1 Sec. 10, T8S, R15E TD 11,001'
91.	Union Oil Co. of California S.L. 7183 #1 (157558)** E. Lk. Pontchartrain Blk. 7 TD 20,445'
91A.	Natomas North America (157438)** S.L. 7185 #1 E. Lk. Pontchartrain Blk. 11 TD 20,290'
92.	Union Oil Co. of California S.L. 6753 #2 (159663)** E. Lk. Pontchartrain TD
92A.	Union Oil Co. of Calif. (152343)** S.L. 6753 #1 E. Lk. Pontchartrain Blk. TD 18,167'
93.	Natomas North America (157439)** S.L. 7186 #1 E. Lk. Pontchartrain Blk. 14 TD
94.	Cities Service Oil Corp.(154563)** S.L. 7192 #1 E. Lk. Pontchartrain Blk. 16 TD 16,796'
95.	Chevron Oil Co. (137233) Iwanta Realty #1 Sec. 8, T10S, R16E TD 13,500'
96.	Shell Oil Co. (87437) S.L. 3748 #1 Sec. --, T10S, R18E TD 16,865'
97.	Florida Gas Expl. Co.(141482) L & N Railroad #D-1 Sec. 15, T10S, R16E TD 10,780'
97A.	Humble Oil & Refg. Co.(132791) L & N Railroad #2 Sec. 12, T10S, R16E TD 11,796'
98.	Humble Oil & Refg. Co.(95400) L & N Railroad #1 Sec. 15, T10S, R16E TD 12,853'
99.	Humble Oil & Refg. Co. (102080) S.L. 3954 #1 Sec. 23, T10S, R16E TD 12,018'

Map No.	Well Identification
100.	Chevron USA (156774)** S.L. 6649 #1 N. Lk. Borgne Blk. 1 TD 12,455'
101.	Chevron Oil Co. (128561) L & N Railroad #1 (by pass) Sec. 28, T10S, R16E TD 14,337'
102.	Natomas North America (158187)** S.L. 7260 #1 Sec. 34, T10S, R15E TD
102A.	Natomas North America (161520) S.L. 7265 #1 Sec. 33, T10S, R15E TD (Location)
103.	Chevron USA (158992)** L & N Railroad #1 Sec. 8, T11S, R15E TD
103A.	Chevron USA (161519) S.L. 7264 #1 Sec. 33, T10S, R15E TD (Location)
104.	Chevron USA (149529) S.L. 6646 #1 N. Lk. Borgne Blk. 23 TD 14,946'
105.	Chevron USA (156556)** S.L. 6647 #3 N. Lk. Borgne Blk. 22 TD 16,200'
106.	Chevron USA (152611)** S.L. 6647 #2 Lk. Borgne Blk. 22 TD 14,925'
107.	Chevron USA (150848)** S.L. 6647 #1 Lk. Borgne Blk. 22 TD 14,950'
108.	Chevron USA (159528) S.L. 6648 #1 Lk. Borgne Blk. 21 TD (Location)
109.	Chevron USA (159398)** S.L. 6651 #1 Lk. Borgne Blk. 3 TD 14,400'
109A.	Chevron USA (161399) S.L. 6651 #2 Lk. Borgne Blk. 3 TD (Location)
110.	Chevron USA (154760)** S.L. 6652 #1 Lk. Borgne Blk. 4 TD 16,000'
111.	Mobil-Florida Gas (140619) S.L. 5780 #2 Lk. Borgne Blk. 8 TD 16,392'
112.	Gulf Oil Corp. (55133) S.L. 2282 #1 Lk. Borgne Blk. 10 TD 10,700'
113.	Texaco, Inc. (158539)** S.L. 7302 #1 Lk. Borgne Blk. 14 TD 13,685'
114.	Exxon Corp. (155497)** S.L. 7127 #1 Sec. --, T11S, R18E TD 15,500'

Map No.	Well Identification
102B.	Natomas North America (162065) S.L. 7265 #2 Sec. 33, T10S, R15E TD (Location)
110A.	Chevron USA (161648) S.L. 6652#2 Lk. Borgne Blk. 4 TD (Location)
95A.	Atlantic Richfield (159760) Musser-Davis #C-1 Sec. 23, T3S, R11W TD (Location)
94A.	Cotton Petr. Corp. (161787) S.L. 7192 #1 E. Lk. Pontchartrain Blk. 16 TD
115.	Texas Pacific Coal & Oil Co. W.E. Day #1 (47180) Sec. 83, T2S, R4E TD 13,305'
116.	Exchange Oil & Gas Co.(128635) Crown-Zellerbach #1 Sec. 41, T1S, R5E TD 13,493'
117.	Magnolia Petr. Co. (54224) Smith-Cole #1 Sec. 64, T2S, R5E TD 13,487'
118.	Discovery Oil & Gas ( ) Harbert #1 Sec. 3, T1S, R6E TD 12,010'
119.	Biglane Oper. Co. ( ) Lea #1 Sec. 6, T1S, R7E TD 11,971'
120.	Sun Oil Co. (92589) R. D. Bridges #1 Sec. 52, T2S, R6E TD 15,631'
121.	Biglane Oper. Co. (136803) Cole-Bridges #1 Sec. 51, T2S, R6E TD
122.	Hunt Oil Co. (130298) Phillips #1 Sec. 22, T2S, R6E TD 20,114'
123.	Dixilyn Corp. et al ( ) Lake Superior Piling #1 Sec. 5, T3S, R8E TD 12,318'
124.	Hill & Mclean (82971) Andrew Grace et al #1 Sec. 35, T2S, R8E TD 12,476'
125.	Brooks Hall-Dixilyn (106652) E. M. Bahm #1 Sec. 54, T1S, R9E TD 11,320'
126.	LaGrange Pet. Co. ( ) Tom Shedd #1 Sec. 57, T2S, R10E TD 11,500'
127.	N. B. Hunt (44836) Johnson #1 Sec. 20, T3S, R11E TD 11,442'
128.	S. W. Richardson LSU #1 Sec. 9, T2S, R12E TD 11,200'

Map No.	Well Identification
129.	Placid Oil Co. (83005) Crown Zellerbach #1 Sec. 17, T2S, R13E TD 13,072'
130.	Placid Oil Co. (84075) Crown Zellerbach #2 Sec. 1, T3S, R12E TD 13,686'
131.	Davidson et al (82685) Adams et al #1 Sec. 56, T2S, R14E TD 10,007'