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STATE BOARD OF CONSERVATION
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FLORIDA GEOLOGICAL SURVEY
Robert O. Vernon, *Director*

MAP SERIES NO. 19

FOLIO OF SOUTH FLORIDA BASIN
A PRELIMINARY STUDY

By
Woodson R. Oglesby

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1965

TALLAHASSEE
1965

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Completed manuscript received
September 15, 1965
Printed by the Florida Geological Survey (118)
Tallahassee
1965

SOUTH FLORIDA BASIN

By
Woodson R. Oglesby

A PRELIMINARY STUDY

The South Florida Basin extends over approximately 77,000 square miles, as outlined on the accompanying maps. About half of the surface expression of the basin area is dry land and the remaining half is water bottom land extending to the edge of the Continental Shelf.

The basin was formed prior to the deposition of Trinity age evaporites; which could not have been deposited under normal marine conditions. Observations of well cores confirm that there were repeated cycles of sea water influx, followed by evaporation, as evidenced by the occurrence of repeated cycles of carbonate-evaporite deposition.

In the Punta Gorda Formation, evaporites predominate, which suggests restricted encroachment of the seas upon the land. In the Gulf Oil Company No. 1 State Lease 826-G, Monroe County, the top 350 feet of the Punta Gorda Formation was cored, and penetrated rock as follows:

- 1.) 40 feet of anhydrite.
- 2.) 60 feet of oil saturated limestone.
- 3.) 250 feet of sediment consisting of 216 feet of anhydrite, 15 feet of halite, and only 19 feet of carbonates.

The carbonates occur in seven isolated portions of the 250 feet of cored section.

Of the uppermost 100 feet of the Punta Gorda Formation, the lower 60 feet is dark brown cryptocrystalline limestone which appears petroliferous and yields an oil cut when treated with dilute hydrochloric acid. The section is too tight to produce in this area but is a likely source bed for petroleum. It is capped by 40 feet of anhydrite.

The thin carbonate sections noted in statements 1 and 2 probably represent sea water influx, perhaps during storms, when barrier reefs were inundated and breached by wave action. The 60-foot section of cryptocrystalline limestone noted in statement 3 indicates a rather extensive period of continuous influx, possibly denoting a temporary rise in sea level prior to the succeeding period of restricted basinal deposit of 40 feet of anhydrite.

The Sunniland Limestone occurs as a biostrome extending from its up-dip limits, shown on accompanying maps, to Charlotte Harbor on the Southwest, and running thence southeasterly to Key Largo. Within this biostrome there are reef-like bioherms composed largely of chamids, rudistids and other mollusks associated with these sessile builders of rigid frameworks. The flanks of these bioherms are composed of bioclastic mollusk detritus and may contain large Foraminifera such as *Operculina* and *Dictyoconus*. The inter-reef areas are occupied by lime muds, now indurated, that frequently contain abundant miliolids and usually lack porosity. For descriptions of similar lithologies, the "Symposium on Edwards Limestone in Central Texas", University of Texas Publication No. 5905, 1959, is recommended.

The Sunniland Limestone interval is largely replaced by evaporites in the trough that parallels the coasts of Collier and Monroe counties. In the Gulf No. 1 State Lease 826-G, evaporites predominate in the cored Sunniland interval, coupled with minor cycles of influx, during which periods calcilutites were precipitated.

The Sunniland Limestone, or its equivalent, is present in the Marquesas Keys and is inferred to extend NNW paralleling the Collier-Monroe trough mentioned above. The Broward Syncline, is indicated as occurring NNE of the Sunniland shelf.

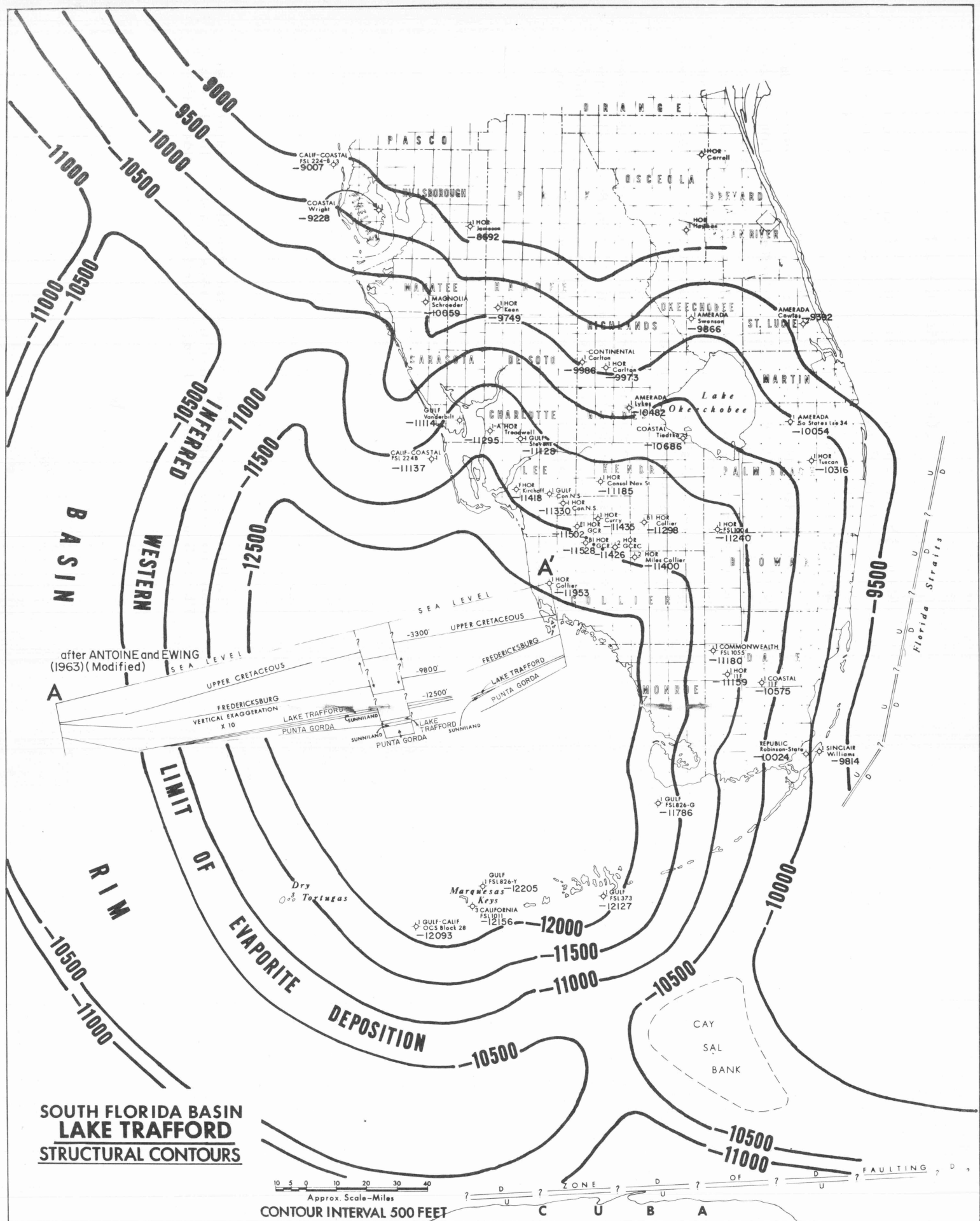
During Washita-Fredericksburg time, the cyclic deposition of carbonate-evaporite series persisted. The close of the Lower Cretaceous is marked by a final deposit of anhydrite which is immediately overlain by one foot of green shale in the Humble No. 1 Collier Corporation, located east of Naples, in Collier County. A basal Fredericksburg shaly calcilutite overlies the green shale, followed by 300 feet of Austin Age calcilutite and chalk. This grades upward into pure white chalk which persists almost uninterrupted throughout approximately 3,000 feet of Gulfian depo-

sition. The absence of evaporites in the Upper Cretaceous evidences widespread encroachment of epicontinental seas, which occurred simultaneously in the mid-continent of North America and in general throughout the world.

The Paleocene Series is marked by a re-occurrence of carbonate-evaporite cycles indicating a general restriction of the seas during this interval. It is assumed that the barriers which cut off unrestricted access to the Atlantic and the Gulf of Mexico from the South Florida Basin during the Comanchean era, were either resurrected at the end of the Gulfian time, or were not destroyed during the Gulfian inundation.

The Eocene-to-Recent interval does not contain evaporites in the geographical locale of the South Florida Basin. This indicates free access to the seas and the formation of a physiographic platform as opposed to the underlying structural basin of preceding eras.

The following maps and cross sections are available at a larger scale. Scale and prices may be obtained upon request. Address inquiries to: Florida Geological Survey, P. O. Box 631, Tallahassee, Florida 32302.



The contours reflect structure at the close of Lake Trafford deposition. The Lake Trafford Formation is proposed to replace the names "upper anhydrite" or "upper massive anhydrite" used informally by the oil industry to designate the impervious beds which overlie the Sunniland Limestone.

The type well of the Lake Trafford Formation is designated the Humble Oil and Refining Company #1 J. A. Curry in Collier County about 2½ miles east of Lake Trafford -1650' S. of N/line and 1650' E. of W/line of Section 8, T 47 S, R 29 E.

The entire section was diamond cored in the type well; portions of the cores are available for study at the Florida Geological Survey, Tallahassee. A core description follows:

Comanche Series

Lake Trafford Formation (11478'-11612')

Total thickness 134 feet.

11480'-11486'	Limestone, brown, lithographic with dolomite phenocrysts.
11501'-11505'	Limestone, buff to tan, microcoquina of miliolids and ostracods to buff, finely sucrosic limestone with molluscan fragments, visible porosity.
11508'-11518'	Limestone, buff to brown, dense, lithographic.

11524'

11531'

11560'-11561'

11561'-11562'

11566'-11571'

11571'-11574'

11574'-11577'

11584'-11589'

11589'-11592'

11592'-11612'

Limestone, medium-sized crystals, with some intercrystalline porosity; heavy oil stain and cut.

Anhydrite, white in matrix of black (carbonaceous?) limestone.

Limestone brown, dense, lithographic.

Anhydrite, white, in matrix of limestone, brown, dense to medium crystalline.

Limestone, buff to tan, medium to coarse crystalline.

Limestone, tan medium crystalline to dense

Limestone, brown, fossiliferous, hard recrystallized.

Limestone brown, miliolitic, dense.

Limestone, brown dense.

Limestone, brown, dense, fossiliferous and recrystallized.

Anhydrite, white in matrix of limestone, dense, brown, carbonaceous.

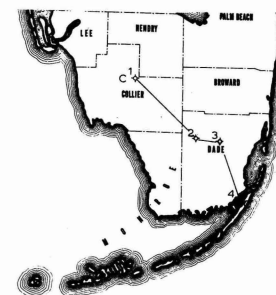
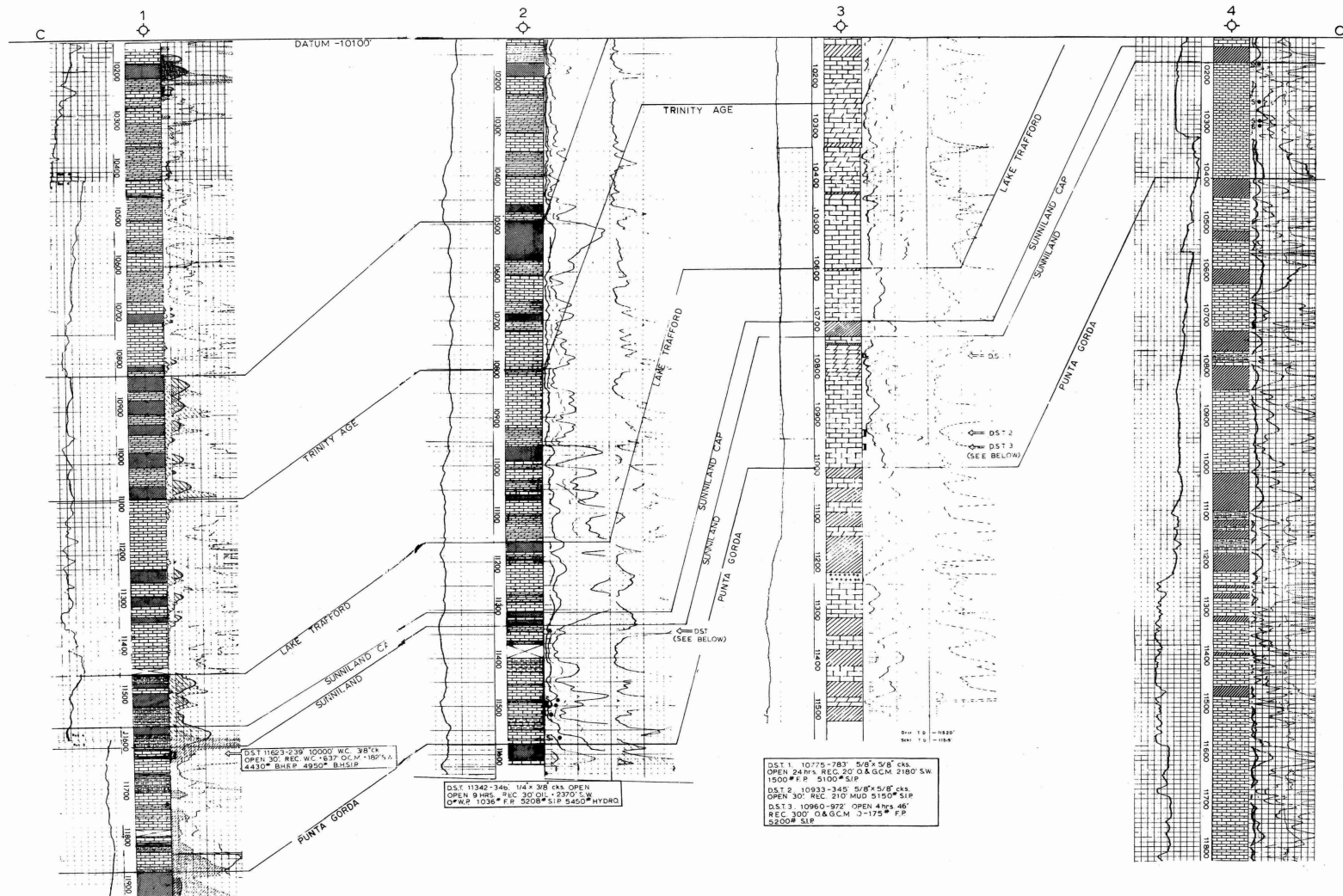
Of the 134-foot section, 38 feet, or slightly less than 30% is anhydrite. This percentage ranges between 10% and 50% in the Charlotte Harbor to Key Largo Trend. Correlations of the Lake Trafford Formation are easily taken from electric logs; dense hard limestones grade laterally to equally dense anhydrites, which appear similar on standard E. S. or I. E. S. logs. Gamma-neutron and density logs are useful in discriminating between dense limestones and anhydrites within the section.

HUMBLE OIL AND REFINING CO.
2 GULF COAST REALITIES CO.
EL. 34' D.F. T.D. 13,512'

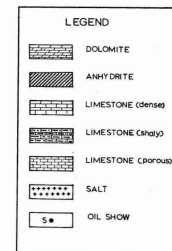
GULF OIL CORPORATION
3 FLORIDA STATE LEASE 340
EL. 25' D.F. T.D. 11,625'

COASTAL PETROLEUM COMPANY
1 INTERNAL IMPROVEMENT FUND
EL. 25' D.F. T.D. 11,520'

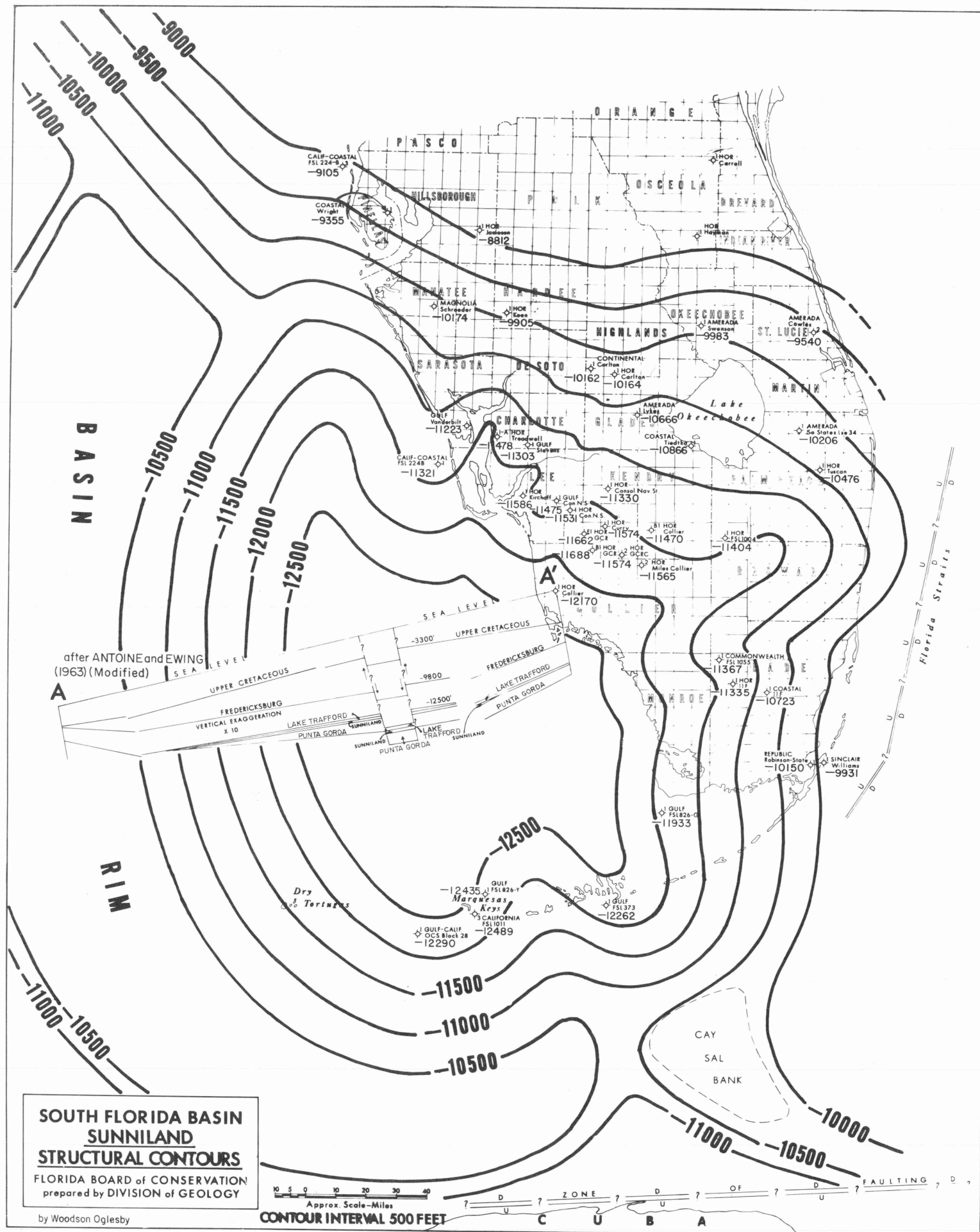
REPUBLIC OIL COMPANY
O.D. ROBINSON - STATE NO. 1
EL. 20' D.F. T.D. 12,057'



0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100



SUNNILAND - KEY LARGO
COLLIER DADE AND MONROE COUNTIES
CROSS SECTION
STATE BOARD OF CONSERVATION
DIVISION OF GEOLOGY
PREPARED: FEB. 1965 REVISED: AUG. 1965



The structure of the South Florida Basin at the close of Sunniland Limestone deposition is shown on the accompanying map.

The basin persisted from pre-Cretaceous time through the Cedar Keys anhydrite (Paleocene). This is demonstrated by repeated sequences of carbonates alternating with anhydrites. The overall known thickness of the carbonate-anhydrite sequences attained 10,000' at Charlotte Harbor (California-Coastal FSL 224 B-1) and 11,000' in the Marquesas Keys (Gulf FSL 826-Y).

The Sunniland Limestone has been defined by Applin (U. S. G. S. Prof. Paper 400-B, pp. B209-211, 1960). The present map conforms to Mr. Applin's definition.

Seismic section A-A' was modified after Antoine and Ewing (Jour. Geophys. Research, April, 1963). The Cretaceous thins rapidly at the western end of the seismic section, indicating the basin rim, which approximates the margin of the continental shelf.

The zone of faulting shown north of Cuba is modified after Pressler (Bull. A. A. P. G., 1947, pp. 1851-62). The postulated faulting along the straits of Florida is shown

on section B-B', (on reverse side), modified after Maher (1964). The origin of the steep-walled straits is attributed to faulting which probably extends southwestward between the Florida Keys and Cay Sal.

The Andros Island well (cf. section B-B') did not contain the evaporites found in the South Florida Basin, indicating separate environments of deposition.

Cross section B-B' was constructed by John C. Maher of the U. S. G. S., Research, Division of Marine Geology, as part of a series extending along the eastern coast of the United States.

The modifications show probable faulting to account for the steep profile of the Florida Straits, and the replacement of Sunniland Limestone by anhydrite in wells 109 and 105.

In well 2, at Andros Island, the Comanche to Midway interval consists exclusively of carbonates, whereas there are numerous evaporites present in a similar interval in well 104 at Key Largo. It is therefore inferred that the eastern rim of the South Florida Basin occurs between wells 104 and 2.

after ANTOINE and EWING
(1963) (Modified)

A

SEA LEVEL
UPPER CRETACEOUS
FREDERICKSBURG
VERTICAL EXAGGERATION
X 10

UPPER CRETACEOUS

FREDERICKSBURG
LAKE TRAFFORD
PUNTA GORDA

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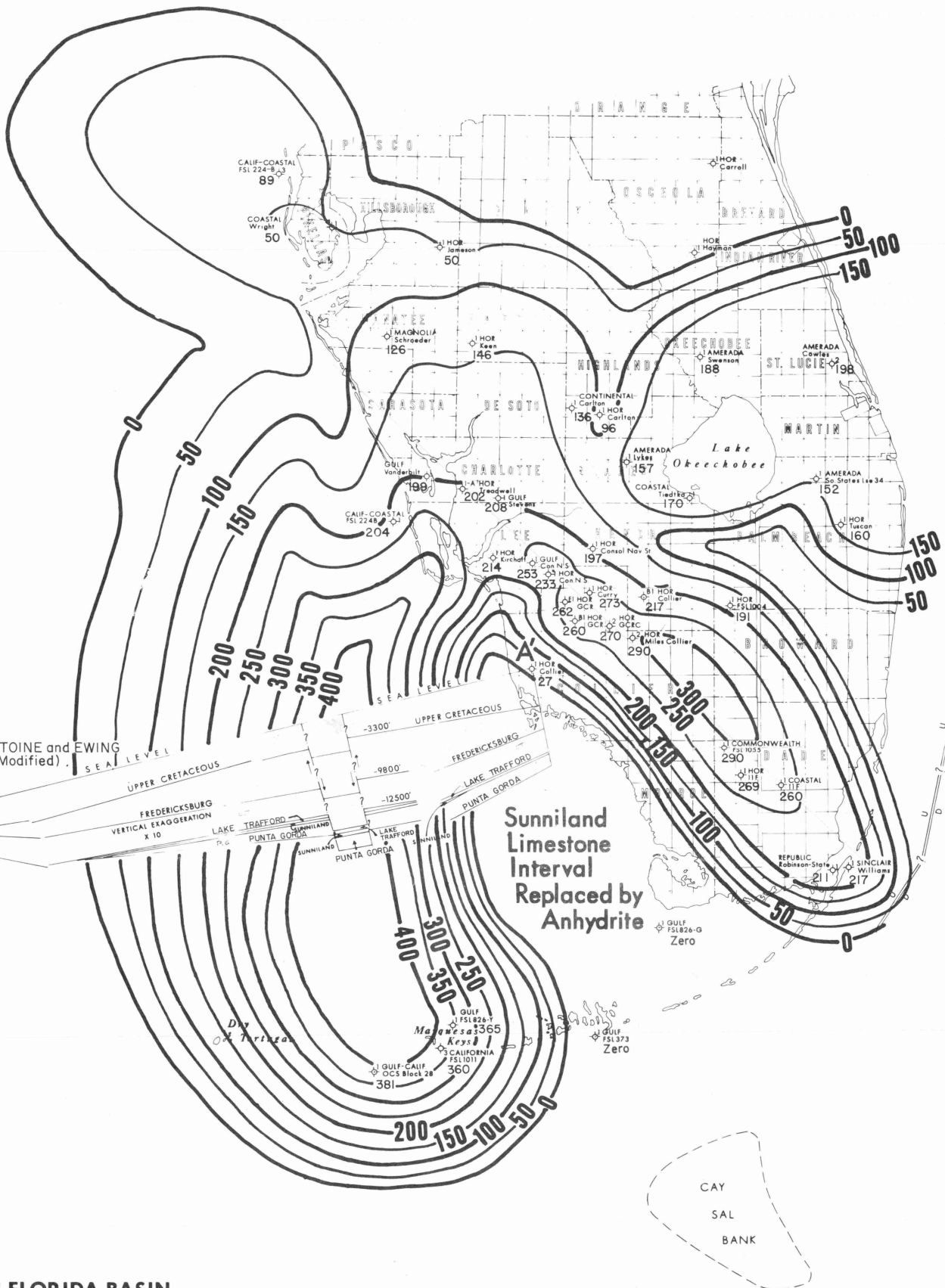
Sunniland
Limestone
Interval
Replaced by
Anhydrite

SOUTH FLORIDA BASIN SUNNILAND LIMESTONE ISOPACH

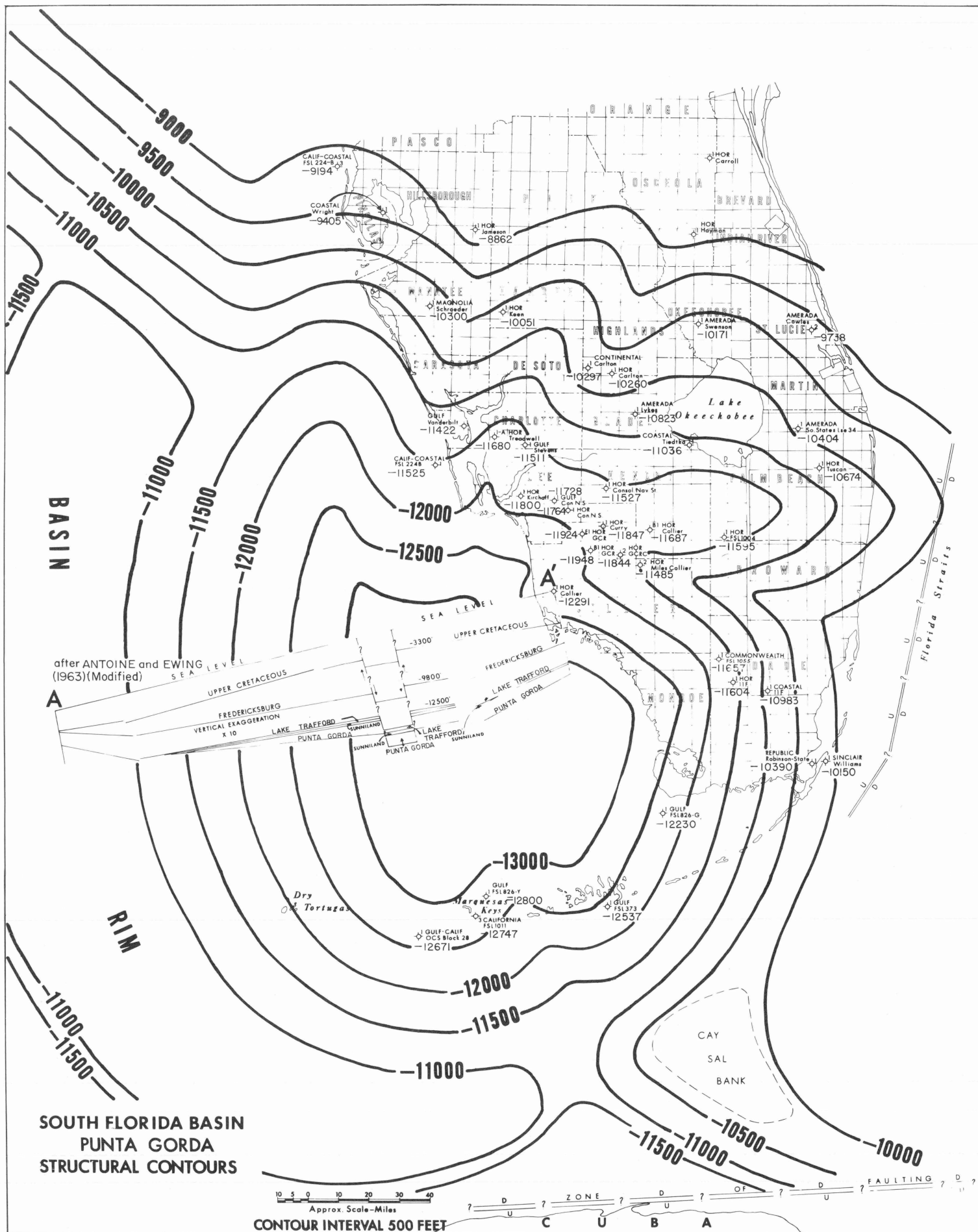
10 5 0 10 20 30 40
Approx. Scale-Miles

CONTOUR INTERVAL 50 FEET

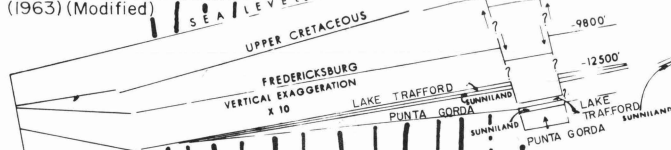
? D ? ZONE ? D ? OF ? D ? FAULTING ? D ?
C U B A



CAY
SAL
BANK



after ANTOINE and EWING
(1963) (Modified)

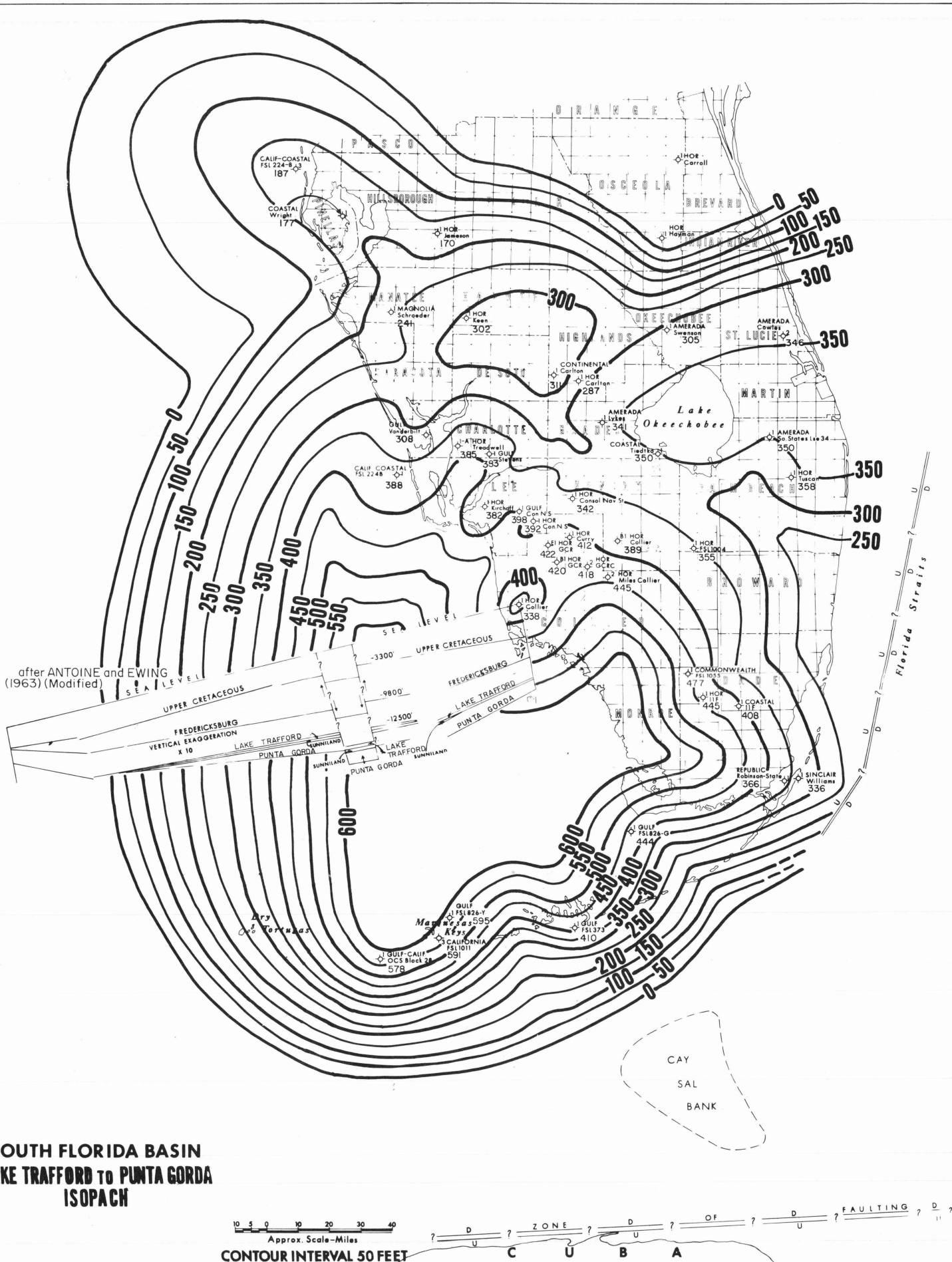


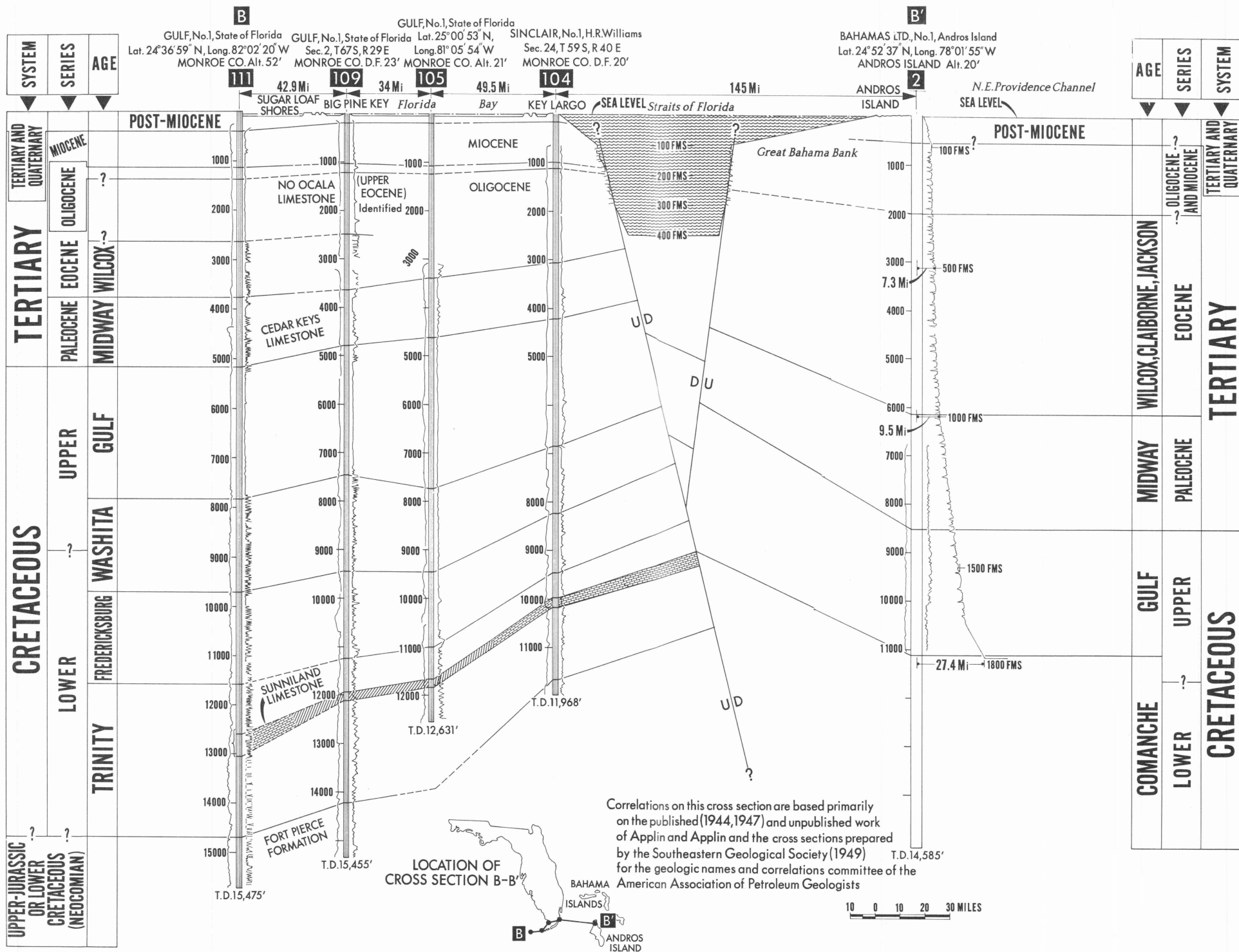
SOUTH FLORIDA BASIN LAKE TRAFFORD TO PUNTA GORDA ISOPACH

10 5 0 10 20 30 40
Approx. Scale-Miles

CONTOUR INTERVAL 50 FEET

? D ? ZONE ? D ? OF ? D ? FAULTING ? D ?
U U C U B A





After John C. Maher (1964) with modifications

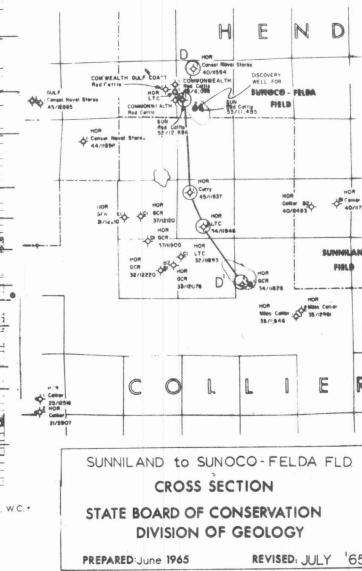
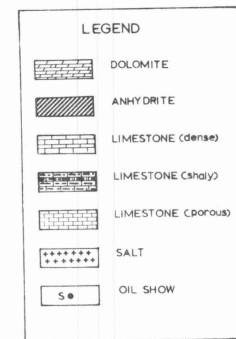
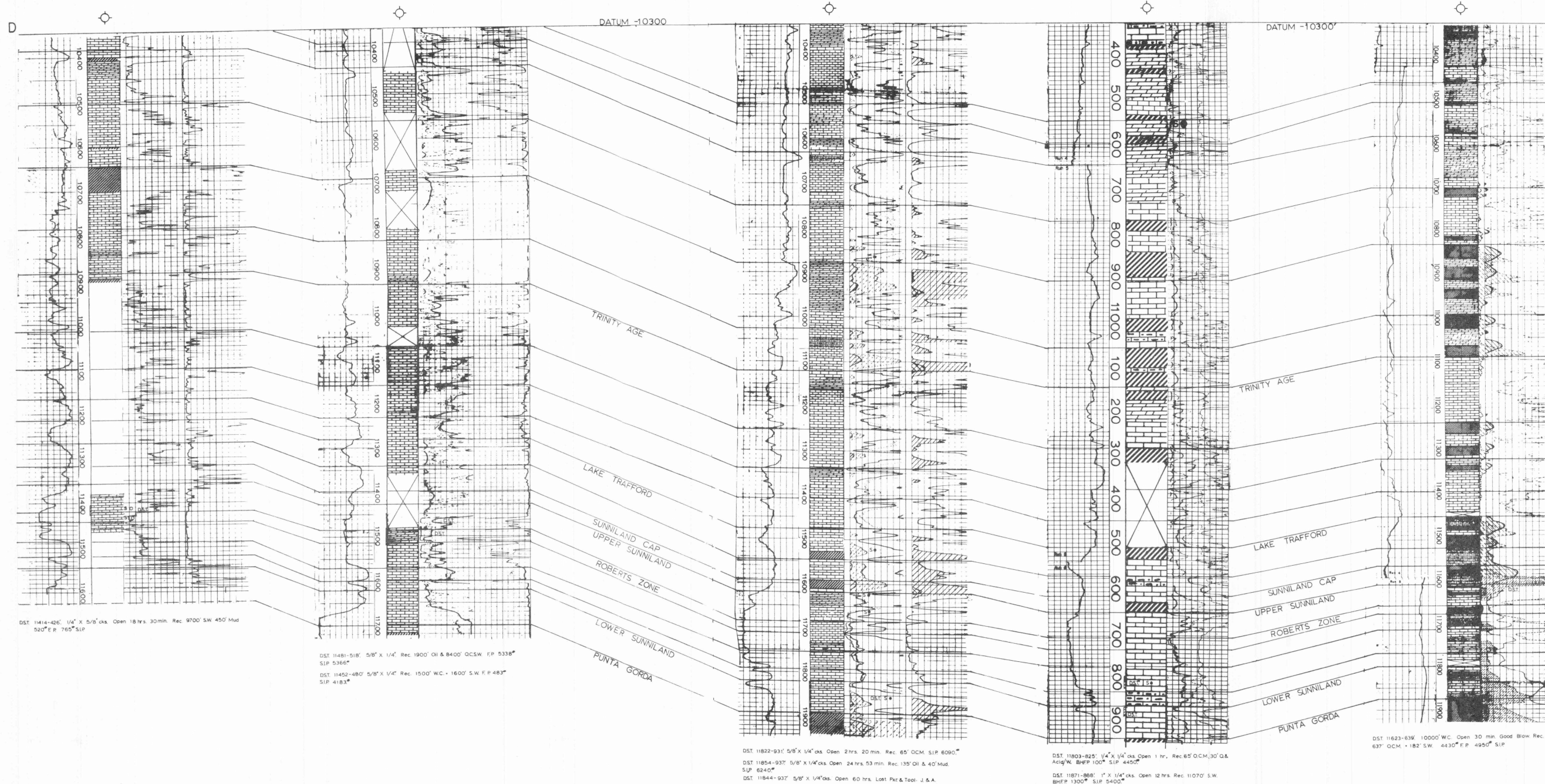
HUMBLE OIL AND REFINING CO.
2 CONSOLIDATED NAVAL STORES
EL. 46' DF T.D. 11595'

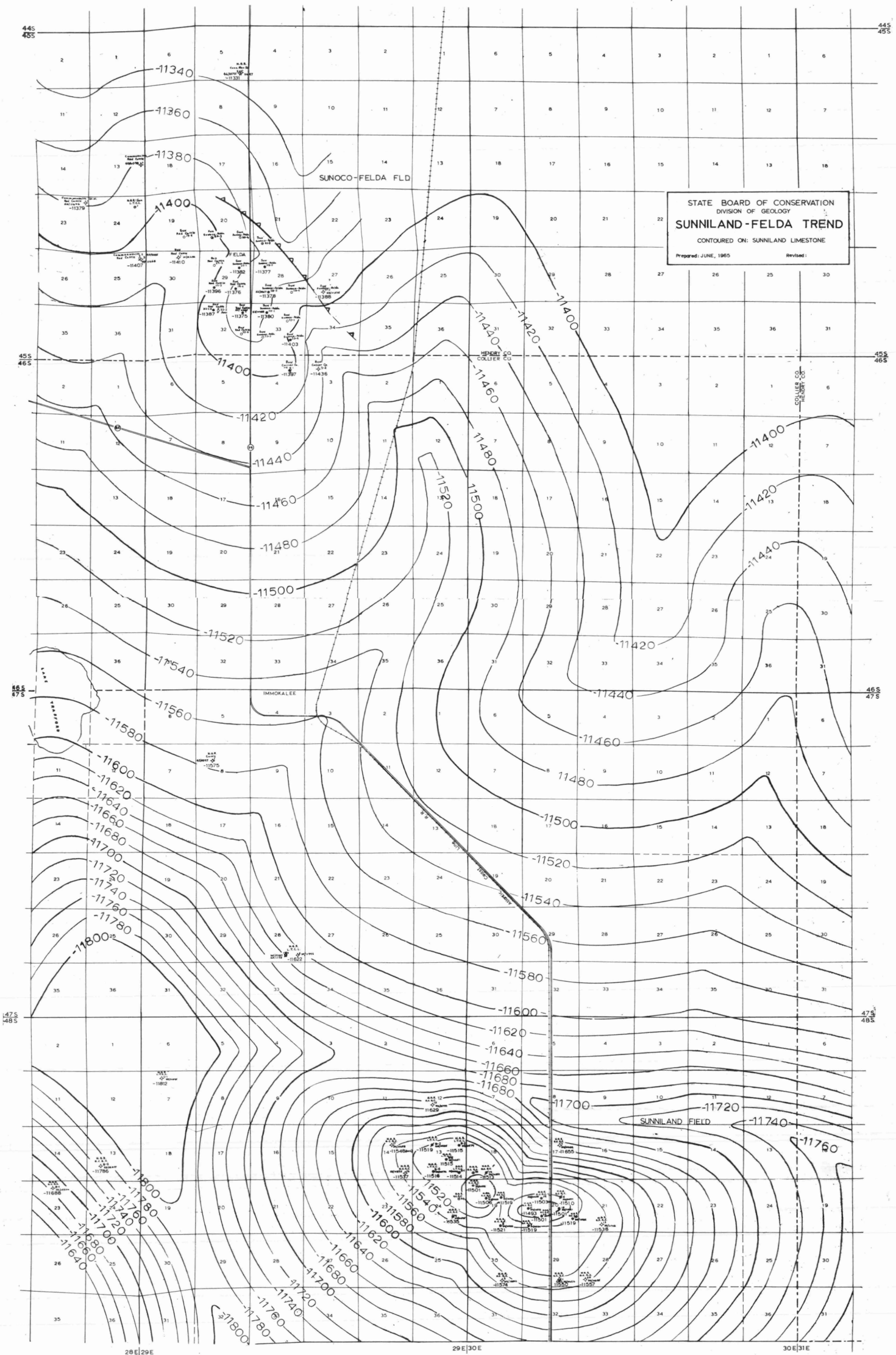
SUN OIL COMPANY
1 RED CATTLE CO.
EL. 51' DF T.D. 12686'

HUMBLE OIL AND REFINING CO.
1 J.A. CURRY
EL. 45' DF T.D. 11397'

HUMBLE OIL AND REFINING CO.
3 LEE TIDEWATER CYPRESS LUMBER CO.
EL. 35' DF T.D. 11946'

HUMBLE OIL AND REFINING CO.
2 GULF COAST REALTIES CO.
EL. 34' D.F. T.D. 13,512'





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Florida

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Oglesby, Woodson R.
Folio of South Florida basin

