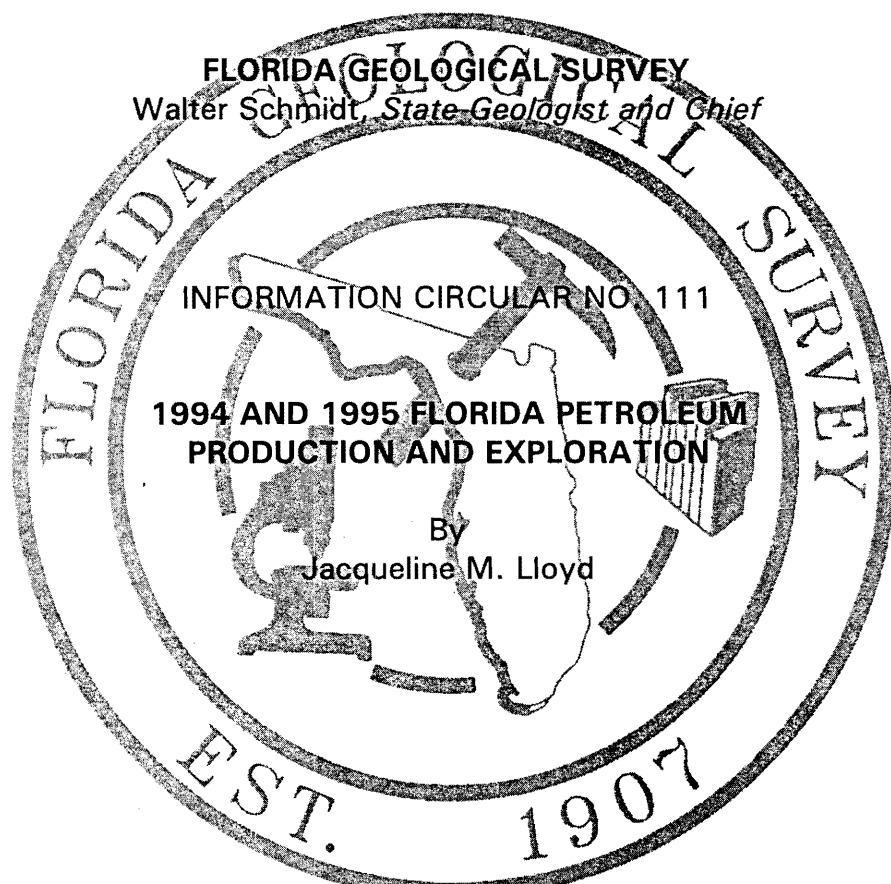


STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
Virginia B. Wetherell, *Secretary*

DIVISION OF ADMINISTRATIVE AND TECHNICAL SERVICES
Nevin Smith, *Director*



Published for the
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FLORIDA GEOLOGICAL SURVEY
Walter Schmidt, *State Geologist and Chief*

INFORMATION CIRCULAR NO. 111

**1994 AND 1995 FLORIDA PETROLEUM
PRODUCTION AND EXPLORATION**

By
Jacqueline M. Lloyd

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FLORIDA GEOLOGICAL SURVEY
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1997

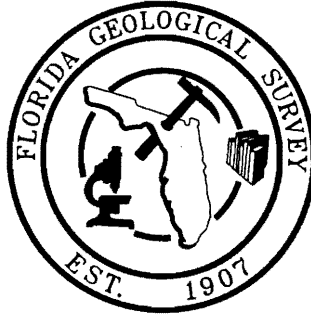


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1997

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LETTER OF TRANSMITTAL



Florida Geological Survey
Tallahassee

Governor Lawton Chiles
Florida Department of Environmental Protection
Tallahassee, Florida 32301

Dear Governor Chiles:

The Florida Geological Survey, Division of Administrative and Technical Services, Department of Environmental Protection, is publishing "1994 and 1995 Florida Petroleum Production and Exploration" as its Information Circular 111. This information is useful to the state and to the oil and gas industry in planning wise development and conservation of Florida's oil and gas resources.

Respectfully yours,

Walter Schmidt, Ph.D., P.G.
State Geologist and Chief
Florida Geological Survey

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ABSTRACT

Florida oil production began to decline in 1979 and generally has continued to do so; however, production increased by eight percent from 1993 to 1994. Production then declined by six percent during 1995. Two of the south Florida oil fields (Sunoco Felda and Sunniland) are nearing the end of their production history. The last reported production from Sunniland field was in 1991 and the last reported production from Sunoco Felda field was in 1992.

Exploration activity during 1994 and 1995 was very limited. There were no exploratory wells drilled, however, one well which was completed in 1993 is included in this report because the completion report was received in 1994. This Santa Rosa County well was plugged and abandoned as a dry hole.

Geophysical exploration during 1994 and 1995 covered only 22.5 miles of seismic lines in the Florida panhandle, 20.3 miles of seismic lines in south Florida, and 102 miles of gravity survey in south Florida. In addition to this completed geophysical exploration, a permit application was pending for an extensive offshore seismic, gravity, and magnetic survey. A similar area was covered by an approved permit during 1992/93 but the permit expired with only minimal magnetic exploration having been conducted. This exploration would potentially explore a dense grid off Florida's Gulf coast extending from offshore of Apalachicola, Franklin County to offshore of Naples, Collier County.

One exploratory well was being drilled in federal waters off Florida at the close of 1995. This well will be the fourth drilled in the Destin Dome area by Chevron. Two of the previously drilled wells were classified by the federal government as producible Norphlet gas discoveries.

A summary of offshore exploratory drilling is included in this report, as well as descriptions of each of Florida's 22 oil fields. The descriptions include discovery data, geologic information, and production totals.

ACKNOWLEDGEMENTS

Several Florida Geological Survey staff members contributed to this report. Special recognition goes to Jim LeBar, Petroleum Engineer with the FGS Oil and Gas Section, for his significant contributions. Jim updated several field structure maps, compiled production statistics, and provided historical and current information on field development, production and exploration. Don Hargrove and Ed Garrett assisted in using and interpreting well and geophysical permit files. Ed Garrett, Jim LeBar, Tom Scott, Walt Schmidt, Deborah Mekeel and Ed Lane reviewed the manuscript and suggested improvements. Jim Jones and Ted Kiper provided base maps, reviewed and suggested improvements to the graphics, and drafted some of the original figures which were updated from earlier petroleum reports. Kim Staubinger (Accounting Systems Analyst, Florida Department of Revenue) provided oil and gas severance tax data.

1994 AND 1995 FLORIDA PETROLEUM PRODUCTION AND EXPLORATION

By

Jacqueline M. Lloyd, P.G. #74

INTRODUCTION

There are two major oil producing areas in Florida. One is the Sunniland trend in south Florida and the other is the Jay trend in the western panhandle area. The Sunniland trend includes 14 oil fields; the western panhandle includes eight. Appendix 1 lists the discovery well data for these fields.

South Florida production began with Florida's first oil discovery at Sunniland field in September, 1943. Of the 14 south Florida oil fields, seven are active, three are temporarily shut-in, and four are plugged and abandoned. These fields are oriented along a northwest-southeast trend through Lee, Hendry, Collier, and Dade Counties (Figure 1). This trend has become known as the Sunniland trend. Production is principally from rudistid reefs found in the upper one hundred feet of the Lower Cretaceous Sunniland Formation (Figure 2). Depth to Sunniland production averages about 11,500 feet.

Production in the western panhandle began with the discovery of Jay field in June, 1970. The eight panhandle oil fields are located in Escambia and Santa Rosa Counties, Florida (Figure 3). Five fields are active and three are plugged and abandoned. Production is from Upper Jurassic

Smackover Formation carbonates and Norphlet Sandstone sands (Figure 4). Depth to Jurassic production averages approximately 15,000 feet.

1994 AND 1995 PRODUCTION

Appendix 2 lists 1994, 1995, and cumulative production statistics for each of Florida's oil fields including oil, gas, and water production data. Appendix 3 lists 1994 and 1995 field well statistics including the number of production, injection, shut-in, and temporarily abandoned wells for each field.

Florida oil production peaked at 47.5 million barrels in 1978. Production began to decline in 1979 and generally has continued to do so since then (Figure 5). Total oil production for 1994, however, was 6,073,038 barrels, up eight percent from 1993. Oil production then decreased by six percent during 1995 for a 1995 total of 5,681,618 barrels. Total gas production increased five percent in 1994 and decreased 15 percent in 1995. Gas production totals were 8,446,904 thousand cubic feet (MCF) in 1994 and 7,171,557 MCF in 1995.

The short term increase in production in 1994 was due to an increase in production in both northwest Florida and south Florida.

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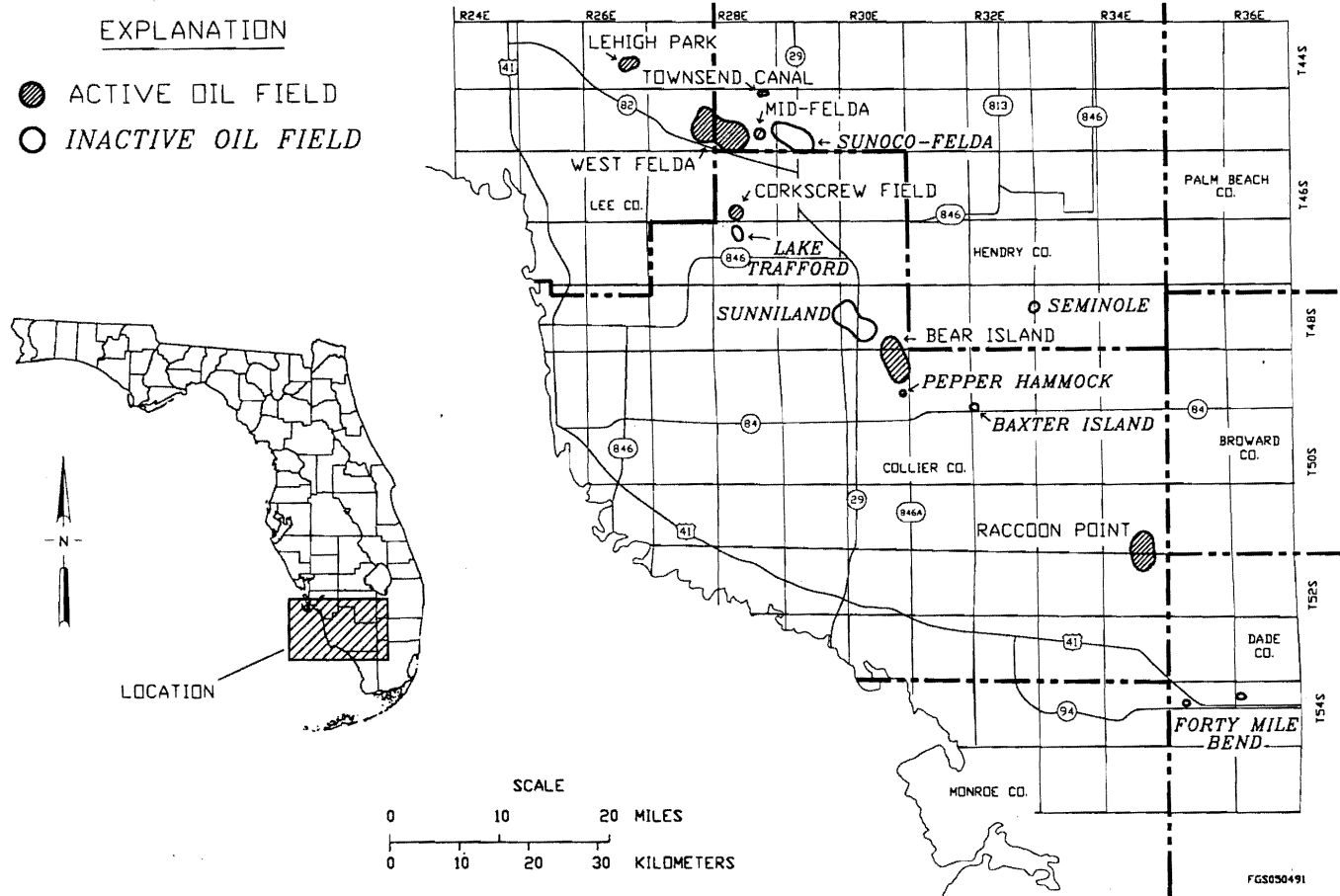


Figure 1. South Florida oil field location map

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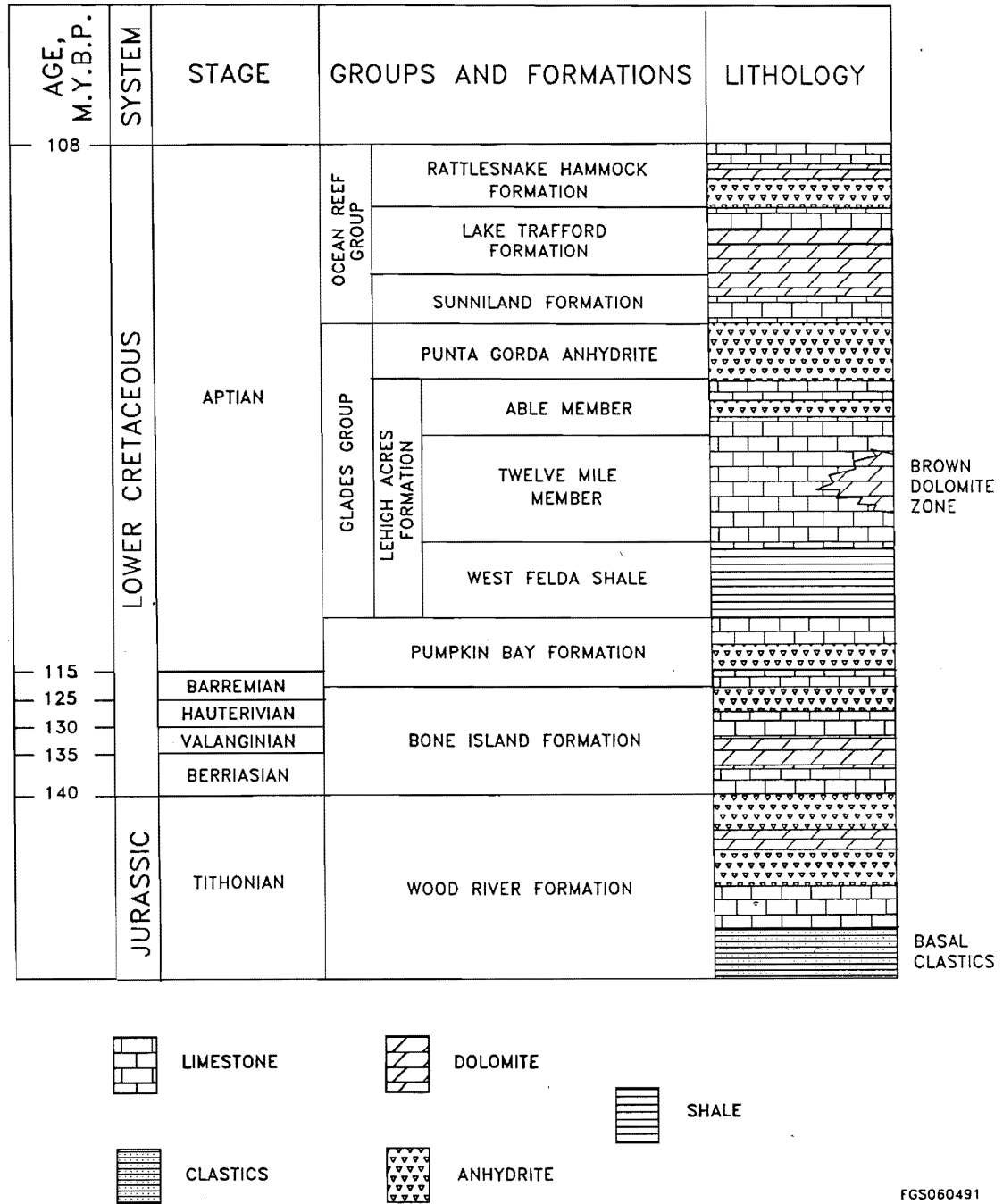


Figure 2. Stratigraphic nomenclature, Upper Jurassic to Lower Cretaceous, south Florida.

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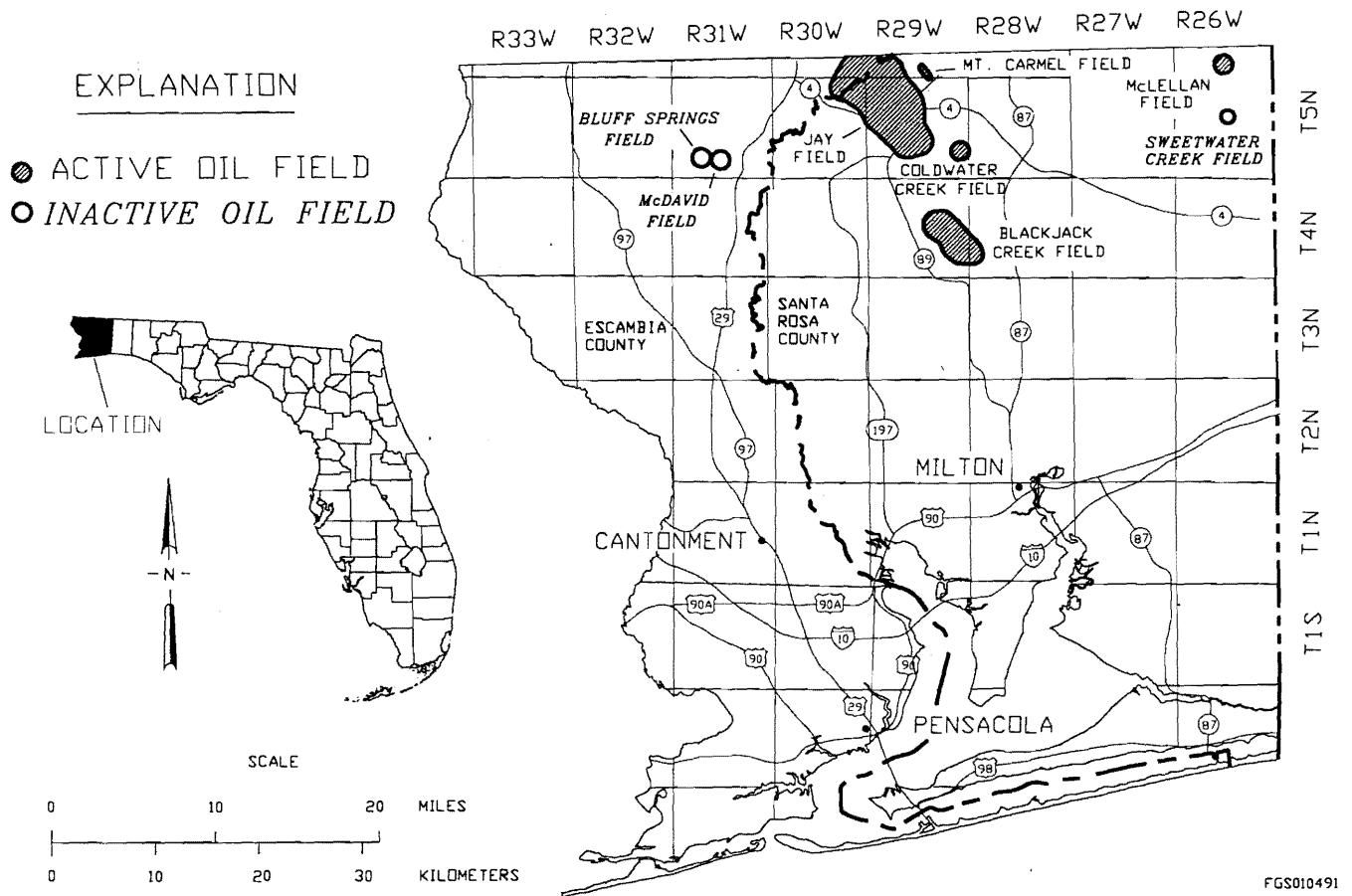
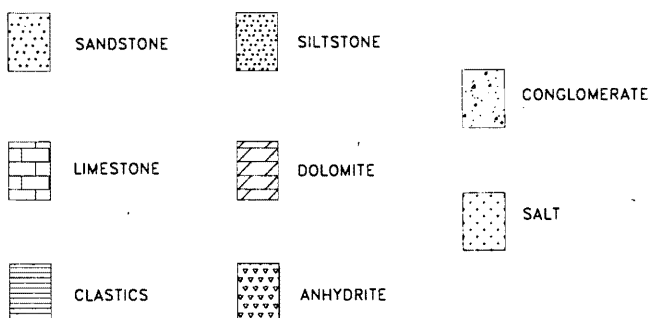


Figure 3. Northwest Florida oil field location map.

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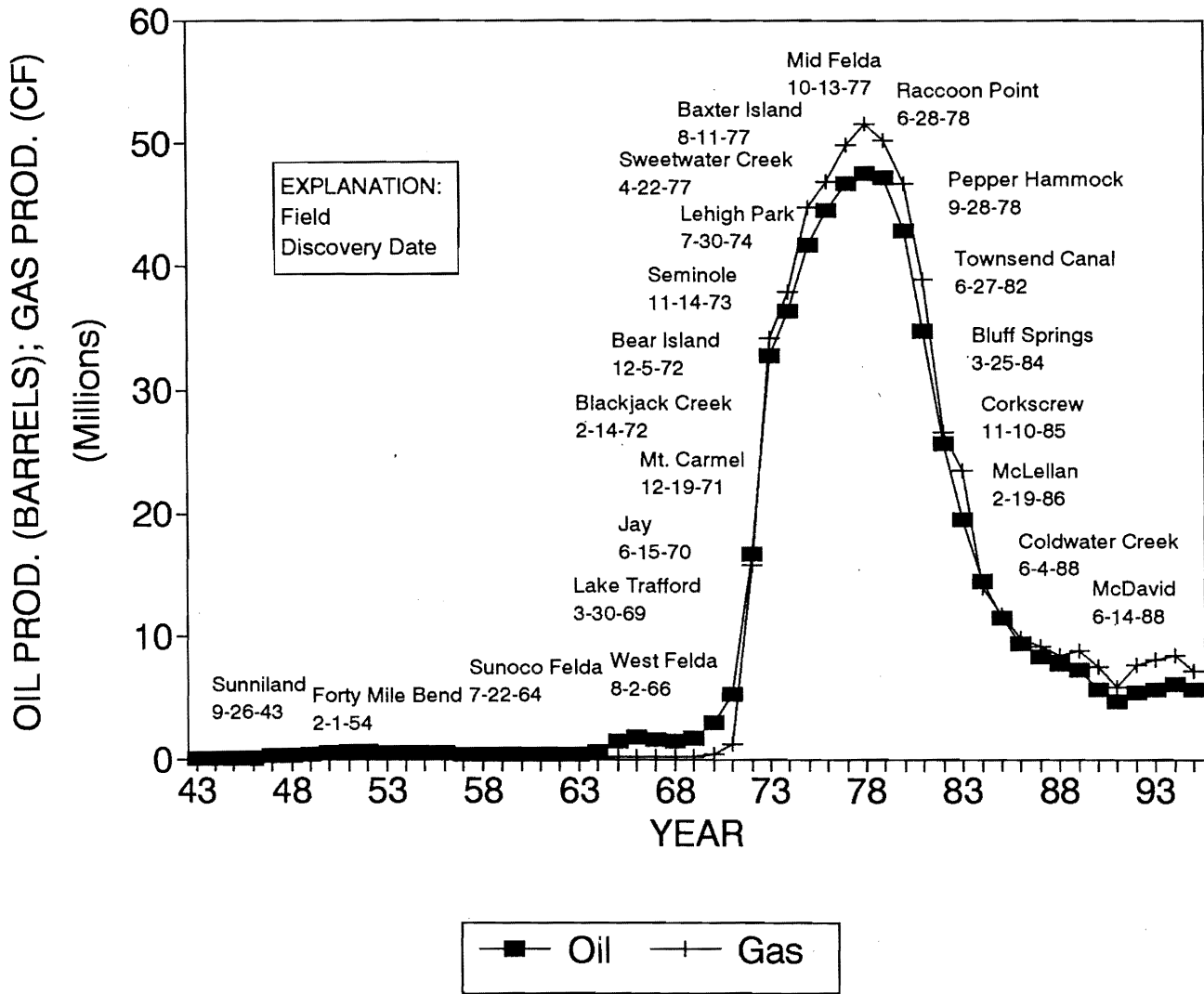
AGE, M.Y.P.B.	SYSTEM	STAGE	GROUPS AND FORMATIONS	LITHOLOGY
135	LOWER CRETACEOUS	BERRIASIAN	COTTON VALLEY GROUP UNDIFFERENTIATED	
140		TITHONIAN		
145	UPPER JURASSIC	UPPER KIMMERIDGIAN	HAYNESVILLE FORMATION	
		LOWER KIMMERIDGIAN	BUCKNER MEMBER (LOWER HAYNESVILLE FORMATION)	
155		OXFORDIAN	SMACKOVER FORMATION	
			NORPHLET SANDSTONE	
160	MIDDLE JURASSIC	CALLOVIAN	LOUANN SALT	



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Figure 4. Stratigraphic nomenclature, Middle Jurassic to Lower Cretaceous, northwest Florida.

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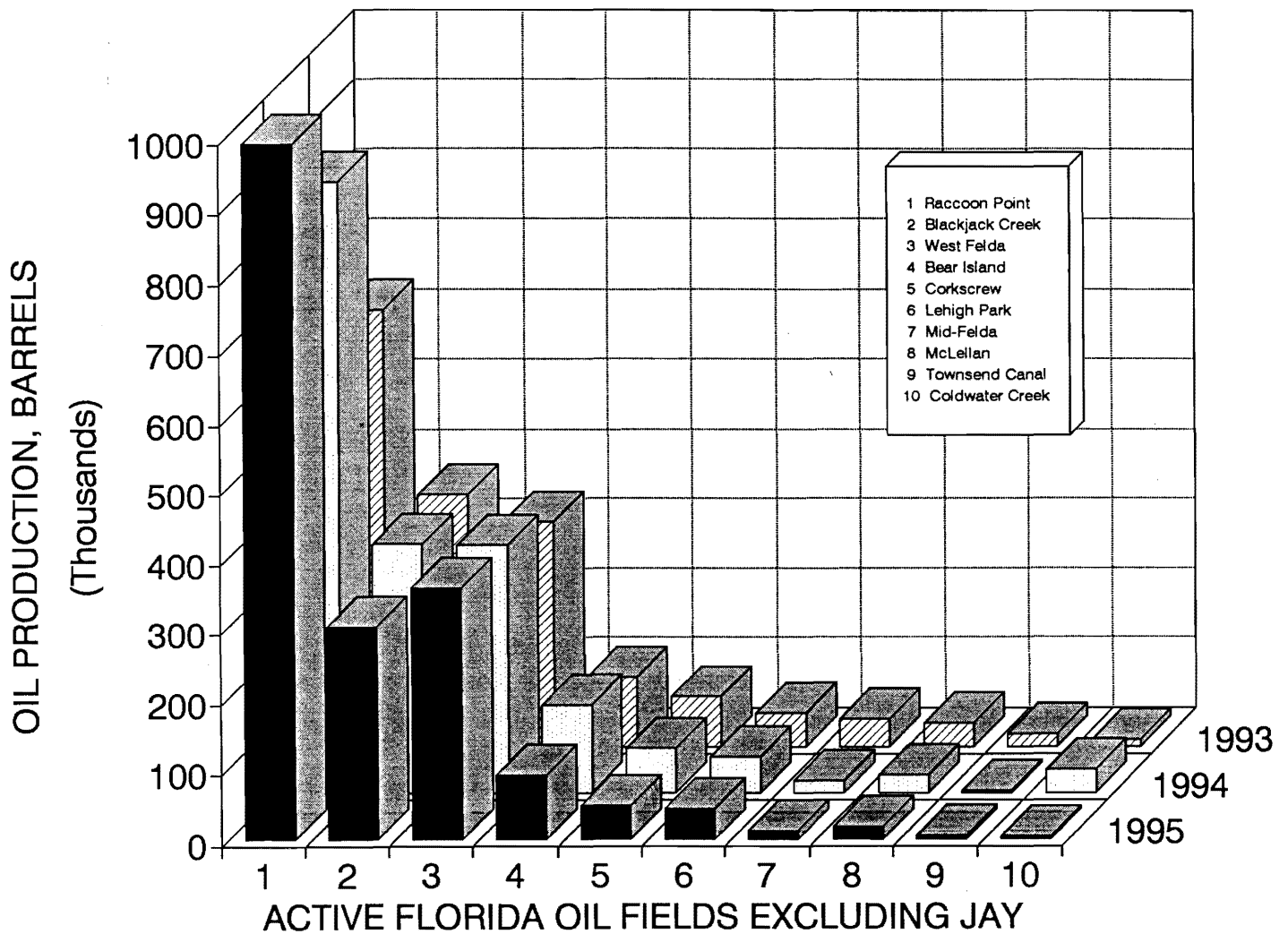
Figure 5. Oil and gas production, 1943 through 1995.

The increase in south Florida oil production was most likely due to field or well-specific management (Ed Garrett, Professional Geologist, Florida Geological Survey, personal communication, 1996). The general trend, however, will probably continue to be a declining trend, with two of the south Florida oil fields recently at or near the end of their production history. The last reported production from Sunniland field was in 1991, while the last reported production from Sunoco Felda field was in 1992. All producing wells at Sunoco Felda have been plugged and abandoned. In addition, the single producing well at Lake Trafford field has been periodically shut-in due to mechanical problems and has been producing only sporadically since March 1988. Finally, the operator of Pepper Hammock field has proposed that the field's single well be plugged and abandoned because it is non-commercial (Jim LeBar, Petroleum Engineer, Florida Geological Survey, personal communication, 1996).

The Jay field was discovered in 1970 and reached peak production in 1978. It accounts for about 68 percent of the 1994 oil production total, about 67 percent of the 1995 total, and about 70 percent of the cumulative total. Figure 6 graphically compares statewide annual oil production with Jay field annual oil production for 1970 through 1995, clearly showing Jay field's dominance in Florida oil production trends. The Jay field production curve is typical of oil fields

produced with tertiary recovery methods (David Curry, Oil and Gas Section Administrator, Florida Geological Survey, personal communication, 1992). Production has generally leveled off since 1987 (Figure 6). This agrees with the projections made by Christian et al. (1981) in their discussion of tertiary recovery estimates for Jay field. They estimated that tertiary recovery would be terminated in 1996, followed by rapid decline to depletion in about 2004. However, this type of level production is difficult to project because it depends, not only on enhanced recovery methods, but also on the price per barrel of oil. Current projections by Jim LeBar (Petroleum Engineer, Florida Geological Survey, personal communication, 1996) predict production through 2010.

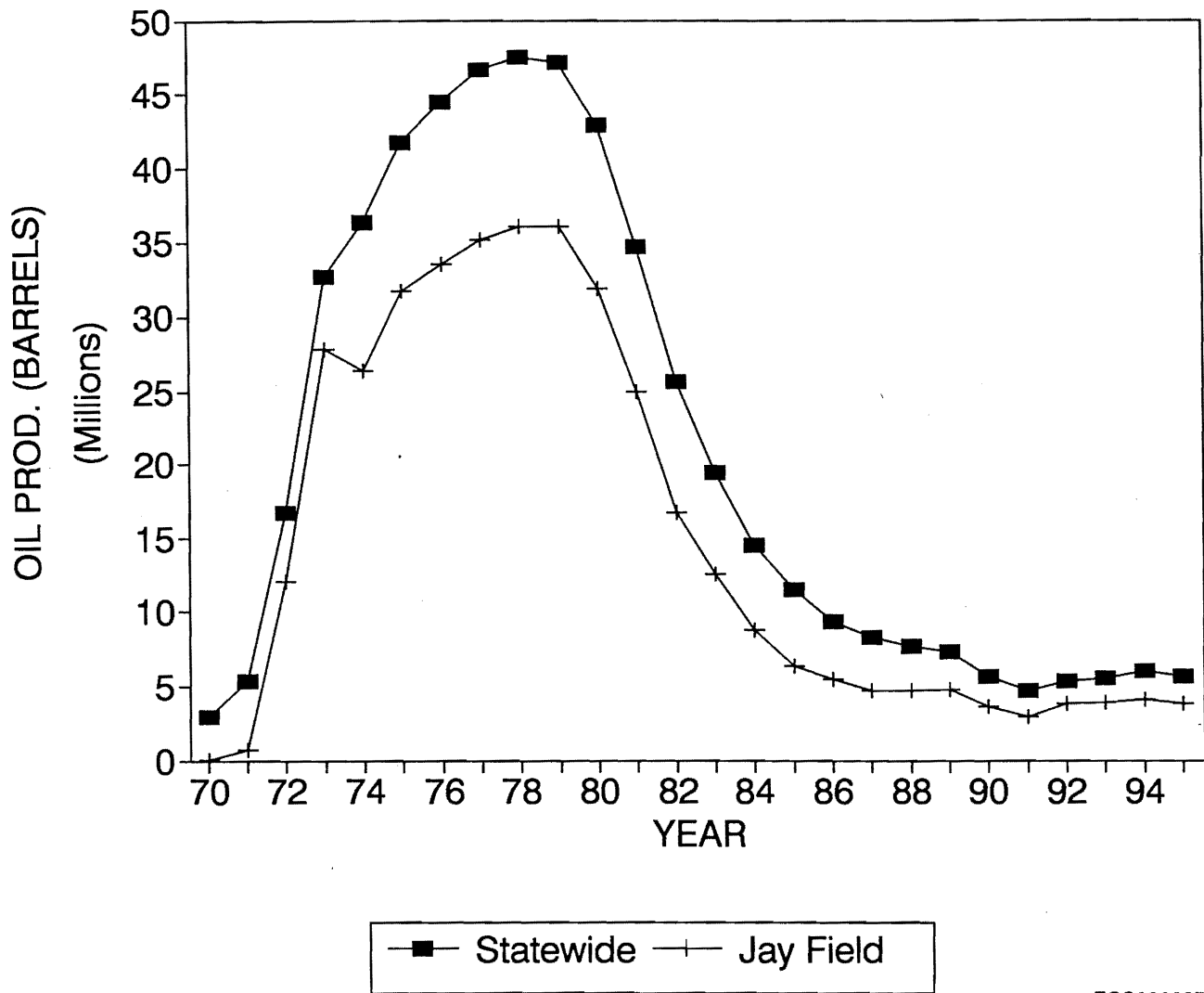
Figure 7 is a histogram comparing 1993, 1994, and 1995 oil production for all Florida oil fields except the Jay field. Jay field data would obscure the information for all other fields since its production for 1993 was more than six times greater than that of Raccoon Point field, the next most productive field in Florida during 1993. Northwest Florida production increased by five percent from 1993 to 1994 and decreased by ten percent from 1994 to 1995. South Florida production increased by 22 percent from 1993 to 1994 and by four percent from 1994 to 1995. Oil and gas severance taxes collected for 1994 and 1995 totaled 7.3 million dollars and 7.7 million dollars,



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Figure 7. 1993, 1994, and 1995 oil production comparison for active Florida oil fields, excluding Jay field.

Florida Geological Survey



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Figure 6. Jay field and statewide oil production comparison, 1970 through 1995.

Florida Geological Survey

respectively (Kim Straubinger, Accounting Systems Analyst, Florida Department of Revenue, written communication, 1996). Florida currently ranks nineteenth in crude oil production for the nation (World Oil, 1996).

1994 AND 1995 ONSHORE DRILLING ACTIVITY

There were no new development wells completed during 1994; only one development well and its sidetrack were completed and abandoned in 1995 (Appendix 4). The original well was drilled in Mt. Carmel field in Santa Rosa County to a total depth of 15,077 feet below MSL and encountered the Smackover Formation at 14,871 feet below MSL and the Norphlet Sandstone at 15,125 feet below MSL. The well had an oil show, however, it was directionally drilled beyond the limits of the permitted irregular drilling unit, and thus had to be sidetracked to a permitted bottom hole location (Jim LeBar, Petroleum Engineer, Florida Geological Survey, personal communication, 1996). The sidetrack well reached a total depth of 15,169 feet below MSL and drilled into the Smackover at 14,822 feet below MSL and the Norphlet at 15,076 feet below MSL. The well is in the process of being plugged and abandoned as a dry hole.

There were no exploratory wells drilled during 1994 and 1995, however, a well drilled in 1993 is included in this report because it was

not reported on until 1994 and was excluded from the previous biennial report on petroleum activities (Lloyd, 1994). This well was drilled in Santa Rosa County, about four miles south of Blackjack Creek field (Appendix 5, Figure 8). The well was drilled to a total depth of 16,414 feet below MSL and encountered the Smackover Formation at about 15,959 feet below MSL and the Norphlet Sandstone at about 16,314 feet below MSL. There were no oil or gas shows in either the Smackover or the Norphlet and the well was plugged and abandoned as a dry hole.

PROPOSED EVERGLADES EXPLORATION

As discussed in the 1992/93 report (Lloyd, 1994) on petroleum activity in Florida, Shell Western had proposed drilling a wildcat well on the Miccosukee Indian Reservation located within the Everglades in south Florida. At the end of 1993, the Bureau of Land Management was in the process of finalizing the Environmental Impact Statement (EIS) for the proposed exploration and an announcement of the federal "record of decision" was expected in summer 1994. On August 1, 1994 Shell Western officially withdrew its application to drill this exploratory well. Following the withdrawal, the Miccosukee Tribe announced that it intends to make an effort to find others interested in pursuing exploration of the Reservation's mineral potential.

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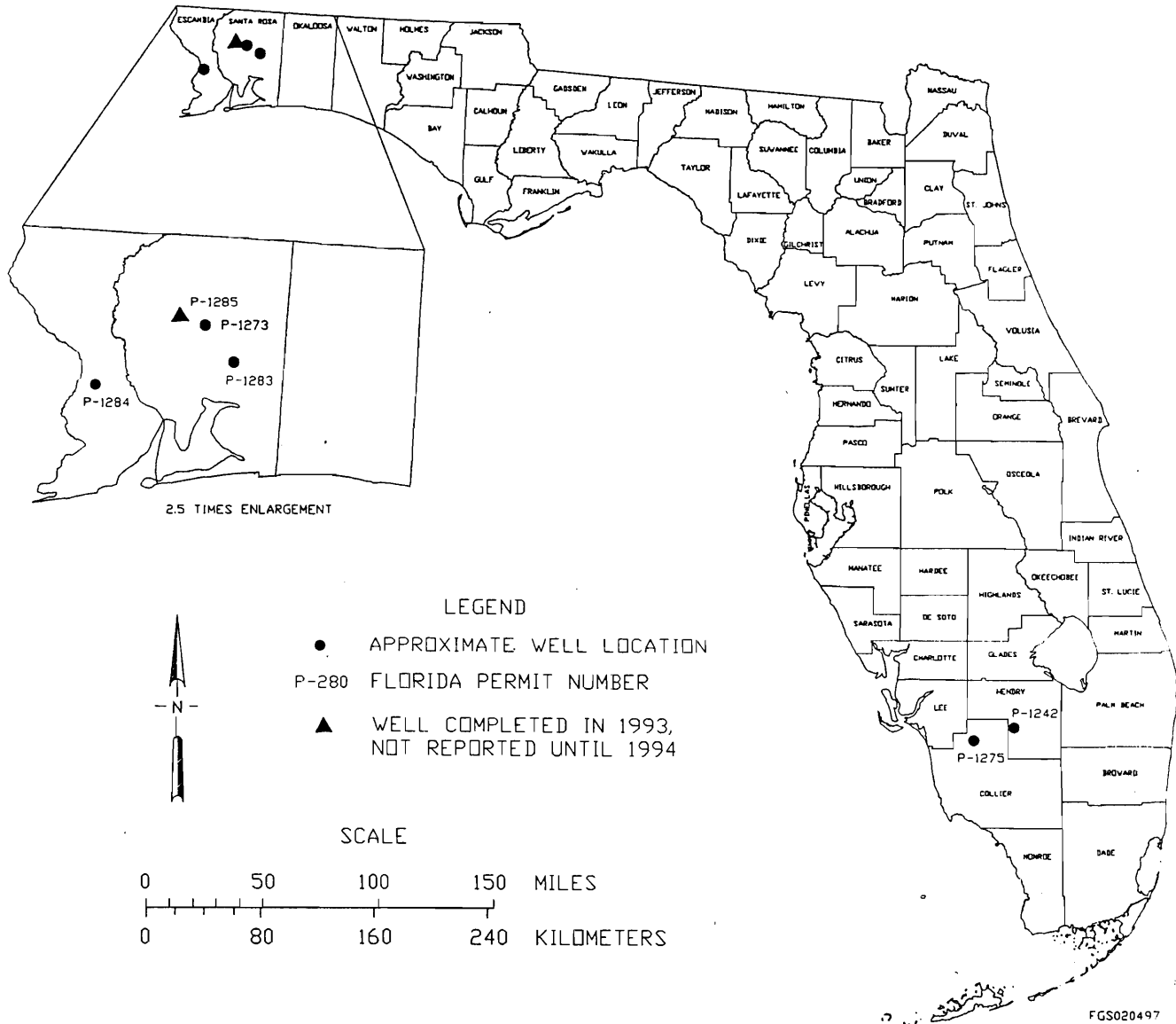


Figure 8. Updated map of 1992 and 1993 exploration wells. There were no new exploration wells drilled during 1994 or 1995.

The drill site would have been on Indian land north of Interstate 75 and just west of the L-28 canal in Broward County. The well was to be directionally drilled with the bottom of the hole located beneath one of south Florida's protected water conservation areas. The proposed location was about 12 miles northeast of Raccoon Point oil field which produces from the Cretaceous Sunniland Formation (Figure 2) at about 11,375 feet below mean sea level (MSL). Raccoon Point field is currently the southeastern-most producing field in the Sunniland trend (Figure 1).

OFFSHORE DRILLING ACTIVITY

State ownership of the continental shelf off Florida extends three miles into the Atlantic Ocean and about 10.4 miles (three marine leagues) into the Gulf of Mexico. The federal government controls resources beyond these state boundaries out to 200 miles. The Outer Continental Shelf (OCS) is a jurisdictional term that describes the offshore area which is under control of the federal government. "Federal waters," in this context, does not refer to ownership, but rather to responsibility (Johnson and Tucker, 1987).

Exploratory Drilling in State Waters

A total of 19 wells were drilled in Florida state waters between 1947 and 1983 (Appendix 6 and Figure 9). Effective July 1992, all drilling activity

was prohibited in Florida state waters (Lloyd and Ragland, 1991), except for within pre-existing lease areas. Only one company, Coastal Petroleum, has pre-existing mineral-rights leases in Florida state waters. Coastal has held leases since 1947 for an area extending from Apalachicola Bay to Naples. The leases originally included all acreage within state waters extending out to 10.4 miles offshore. The leases were renegotiated in 1975, leaving Coastal with full lease rights from 7.4 to 10.4 miles and partial lease rights within the remaining portion of the original lease area. The outer lease area is shown as the offshore shaded area on Figure 10 (this coincides with the company's proposed geophysical exploration area).

The information obtained from the 19 wells that were drilled in state waters prior to the ban may be useful in future decisions concerning offshore exploration and development in federal waters. The 19 offshore wells tested three different potential oil horizons. Ten of the wells were within the south Florida Basin (off Charlotte and Lee Counties and off the Florida Keys, Monroe County, Figures 9 and 11) and targeted the Lower Cretaceous. The six wells drilled off the Florida panhandle sought to extend the onshore (and offshore Alabama) Jurassic production (Figures 3 and 9). The remaining three wells drilled off the northern portion of the Gulf coast (Permits 304, 382 and 383) were Cretaceous or possibly Paleozoic tests (Applegate and Lloyd, 1985).

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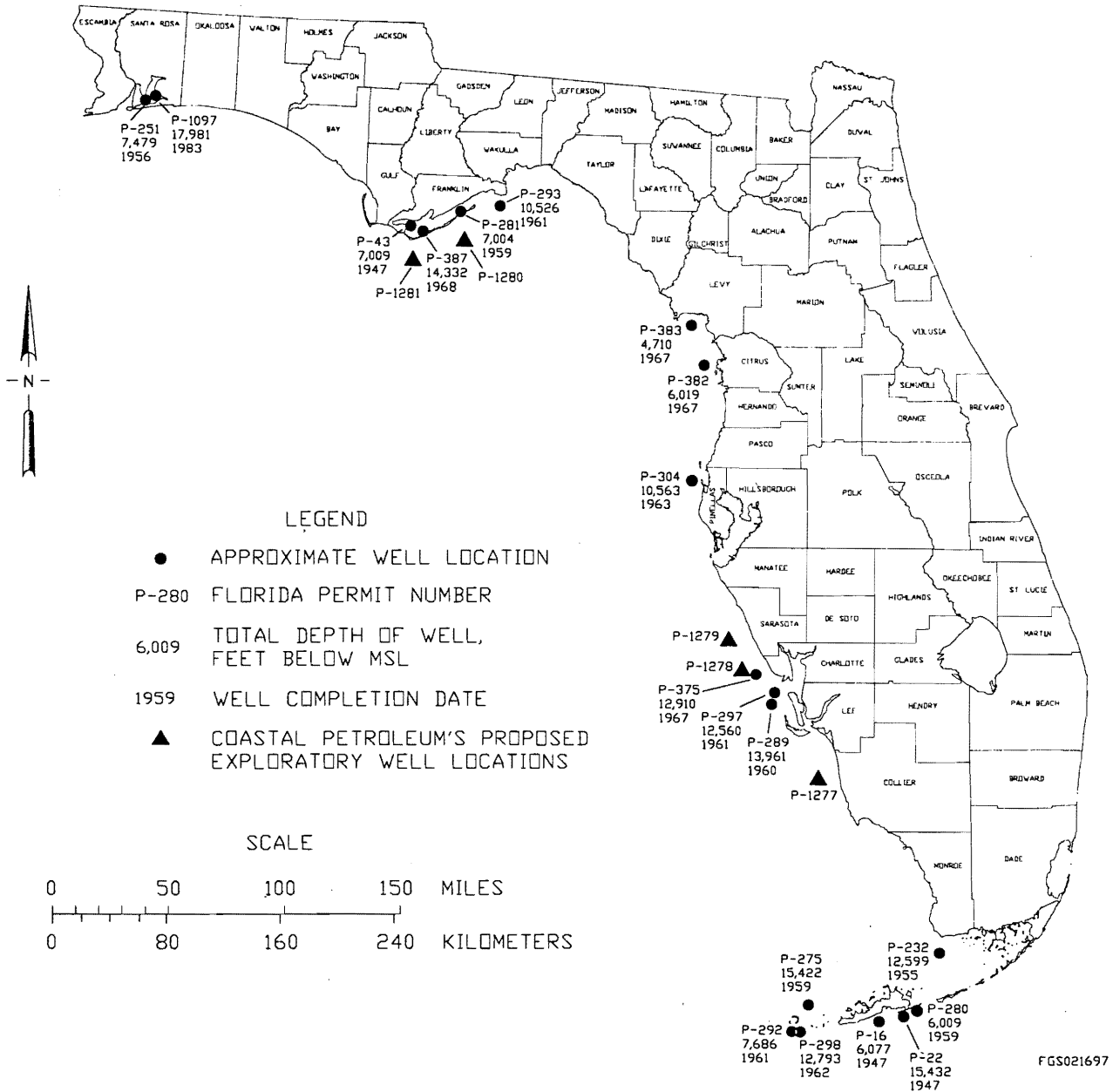


Figure 9. Exploration wells, Florida state waters, including Coastal Petroleum's proposed exploratory well locations.

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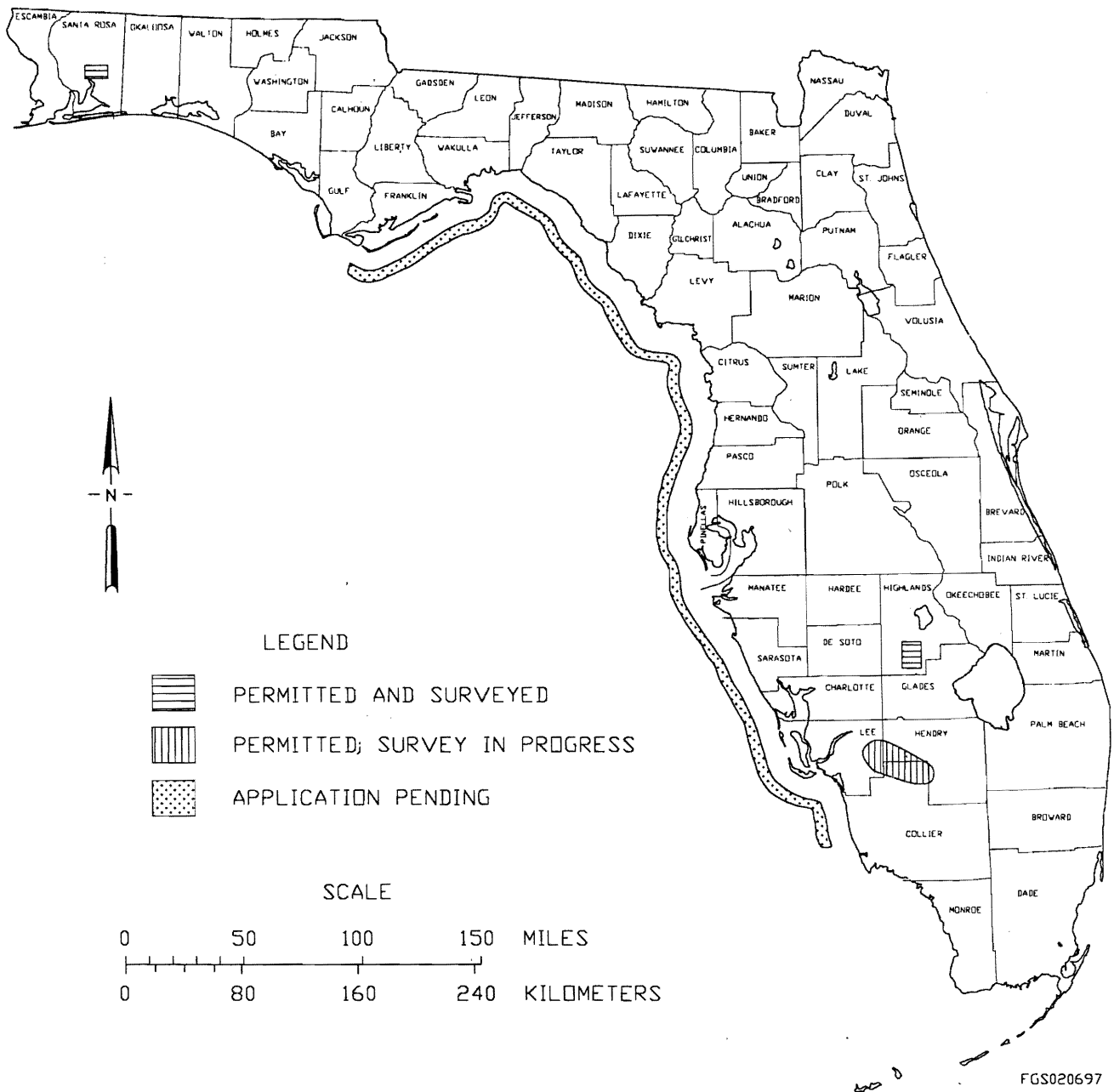


Figure 10. 1994 and 1995 geophysical exploration activity.

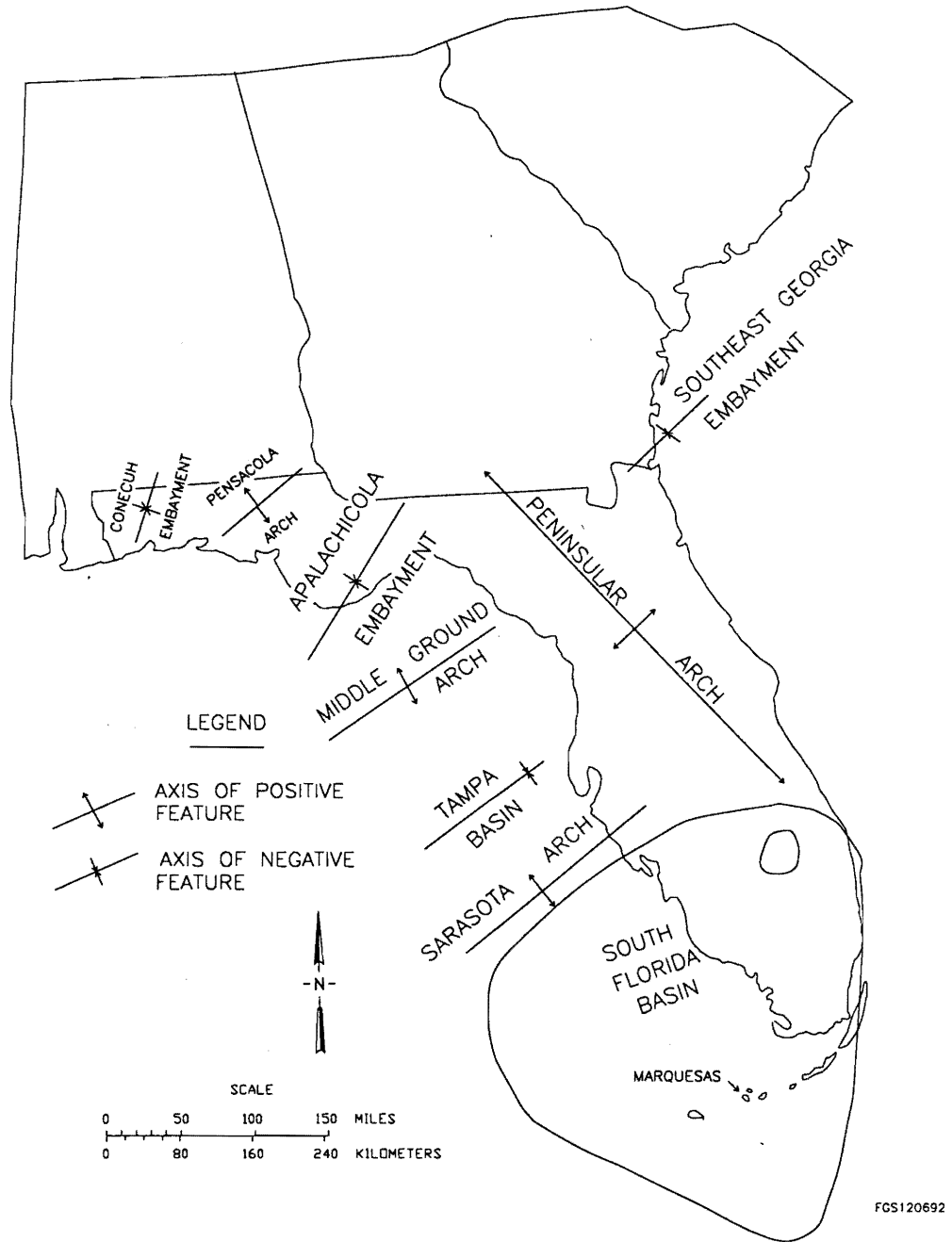


Figure 11. Mesozoic structural features in Florida and offshore (after Applegate, 1987).

As shown in Appendix 6, only one of the wells drilled in state waters had a significant oil show. A drill stem test of the Gulf Oil-Florida State Lease 826-Y (Permit 275), located near the Marquesas Keys off Monroe County, recovered 15 barrels of 22° A.P.I. gravity oil and 14.1 barrels of saltwater from the Lake Trafford (?) Formation. Another well, which was drilled in federal waters near the Marquesas, tested black saltwater in the Lake Trafford and Sunniland Formations and in the Brown Dolomite Zone of the Lehigh Acres Formation (Applegate and Lloyd, 1985).

Exploratory Drilling in Federal Waters, Offshore Florida

The first federal oil and gas lease sale off Florida was conducted in May, 1959 off the Florida Keys in what is now the Straits of Florida Planning Area. Ten additional OCS lease sales have occurred since then; seven in the Eastern Gulf of Mexico Planning Area and three in the South Atlantic Planning Area. There have been no sales in the Straits of Florida Planning Area off Florida since the 1959 sale. The last lease sale in the South Atlantic Planning Area off Florida was Sale 78 in July, 1983. Leases in the Eastern Planning Area are shown on Figure 12.

The two most recent lease sales off Florida were in the Eastern Planning Area. They were Sales 79 and 94, held in January, 1984 and January, 1985, respectively. Lease sales 79 and 94 are discussed in Applegate and Lloyd

(1985) and Lloyd and Applegate (1987).

The State of Florida has responded to the public's environmental concerns by objecting to future lease sales and exploration in federal waters off the Florida coast. In response to these concerns, the federal government excluded all areas originally proposed off the Florida coast in Eastern Planning Area Sale 116, held in November 1988. The federal government also agreed to pay nine oil companies a total of \$200 million for 73 leases off the Florida coast south of 26° north latitude (Pulley Ridge and Howell Hook areas, Figure 12). This settlement permanently excludes the southwest Florida area from petroleum exploration, but does not affect the area off Florida's panhandle. Florida's Governor Lawton Chiles has said that he will continue to fight for protection of the remainder of the Florida Gulf coastline and is pressing for a permanent 100-mile wide buffer zone around the entire Florida coastline. The 100-mile buffer will be excluded from the next Minerals Management Service five-year (1997-2002) lease plan.

At the close of 1995, Chevron was in the process of drilling an exploratory well in the Destin Dome area, 26 miles south of Pensacola, Florida (Block 57, Figure 12, map location code 40). Chevron has successfully drilled two producible Norphlet wells in this area (Block 56, Figure 12, map location code 32) (Lloyd, 1992). In addition to the two Chevron wells, the Amoco-8338 well,

which was completed in Destin Dome block 111 in 1987, was also a Norphlet discovery described by Gould (1989) as a producible field (Figure 12, map location code 31). This was the first commercial discovery in the Eastern Gulf of Mexico Planning Area (Gould, 1989). These discoveries extend the offshore Norphlet gas trend (which is highly productive off Mobile Bay, Alabama) seaward and eastward from the Mobile map area of the Central Gulf of Mexico Planning Area, offshore Alabama, into the Florida offshore.

In addition to these Norphlet gas discoveries, another Amoco well drilled in DeSoto Canyon, Block 133 (Figure 12, map location code 38) was apparently judged to be producible from a Miocene fan deposit (depth to producing horizon is not known). The location is approximately 100 miles south of the Florida-Alabama border; it is not known whether this will spur further interest in federal waters off Florida in this area.

1994 AND 1995 GEOPHYSICAL EXPLORATION ACTIVITY

Geophysical exploration during 1994 and 1995 included 102 miles of gravity survey and 42.8 miles of seismic survey. Appendix 7 summarizes the data for the three permits covering these areas. The gravity survey was completed in Highlands County (Figure 10) in an area northeast of the Sunniland producing trend. Of the 42.8 miles of

seismic survey, 22.5 miles were located in Santa Rosa County southeast of the known Smackover production. The remaining 20.3 miles were located in south Florida in Lee, Hendry and Collier Counties within the Sunniland producing area.

An additional permit application was pending at the end of 1995 which included an extensive offshore area. This application includes seismic, gravity, and magnetic surveys of a dense grid off of Florida's Gulf coast extending from offshore of Apalachicola, Franklin County to offshore of Naples, Collier County (Figure 10). The permit application is incomplete at this time and does not provide seismic mileage or gravity/magnetic survey details. The same area was permitted for exploration in July 1992, however, the permit expired in July 1993 with minimal activity (magnetometer survey off Franklin and Gulf Counties) reported to the Department of Environmental Protection.

FLORIDA OIL FIELD DESCRIPTIONS

Applegate and Lloyd (1985) and Lloyd (1991) provide a brief history of each of Florida's oil fields including discovery data, geologic information, and production totals. Structure maps were presented whenever possible. These publications are now out-of-print; therefore, this information is summarized again and presented in this report. Fields are discussed in approximate geographic order from

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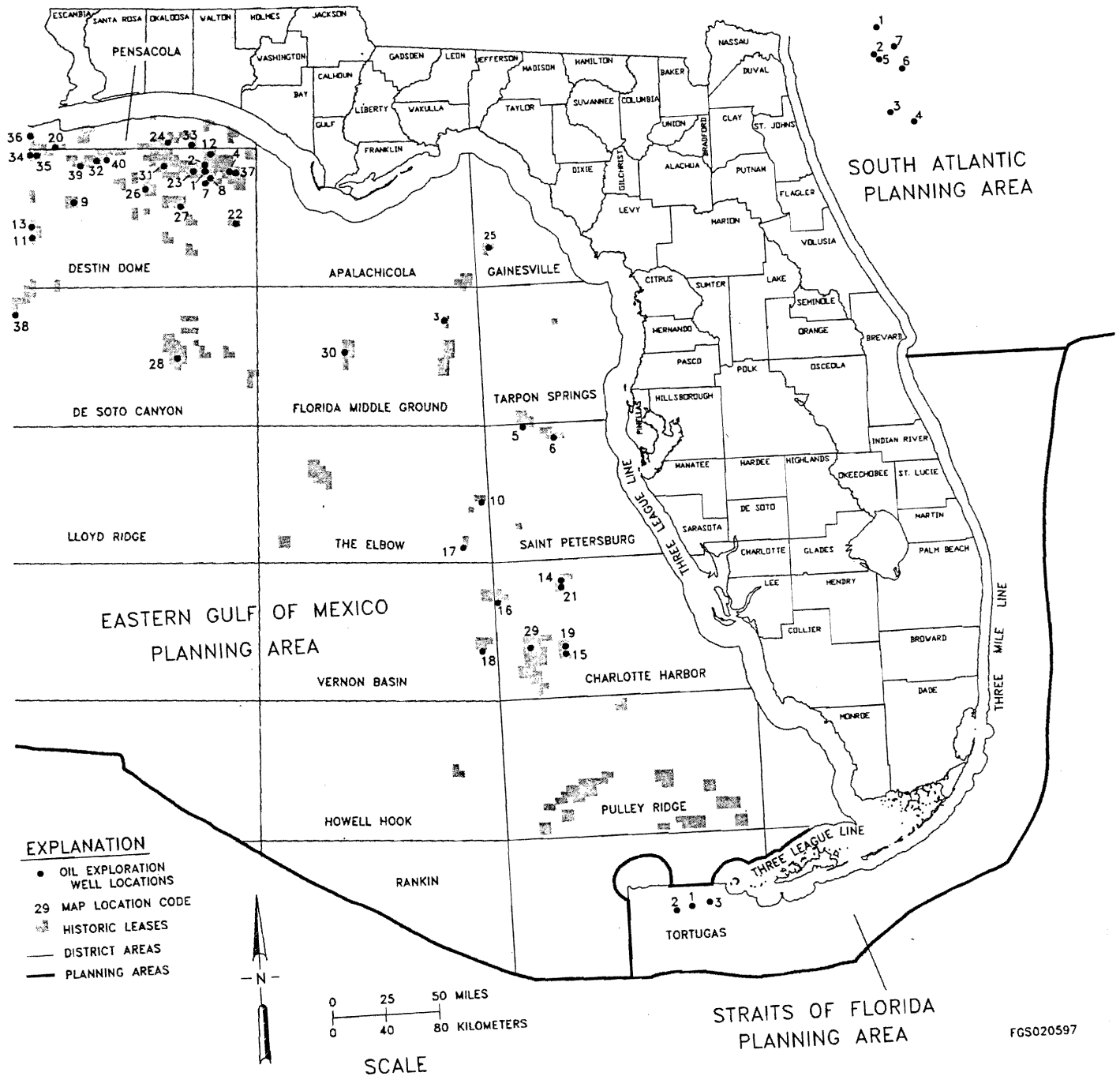


Figure 12. Exploration wells and historic leases, federal waters, offshore Florida (Gould, 1989).

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MAP LOCATION CODES AND WELL DATA FOR FIGURE 12

PLANNING AREA	MAP LOCATION CODE	MAP AREA	BLOCK NUMBER	LEASE NO. OR FLORIDA PERMIT NO. (P-)	OPERATOR	WELL NO. (1)	PLUGGED & ABANDONED DATE	TOTAL DEPTH (FT.)
EASTERN GULF OF MEXICO PLANNING AREA (2)	1	Destin Dome	162	2486	Exxon	1	1974	10,930
	2	Destin Dome	118	2492	Exxon	1	1974	7,075
	3	Florida Middle Ground	252	2516	Texaco	1	1975	15,663
	4	Destin Dome	166	2490	Fina	1	1975	17,608
	5	St. Petersburg	7	2527	Shell	1	1975	18,443
	1	Destin Dome	162	2486	Exxon	2	1975	10,418
	2	Destin Dome	118	2492	Exxon	2	1975	7,507
	6	St. Petersburg	100	2523	Texaco	1	1975	17,388
	7	Destin Dome	250	2472	Exxon	1	1975	6,634
	8	Destin Dome	207	2480	Exxon	1	1975	4,800
	1	Destin Dome	162	2486	Exxon	3	1975	17,938
	9	Destin Dome	360	2468	Gulf	1	1975	20,988
	10	The Elbow	566	3344	Mobil	1	1977	15,865
	11	Destin Dome	617	2463	Chevron	1	1977	10,513
	12	Destin Dome	31	2502	Amoco	1	1977	18,338
	13	Destin Dome	529	3888	Shell	1	1980	20,450
	14	Charlotte Harbor	144	3906	Gulf	1	1981	11,362
	15	Charlotte Harbor	672	3917	Tenneco	1	1981	11,302
	16	Charlotte Harbor	265	3912	Shell	1	1981	12,362
	17	The Elbow	915	3341	Mobil	1	1981	18,128
	18	Vernon Basin	654	3903	Mobil	1	1981	10,768
	19	Charlotte Harbor	628	3915	Mobil	1	1981	1,270
	20	Pensacola	973	3886	Mobil	1	1981	23,264
	21	Charlotte Harbor	188	3909	Odeco	1	1981	11,360
	22	Destin Dome	563	3890	Sohio	1	1982	21,068
	23	Destin Dome	160	6417	Shell	1 TA	1985	7,764
	24	Pensacola	948	6391	Sohio	1	1985	18,958
	23	Destin Dome	160	6417	Shell	2	1985	16,953
	25	Gainesville	707	6456	Sohio	1	1985	15,941
	26	Destin Dome	284	6428	Exxon	1	1985	17,500
	27	Destin Dome	422	6438	Chevron	1	1985	22,222
	28	DeSoto Canyon	512	6472	Shell	1	1986	12,300
	29	Charlotte Harbor	622	4950	Shell	1	1986	10,550
	30	Florida Middle Ground	455	8363	Tenneco	1	1986	12,401
	24	Pensacola	948	6391	Tenneco	2 ST	1987	19,200
	31	Destin Dome	111	8338	Amoco	1	1987	19,240
	32	Destin Dome	56	6406	Chevron	1 TA	1988	22,572
	24	Pensacola	948	6391	Tenneco	2 TA	1988	19,200
	33	Pensacola	996	6396	Texaco	1	1988	17,910
	34	Destin Dome	1	6397	Gulfstar	1 TA	1989	2,000
	35	Destin Dome	2	6398	Gulfstar	2 TA	1989	1,800
	36	Pensacola	881	6390	Gulfstar	1 TA	1989	2,700
	37	Destin Dome	167	6420	Chevron	1	1989	17,128
	32	Destin Dome	56	6406	Chevron	2	1990	22,840
	38	DeSoto Canyon	133	10444	Amoco	1	1993	12,564
	39	Destin Dome	97	8336	Chevron	1	1994	24,084
	40	Destin Dome	57	6407	Chevron	1 TA	1996	22,811
SOUTH ATLANTIC PLANNING AREA (3)	1	NH 17-5	208	3686	Tenneco	1	1979	7,754
	2	NH 17-5	427	3695	Tenneco	1	1979	7,472
	3	NH 17-2	913	3664	Getty	1	1979	7,000
	4	NH 17-2	1005	3671	Transco	1	1979	11,635
	5	NH 17-5	472	3699	Exxon	1	1979	7,578
	6	NH 17-5	564	3705	Exxon	1	1980	12,863
	7	NH 17-5	387	N.A.	Ocean Prod.	GE-1	1977	13,254
STRAITS OF FLORIDA PLANNING AREA (3)	1	NG 17-10	44	P-296	Gulf	1	1961	4,686
	2	NG 17-10	46	P-290	Gulf	1	1961	7,871
	3	NG 17-10	28	P-284	Gulf	1	1960	15,294

1. TA = Temporarily Abandoned; ST = Sidetrack Well.

2. Data from Gould, 1989; Andy Petty, MMS, personal communication, 1992 and 1996; S. M. Fury, Chevron, personal communication, 1996.

3. Data from Karpas and Gould, 1990.

north to south and west to east (Figures 1 and 3). More detailed information is presented for the five oil fields discovered since 1985. These are Bluff Springs, McDavid, Coldwater Creek, and McLellan fields in north Florida and Corkscrew field in south Florida.

North Florida Oil Field Summaries

INTRODUCTION

Production in north Florida began with the discovery of Jay field in June, 1970. There are now eight panhandle oil fields located in Escambia and Santa Rosa Counties, Florida (Figure 3). Five fields are active and three are plugged and abandoned. Production is from Upper Jurassic Smackover Formation carbonates and Norphlet Sandstone sands (Figure 4).

Jay field is located within a trend which extends through Escambia and Santa Rosa Counties in Florida, and Escambia County, Alabama. Other fields within the trend include Mt. Carmel, Coldwater Creek, and Blackjack Creek fields in Florida and Fanny Church, Flomaton, and Big Escambia Creek fields in Alabama. The fields are located along a normal fault complex which rims the Gulf Coast through Alabama, Mississippi, Louisiana, Arkansas, and Texas (Moore, 1984).

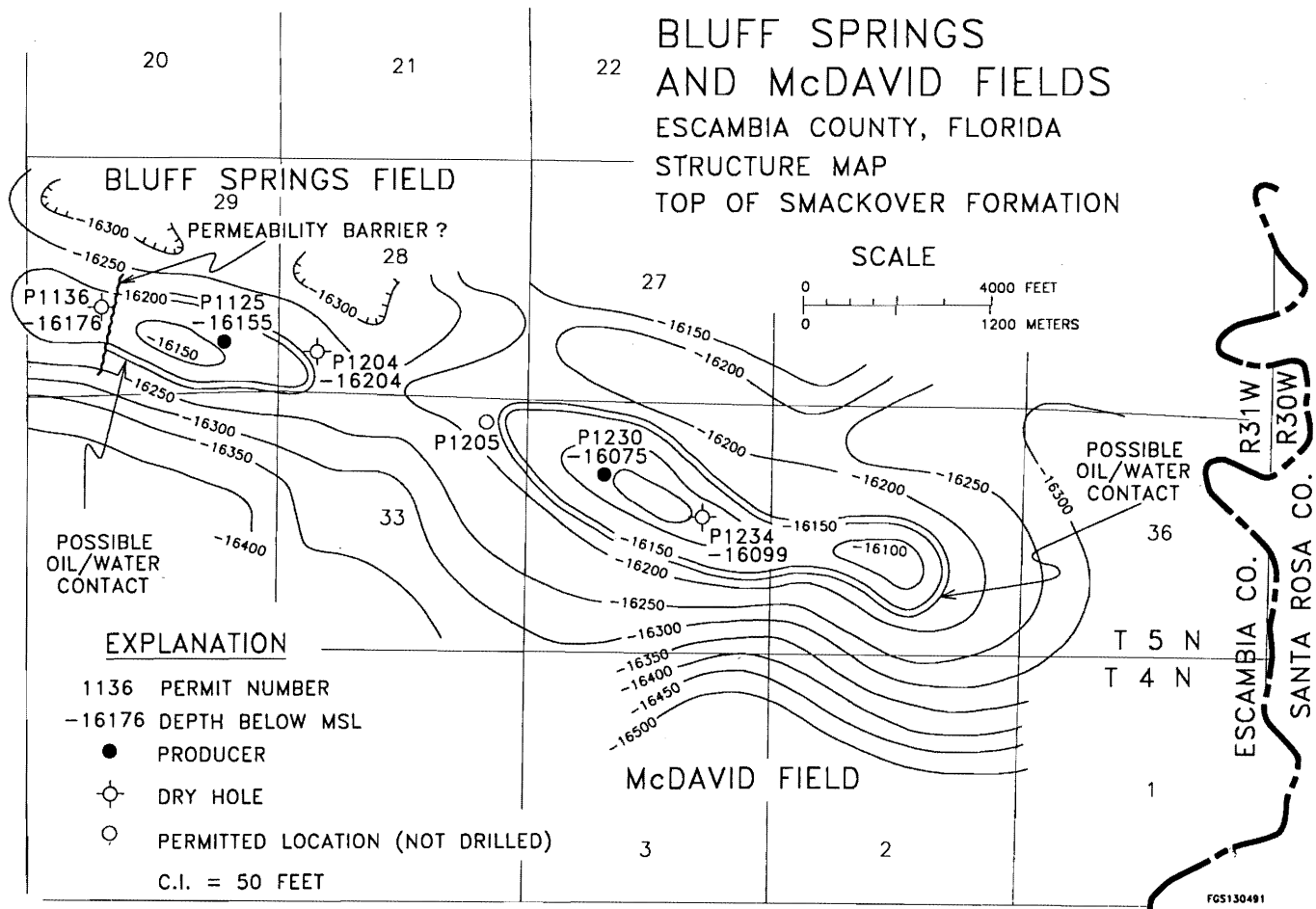
Bluff Springs and McDavid fields are located west and southwest of the Jay trend in an area known to be underlain by Louann Salt, with seismic

studies indicating salt-induced fault structures in the overlying formations (Lloyd and Applegate, 1987). The remaining two north Florida oil fields, McLellan and Sweetwater Creek, are located east of the Jay trend, near the approximate updip limits of the Smackover Formation (Lloyd, 1989; Applegate et al., 1978; Ottman et al., 1973 and 1976) and could be the result of stratigraphic pinchouts. They are also located within the area known to be underlain by the Louann Salt and may have salt-related trap structures. Current data does not reveal which trapping mechanism produced the Smackover reservoirs for these fields.

BLUFF SPRINGS FIELD

Bluff Springs field was discovered on March 25, 1984 and was plugged and abandoned in 1991 after producing a total of 242,000 barrels of oil solely from the discovery well (Appendices 1 and 2). The discovery well, the Stone Petroleum Corp. St. Regis Paper Co. number 29-4 (permit 1125), was a rank wildcat located in Section 29, Township 5 North, Range 31 West, Escambia County. It is approximately 10 miles west-southwest of Jay field and approximately four miles southeast of the nearest previously drilled wildcat, permit 1177 (Figures 3 and 13). This area, west and southwest of Jay, is known to be underlain by Louann Salt, with seismic studies indicating salt-induced fault structures in the overlying formations (Lloyd and Applegate,

Figure 13. Bluff Springs and McDavid fields structure map, top of Smackover Formation (after Hughes Eastern Corporation, 1988).



1987). Seismic data has been interpreted by Hughes Eastern Corporation (1988) to indicate several small structures in a northwest-to-southeast trend in this specific area.

The discovery well produced 477 barrels of oil and 170 barrels of saltwater per day. Oil gravity was 57.0° A.P.I. Production was from Jurassic-age Smackover Formation dolostones from -16,154 to -16,161 feet MSL. These dolostones are dark brownish-gray to brownish-black, fine grained, microcrystalline, and show evidence of recrystallization from originally oolitic and possibly pelletal facies (Lloyd, 1986; Lloyd and Applegate, 1987).

The offset well, permit 1136 (Stone Petroleum Corporation - St. Regis Paper Company number 29-3) was drilled about one-half mile northwest of the discovery well (Figure 13). The Smackover Formation was encountered at -16,171 feet MSL, structurally 17 feet lower than in the discovery well (Figure 14). The well produced only saltwater from two thin zones (-16,182 to -16,185 feet MSL and -16,192 to -16,195 feet MSL; Figure 14) within the upper Smackover. Core analysis by Location Sample Service, Inc. (LSS), Jackson, Mississippi, yielded mean porosity estimates for these zones of 11.4 and 8.4 percent, respectively. LSS found a trace of oil in one sample at -16,185 feet MSL. This well may be located too low on the structure. Alternatively, as shown on the structure map (Figure 13) drawn by Hughes Eastern

Corporation (1988; based on geophysical and well data), Hughes believes there may be a permeability barrier between the discovery well and this well.

Ownership of the discovery well transferred to Hughes Eastern Corporation in 1985. Permits were issued to Hughes Eastern to drill two additional offsets, one east and one southeast of the discovery well (permits 1204 and 1205, Figure 13). Permit 1204 was completed in August 1986. The Smackover was again found at a structurally lower position (Figure 14), this time 44 feet lower. Two zones of saltwater production were also encountered (-16,208 to -16,211 feet MSL and -16,215 to -16,233 feet MSL; Figure 14). LSS core analysis yielded mean porosity estimates of 23.9 and 13.6 percent, respectively, and no indications of oil. As interpreted by Hughes Eastern Corporation (1988) (Figure 13), the Smackover in this well is below the probable oil-water contact. The third offset, permit 1205, was not drilled. The location for permit 1205 is actually closer to McDavid field (discussed below) and is outside the potential productive limits drawn by Hughes Eastern Corporation (1988) (Figure 13).

McDAVID FIELD

McDavid field was discovered on June 14, 1988 with the first production test of the discovery well, the Hughes Eastern Corp. Walker-Baley number 34-2 (permit 1230, Appendix

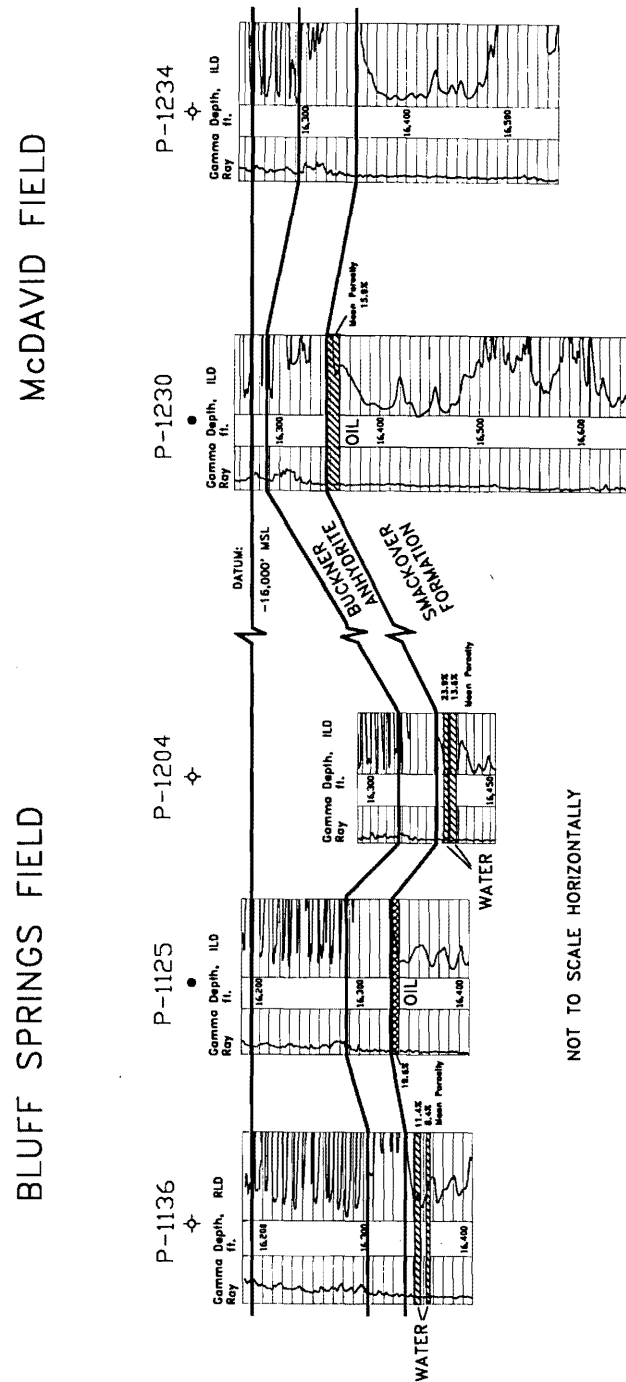


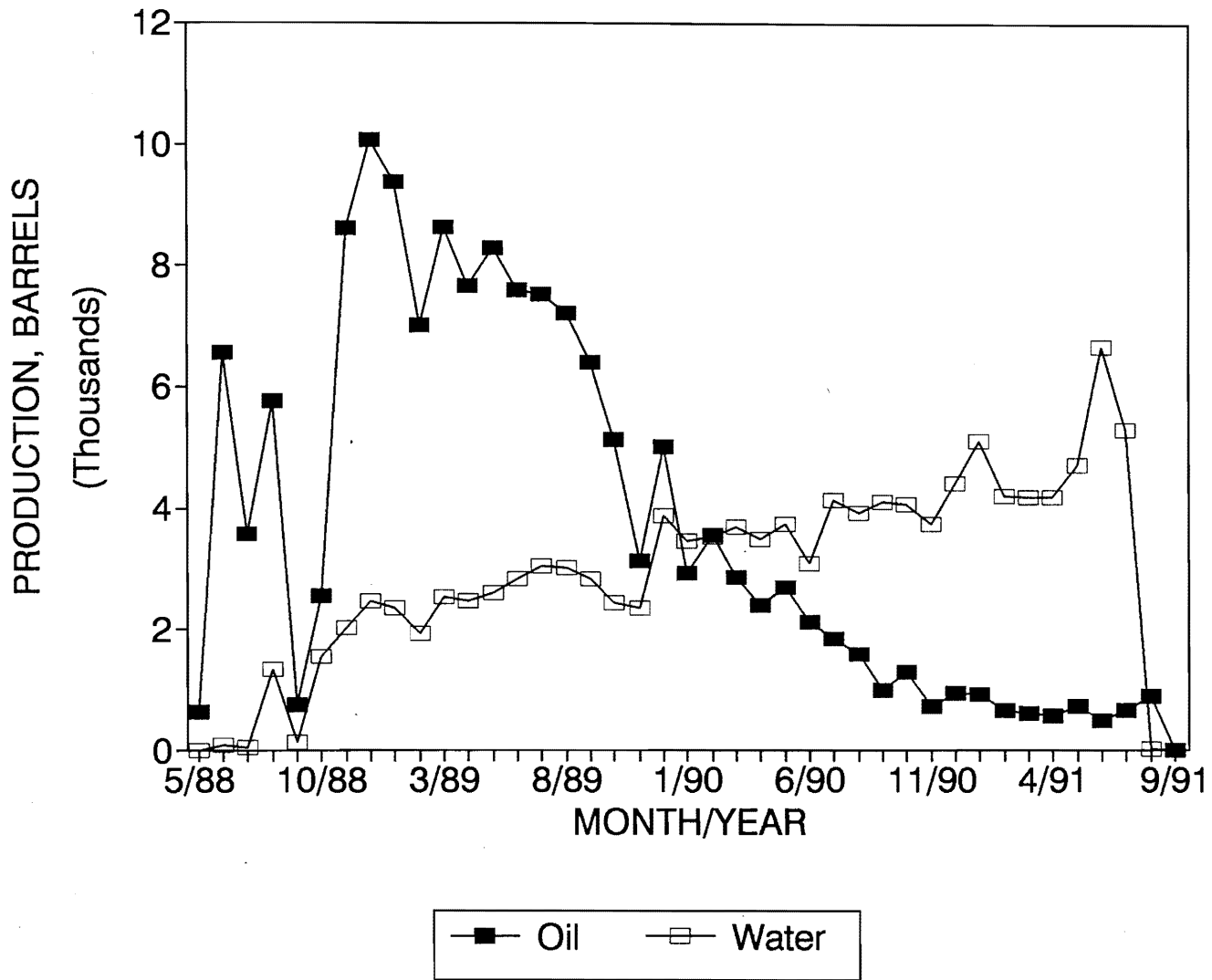
Figure 14. Geophysical log correlation, Bluff Springs and McDavid fields.

1). This field was also plugged and abandoned in 1991 after producing solely from its discovery well. McDavid field produced a total of 150,000 barrels of oil (Appendix 2). The discovery well is located in Section 34, Township 5 North, Range 31 West, Escambia County (Appendix 1). It is about one and one-half miles southeast of the Bluff Springs discovery well (Figures 3 and 13). As discussed above for Bluff Springs field, this area, west and southwest of Jay, is known to be underlain by Louann Salt, with seismic studies indicating salt-induced fault structures in the overlying formations (Lloyd and Applegate, 1987). Seismic data has been interpreted by Hughes Petroleum Corp. (1988) (Figure 13) to indicate several small structures in a northwest to southeast trend in this specific area.

The discovery well produced 235 barrels of oil per day and no saltwater. Oil gravity was 53.8° A.P.I. Production was from Jurassic-age Smackover Formation dolostones from -16,075 to -16,089 feet MSL. These dolostones were described by LSS as gray to dark gray, sucrosic to granular, with poor to fair porosity and permeability. Examination of core chips with a binocular microscope concurs with this description. Core analysis by LSS yielded a mean porosity estimate of 15.9 percent for this zone. Geophysical log analyses by Charles Tootle (Professional Engineer, Florida Geological Survey, personal communication, 1988) yielded a mean porosity estimate of 12.8 percent, an

original oil in place estimate of 4,987,347 barrels, and a recoverable oil estimate of 498,736 barrels (Appendix 8).

The first offset, permit 1234 (Hughes Eastern Corporation - Jones Estate number 34-1) is located about one-half mile southeast of the discovery well (Figure 13). The offset was completed in June 1989. The Smackover Formation was encountered at -16,099 feet MSL, structurally 24 feet lower than in the discovery well (Figure 14). The structure map (Figure 13) was drawn prior to the time this well was drilled. As shown on the map, Hughes Eastern Corporation expected to encounter the Smackover at about -16,050 feet MSL in this well. Based on the actual depth (-16,099 feet MSL), the McDavid structure is probably smaller than that shown. The productive limit expected by Hughes is still below this depth (at about -16,200 feet, Figure 13); however, analysis of geophysical logs from this well indicate that the oil-water contact may actually be at about -16,102 feet MSL (Joel Duncan, professional geologist, Florida Geological Survey, personal communication, 1991). In addition, production from the discovery well appears to have peaked around December 1988 and may have depleted this small structure enough to move the potential productive limits above the level of the Smackover in the offset (Figure 15) (Joel Duncan, professional geologist, Florida Geological Survey, personal communication, 1991).



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Figure 15. McDavid field production curve.

JAY FIELD

Jay field was discovered in June, 1970, by the drilling of the Humble St. Regis number 1 (permit 417) in Section 43, Township 5 North, Range 29 West, Santa Rosa County (Figures 3 and 16 and Appendix 1). The well produced from the Smackover Formation from -15,264 to -15,318 feet MSL. The initial production test yielded 1,712 barrels of 50.7° A.P.I. gravity oil and 23 barrels of saltwater per day.

Jay field is located within the "Jay trend" of Escambia and Santa Rosa Counties, Florida and Escambia County, Alabama (discussed in north Florida oil fields introduction above). The northern extension of Jay, in Escambia County, Alabama, is the Little Escambia Creek (LEC) field. Oil accumulation at Jay is within an asymmetric anticline with the fault complex forming the eastern barrier to oil migration (Figure 16) (Applegate and Lloyd, 1985).

The northern limit of Jay field is a porosity barrier in Alabama where the lithology changes from porous dolostone to dense, micritic limestone. The porosity at Jay field is due to dolomitization of the pelletal grainstones in the upper, regressive section of the Smackover Formation. Dolomitization, fresh water leaching, and an anhydrite cap rock (Buckner Member of the Haynesville Formation, Figure 4) have formed a complex, extensive reservoir. Numerous analyses of the Jay area Smackover Formation,

including comparisons with modern carbonate environments, have been made in attempts to understand this complex reservoir (Ottman et al., 1973 and 1976; Sigsby, 1976; Mancini and Benson, 1980; Lomando et al., 1981; Vinet, 1984; Moore, 1984; Bradford, 1984; Lloyd et al., 1986).

Despite the complexity of the Jay field Smackover Formation reservoir, exploration and development of the field have been extremely successful. Core analyses were combined with bottom hole pressure data, porosity log information, and other geologic data to arrive at a highly successful reservoir management program (Shirer et al., 1978; Langston et al., 1981; Langston and Shirer, 1985).

As of December 1995, Jay field was producing from a total of 51 wells, 32 wells were temporarily shut-in, and there were 28 injection wells (Appendix 3). Cumulative production for Jay field, as of the end of 1995, was 387,815,585 barrels of oil (Appendix 2).

COLDWATER CREEK FIELD

Coldwater Creek field was discovered on June 4, 1988. The discovery well was a reentry of a Smackover wildcat. The original permit was issued to Inexco Oil Company (permit 1173). The location is about two miles east of the southern portion of Jay field in Section 26, Township 5 North, Range 29 West, Santa Rosa County (Figure 3). Inexco began drilling

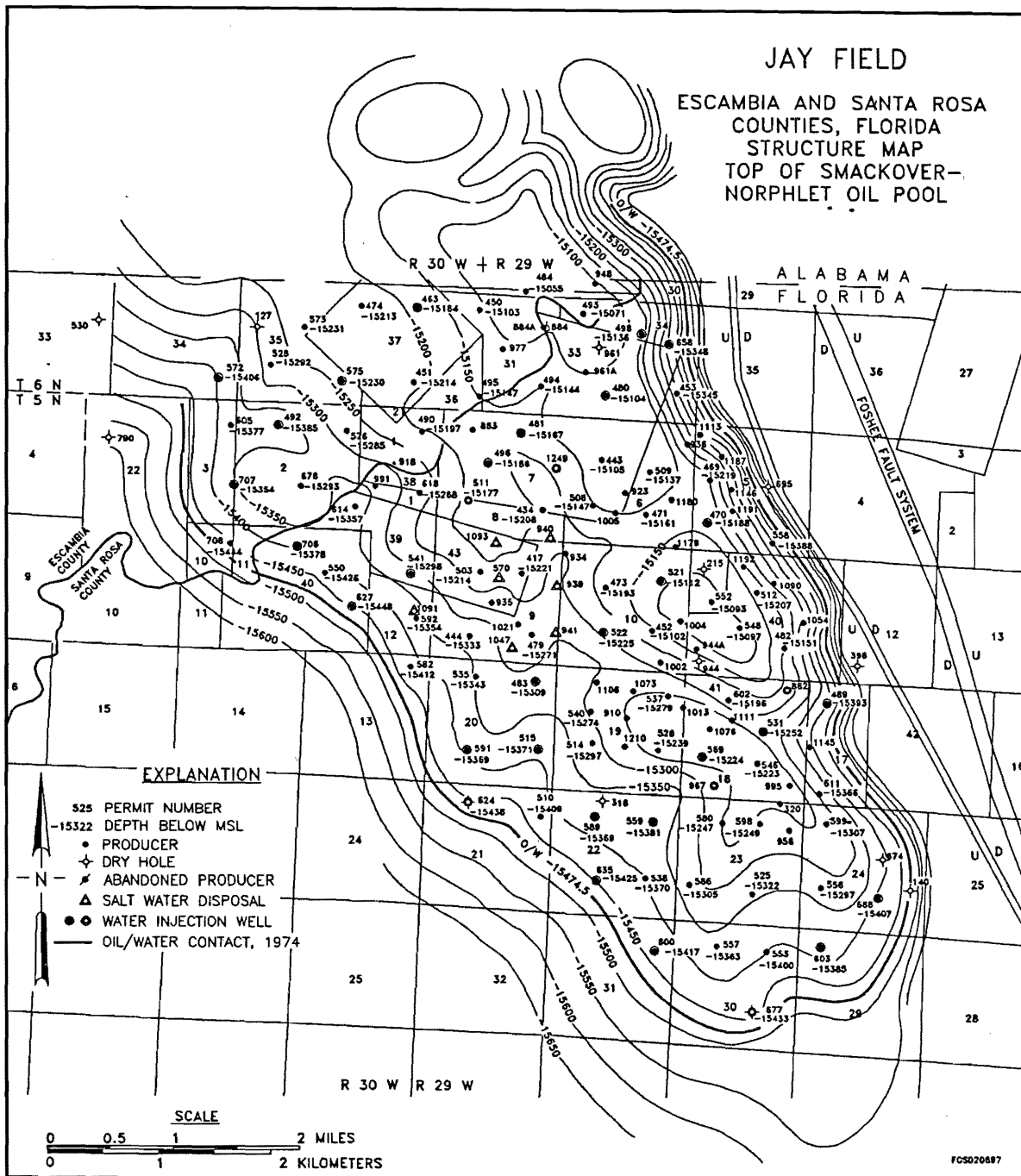


Figure 16. Jay field structure map, top of Smackover Formation (after Jay-LEC Fields Unit Geological Committee, 1974).

Florida Geological Survey

in November, 1985. They drilled the well to a total depth of -15,407 feet MSL, logged the well, and recommended plugging and abandonment.

The top of the Smackover Formation had been encountered at -14,969 feet MSL; the Norphlet Sandstone at -15,331 feet MSL. Side wall core analyses by Location Sample Service, Inc. (Jackson, Mississippi) indicated a potential oil productive zone from -14,985 to -15,016 feet MSL. Mean porosity of the zone was about 14.8 percent. Analysis of the same interval by Charles Tootle yielded a mean porosity of about 12 percent, an original oil in place estimate of 2,080,107 barrels, and a recoverable oil estimate of 312,016 barrels (Appendix 8).

Louisiana Land and Exploration Company (LL&E) took over operations on January 10, 1986 and plugged and abandoned the well. Bruxoil, Inc. then took over responsibility for the well. They conducted a geophysical survey across the area (geophysical permit G-70-86; see Lloyd, 1989). The stated purpose was to determine whether to reenter the existing well or drill at a new location. They decided not to reenter the well and have not submitted any permit applications to drill in the vicinity.

In 1987, Red Rock Oil and Minerals Corporation received permit 1220 (Appendix 1) to reenter the well. They completed redrilling on May 24, 1987 and ran the first production test on June 4, 1988. This test yielded 152

barrels per day of 46.5° A.P.I. gravity oil and 280 barrels per day of saltwater. In a retest on December 27, 1988, the well flowed 259 barrels per day of 46.5° A.P.I. gravity oil with no saltwater production. Production is from the zone discussed above, from -14,984 to -15,006 feet MSL in the Smackover Formation. Judging from the field's location within the Jay trend, it appears that reservoir formation may have been structurally related to the Foshee Fault System; however, a single well does not yield sufficient information to test this hypothesis.

No additional wells have been drilled at Coldwater Creek field. Cumulative production, as of December 1995 from Coldwater Creek field was 80,068 barrels of oil from this single well (Appendix 2).

BLACKJACK CREEK FIELD

The Blackjack Creek field discovery well was the Humble Oil and Refining Company - St. Regis Paper Company number 13-3 well (permit 523) drilled in Section 13, Township 4 North, Range 29 West, Santa Rosa County, about eight miles southeast of Jay field (Appendix 1, Figures 3 and 17). The well was completed February 14, 1972, as a producer in the Norphlet Sandstone from -15,965 to -15,975 feet MSL. Initial production was 371 barrels of 51.3° A.P.I. gravity oil and 4.5 barrels of saltwater per day. Due to limited productivity and water production from the Norphlet

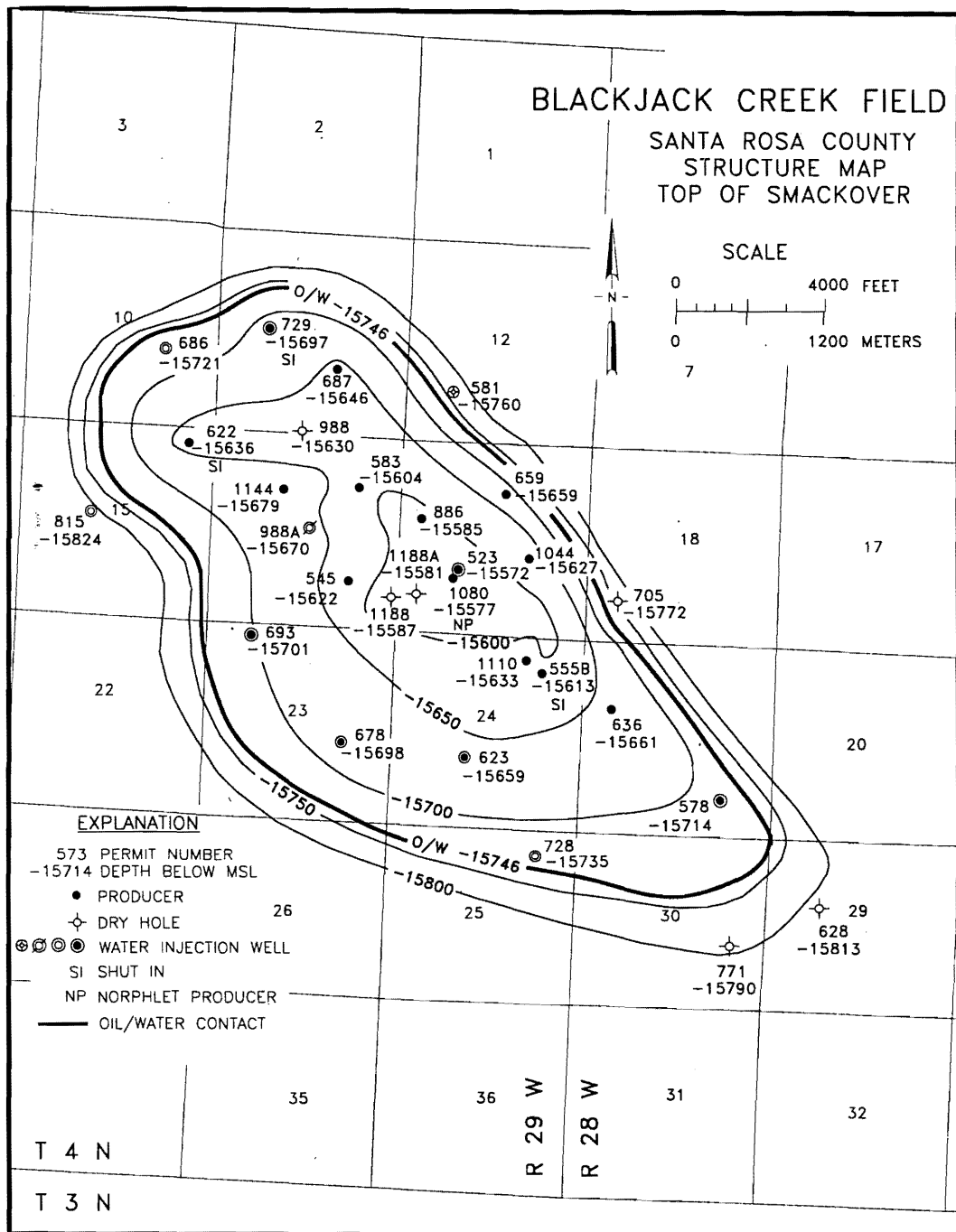


Figure 17. Blackjack Creek field structure map, top of Smackover Formation (after Blackjack Creek Geological Committee, 1974, modified by Jim LeBar, Petroleum Engineer, Florida Geological Survey, personal communication, 1996).

Sandstone, the well was recompleted as a Smackover Formation producer from -15,633 to -15,743 feet MSL. The initial production test from the Smackover, on January 22, 1975, yielded 1,428 barrels of 51.2° A.P.I. gravity oil and no saltwater.

Blackjack Creek field now produces primarily from oolitic dolostones of the Smackover Formation (Applegate and Lloyd, 1985). A single well, permit 1080 (Figure 17), produces from the Norphlet Sandstone. The trapping structure is an anticline located on the downthrown, southwest side of the regional Foshee Fault System (Figure 17). Similar to Jay field, Blackjack Creek has been carefully cored and analyzed to achieve a successful reservoir management and development program.

Cumulative production for Blackjack Creek field was 56,805,223 barrels through December 1995 (Appendix 2). Of this total production, 578,533 barrels were produced from the Norphlet Sandstone and 56,226,690 barrels were produced from the Smackover Formation. Through January 1996, 18 producing wells and seven dry holes had been drilled at Blackjack Creek. Ten wells were actively being produced as of December 1995 (Appendix 3).

MT. CARMEL FIELD

Mt. Carmel field was discovered in December 1971 by LL&E. The discovery well was the LL&E - Finley Heirs number 39-3 (permit 504),

located about one mile east of Jay field in Section 39, Township 5 North, Range 29 West, Santa Rosa County (Appendix 1, Figures 3 and 18). Initial production was 1,440 barrels of 47° A.P.I. gravity oil per day with no saltwater.

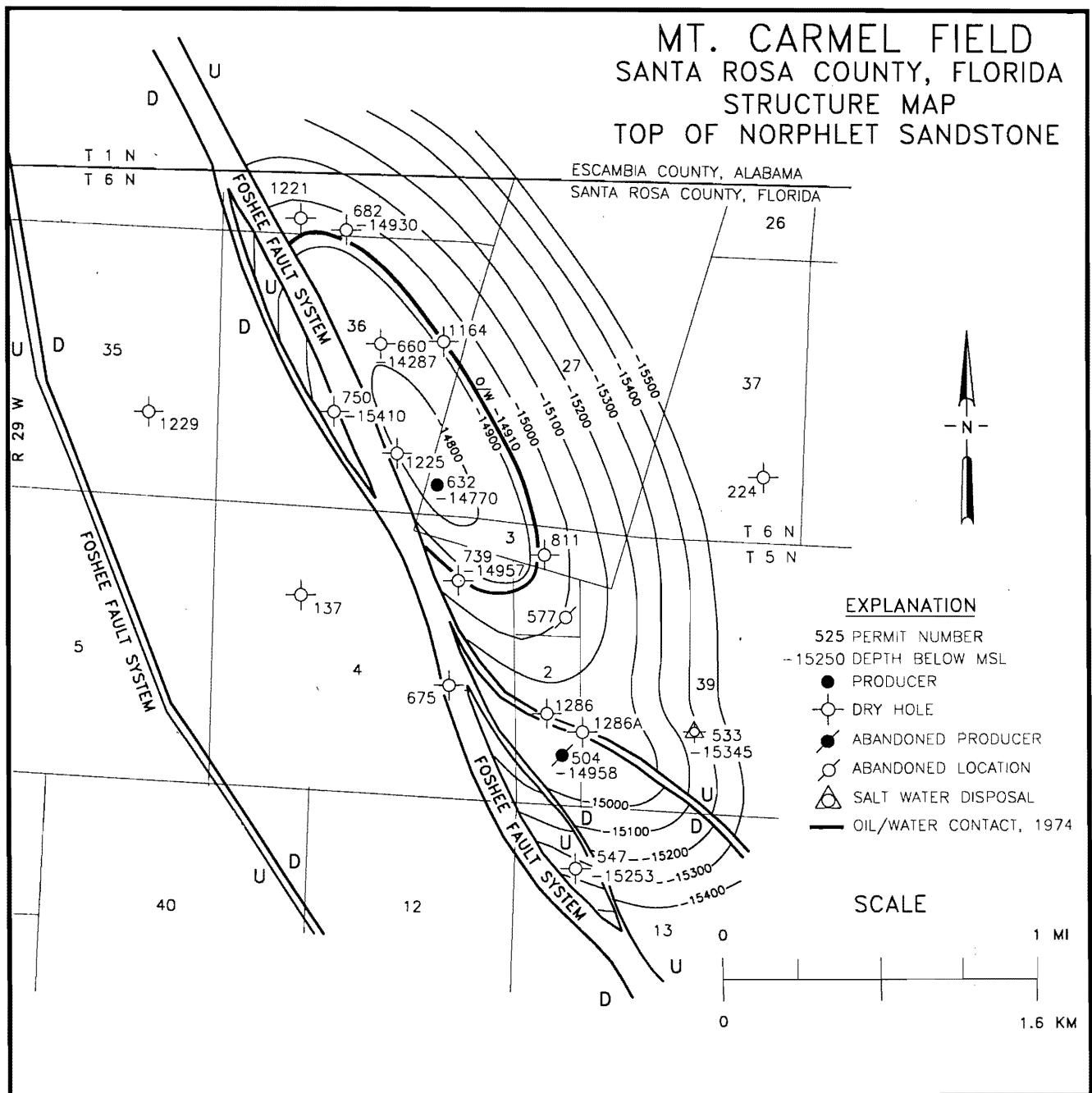
Mt. Carmel field is separated from Jay field by the Foshee Fault System (Figure 18). Mt. Carmel field produces both oil and gas from the Smackover Formation and the Norphlet Sandstone. Complex reservoir geometry has apparently made development of this field more difficult. As of January 1996, three producing wells and 12 dry holes had been drilled at Mt. Carmel field.

There is currently one producing well in the Mt. Carmel field. As of the end of 1995, the field had produced 4,770,745 barrels of oil (Appendix 2).

McLELLAN FIELD

McLellan field was discovered on February 15, 1986, with the initial testing of the Exxon Corporation - State of Florida number 33-1 (permit 1194, Appendix 1, Figures 3 and 19). The well is located about 3.25 miles north of the abandoned Sweetwater Creek field in Section 33, Township 6 North, Range 26 West, Santa Rosa County.

An initial flowing test of the discovery well produced 152 barrels of 41° A.P.I. gravity oil per day and no saltwater. Production is from Smackover Formation dolostones from -13,827 to -13,845 feet MSL (Figure



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Figure 18. Mt. Carmel field structure map, top of Norphlet Sandstone (after Miller, 1974).

Florida Geological Survey

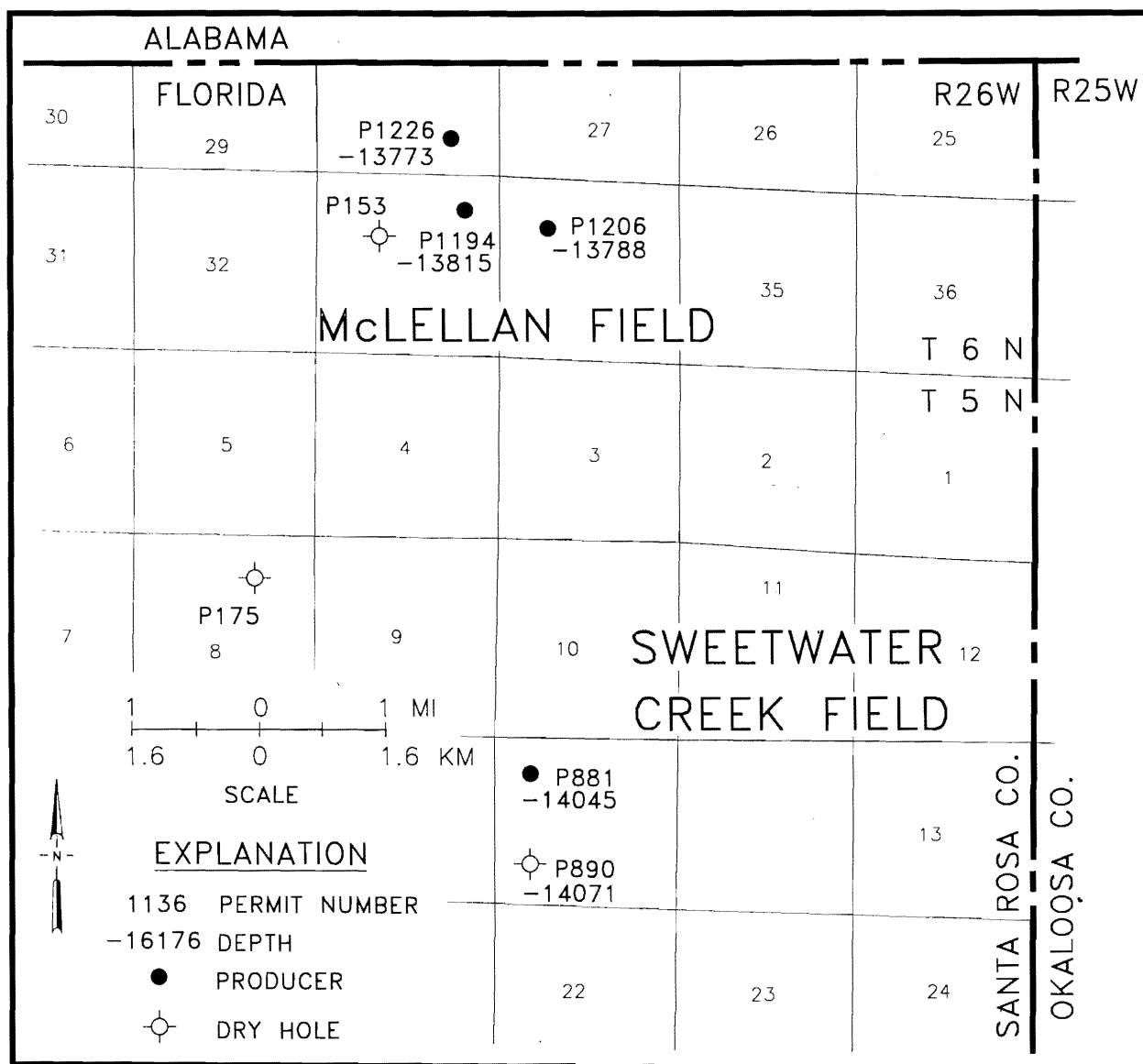


Figure 19. McLellan and Sweetwater Creek fields well location map.

20). Core analysis of a potential oil and gas productive zone from -13,819 to -13,845 feet MSL by Core Laboratories, Inc. (Dallas, Texas) indicated a mean porosity of 12.3 percent. The analysis showed additional oil and gas production potential between -13,854 and -13,863 feet MSL. Mean porosity is about 15 percent for this zone. Both of the analyzed zones contained dark, fine grained, microcrystalline dolostones with vuggy porosity.

McLellan field is located within the area known to be underlain by the Louann Salt and may have a salt-related trap structure. It is also located within a few miles of the approximate updip limits of the Smackover Formation (Lloyd, 1989; Applegate et al., 1978; Ottman et al., 1973, 1976); thus, the trap could be a stratigraphic pinchout. Current data does not reveal which trap mechanism produced the Smackover reservoir for this field.

The first offset and confirmation well for the field was the Exxon Corporation - State of Florida number 34-2 (permit 1206). It is located about one-half mile east of the discovery well (Figure 19). It was tested on March 9, 1987 and flowed 641 barrels of 43.4° A.P.I. gravity oil and 24 barrels of saltwater per day. The Smackover Formation was encountered at -13,788 feet MSL, 27 feet higher than in the discovery well (Figure 20). Production is from the Smackover Formation from -13,797 to -13,847 feet MSL. Core analysis by All Points, Inc. (Houston,

Texas) yielded a mean porosity of 11.5 percent for the productive zone.

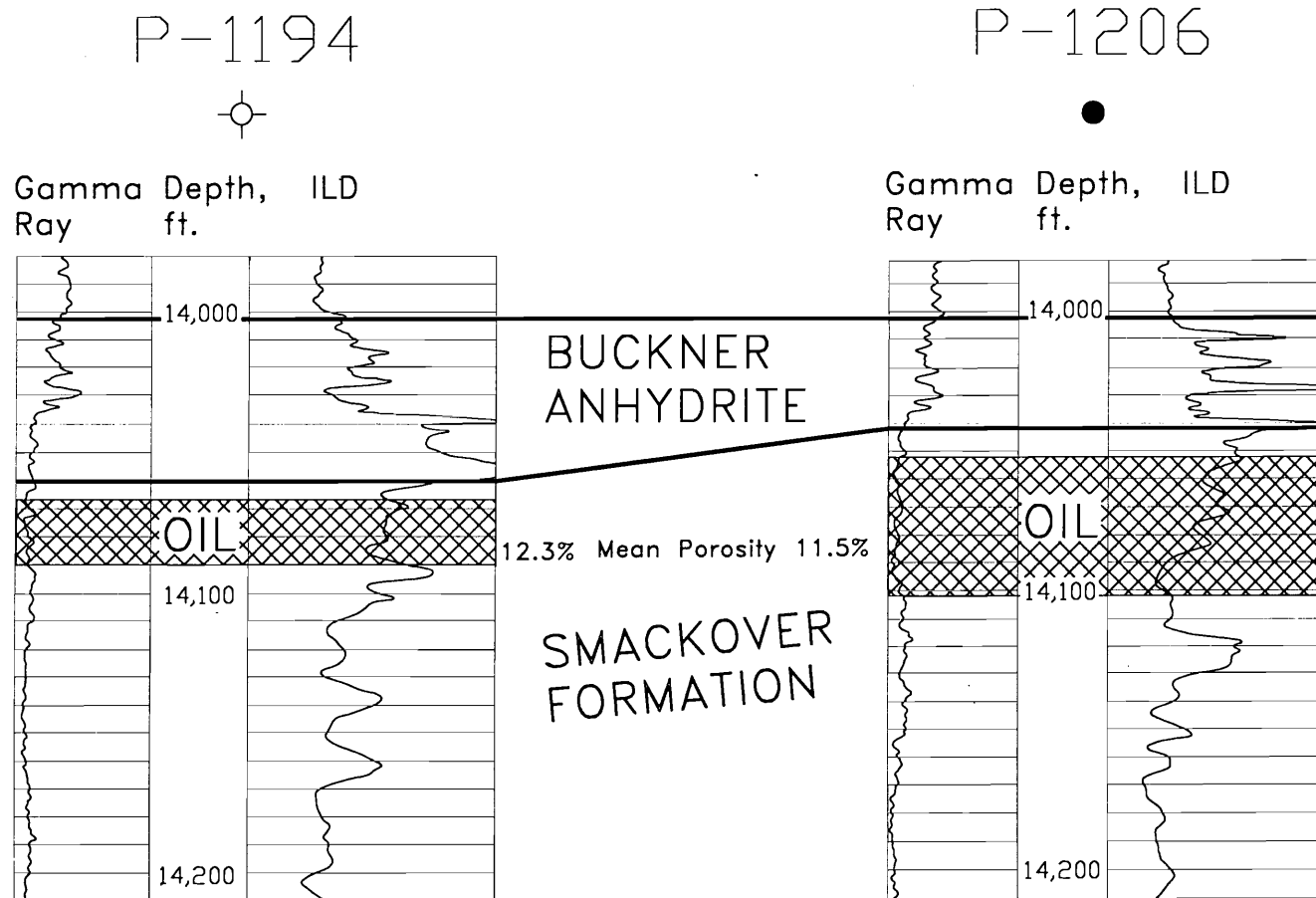
A second offset to the discovery well, Exxon Corporation - State of Florida number 28-4 (permit 1226) was drilled about one-half mile north of the discovery well (Figure 19). During initial production tests, in February 1988, the well flowed 154 barrels of oil (gravity not reported) and 171 barrels of saltwater per day. The Smackover was encountered 42 feet higher in this well than in the discovery well (Figure 20), indicating a fairly steep gradient between these wells. This second offset well has since been converted to a salt water disposal well.

As of December 1995, production for McLellan field was from the two remaining wells and totaled 351,617 barrels of oil (Appendix 2 and 3).

SWEETWATER CREEK FIELD

Sweetwater Creek field was discovered on April 22, 1977, with the successful flow test of the Houston Oil and Minerals Corporation - W. M. Stokes number 15-2 well (permit 881, Appendix 1, Figures 3 and 19). The well is located in Section 15, Township 5 North, Range 26 West, Santa Rosa County. In the initial test the well produced 624 barrels of 43.5° A.P.I. gravity oil and only a trace of saltwater from a Smackover limestone interval from -14,044 to -14,085 feet MSL. This test data spurred rumors that a "new Jay" field had been discovered. Rumors proved to be false and an

Figure 20. Geophysical log correlation, Mclellan field.



NOT TO SCALE HORIZONTALLY

offset drilled in 1978 to the south of the discovery well was dry (permit 890, Figure 19). Core analyses of the Smackover Formation in the offset well by Core Laboratories, Inc. (Dallas, Texas) indicated very fine crystalline, gray brown limestone and dolostone, with low porosity and permeability, and potential for only saltwater production. The field produced a total of 13,695 barrels of oil during its entire lifetime (Appendix 2). The discovery well was the only producer at Sweetwater Creek field and was plugged and abandoned in December 1980, after it began producing 100 percent saltwater.

South Florida Oil Field Summaries

INTRODUCTION

South Florida oil production began with Florida's first oil discovery at Sunniland field in September, 1943. There are now 14 oil fields in south Florida, oriented in a northwest-southeast trend through Lee, Hendry, Collier and Dade Counties (Figure 1). Of these 14 Sunniland trend oil fields, seven are active, three are temporarily shut-in, and four are plugged and abandoned.

Reservoirs found along the Sunniland trend are composed of localized buildups of organic debris into mounds or pods which formed porous grainstones within the upper Sunniland Formation (Figure 2). The fauna which make up these bioherms include rudistids, algal plates, gastropods, and foraminifera. Dolomitization has

enhanced the porosity of these grainstones. The grainstones grade laterally into nonporous, miliolid-rich mudstones (Means, 1977; Mitchell-Tapping, 1984, 1985, and 1986). These miliolid mudstones often provide the trapping mechanism for these reservoirs.

The exception to the above general description of south Florida oil fields is Lake Trafford field. Lake Trafford produces oil from a fractured limestone in the lower Sunniland Formation (Means, 1977).

LEHIGH PARK FIELD

The discovery well for the Lehigh Park field was the Exxon Consolidated - Tomoka number 22-4 (permit 712) drilled in Section 22, Township 44 South, Range 26 East, Lee County (Appendix 1, Figures 1 and 21). This is the most northwesterly field in the Sunniland trend. The discovery well was completed on July 30, 1974, in the -11,349 to -11,354 foot MSL interval of the Sunniland Formation. Initial production was 490 barrels of 27.6° A.P.I. gravity oil and 48 barrels of saltwater per day. This well was later abandoned and a deviated well (permit 712A) was drilled at the same surface location to produce higher on the structure. A total of nine dry holes were drilled to delineate this field. All of the producing wells were directionally drilled because bottom hole locations are beneath the town of Lehigh Acres.

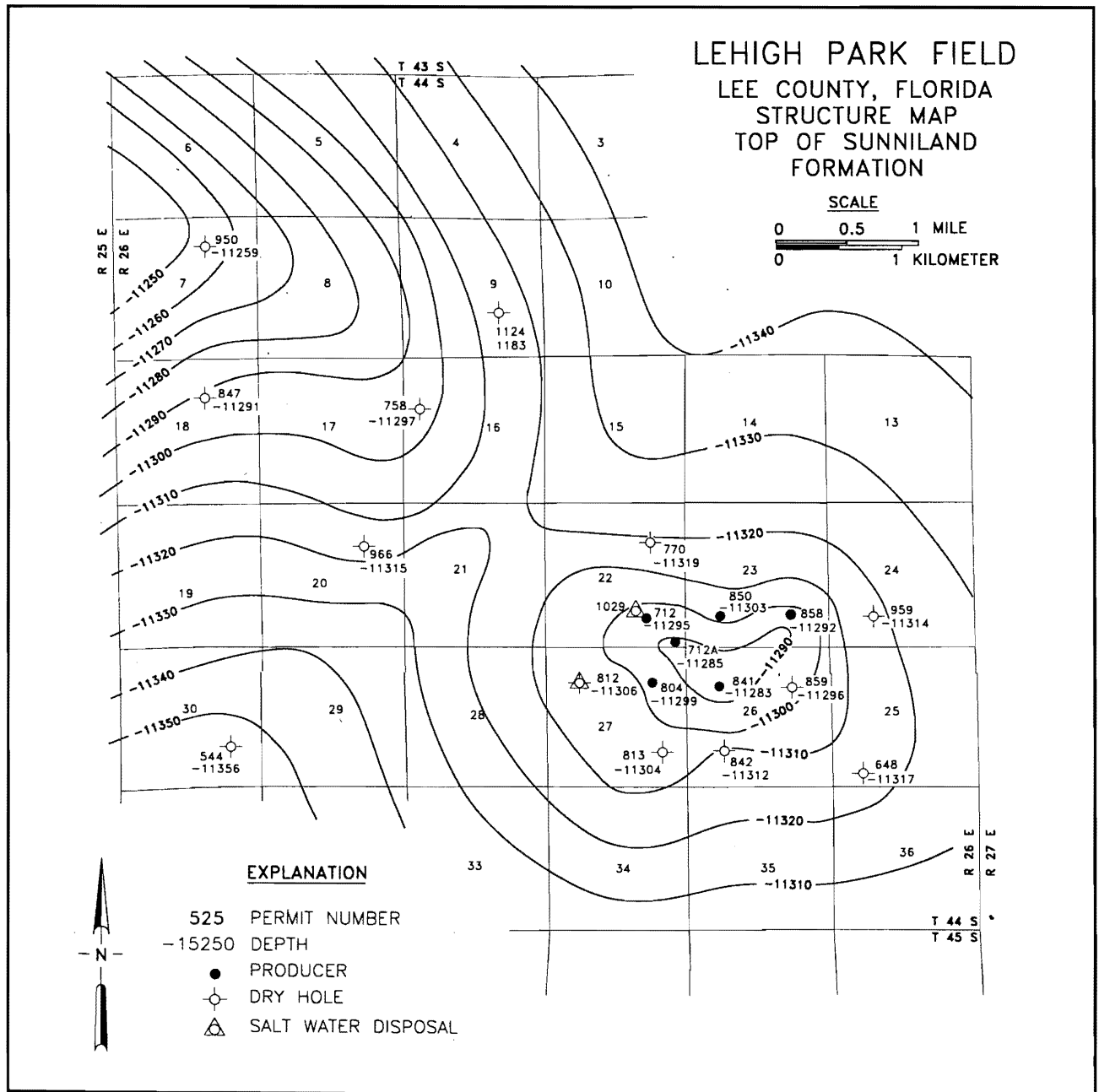


Figure 21. Lehigh Park field structure map, top of Sunniland Formation (after Ferber, 1985)

Figure 21 is a structure map of the top of the Sunniland Formation (Ferber, 1985) at Lehigh Park field. The reservoir appears to be typical of the south Florida Sunniland trend fields, a leached limestone bioherm. Core analysis by R. E. Laboratories, Inc. (Dallas, Texas) yielded an average porosity of 19.7 percent for the Sunniland Formation from -11,337 to -11,364 feet MSL. They described this interval as a tan to brown, fossiliferous, partially dolomitized limestone.

One well was actively producing, and production totaled 5,462,076 barrels of oil at the end of December 1995 for this field (Appendices 2 and 3).

TOWNSEND CANAL FIELD

Townsend Canal field is located in Section 2, Township 45 South, Range 28 East, Hendry County, approximately three miles north of Mid-Felda field, within the Sunniland trend (Figure 1). It was discovered on June 27, 1982, with the first production test of the Natural Resources Management Corporation - A. Duda & Sons number 2-3 well (permit 1070). The test produced 160 barrels of 28.4° A.P.I. gravity oil and 42 barrels of saltwater per day. Production is from the Sunniland Formation between -11,363 and -11,368 feet MSL (Appendix 1).

One well was producing at Townsend Canal field at the end of 1995 (Appendix 3). Production totaled

526,420 barrels of oil at the end of 1995 (Appendix 2).

WEST FELDA FIELD

West Felda field was discovered on August 2, 1966, with the drilling of the Sun - Red Cattle number 21-3 well (permit 371) in Section 21, Township 45 South, Range 28 East, Hendry County. The field now extends into Lee County (Appendix 1, Figures 1 and 22). The first production test yielded 56 barrels of 24.6° A.P.I. gravity oil and 148 barrels of saltwater per day from the -11,437 to -11,440 foot MSL interval of the Sunniland Formation.

The field is mainly a stratigraphic trap; however, structural closure is more evident than at Sunoco Felda field (Figure 22). The main producing unit has a composition typical of the south Florida Sunniland trend fields (Means, 1977; Mitchell-Tapping, 1986). Means (1977) summarized the reservoir characteristics for West Felda field as follows: average pay thickness of 17 feet, average porosity of 20 percent, average water saturation of 35 percent, A.P.I. oil gravity of 26°, and average daily oil production of 4,600 barrels. Values indicate improved reservoir quality over Sunoco Felda field.

Means (1977) believed that the reservoir quality was improved because West Felda field "experienced higher energy and more-normal marine conditions" than did Sunoco Felda field. Alternatively, Mitchell-Tapping (1986) considered the energy levels

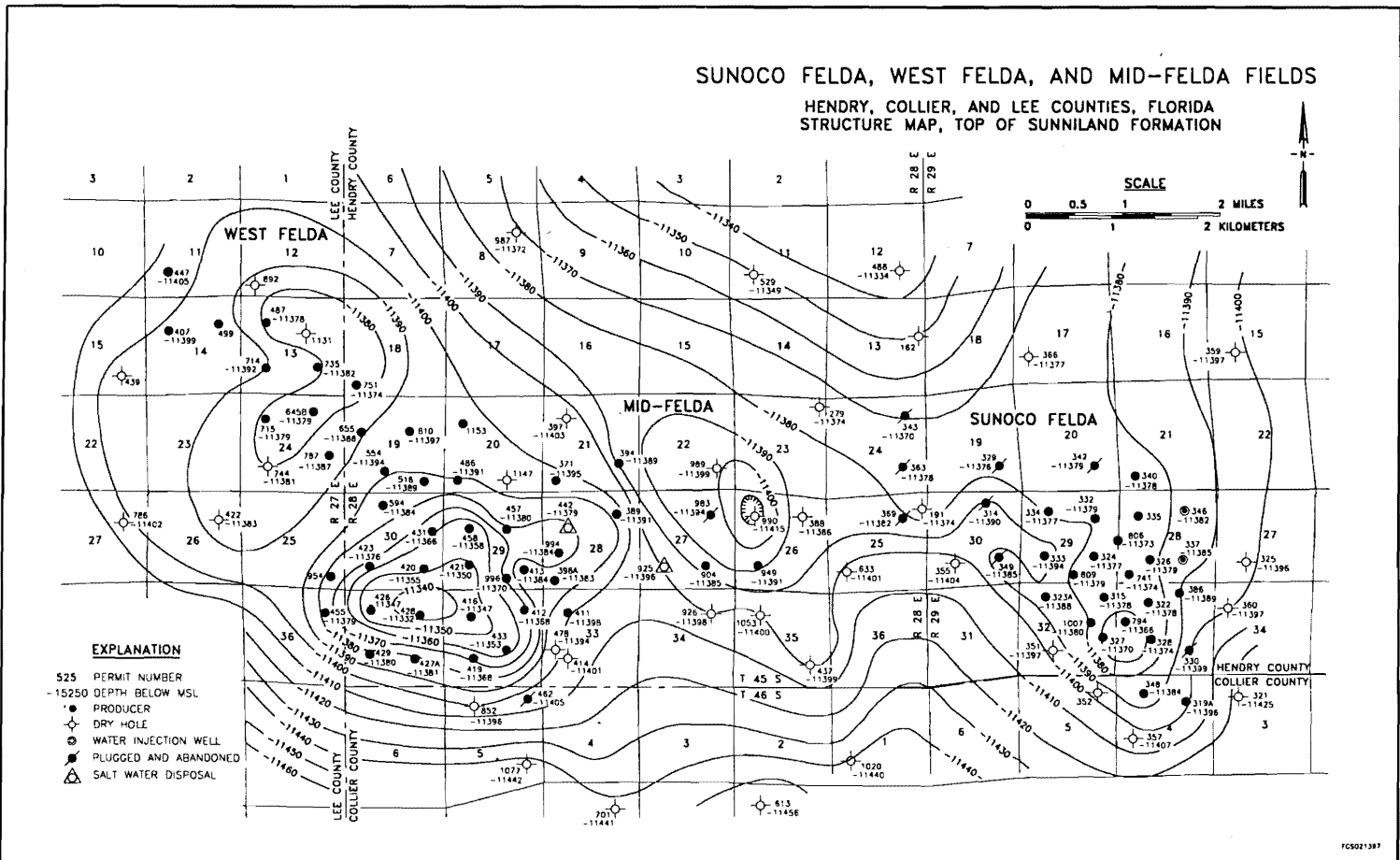


Figure 22. Sunoco Felda, West Felda, and Mid-Felda fields structure map, top of Sunniland Formation.

topographically higher" at West Felda field.

At the end of December 1995, six wells were producing at West Felda field and cumulative production totaled 43,301,266 barrels of oil (Appendices 2 and 3).

MID-FELDA FIELD

The Mid-Felda field discovery well was the R. L. Burns - Red Cattle number 27-4 (permit 904) in Section 27, Township 45 South, Range 28 East in Hendry County, Florida (Appendix 1). The well was completed in the -11,433 to -11,437 foot MSL interval of the Sunniland Formation on October 13, 1977. An initial production test on October 24, 1977 yielded 281 barrels of 26° A.P.I. gravity oil and 53.6 barrels of saltwater per day (Appendix 1).

The well is located on a small subsurface feature between West Felda field and Sunoco Felda field (Figure 22). Samples from the producing zone show a partially dolomitized fossil hash with about ten feet of oil staining. Geophysical log analysis indicated approximately 20 percent porosity for an eight-foot interval (Applegate and Lloyd, 1985).

At the end of 1995, two wells were actively producing (Appendix 3). Cumulative production, as of the end of December 1995 was 1,484,994 barrels of oil (Appendix 2).

SUNOCO FELDA FIELD

The Sunoco Felda field, located in Hendry and Collier Counties, was discovered in July 1964 by Sunoco, when they drilled the discovery well (Appendix 1). The well (the Sun - Red Cattle number 32-1; permit 315) is located in Section 32, Township 45 South, Range 29 East. Sunoco Felda was the second commercial oil field discovered in Florida and was discovered 21 years after the first commercial discovery (Sunniland field). Forty Mile Bend field was discovered in 1954 but turned out to be non-commercial and was abandoned in 1956. The Sunoco Felda discovery well location was based on a combination of subsurface and seismic data (Tyler and Erwin, 1976).

In an initial pumping test in November 1964, the discovery well produced 427 barrels of 25.4° A.P.I. gravity oil and 11 barrels of saltwater per day. Production is from the Sunniland Formation from -11,417 to -11,430 feet MSL from a leached limestone bioherm. The faunal composition of the bioherm is somewhat typical of the Sunniland reservoirs (as described in the south Florida oil fields introduction above) (Means, 1977; Mitchell-Tapping, 1986). Mitchell-Tapping (1986) observed faunal differences at Sunoco Felda field which indicated formation in "the shallow lagoonal zone of the back-reef environment." The reservoir has a permeability barrier to the northeast

"the shallow lagoonal zone of the back-reef environment." The reservoir has a permeability barrier to the northeast which prevents migration of the oil updip (Tyler and Erwin, 1977).

Means (1977) summarized the reservoir characteristics of Sunoco Felda field. These include an average pay zone thickness of 11 feet, average porosity of 18 percent, average water saturation of 50 percent, A.P.I. oil gravity of 25°, and average daily oil production of 1,700 barrels.

The last reported production from Sunoco Felda field was in August, 1992 and all producing wells have been plugged and abandoned. The total production for this field was 11,528,000 barrels of oil (Appendix 2).

CORKSCREW FIELD

Corkscrew field was discovered on November 10, 1985 with an initial swab test of the R. K. Petroleum - Rex Properties number 33-2 (permit 1170, Appendix 1). Corkscrew field is located about two and one-half miles north and slightly west of the one-well Lake Trafford field in Collier County, Florida (Figures 1 and 23). In its initial test, the discovery well produced 435 barrels of 25° A.P.I. gravity oil per day with no saltwater. Production was from open hole in the Sunniland at -11,502 to -11,520 feet MSL.

Core analysis by Analytical Logging, Inc. (Ft. Myers, Florida) indicated an oil producing zone from -11,506 to -11,515 feet MSL. The zone was described as a "fossil-hash"

of dolomitic limestone with an average porosity of 15.25 percent. This description, and the small closed structure drawn by LeBar (Petroleum Engineer, Florida Geological Survey, personal communication, 1996) (Figure 23), are again consistent with a bioherm formation for the reservoir.

Two successful offsets have been drilled at Corkscrew field (Figure 23, permits 1199 and 1201A) (Lloyd, 1989). In addition, permit 1243C, a reentry and sidetrack of the Permit 1224 (a dry hole), was completed as a producer in 1993, but was ultimately deemed non-commercial. Corkscrew field's total oil production as of January 1, 1996 was 966,703 barrels (Appendix 2).

LAKE TRAFFORD FIELD

Lake Trafford field was discovered by Mobil Oil Corporation on the Baron Collier Jr. lease in Section 9, Township 47 South, Range 28 East in Collier County (Figures 1 and 24). The discovery well (permit 401) was completed on March 30, 1969 (Appendix 1). During initial production tests the well pumped 118 barrels of 25.6° A.P.I. gravity oil and 78 barrels of saltwater per day. Production was from the Sunniland Formation from -11,830 to -11,892 feet MSL. The well was later squeeze cemented to shut off water from above the perforations. The well is unique in south Florida in that it has not produced water since that time.

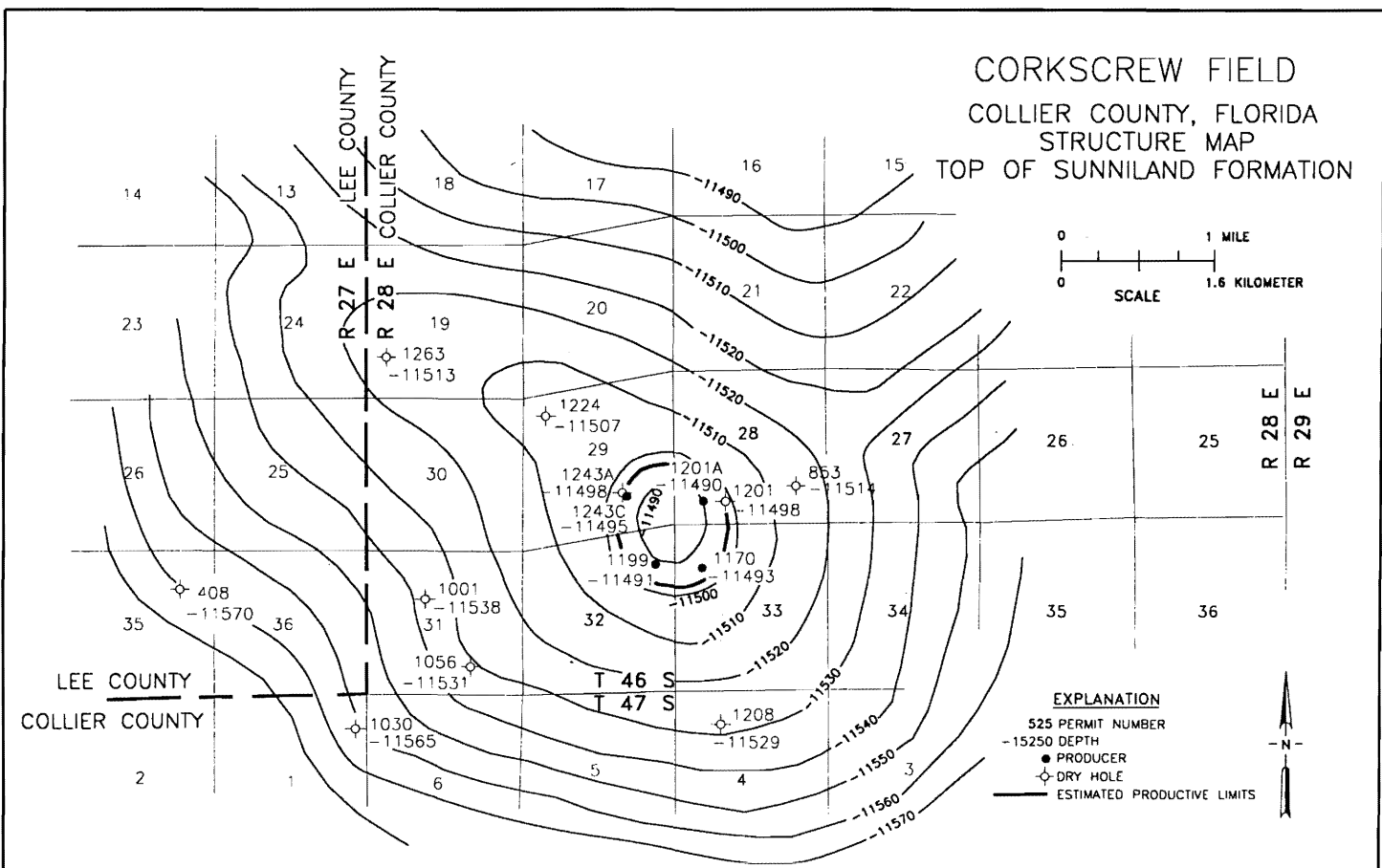


Figure 23. Corkscrew field structure map, top of Sunniland Formation (mapped by J. LeBar, petroleum engineer, Florida Geological Survey, 1996, personal communication).

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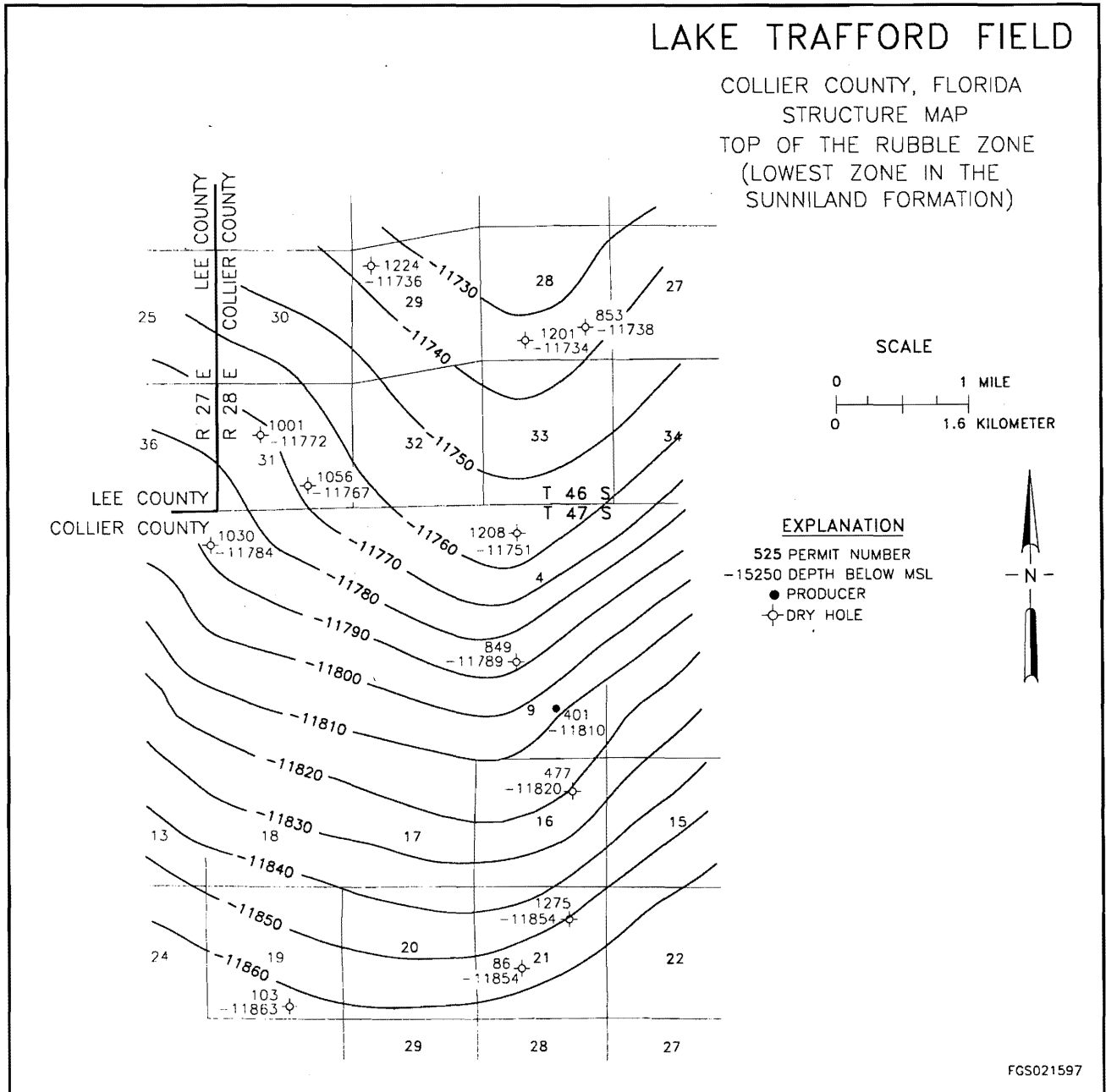


Figure 24. Lake Trafford field structure map, top of rubble zone, Sunniland Formation (lowest zone in Sunniland Formation, mapped by J. LeBar, petroleum engineer, Florida Geological Survey, 1996, personal communication).

Lake Trafford field is also unique in south Florida as the only field which produces oil from a fractured limestone in the lower Sunniland Formation (Means, 1977). This producing horizon has been described as an argillaceous, burrowed, limestone "rubble." Figure 24 is a structure map on top of this "Rubble Zone" as mapped by Jim LeBar (Petroleum Engineer, Florida Geological Survey, personal communication, 1996). The combination of burrowing and fracturing was believed to be responsible for the development of producible permeability and porosity (Jim Richter, Mobil Oil Corporation, personal communication, in Applegate and Lloyd, 1985).

Offsets drilled northwest and south of the discovery well were dry holes. The discovery well remains the single producing well for Lake Trafford field. The well has been periodically shut-in due to mechanical problems and has been producing only sporadically since March 1988. This well is still capable of producing substantial reserves if the mechanical problems can be solved (Jim LeBar, Petroleum Engineer, Florida Geological Survey, personal communication, 1996). The last reported production was during 1992. Total oil production for this field, as of January 1996, was 278,000 barrels (Appendix 2).

SUNNILAND FIELD

In September 1943, Humble Oil and Refining Company discovered

Sunniland field in Collier County, Florida (Appendix 1, Figures 1 and 25). This was the first commercial oil discovered in Florida. The discovery well was the Humble Oil and Refining Company - Gulf Coast Realties number 1 (permit 42) located in Section 29, Township 48 South, Range 30 East. The well was completed in an open hole interval between -11,568 and -11,592 feet MSL. Initial production was 97 barrels of 26° A.P.I. gravity oil and 425 barrels of saltwater per day by pumping.

The well was drilled on a prospect outlined by magnetic, gravity, seismic, and core data. Production in the field is from various porous zones in rudistid mounds in the upper 60 feet of the formation. Mitchell-Tapping (1985) described the producing horizon as consisting of leached rudist and algal particles together with pellets and foraminifers. Mitchell-Tapping's (1985) study of Sunniland, Bear Island, and Forty Mile Bend fields concluded that the depositional environment of these fields was that of a tidal shoal with a landward (east-northeast) mud-flat area and a seaward (west-southwest) shallow-water back-reef area. The structure map (Figure 25) for the Sunniland field shows a northwest-southeast trending dome that formed as these rudistid beds grew with slowly-rising sea level during the Lower Cretaceous. The dome is about four miles long and two miles wide with closure of about 40 feet.

Twenty-six producing wells and ten dry holes have been drilled at

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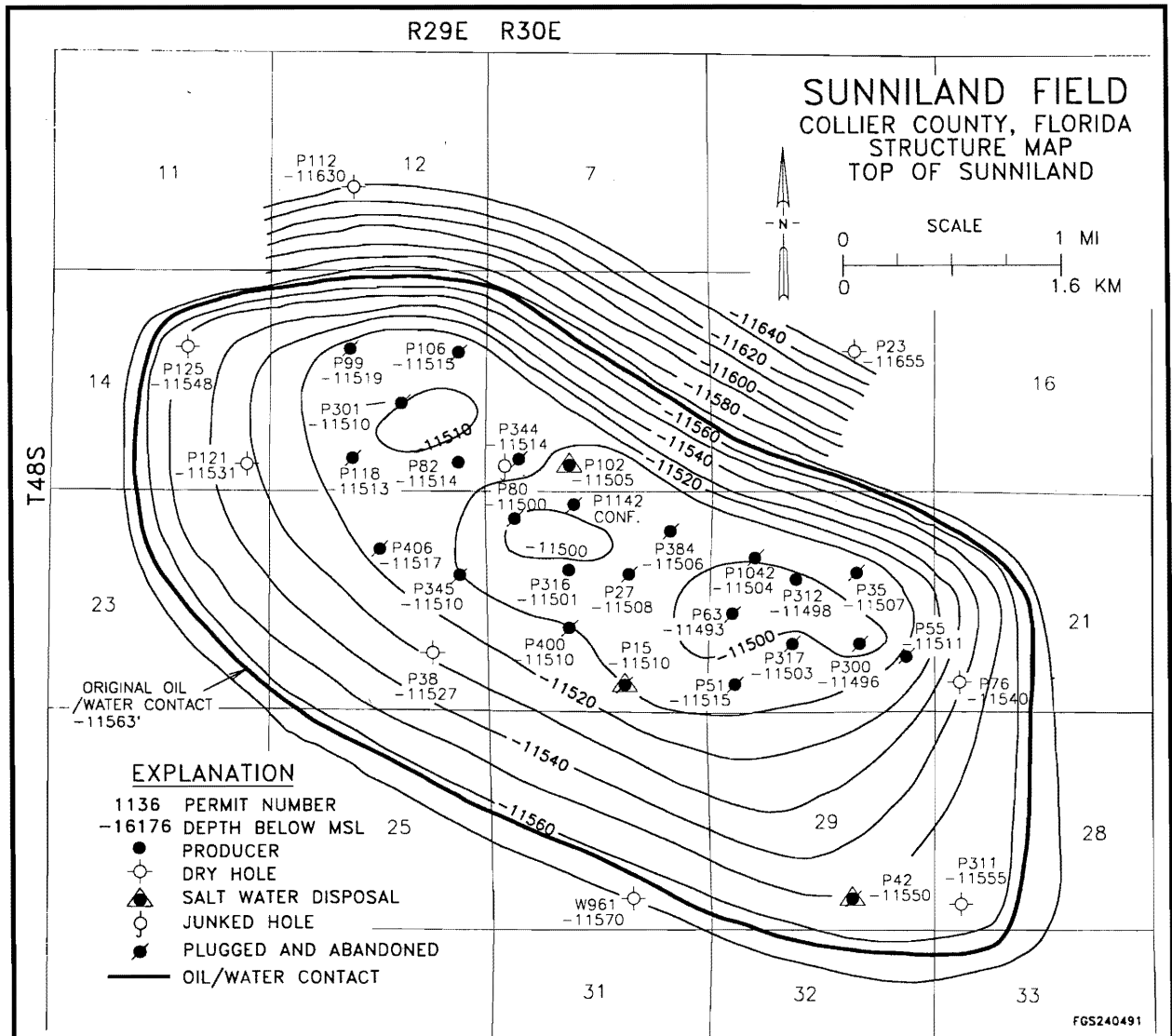


Figure 25. Sunniland field structure map, top of Sunniland Formation.

Sunniland field. After producing oil for over 50 years, increased saltwater production has forced abandonment of Sunniland field. All but two of the producing wells have been plugged and abandoned. It is unlikely that the remaining two wells (which are shut-in) will produce any additional oil (Jim LeBar, Petroleum Engineer, Florida Geological Survey, personal communication, 1996). The oil production total for Sunniland field, as of January 1996, was 18,445,000 barrels of oil (Appendix 2).

SEMINOLE FIELD

The discovery well for the Seminole field was the Weiner-Oleum Corporation well number 12-1 (permit 662) in Section 12, Township 48 South, Range 32 East, Hendry County (Appendix 1, Figure 1). The well was completed in the -11,379 to -11,384 foot MSL interval of the Sunniland Formation on November 14, 1973. Initial production was 26 barrels of 25.4° A.P.I. gravity oil and eight barrels of saltwater per day. This three-well oil field was abandoned in 1978 after producing a total of 85,000 barrels of oil (Appendix 2).

BEAR ISLAND FIELD

Bear Island field was discovered on December 5, 1972, with the completion of the Exxon - Gulf Coast Realities number 2-4 well (permit 563) in Section 2, Township 49 South,

Range 30 East (Appendix 1, Figures 1 and 26). The field is located about two miles southeast of Sunniland field. The discovery well pumped 132 barrels of 26° A.P.I. gravity oil and 545 barrels of saltwater per day from perforations between -11,558 and -11,564 feet MSL in Sunniland carbonates.

The structure map of Bear Island field (Figure 26) indicates a northwest-southeast trending dome about 4.5 miles long and 2.5 miles wide with a closure of about 55 feet. Mitchell-Tapping (1985) found this field to have the same faunal assemblage as Sunniland field; his conclusion concerning the general depositional environment is listed above in the description of Sunniland field. Despite the generally similar origin, Mitchell-Tapping (1985) found Bear Island field to be lithologically different from Sunniland field. Most of the Sunniland Formation at Bear Island field is dolomitized and is more leached than at Sunniland field. Anhydrite and some secondary dolomitization has reduced the effective permeability in some sections. Dolomitization in the lower units of the upper Sunniland, however, enhanced both porosity and permeability (Mitchell-Tapping, 1985).

A total of 25 producing wells have been drilled at Bear Island field; five of these were active at the end of 1995 (Appendix 3). Total oil production, through December 1995, was 11,318,991 barrels (Appendix 2).

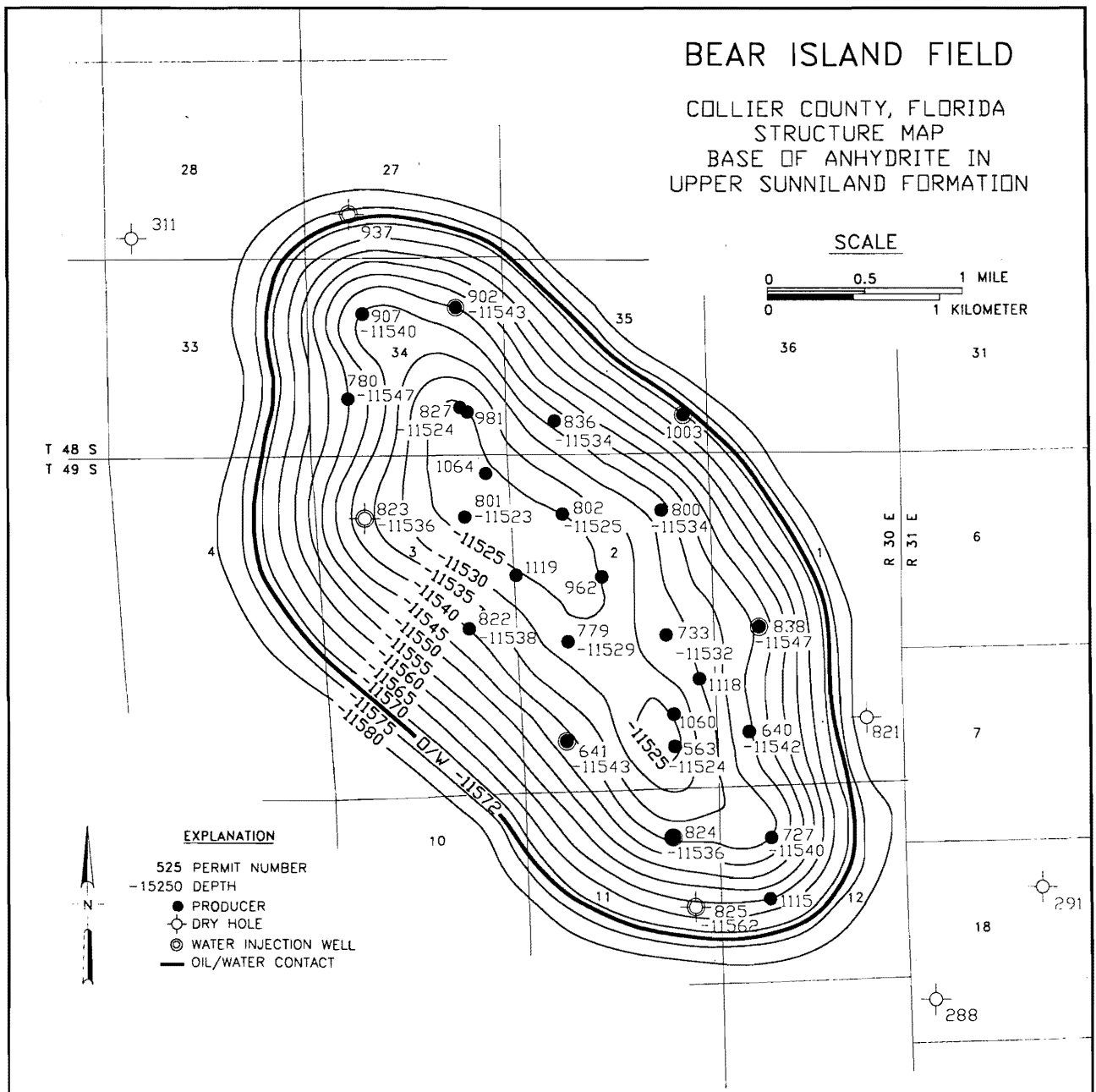


Figure 26. Bear Island field structure map, base of anhydrite in Upper Sunniland Formation (after Bear Island Geological Committee, 1978).

PEPPER HAMMOCK FIELD

Pepper Hammock was discovered on September 28, 1978. The discovery well, the Exxon Corporation - Collier Company number 23-1 well (permit 897), is located in Section 23, Township 29 South, Range 30 East, approximately one and one-half miles south of Bear Island field (Appendix 1, Figure 1). The initial production test yielded 20 barrels of 27° A.P.I. gravity oil and 206 barrels of saltwater per day. Production was from Sunniland limestones between -11,586 and -11,590 feet MSL. The discovery well is the only well at Pepper Hammock and is shut-in. A total of 323 barrels of oil were produced before the well was shut-in in October 1978 (Appendix 2).

BAXTER ISLAND FIELD

Baxter Island field is a one-well, abandoned field located approximately eight miles southeast of Bear Island field (Figure 1). The single producer and discovery well was the Diamond Shamrock - Gerry Brothers Ltd. number 31-3 well (permit 865) located in Section 31, Township 49 South, Range 32 East, Collier County (Appendix 1). In its initial production test on August 11, 1977, the well pumped 35 barrels of 22.4° A.P.I. gravity oil and 220 barrels of saltwater per day. Production was from the Sunniland Formation from -11,482 to -11,485 feet MSL. The field produced a total of 1,859 barrels of oil before

the well was shut-in in 1978 (Appendix 2). The well was plugged and abandoned on January 12, 1980.

RACCOON POINT FIELD

Raccoon Point field is the southeastern-most active field in the Sunniland trend (Figure 1). Its discovery well was the Exxon -Oleum Corporation number 33-4 (permit 829) drilled in Section 33, Township 51 South, Range 43 East, Collier County (Appendix 1, Figure 27). Initial production was from the -11,371 to -11,375 foot MSL interval of the Sunniland Formation. In a production test on June 20, 1978, the well pumped 57 barrels of 23.3° A.P.I. gravity oil and 845 barrels of saltwater per day.

Figure 27 indicates a structure similar to other Sunniland producing fields. At the end of 1995, six wells were actively producing (Appendix 3). Oil production totaled 8,569,027 barrels at the end of December 1995 (Appendix 2).

FORTY MILE BEND FIELD

Commonwealth Oil Company drilled the Wiseheart - State Board of Education number 1 wildcat (permit 167) in Section 16, Township 45 South, Range 35 East, Dade County. It was located 50 miles southeast of Sunniland field (Appendix 1, Figure 1). The well was completed in the -11,298 to -11,315 foot MSL interval of the Sunniland Formation and was initially

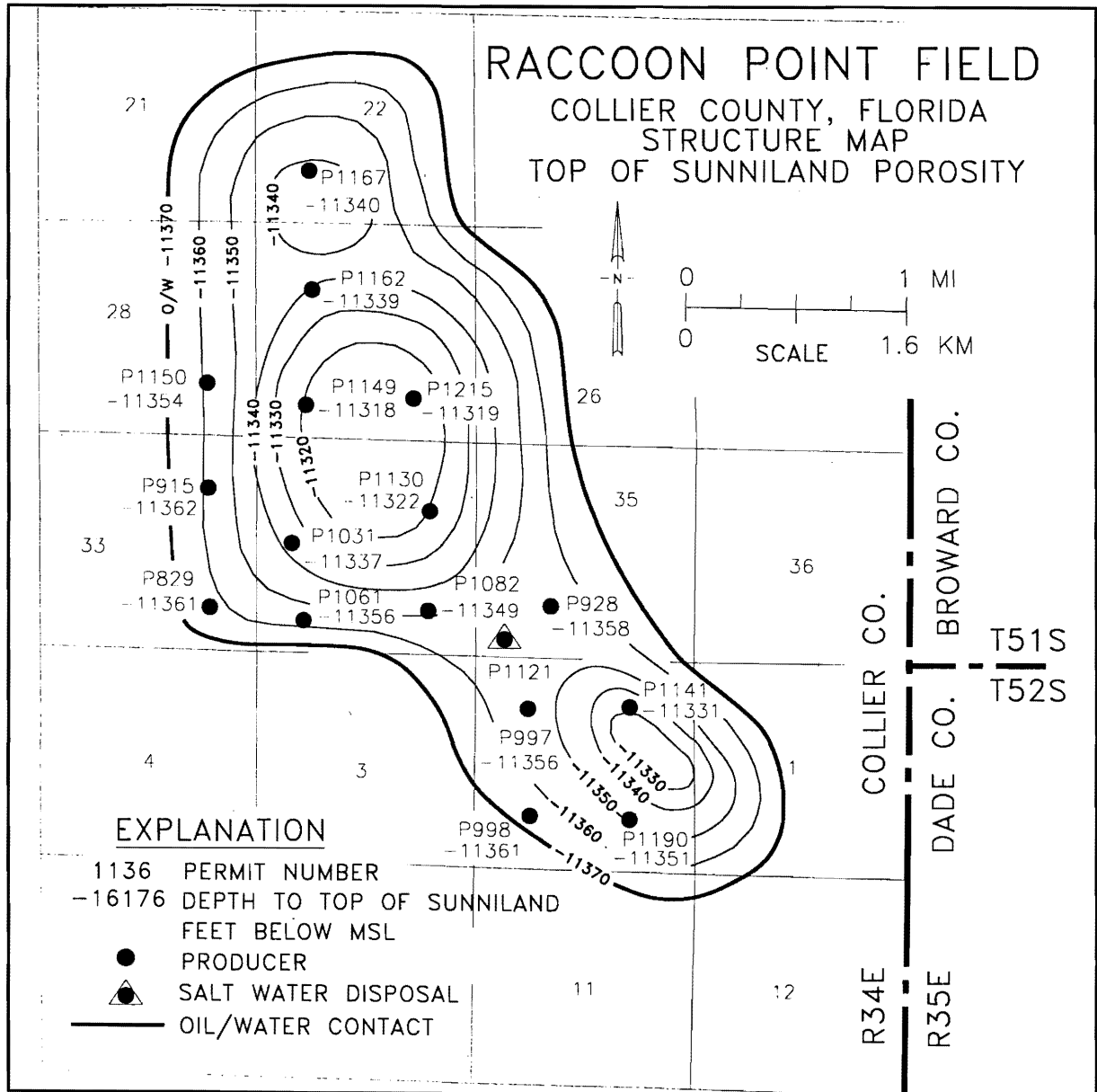


Figure 27. Raccoon Point field structure map, top of Sunniland Formation porosity (after Raccoon Point Geological Committee, 1993).

tested on February 5, 1954. In this initial test, the well pumped an estimated 76 barrels of 21.3° A.P.I. gravity oil and 96 barrels of saltwater per day. Core examination (Applegate and Lloyd, 1985) in the open interval showed a partially to fully oil-saturated, finely crystalline dolostone and limestone with pin-point porosity, which did not appear to be commercial.

The second well in the Forty Mile Bend field, the Gulf Oil - State of Florida number 1 well (permit 182), was also completed in 1954. The well is located about three and one-quarter miles east of the discovery well (Figure 1). It was completed as a pumping well in the -11,309 to -11,316 foot MSL interval of the Sunniland Formation. Initial production was 112 barrels of 21.7° A.P.I. gravity oil per day. Water production was not tabulated.

The distance between the two wells comprising Forty Mile Bend field indicate that they probably did not produce from the same reservoir.

Mitchell-Tapping (1985) studied the fauna and lithology of Sunniland, Bear Island, and Forty Mile Bend fields. His description of the depositional environment for these fields is discussed above in the Sunniland field description. He found the lithology and fauna at Forty Mile Bend to be similar to that of Sunniland field, except for the presence of anhydrite in the pore space and an increase in the dolomite content.

Low oil gravity and low porosity and permeability in the Sunniland at both well locations made this field non-commercial. In addition, a half-inch hole was found in the casing of the Gulf well (permit 182) at -10,027 feet MSL. This could have caused excessive water flow, and thus shortened the productive life of this well. Both of the Forty Mile Bend wells were abandoned in 1956, after producing only 32,888 barrels of oil in about 17 months in 1954 and 1955 (Appendix 2) (Gunter, 1955 and 1956).

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APPENDIX 1. FLORIDA OIL FIELD DISCOVERY WELL DATA

DISCOVERY DATE	PERMIT NO.	FIELD	COUNTY	DATUM FOR DEPTH MEASUREMENTS, FT. MSL (1)	PERFORATIONS OR OPEN HOLE DEPTH BELOW DATUM, FT.	TOTAL DEPTH BELOW DATUM, FT.	PRODUCING FORMATION	DISCOVERY STATUS	OIL GRAVITY, DEGREES API
9-26-43	42	Sunniland	Collier	34 (DF)	11,602-11,626	11,626	Sunniland	Pumping	26
2-1-54	167	Forty Mile Bend	Dade	24 (DF)	11,322-11,339	11,557	Sunniland	Pumping	21
7-22-64	315	Sunoco Felda	Hendry	55	11,472-11,485	11,485	Sunniland	Pumping	25
8-2-66	371	West Felda	Hendry	49	11,486-11,489	11,675	Sunniland	Pumping	26
3-30-69	401	Lake Trafford	Collier	40	11,870-11,892	11,987	Sunniland	Pumping	26
6-15-70	417	Jay	Santa Rosa	206	15,470-15,524	15,984	Smackover & Norphlet	Flowing	51
12-19-71	504	Mt. Carmel	Santa Rosa	274	15,260-15,280	15,399	Smackover & Norphlet	Flowing	47
2-14-72	523	Blackjack Creek	Santa Rosa	157	15,790-15,900	16,235	Smackover & Norphlet	Flowing	51
12-5-72	563	Bear Island	Collier	31	11,589-11,595	11,817	Sunniland	Pumping	26
11-14-73	662	Seminole	Hendry	36	11,415-11,420	11,651	Sunniland	Pumping	25
7-30-74	712	Lehigh Park	Lee	40	11,389-11,394	11,630	Sunniland	Pumping	28
4-22-77	881	Sweetwater Creek	Santa Rosa	255	14,299-14,340	14,611	Smackover	Pumping	45
8-11-77	865	Baxter Island	Collier	30	11,512-11,515	11,823	Sunniland	Pumping	22
10-13-77	904	Mid-Felda	Hendry	59	11,492-11,496	11,686	Sunniland	Pumping	26
6-20-78	829	Raccoon Point	Collier	39	11,410-11,414	11,658	Sunniland	Pumping	23
9-28-78	897	Pepper Hammock	Collier	43	11,629-11,633	11,897	Sunniland	Pumping	27
6-27-82	1070	Townsend Canal	Hendry	53	11,416-11,421	11,462	Sunniland	Pumping	28
3-25-84	1125	Bluff Springs	Escambia	178	16,332-16,339	16,800	Smackover	Flowing	57
11-10-85	1170	Corkscrew	Collier	45	11,547-11,565	11,565	Sunniland	Pumping	26
2-19-86	1194	McLellan	Santa Rosa	245	14,072-14,090	14,475	Smackover	Flowing	41
6-4-88	1220	Coldwater Creek	Santa Rosa	166	15,150-15,170	15,407	Smackover	Flowing	47
6-14-88	1230	McDavid	Escambia	271	16,346-16,360	16,800	Smackover	Flowing	54

1. This is usually the kelly bushing elevation; where this is unavailable, drill floor (DF) elevation is given.

APPENDIX 2. 1994, 1995 AND CUMULATIVE PRODUCTION DATA (1)

FIELD (2)	1994 PRODUCTION			1995 PRODUCTION			CUMULATIVE PRODUCTION	
	Oil (Bbls)	Gas (MCF)	Water (Bbls)	Oil (Bbls)	Gas (MCF)	Water (Bbls)	Oil (MBbls)	Gas (MMCF)
NORTHWEST FLORIDA								
Bluff Springs (3)	0	0	0	0	0	0	242	129
McDavid (3)	0	0	0	0	0	0	150	62
Jay (Fla. only)	4,159,336	7,410,410	55,199,267	3,810,967	6,230,813	61,436,742	387,816	505,234
Jay (Fla. + Ala.)	4,580,107	8,043,399	60,918,577	4,076,430	6,613,768	67,047,142		
Coldwater Creek	32,699	0	116,915	3,404	0	16,753	81	14
Blackjack Creek	354,722	814,154	8,505,848	301,964	738,079	8,595,142	56,805	57,325
Mt. Carmel	20,725	0	160,721	2,737	0	45,557	4,770	4,797
McLellan	24,842	7,888	35,105	17,238	4,560	39,137	352	144
Sweetwater Creek (3)	0	0	0	0	0	0	14	15
Subtotal (4)	4,592,324	8,232,452	64,017,856	4,136,310	6,973,452	70,133,331	450,230	567,720
SOUTH FLORIDA								
Lehigh Park	50,153	6,318	701,074	43,271	6,318	661,097	5,462	559
Townsend Canal	2,590	0	19,578	4,816	0	50,645	527	0
West Felda	353,456	27,934	3,125,074	357,942	28,777	3,283,230	43,301	3,383
Mid-Felda	17,074	0	49,992	10,299	0	91,870	1,485	10
Sunoco Felda (3)	0	0	0	0	0	0	11,598	982
Corkscrew	61,667	0	67,347	47,136	0	59,721	967	0
Lake Trafford	0	0	0	0	0	0	278	0
Seminole (3)	0	0	0	0	0	0	85	0
Sunniland	0	0	0	0	0	0	18,445	1,825
Bear Island	123,877	24,453	458,640	90,125	23,099	275,807	11,319	942
Pepper Hammock	0	0	0	0	0	0	0	0
Baxter Island (3)	0	0	0	0	0	0	2	0
Raccoon Point	871,897	155,747	913,951	991,719	139,911	1,892,882	8,568	1,121
Forty Mile Bend (3)	0	0	0	0	0	0	33	2
Subtotal	1,480,714	214,452	5,335,656	1,545,308	198,105	6,315,252	102,070	8,824
STATEWIDE TOTAL	6,073,038	8,446,904	69,353,512	5,681,618	7,171,557	76,448,583	552,300	576,544
1. Statistics compiled by Jim LeBar, Petroleum Engineer, Florida Geological Survey, Oil and Gas Section. 2. Fields are listed in approximate order from north to south and west to east. 3. Plugged and abandoned oil fields. 4. Northwest Florida subtotals use Jay (FL only) data. Abbreviations: Bbls - Barrels (42 US Gallons) MBbls - Thousand Barrels MCF - Thousand Cubic Feet MMCF - Million Cubic Feet								

Information Circular 111

APPENDIX 3. 1994 AND 1995 FIELD WELL STATISTICS (1)

FIELD (2)	1994 Number of Wells					1995 Number of Wells				
	PRO	INJ	SI	TA	TOTAL	PRO	INJ	SI	TA	TOTAL
NORTHWEST FLORIDA										
Jay	43	31	35	0	109	51	27	32	1	111
Coldwater Creek	1	0	0	0	1	0	0	1	0	1
Blackjack Creek	8	10	3	0	21	10	9	2	1	22
Mt. Carmel	1	0	0	0	1	0	0	1	0	1
McLellan	2	0	0	0	2	2	0	0	0	2
Subtotal	55	41	38	0	134	63	36	36	2	137
SOUTH FLORIDA										
Lehigh Park	1	0	0	0	1	1	0	0	0	1
Townsend Canal	1	0	3	0	4	1	0	1	0	2
West Felda	8	0	15	0	23	6	0	11	2	19
Mid-Felda	1	0	1	0	2	2	0	0	0	2
Sunoco Felda	0	0	4	0	4	0	0	0	0	0
Corkscrew	3	0	0	0	3	3	0	0	0	3
Lake Trafford	0	0	1	0	1	0	0	1	0	1
Sunniland	0	0	4	0	4	0	0	2	0	2
Bear Island	6	0	9	0	15	5	0	8	0	13
Pepper Hammock	0	0	1	0	1	0	0	1	0	1
Raccoon Point	5	0	7	0	12	6	0	7	0	13
Subtotal	25	0	45	0	70	24	0	31	2	57
STATEWIDE TOTAL	80	41	83	0	204	87	36	67	4	194

1. 1994 statistics compiled by Charles Tootle, Petroleum Engineer, Florida Geological Survey, Oil and Gas Section.

1995 statistics compiled by Jim LeBar, Petroleum Engineer, Florida Geological Survey, Oil and Gas Section.

2. Fields are listed in approximate order from north to south and west to east.

Abbreviations:

PRO - Producing Wells

INJ - Injection Wells

SI - Shut In Wells

TA - Temporarily Abandoned Wells

Florida Geological Survey

APPENDIX 4. 1994 AND 1995 FIELD WELLS DRILLED

FIELD County	Permit No.	Operator-Well Name & No.	Location (1)	Completion Date	Drill Floor Elev., Ft. Above MSL	Total Depth Ft. (2)	Comments
MT. CARMEL Santa Rosa	P-1286	Daniels Corp.- Hendricks 2-1, No. 2	SHL: 980' FWL & 1680' FSL Sec. 2, T5N, R29W BHL: Not available. (3)	01/29/95	273	MD: 15,370 TVD: 15,350	Top of Smackover: 15,082'. Top of Norphlet: 15,310'. Well sidetracked, P-1286A.
Santa Rosa	P-1286A	Daniels Corp.- Hendricks 2-1, No. 2, ST1	SHL: 980' FWL & 1680' FSL Sec. 2, T5N, R29W BHL: 1305' FWL & 1405' FSL Sec. 2, T5N, R29W	03/09/95	273	MD: 15,511 TVD: 15,442	Top of Smackover: 15,164'. Top of Norphlet: 15,418'. Dry hole, in process of plugging & abandonment.

1) Directionally drilled well; SHL is surface hole location, BHL is bottom hole location.

2) MD: measured depth, TVD: true vertical depth.

3) Directional survey to total depth not supplied by operator. Hole location at a depth of 14,754' was 1,711' FSL and 587' FWL, Sec. 2, T5N, R29W.

APPENDIX 5. EXPLORATORY WELL DRILLED IN 1993, COMPLETION REPORT RECEIVED IN 1994

County	Permit No.	Operator-Well Name & No.	Location	Completion Date	Drill Floor Elev., Ft. Above MSL	Total Depth Ft.	Comments
Santa Rosa	P-1285	Mack Oil Corp.- Champion 23-1	1339' FNL & 1274' FEL Sec. 23, T3N, R28W	11/07/93	186	16,600	Target: Smackover Fm. Top of Smackover: 16,145'. Plugged & abandoned as a dry hole, 11/10/93.

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APPENDIX 6. OIL EXPLORATION WELLS DRILLED IN STATE WATERS (1)

Year	Permit and Well(2) No.	Operator	Lease No. and Area	County	Rotary Table Elev. Ft. above MSL	Total Depth, Ft.	Geological Significance
1947	P-16 W-1413	Gulf Oil Corp.	State of Florida Lease 374 No. 1 Sugarloaf Key Area	offshore Monroe	23	6,100	Bottomed in Upper Cretaceous(?).
1947	P-22 W-972	Gulf Oil Corp.	State of Florida Lease 373 No. 1 Big Pine Key Area	offshore Monroe	23	15,455	No porosity in Sunniland Fm. Well bottomed in Pumpkin Bay Fm. Very difficult to correlate this well because of anhydrite development. Structurally very low.
1947	P-43 W-1502	Magnolia Petroleum Co.	State of Florida Block 5-B No. 1-A St. Vincent Sound	offshore Franklin	10	7,019	Bottomed in Lower Cretaceous.
1955	P-232 W-3510C	Gulf Oil Corp.	State of Florida Lease 826-G No. 1 Florida Bay	offshore Monroe	32	12,631	Well cored from 11,661-12,544' in Sunniland Fm. and Punta Gorda Anhydrite. Encountered some salt stringers in Punta Gorda. Only 60' of dark dense calcilutite in Sunniland Fm.
1956	P-251 W-4122	HORC	State of Florida Lease 833 No. 1 Pensacola Bay	offshore Santa Rosa	26	7,505	Bottomed in Lower Cretaceous.
1959	P-275 W-5094	Gulf Oil Corp.	State of Florida Lease 826-Y No. 1 Marquesas	offshore Monroe	56	15,478	Four drill stem tests: 12,474-12,533'(Lake Trafford? Fm.) 12,534-12,544'(Sunniland Fm.) 12,582-12,822'(Sunniland Fm.) 14,642-14,702'(Brown Dolomite Zn.) The 12,474-12,533' test recovered 15 barrels of 22 degree API gravity oil and 14.1 barrels of saltwater. Brown Dolomite from 14,650-15,036' was somewhat vuggy. This may be the principal target in this area. Net dolomite estimated at 400'.
1959	P-280 W-5152	California Coastal	State of Florida Lease 1011 No. 1 Big Pine Key Area	offshore Monroe	21	6,030	Bottomed in Lower Cretaceous.
1959	P-281 W-5103	California Coastal	State of Florida Lease 224-A No. 1 St. George Island Area	offshore Franklin	26	7,030	Bottomed in Lower Cretaceous.
1960	P-289 W-5574	California Coastal	State of Florida Lease 224-B No. 1 Boca Grande Area	offshore Lee	39	14,000	Brown Dolomite: 12,485-12,589'. Estimated net dolomite: 103'.
1961	P-292 W-5713	California Coastal	State of Florida Lease 1011 No. 2 Marquesas	offshore Monroe	36	7,722	Bottomed in Lower Cretaceous.
1961	P-293 W-5654	California Coastal	State of Florida Lease 224-A No. 2 South of Alligator Point	offshore Franklin	34	10,560	Did not encounter Smackover Fm. Bottomed in Eagle Mills Fm. of Triassic age. Diabase found in Eagle Mills.

1. Modified from Applegate and Lloyd, 1985.

2. Florida Geological Survey well number for samples (cuttings or core chips).

Florida Geological Survey

APPENDIX 6 (cont.). OIL EXPLORATION WELLS DRILLED IN STATE WATERS (1)

Year	Permit and Well(2) No.	Operator	Lease No. and Area	County	Rotary Table Elev. Ft. above MSL	Total Depth, Ft.	Geological Significance
1961	P-297 W-5785	California Coastal	State of Florida Lease 224-B No. 2 Boca Grande Area	offshore Lee	40	12,600	There is an estimated 40' of dolomite in the 12,445-12,560' Brown Dolomite interval. No evidence of oil staining. Dolomite microcrystalline to finely crystalline. Core analysis from 11,255-11,625' Sunniland interval showed no permeability, extremely low porosity, and no oil.
1962	P-298 W-5970	California Coastal	State of Florida Lease 1011 No. 3 Marquesas	offshore Monroe	57	12,850	Bottomed in Punta Gorda Anhydrite. No shows of oil and no porosity reported. Drill stem test of the 12,521-12,600' interval tested saltwater. Rebecca Shoals Reef (Paleocene and Upper Cretaceous) present.
1963	P-304 W-6278	California Coastal	State of Florida Lease 224-B No. 3 Honeymoon Island Area	offshore Pinellas	37	10,600	Bottomed in Lower Cretaceous. Very poor samples. No oil shows. Carbonates-clastics below 7,000'.
1967	P-375 W-8139	Mobil Oil Corp.	State of Florida Lease 224-B No. 1 Boca Grande Area	offshore Charlotte	21	12,931	This well drilled into Pumpkin Bay Fm. at 12,230'. Drilled into basement (rhyolite porphyry) at 12,830'. No shows in Sunniland Fm. Brown Dolomite Zone: 11,920-12,000'. Estimated net dolomite: 70'. Poor samples.
1967	P-382 W-8304	Mobil Oil Corp.	State of Florida Lease 224-A No. 1-A W-SW of Crystal River	offshore Citrus	22	6,041	Mixed facies (carbonates, sandstones, and shales) at 4,325'; Triassic, Eagle Mills at 5,625'; Paleozoic at 5,920'. Very indurated shale and siltstone. Some quartzite. Bedding planes vertical in this core. No shows and no porosity.
1967	P-383 W-8305	Mobil Oil Corp.	State of Florida Lease 224-A No. 1-B Cedar Key Area	offshore Levy	25	4,735	Mixed facies (carbonates, sandstones, and shales) at 2,882' in Cretaceous. Predominantly varicolored unconsolidated sandstone below 4,180'. Highly indurated quartzites and interbedded shales in core (Paleozoic) from 4,720-4,735'.
1968	P-387 W-8487	Mobil Oil Corp.	State of Florida Lease 224-A No. 1-C Little St. George Island Area	offshore Franklin	37	14,369	This well encountered Jurassic limestone. First indication of possible Smackover Fm. in Apalachicola area.
1983	P-1097 W-15391	Getty Oil Company	State of Florida Lease 2338 No. 1 East Bay	offshore Santa Rosa	30	18,011	Smackover tests at 17,405-17,411' and 17,328-17,411' produced only saltwater. Norphlet Ss. and Louann/Werner evaporites were very thin.

1. Modified from Applegate and Lloyd, 1985.

2. Florida Geological Survey well number for samples (cuttings or core chips).

APPENDIX 7. 1994 AND 1995 GEOPHYSICAL EXPLORATION ACTIVITY

PERMIT	GEOPHYSICAL COMPANY	COUNTY	PERMIT APPROVED	EXPIRATION DATE	STATUS	ENERGY SOURCE	SURVEY LENGTH, MI	
							APPROVED	SURVEYED
G-152-93	Universal Seismic Acquisition Inc.	Santa Rosa	03-Mar-94	03-Mar-95	Completed	Seismic Explosives	22.5	22.5
G-153-93	Triton Energy Company	Highlands	23-Nov-93	23-Nov-94	Completed	Gravity	102.0	102.0
G-154-95	Calumet Florida Inc.	Lee, Hendry, & Collier	24-Mar-95	23-Mar-96	In Progress	Seismic Explosives	52.4	20.3
G-155-95	Coastal Petroleum	Offshore	Application Pending			Airgun and Gravity/Magnetic	Dense grid: Apalachicola to Naples. Mileage not given in application.	
Total Miles in Applications:							176.9	144.8
Survey Miles by Area:								
North Florida:							22.5	22.5
South Florida:							154.4	122.3

APPENDIX 8. FLORIDA OIL AND GAS RESERVE ESTIMATES (1)

FIELD (2)	OIL GRAVITY, A.P.I.	AVERAGE POROSITY, PERCENT	PRODUCTIVE ACRES	AVERAGE GAS-OIL RATIO, SCF/STB	ORIGINAL OIL IN PLACE, BARRELS	ESTIMATE RECOVERY FACTOR, FRACTION	ORIGINAL RECOVERABLE OIL IN PLACE, BARRELS	OIL PRODUCED THROUGH 1-1-96, BARRELS	REMAINING RECOVERABLE OIL RESERVES AS OF 1-1-96, BARRELS	ORIGINAL RECOVERABLE GAS IN PLACE, MCF	GAS PRODUCED THROUGH 1-1-96, MCF	REMAINING RECOVERABLE GAS RESERVES AS OF 1-1-96, MCF
NORTHWEST FLORIDA												
Bluff Springs (3)	53	19.6	160.00	550	1,300,440	0.19	247,084	241,871	5,213	135,795	128,565	7,230
McDavid (3)	53	12.8	160.00	400	4,987,347	0.10	498,736	150,323	348,413	199,494	61,859	137,635
Jay (FL & AL)	51	14.0	14,414.50	1,277	820,569,503	0.60	492,341,702	419,824,453	72,517,249	628,720,354	547,251,409	81,468,945
Jay (FL only)	51	14.0	13,021.14	1,277	763,129,638	0.60	457,877,783	387,815,585	70,062,198	584,709,929	505,234,204	79,475,725
Coldwater Creek	47	12.1	160.00	500	2,080,107	0.15	312,016	80,068	231,948	156,008	14,012	141,996
Blackjack Creek	48	16.5	5,719.98	954	100,500,000	0.60	60,300,000	56,805,223	3,494,777	57,526,200	57,324,872	201,328
Mt. Carmel	43	9.1	481.28	1,028	17,500,000	0.29	5,075,000	4,770,745	304,255	5,218,140	4,797,292	420,848
McLellan	43	9.0	480.00	430	2,915,540	0.14	412,686	351,617	61,069	177,455	143,494	33,961
Sweetwater Creek (3)	44	11.0	160.00	1,070	624,000	0.10	62,400	13,695	48,705	66,768	14,655	52,113
Subtotal (4)			20,342.40		893,037,072		524,785,705	450,229,127	74,556,578	648,189,789	567,718,953	80,470,836
SOUTH FLORIDA												
Lehigh Park	28	17.7	800.00	100	8,211,707	0.68	5,583,961	5,462,076	121,885	558,396	558,161	235
Townsend Canal	28	13.7	640.00	0	4,504,699	0.20	900,940	526,420	374,520	0	0	0
West Felda	26	15.0	7,500.00	80	125,802,366	0.35	44,030,828	43,301,266	729,562	3,522,466	3,383,330	139,136
Mid-Felda	26	11.9	480.00	10	5,090,419	0.30	1,527,126	1,484,994	42,132	12,726	10,094	2,632
Sunoco Felda (3)	25	15.0	3,840.00	85	28,946,578	0.40	11,608,631	11,598,196	10,435	984,184	981,827	2,357
Corkscrew	26	6.9	480.00	0	1,667,806	0.65	1,084,074	966,703	117,371	0	0	0
Lake Trafford	26	7.9	160.00	0	7,690,293	0.04	307,612	278,241	29,371	0	0	0
Seminole (3)	25	14.1	480.00	0	2,366,565	0.10	236,657	84,755	151,902	0	0	0
Sunniland	26	15.0	2,080.00	100	37,685,118	0.50	18,842,559	18,445,245	397,314	1,884,256	1,824,628	59,628
Bear Island	26	11.9	2,880.00	80	42,811,959	0.35	14,984,184	11,318,991	3,665,193	1,198,735	941,112	257,623
Pepper Hammock	27	15.3	160.00	0	976,713	0.10	97,671	323	97,348	0	0	0
Baxter Island (3)	22	19.6	160.00	0	1,276,617	0.10	127,662	1,859	125,803	0	0	0
Raccoon Point	23	13.9	2,400.00	120	42,437,790	0.25	10,609,448	8,569,027	2,040,421	1,273,134	1,121,170	151,964
Forty Mile Bend (3)	21	10.0	320.00	50	1,112,701	0.07	77,889	32,888	45,001	3,894	1,656	2,238
Subtotal			22,380.00		310,581,331		110,019,242	102,070,984	7,948,258	9,437,791	8,821,978	615,813
STATEWIDE TOTAL			42,722.40		1,203,618,403		634,804,947	552,300,111	82,504,836	657,627,580	576,540,931	81,086,649

1. Updated from estimates by Charles H. Tootle in Lloyd, 1994. See Lloyd, 1994 for explanation of methods used to determine reserve estimates.

2. Fields are listed in approximate order from northwest to southeast.

3. Plugged and abandoned oil fields.

4. Northwest Florida subtotals use Jay (FL only) data.

DISCLAIMER:

An attempt was made to present realistic estimates; however, no guarantee or warranty is expressed or implied. Anyone who uses this information does so at their own risk.

ABBREVIATIONS: MCF - Thousand Cubic Feet

SCF - Standard Cubic Feet

STB - Stock Tank Barrels

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