1988

Review of Hydrocarbon Producing Zones Near the Richton Dome High-Level Nuclear Waste Site, Perry County, Mississippi

Charles Swann

Katherine Walton

Open-File Report 88-10

Review of Hydrocarbon Producing Zones Near the Richton Dome High-Level Nuclear Waste Site, Perry County, Mississippi

Charles T. Swann and Katherine H. Walton

1988

The Mississippi Mineral Resources Institute
University, Mississippi 38677

REVIEW OF HYDROCARBON PRODUCING ZONES NEAR THE RICHTON DOME HIGH-LEVEL NUCLEAR WASTE SITE, PERRY COUNTY, MISSISSIPPI

OPEN FILE REPORT 88-10

by

Charles T. Swann
Mississippi Department of Energy and Transportation
510 George Street
Jackson, Mississippi 39202

and

Katherine H. Walton
The Mississippi Mineral Resources Institute
Room 202, Old Chemistry Building
University, Mississippi 38677

March 1988

ABSTRACT

Richton Dome is a large, shallow salt diapir which was considered a potentially acceptable site for the nation's first high-level nuclear waste repository. Recent legislation by the United States Congress, however, has directed all site characterization efforts to the Yucca Mountain site in Nevada. Prior to this Congressional action, studies have been underway by the State of Mississippi to evaluate the commercial aspects and mineral resources of the diapir. This report evaluates the producing horizons within 30 miles of Richton Dome in an effort to establish a regional framework for comparison with ongoing, more site-specific investigations.

The area surrounding Richton Dome produces both oil and gas from units as old as the Norphlet Formation of the Jurassic Period to the Clayton Formation of the Tertiary Period. The Upper Cretaceous section produces the largest amount of oil followed by the Lower Cretaceous, Jurassic and Tertiary sections respectively. The Jurassic section produces the largest amount of gas followed by the Upper Cretaceous, Lower Cretaceous, and Tertiary sections. Production near Richton Dome is from the Eutaw (Glazier Field) and the Hosston (Tiger Field). A total of 100 feet of heavy oil has been reported from the flanks of the Richton diapir itself. A paucity of hydrocarbon tests at Richton Dome, evidence of nearby and regional production, reported oil shows from the flanks of the dome, and probable trapping mechanisms of the diapir indicate that the potential for production should not be condemned without further evaluation.

ACKNOWLEDGEMENTS

The authors would like to acknowledge the following people for their contributions to this project: Carolyn Woodley of the Mississippi Bureau of Geology for her assistance in obtaining reference materials, Paul Mitchell of the Mississippi Mineral Resources Institute for providing illustrations for this report, and Henry S. Johnson Jr. also of the Mississippi Mineral Resources Institute for his advice and constructive criticism.

The United States Department of Energy provided partial fiscal support with Grant Number DE-FG 97-83WM46655 through the Mississippi Department of Energy and Transportation Board Contract 84-039-174.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

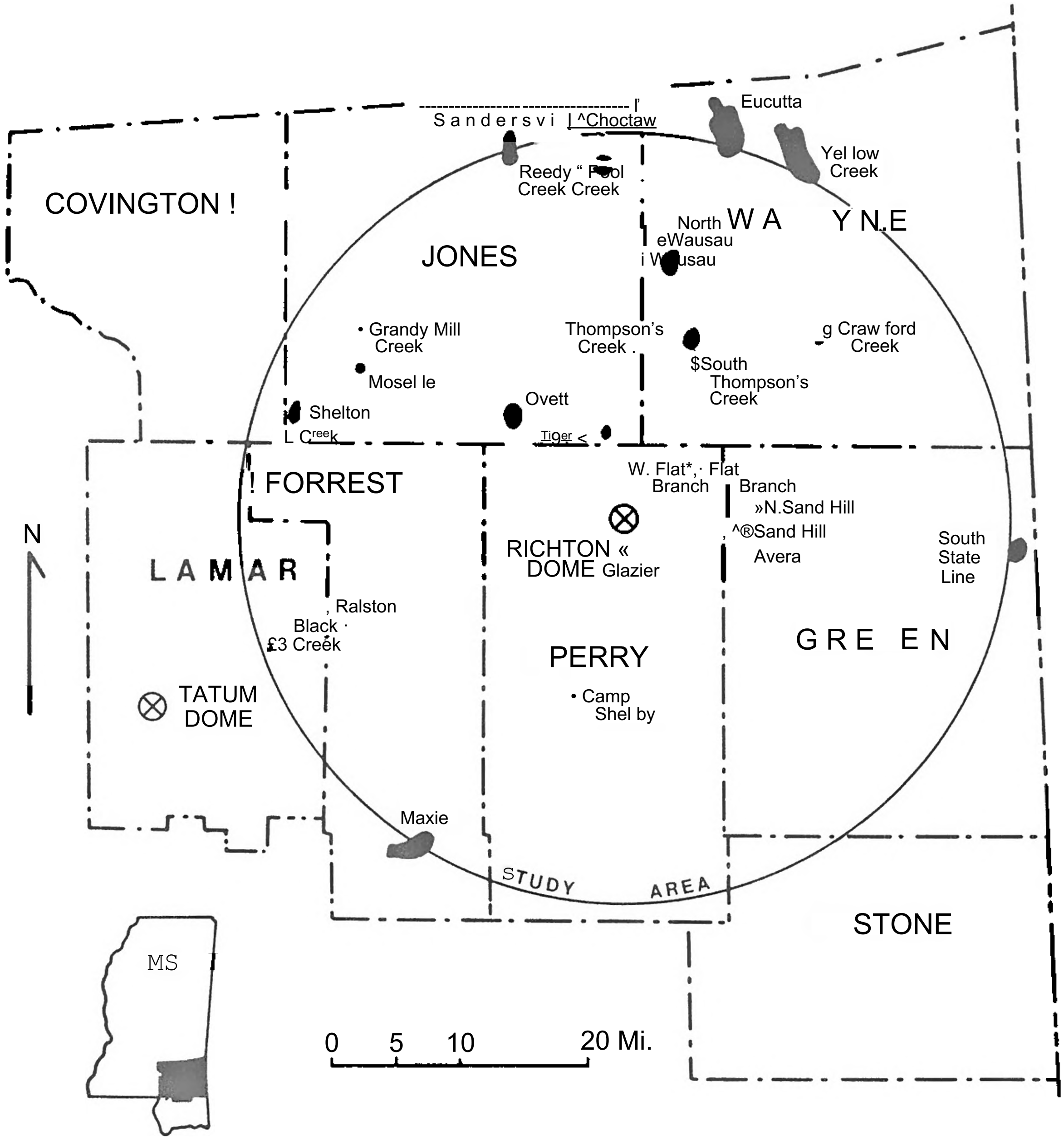
REVIEW OF HYDROCARBON PRODUCING ZONES NEAR THE RICHTON DOME HIGH-LEVEL NUCLEAR WASTE SITE, PERRY COUNTY, MISSISSIPPI

INTRODUCTION

The Richton Dome, a large salt diapir in Perry County, Mississippi, was considered one of the potentially acceptable sites for construction of a high-level nuclear waste repository. Recent legislation by the United States Congress, however, has directed the Department of Energy to investigate only the Yucca Mountain Site in Nevada. This action, for all practical purposes, has eliminated the Richton Dome as a high-level nuclear waste repository site.

For several years prior to this congressional action, the State of Mississippi has been involved in geologic studies and reviews regarding the Richton site. These studies investigate the potential for economic accumulations of hydrocarbons as they relate to the potential for human intrusion after repository construction. In addition to this report, other studies are presently being completed for the Richton Site and adjacent producing fields.

In analyzing the hydrocarbon accumulation potential at Richton Dome, a general framework of production of the surrounding area should be constructed for purposes of comparison with detailed site-specific data. This report provides that framework by investigating the hydrocarbon producing zones within a radius of 30 miles around the Richton site (Figure 1). Those fields which have produced oil or gas within the past ten years are evaluated for such data as production, number of wells, producing zones, and types of trapping mechanism.



LOCATION MAP

FIGURE 1: STUDY AREA LOCATION MAP

No such compilation of data presently exists for this study area. Devery (1981) has produced a chart of hydrocarbon producing zones in Mississippi, but she does not include such information as number of wells, trapping mechanisms, and amounts of production. Furthermore, fields which existed at the time of publication have changed significantly, and new fields have since been discovered. Knight (1985) analyzes the hydrocarbon potential at Richton Dome, but his investigation is primarily site-specific in nature and does not address the regional aspects of hydrocarbon accumulation.

The purpose of this report is to identify production trends in the fields surrounding Richton Dome, thereby suggesting or discouraging further investigation of the Richton site. Murray (1983) rates Richton Dome's hydrocarbon potential as speculative to poor. Knight (1985) has also stated that the Richton site is unlikely to house substantial hydrocarbons, but his conclusions are based on production data from a very small surrounding area and on mainly sulfur exploration test wells. These wells are generally shallower than oil exploration wells and have been drilled mostly on top of the dome, rather than on the flanks where hydrocarbon traps would be expected. But even in most of the sulfur test wells, strong hydrogen sulfide odors were apparent (Mississippi Bureau of Geology Files, 1945), suggesting the existence of gas. This report will attempt to support or challenge the above opinions by analyzing a larger radius of surrounding production fields and by considering only those test wells drilled to depth on the flanks of the dome.

REGIONAL GEOLOGY

The Richton Salt Dome is the shallowest and largest of Mississippi's salt domes. Based on gravity modeling studies (Earth Technology Corporation, 1985; Schutts, 1987), it is elliptical in shape, with an area of over 3900 acres at 1000 feet below sea level and over 4700 acres at approximately 4000 feet below sea level. It is located in the eastern half of the Mississippi Salt Basin which originated with evaporite deposition in the Jurassic Period. The primary evaporite unit is the Louann Salt which is usually considered the source for the salt domes and other salt structures. Approximately 20,000 feet of sediments lie above this source bed in the basin interior (Law Engineering Testing Company, 1982) (Figure 2).

Structure within the study area can be attributed to plastic deformation of the Louann Salt. Paulson (1970) suggests that wrench faulting in the Paleozoic basement complex has initiated this salt movement, resulting in the emplacement of domes and other salt structures. Eargle (1968) cites evidence of Quaternary movement of the Tatum Dome in Lamar County, Mississippi, suggesting that salt deformation may be continuing into the Recent. The Earth Technology Corporation (1987) has completed a review of the geology, covering the eastern Mississippi Salt Basin with an emphasis on the Richton Dome area in greater detail than is discussed in this text.

The Heidelberg-Sand Hill Graben System is associated with the hydrocarbon traps in 12 of the 29 oil fields in the study area. This fault system, extending about 55 miles from Jasper to Greene counties, is an elongate structure whose major faults parallel the long axis of the salt ridge. The primary graben, containing younger faults, formed when the rising salt and the overlying sediments created stress fields. The western boundary of the graben system is a continuous fault with offsets of 600 to 1400 feet at the

PERIOD		GROUP	TEXT UNIT	PRODUCTION #Gas ·Oil
Teriary		Midway	Naheola	
			Porters Creek	
			Clayton Fm.	● ☼
CRETACEOUS	Upper Cretaceous	Selma	Selma Chalk undifferentiated	
		Eutaw	undifferentiated	0
		Tuscaloosa	"Upper Tuscaloosa"	$
			"Middle Tuscaloosa"	
			"Lower Tuscaloosa"	● ☼
	Lower Cretaceous	Washita	undifferentiated	● #
		Fredericksburg		
		Trinity	Paluxy	© ☼
			Mooringsport	●
			Ferry Lake Anhydrite	
			Rodessa	● ☼
			Pine Island	●
			Sligo	● ☼
			Hosston	● ☼
JURASSIC	Upper Jurassic	Cot ton Va 11 ey	^^Dorcheat facies	·
			Schuler facies	#
		Louark	Haynesville Buckner	
			Smackover Limestone	●
			Norph let	0 ☼
			Louann Salt	

FIGURE 2: STUDY AREA STRATIGRAPHIC COLUMN

level of the Tuscaloosa marine shale. This fault terminates at the Louann Salt and is believed to have been the dominant fault along most of the early system. The eastern boundary is a series of en echelon faults at the same stratigraphic level, but with smaller displacements than the western fault line. Separate piercement domes extend upward into the overlying sediments along the ridge and are associated with several of the oil fields (Bowman and Meylan, 1986).

Evans (1987) has proposed a hypothesis to explain why some oil fields have multiple reservoirs while others have only one, and why the shallow salt domes are not as productive as the intermediate and deep domes. According to his hypothesis, multiple ("stacked") reservoirs are formed by oil migration across fault zones as source beds and reservoir rocks are juxtaposed during fault movement. He also suggests that hydrocarbons migrate to the surface and escape around shallow salt domes.

According to Evans' hypothesis, the flanks of Richton Dome should not contain hydrocarbons. It is the shallowest dome in Mississippi, it has a thin calcite caprock (Werner, 1986; Drumheller and others, 1982), and it is associated with faulting (Law Engineering Testing Co., 1982). The Evans hypothesis would explain that limestone caprock is indicative of escaped hydrocarbons. The limestone caprock was formed by bacteria as hydrocarbons migrated over the top of the dome. The faulting and shallow depth of the diapir would have provided the mechanism for hydrocarbon escape to the surface.

Analysis of the above hypothesis reveals contradictions concerning hydrocarbon migration. Evans' first conclusion suggests lateral hydrocarbon movement across faults and specifically excludes upward migration along fault zones. His discussion as to why the shallow domes are less productive, however, appears to require upward migration along the fault zones to allow the hydrocarbons to escape. The presence of 100 feet of oil saturated sands on the northern flank of the Richton Dome contradicts the predictions of Evans' hypothesis, regardless of the mechanisms of petroleum migration. Evans concedes that Camp Shelby Field, associated with the shallow Cypress Creek Dome (or Agnes Dome), is an exception to his shallow dome hypothesis. The Richton site may eventually prove to be one also.

PRODUCING ZONES - STRATIGRAPHY AND PRODUCTION

This report uses the oil and gas pools cited in the records and publications of the State Oil and Gas Board. These pools often are assigned to only a portion of a formal statigraphic unit. In the "Tuscaloosa-Eutaw pool", for example, the producing zone apparently includes the formational boundary. An effort has been made in this investigation to correlate local, informal units with established stratigraphic units or with the more common pools established by the State Oil and Gas Board. These pools are then grouped to better reflect stratigraphic units. Incorrect correlation of informally defined units and the interpretation of boundaries of the better known pools introduce potential error into the study.

The records of the State Oil and Gas Board extend back to the early 1930's, but only the last ten years have been analyzed in this study, a sufficient length of time to determine recent trends in the area's production. Hydrocarbon production is grouped and discussed by fields in Appendix A and in Tables 4 through 6, and by stratigraphic units below and in Figures 4 through 21. Production data comes from the Mississippi Oil and Gas Board Annual Reports, 1977-1986. A brief description of the stratigraphy in South Mississippi for each of the producing units is also included below.

TERTIARY PRODUCTION:

The Clayton Formation of the Lower Tertiary and the underlying Selma Group of the Upper Cretaceous have chalk lithologies (Devery, 1982a) which often are not distinguished from each other on well logs. One of the three producing wells in Camp Shelby Field yields oil and gas from the Clayton Pool. Production from the Tertiary section totals 142,433 barrels of oil (Bbls) and 55,751 thousand cubic feet (MCF) of gas during the study interval (Figure 3).

UPPER CRETACEOUS PRODUCTION:

The producing zones in the Upper Cretaceous section are almost exclusively of a sand lithology. Producing pools in the Upper Cretaceous section include the Eutaw, Lower Eutaw, Eutaw-Tuscaloosa, Upper Tuscaloosa, Tuscaloosa, and Lower Tuscaloosa pools.

Eutaw Pools:

The Eutaw can be divided into two major lithologies. The upper section is composed of a chalk facies conformably underlying the younger Selma Group, and the lower section is a dark shale with a fine-grained basal sand unit (Devery 1982a).

The Eutaw and Lower Eutaw pools have produced 17,091,131 Bbls of oil and 2,005,107 MCF of gas. Oil and gas production both generally decline over the study period, and the number of producing wells ranges from 191 to 207 (Figure 4). An increase in the number of production wells in 1981 partially coincides with an increase in gas production.

In three years, the Eutaw-Tuscaloosa oil pool has produced a total of 6823 Bbls of oil from one producing well. Table 1 summarizes the production from this minor pool.

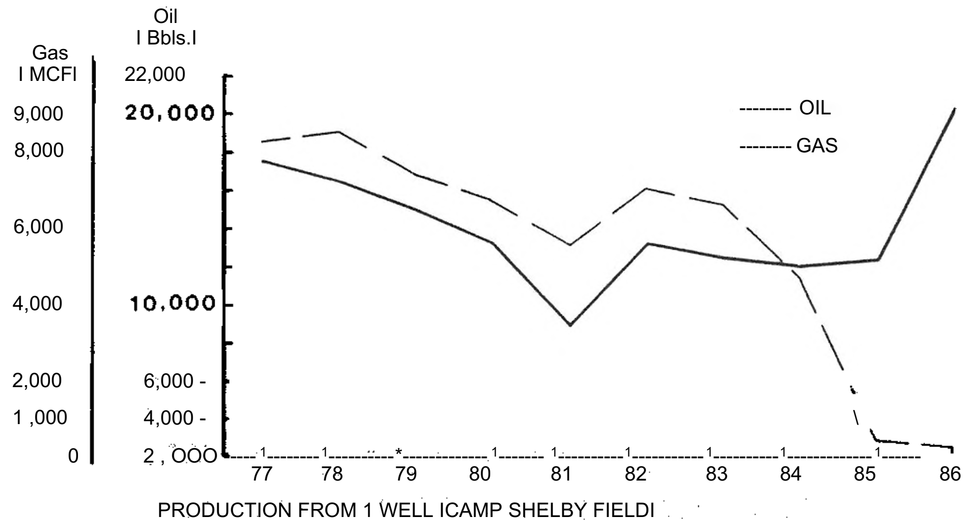


FIGURE 3: CLAYTON POOL PRODUCTION

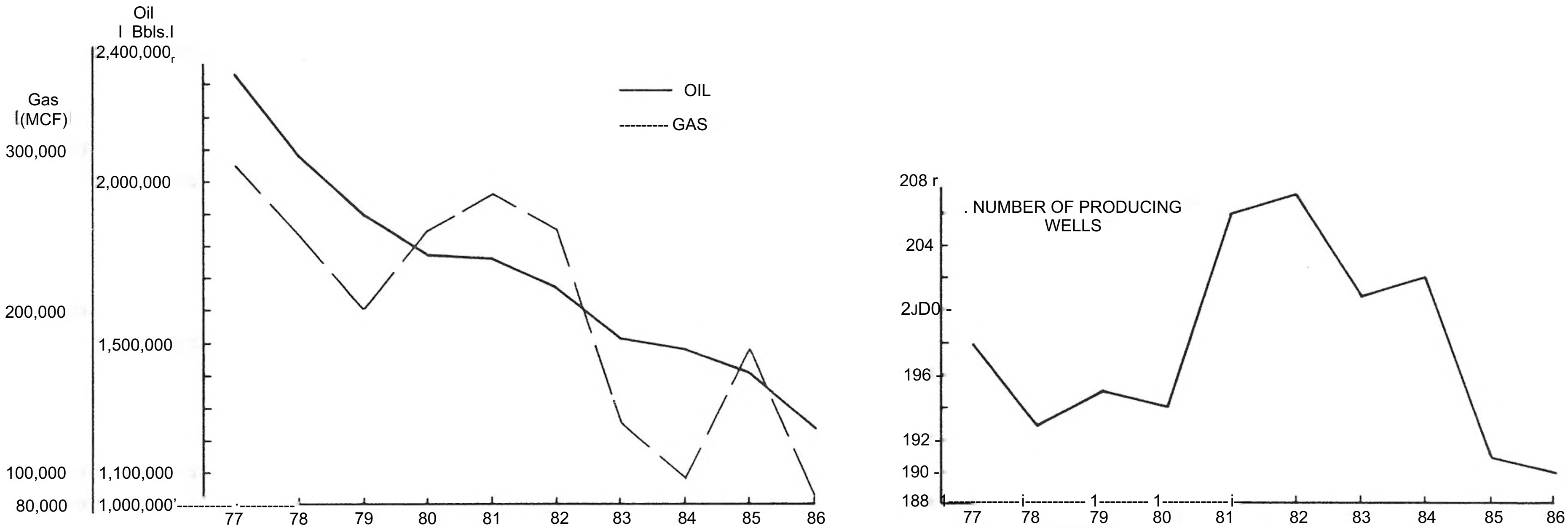


FIGURE 4: EUTAW POOLS PRODUCTION

	Oil Bbls.	Gas MCF	Prod. Wells
1980	4,389	0	1
1981	2,394	0	1
1982	40	0	1

TABLE 1: EUTAW/TUSCALOOSA POOL PRODUCTION

Tuscaloosa Pools:

The Tuscaloosa Group can be divided into three major lithologies. The lower Tuscaloosa consists of a basal, massive sand which is easily distinguished on well logs and a sequence of alternating sand and shale. The middle Tuscaloosa is composed of dark shale with limestones. The upper Tuscaloosa section consists of interbedded sand and shales (Devery 1982a).

The Upper Tuscaloosa pool has produced 1,304,921 Bbls of oil and 124,887 MCF of gas. Oil production increases until 1981 and then decreases for the remaining six years (Figure 5). Gas production remains steady and low except for a marked increase in 1984. The number of producing wells increases from 3 to 17 over the study interval, the increase in the number of producing wells from 1979 to 1981 correlating with an interval of increased oil production. Increasing numbers of producing wells as a whole, however, do not correspond accordingly with a steady increase in hydrocarbon production.

The Tuscaloosa pool has produced 3,057,994 Bbls of oil and 47,097 MCF of gas. Oil production reaches a peak in 1978 and generally declines thereafter (Figure 6). Gas production is relatively steady and low, with an anomalous increase in 1983. The number of producing wells increases from 26 wells to 37 wells in 1982, then decreases for the remaining 4 years. Despite the increased number of producing wells in the latter half of the study period, the production of oil and gas decreases significantly.

The Lower Tuscaloosa pool has produced 2,025,082 Bbls of oil and 5,249,819 MCF of gas. Unlike the above pools, the Lower Tuscaloosa pool produces more oil at the end of the study period than at the beginning, reaching maximum production in 1985 (Figure 7). Gas production, however, generally declines to a minimum production in 1986. The number of producing wells increases from 22 to 33. The

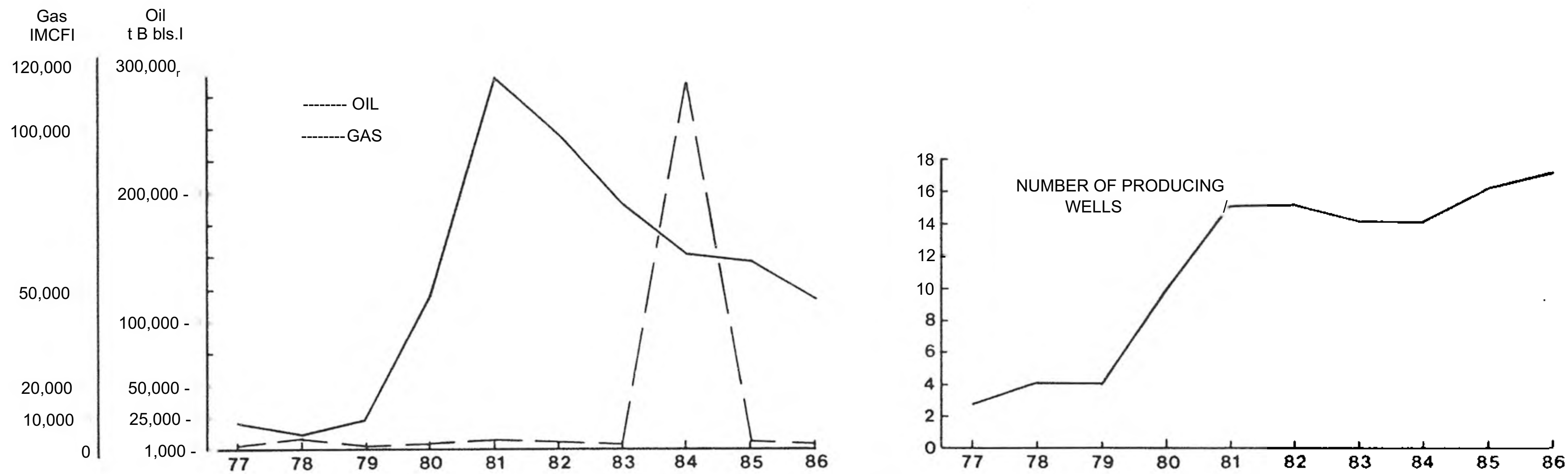


FIGURE 5 : UPPER TUSCALOOSA POOL PRODUCTION

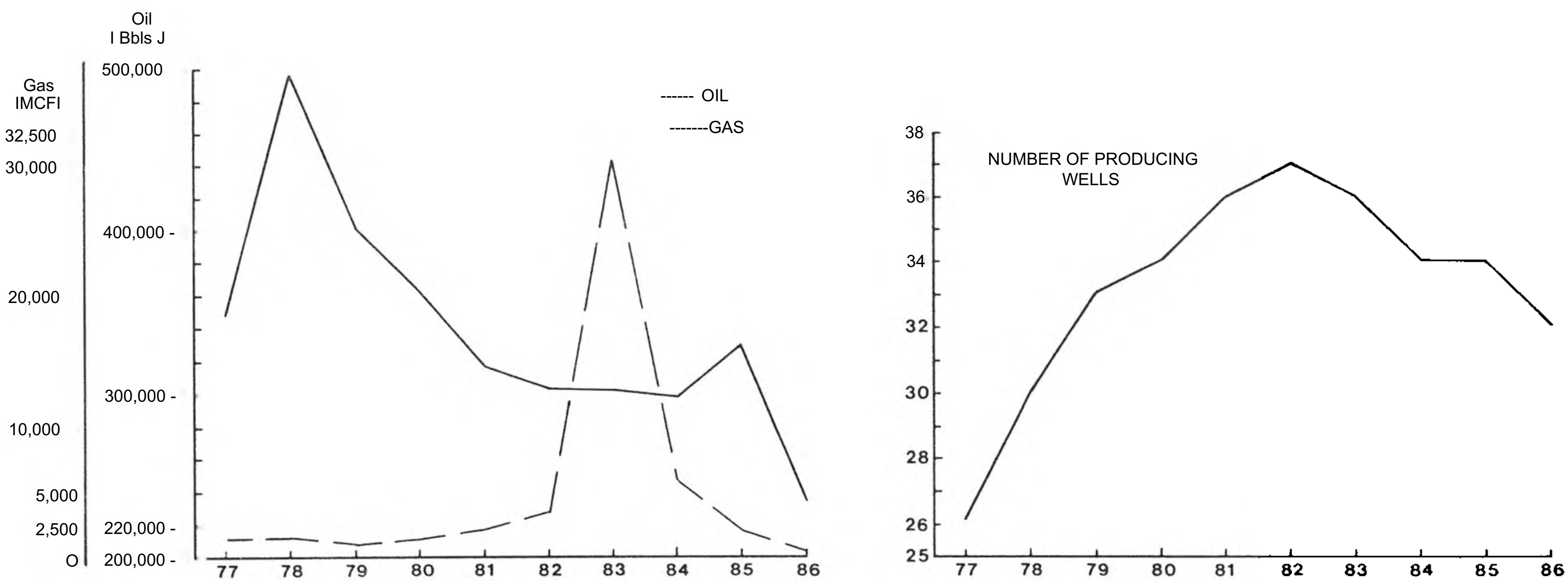


FIGURE 6 : TUSCALOOSA POOL PRODUCTION

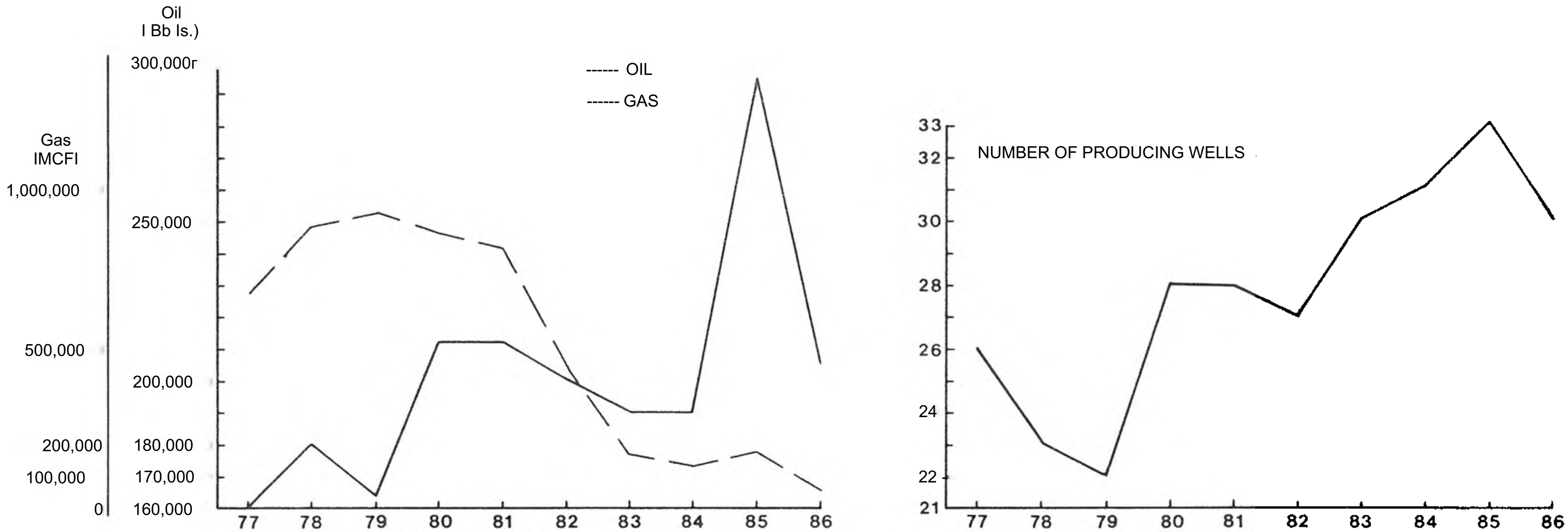


FIGURE 7: LOWER TUSCALOOSA PRODUCTION

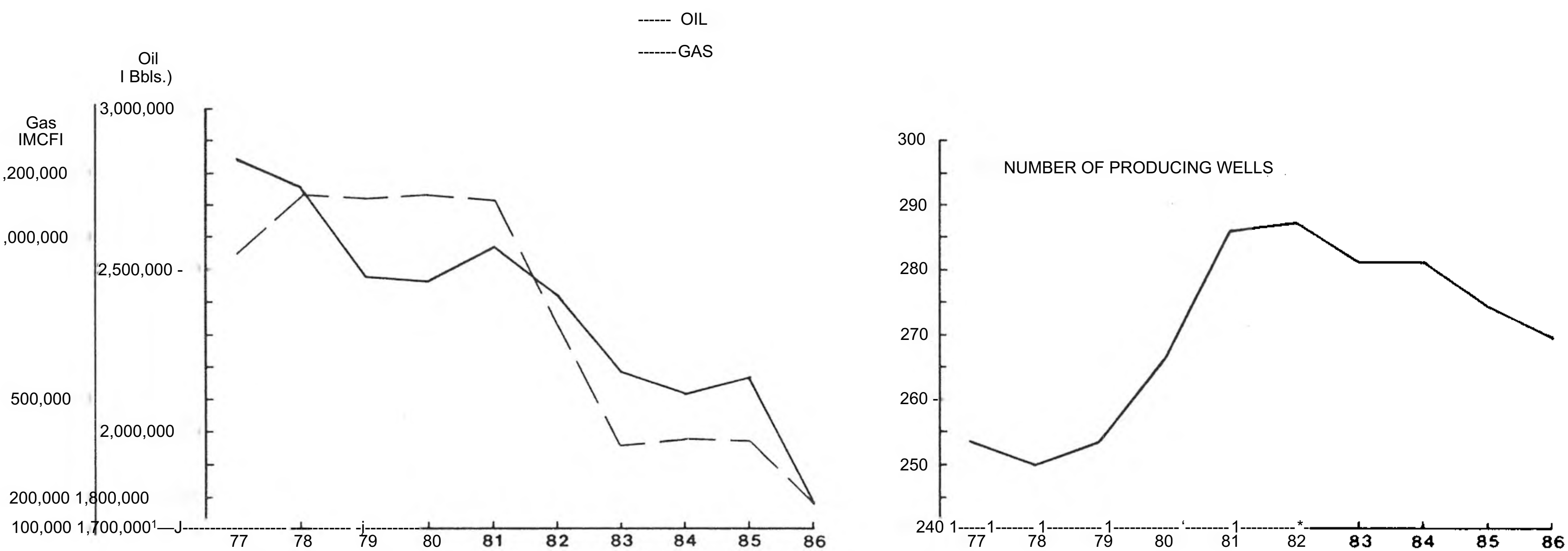


FIGURE 8 : UPPER CRETACEOUS PRODUCTION

maximum number of producing wells in 1985 corresponds with maximum oil production and with a slight increase in gas production.

The Upper Cretaceous section has produced a total of 22,485,951 Bbls of oil and 7,426,910 MCF of gas. Both oil and gas production from the Upper Cretaceous decline markedly over the study period while the number of producing wells increases, reaching a high of 287 wells in 1982 (Figure 8). The increasing number of producing wells, therefore, has not beneficially affected overall production.

LOWER CRETACEOUS PRODUCTION:

The Lower Cretaceous pools include the Washita-Fredericksburg, Paluxy, Upper Paluxy, Lower Paluxy, Paluxy-Gammil, Mooringsport, Mooringsport-Rodessa, Rodessa, Pine Island, Sligo, Hosston, Lower Cretaceous, Lower-Lower Cretaceous, Mid-Lower Cretaceous, and the Upper-Lower Cretaceous. In order to more efficiently evaluate the production data, some of these pools are combined into larger units.

Washita-Fredericksburg Pool:

The Washita-Fredericksburg lithology is typically described as a fluvial-deltaic sequence of lignites, dark-gray shales, and fine to coarse-grained sandstones with minor limestones. The top contact is chosen at the base of the massive sand in the lower Tuscaloosa section and is considered unconformable (Devery, 1982a).

The Washita-Fredericksburg pool has produced 1,786,574 Bbls of oil and 141,609 MCF of gas. The curve illustrating oil production decreases until 1981, increases until 1983, and decreases again (Figure 9). Gas production peaks in 1982 and generally decreases thereafter. The number of producing wells ranges from 11 to 17, with the shape of the curve reflecting the shape of the oil production curve.

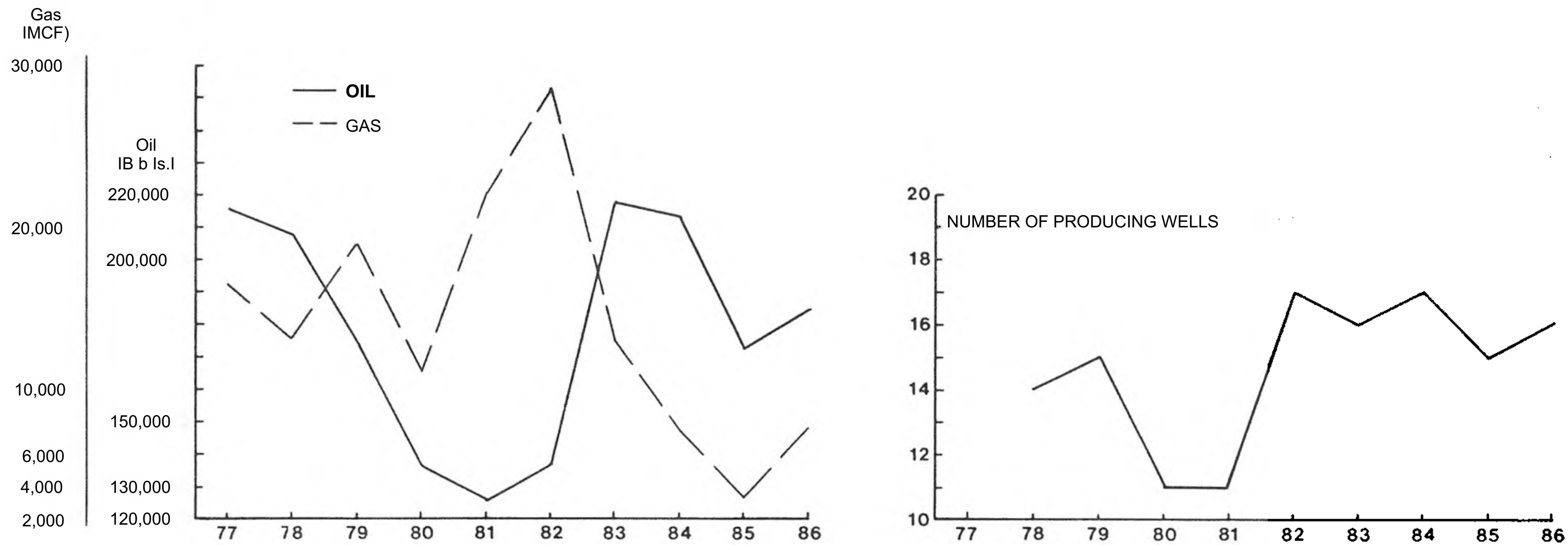


FIGURE 9: WASH ITA - FREDERICKSBURG POOL PRODUCTION

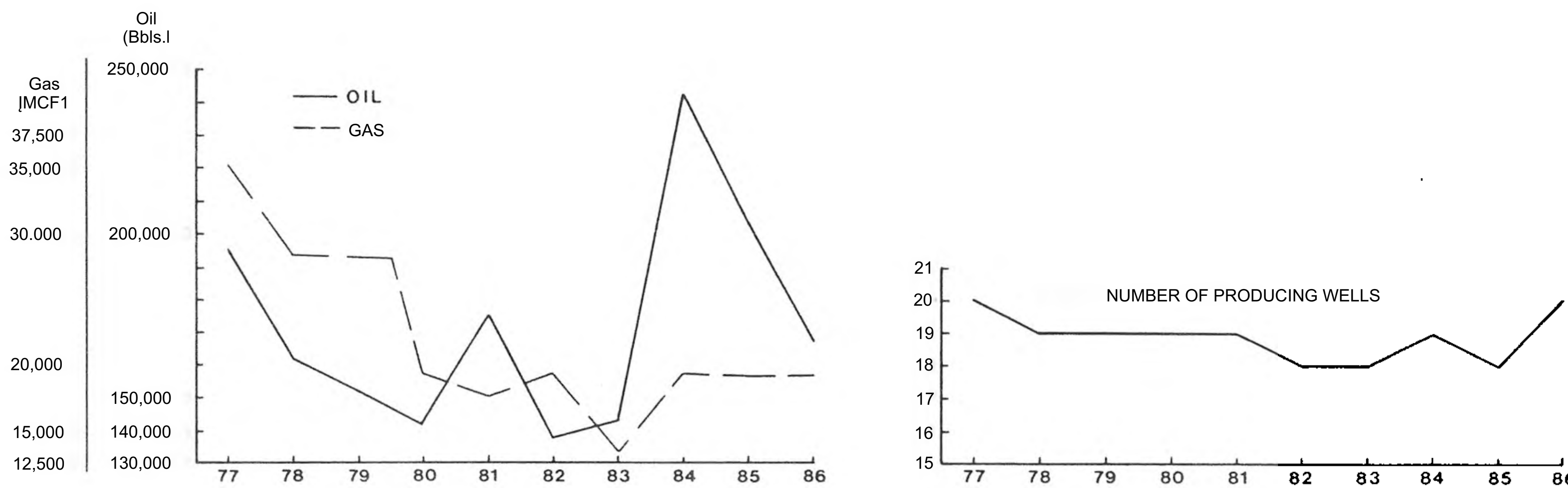


FIGURE 10 : PALUXY POOLS PRODUCTION

Paluxy Pools:

The Paluxy lithology in southern Mississippi is described as a sequence of gray limestones, shales, and sandstones (Devery, 1982a). Coyle (1981) indicates that the Paluxy in the area of Hinds County, Mississippi, consists of a sequence of interbedded fine to coarse-grained sand and shale.

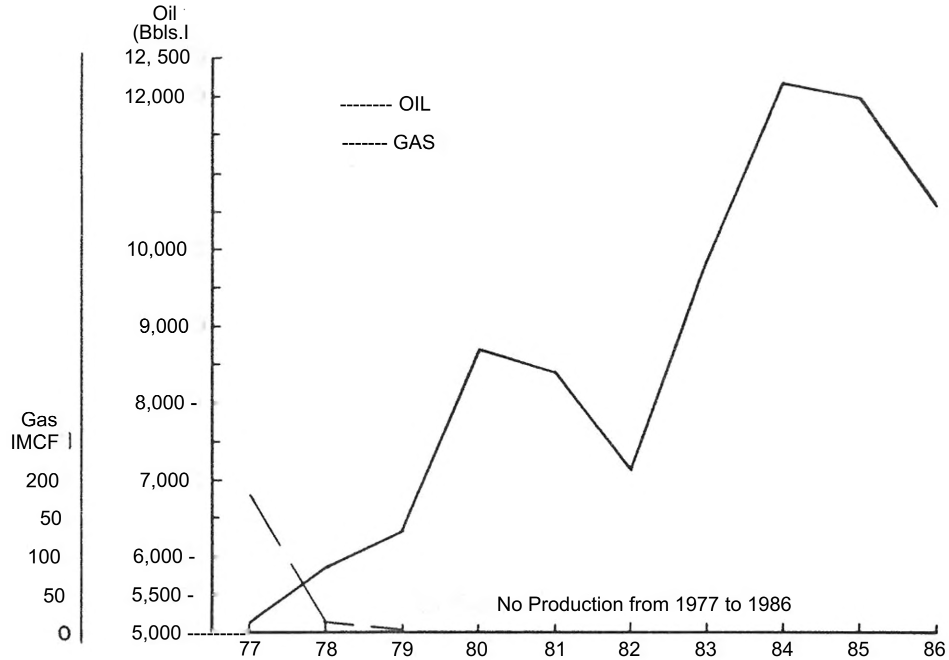
The Paluxy, Upper Paluxy, Lower Paluxy, and the Paluxy-Gammil pools have produced 1,730,138 Bbls of oil and 219,209 MCF of gas. Although 1984 marks a significant increase, oil production from these pools does not plot in a consistently increasing or decreasing pattern (Figure 10). Gas production declines over most of the ten-year period, with a minimum production level in 1983. The number of producing wells ranges only from 18 to 20.

Mooringsport Pools:

The typical Mooringsport lithology consists of oolitic limestone and gray shale in south Mississippi (Devery, 1982a). The Mooringsport and Mooringsport-Rodessa pools have produced 86,041 Bbls of oil and 173 MCF of gas. Oil production from these pools generally increases, reaching a maximum in 1984 (Figure 11). Gas is produced only during the initial two years or the study. Two wells supply the production throughout the study period.

Rodessa Pool:

The Rodessa in southern Mississippi consists of dark-gray, oolitic limestone, gray shales and anhydrite stringers (Devery, 1982a). The Rodessa pool has produced 1,058,407 Bbls of oil and 158,000 MCF of gas. The oil and gas production curves have similar production peaks and lows, both reaching maxima in 1982 (Figure 12). Production for gas and oil at the end of the study period is only slightly higher than in 1977. The number of producing wells ranges from 8 to 15, the increases and decreases correlating somewhat with those of oil and gas production.



THERE WERE 2 PRODUCING WELLS FROM 1977 TO 1986

FIGURE 11: MOORINGSPORT POOLS PRODUCTION

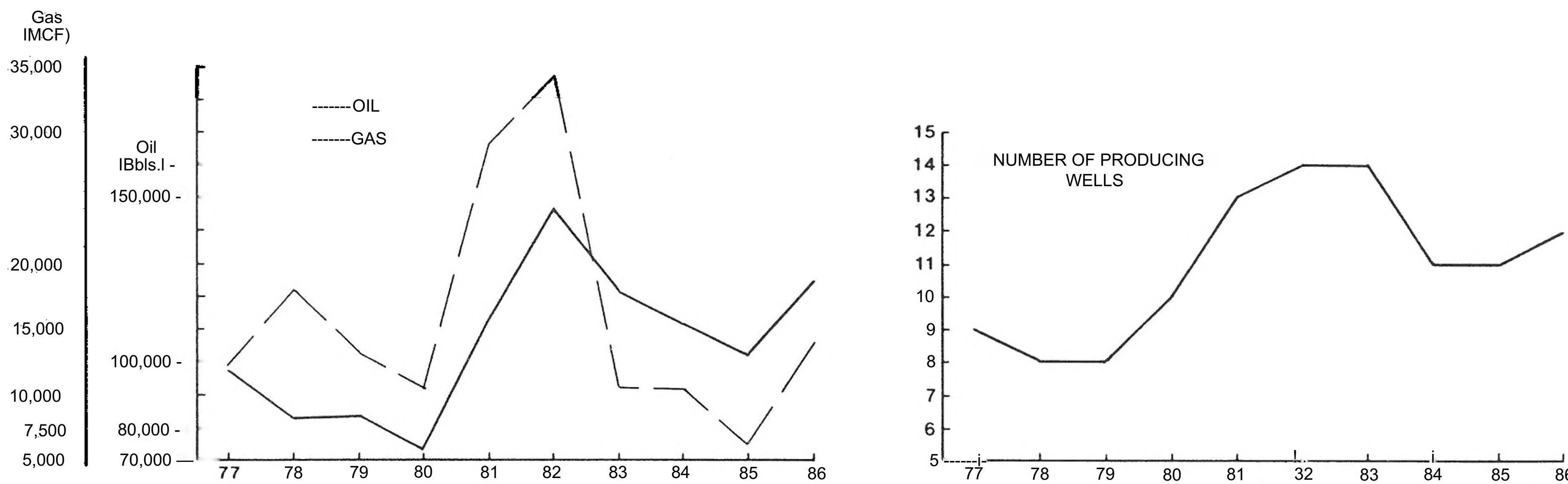


FIGURE 12: RODESSA POOL PRODUCTION

Pine Island Pool:

The Pine Island lithology consists of red and gray shales and limestones (Devery, 1982a). One to two wells in the Pine Island pool have produced 22,099 Bbls of oil and no gas (Figure 13). Production is the highest from 1980 to 1983, but otherwise remains relatively low.

Sligo Pool:

The Sligo is considered a down-dip, marine facies of the Hosston, generally consisting of shales, mudstones, and limestones (Devery, 1982a). Up to three wells in the Sligo pool have produced 60,415 Bbls of oil and 33,207 MCF of gas (Figure 14). Oil production reaches a maximum in 1980 and gas production peaks in 1981. All production from the Sligo ceases in 1986.

Hosston Pool:

The typical Hosston lithology consists of shales and fine to medium-grained sand. This unit is thought to have been deposited in continental to deltaic paleo-environments, and may thus exhibit rapid lithology changes (Devery, 1982a).

The Hosston pool has produced 1,777,299 Bbls of oil and 3,050,219 MCF of gas. Oil production reaches a peak in 1978 and steadily declines until 1982 when it maintains a steady, low rate (Figure 15). Gas production reaches a peak in 1979 and steadily declines until 1982 when it too levels off at a lower rate. The number of producing wells ranges from eight to fifteen, generally increases, and does not correspond well with the graphs of hydrocarbon production.

Other Lower Cretaceous Pools:

The Lower Cretaceous, Lower-Lower Cretaceous, Mid-Lower Cretaceous, Cretaceous, and Upper-Lower Cretaceous pools are combined in this report since their individual stratigraphic locations have been described inadequately. These pools

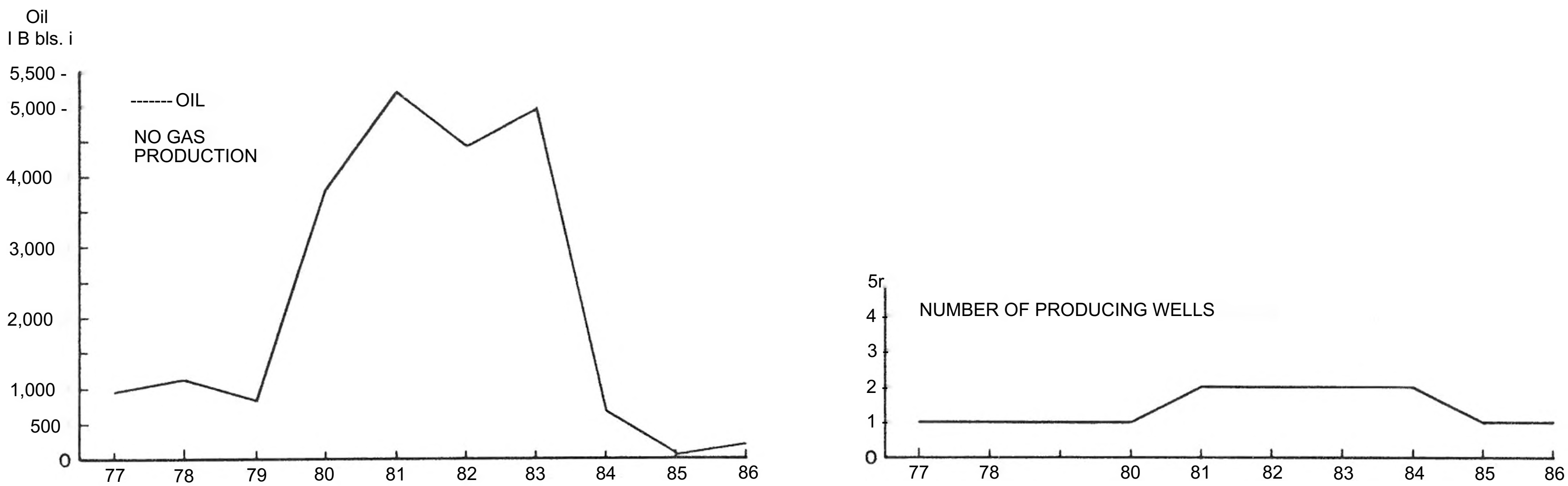


FIGURE 13: PINE ISLAND POOL PRODUCTION

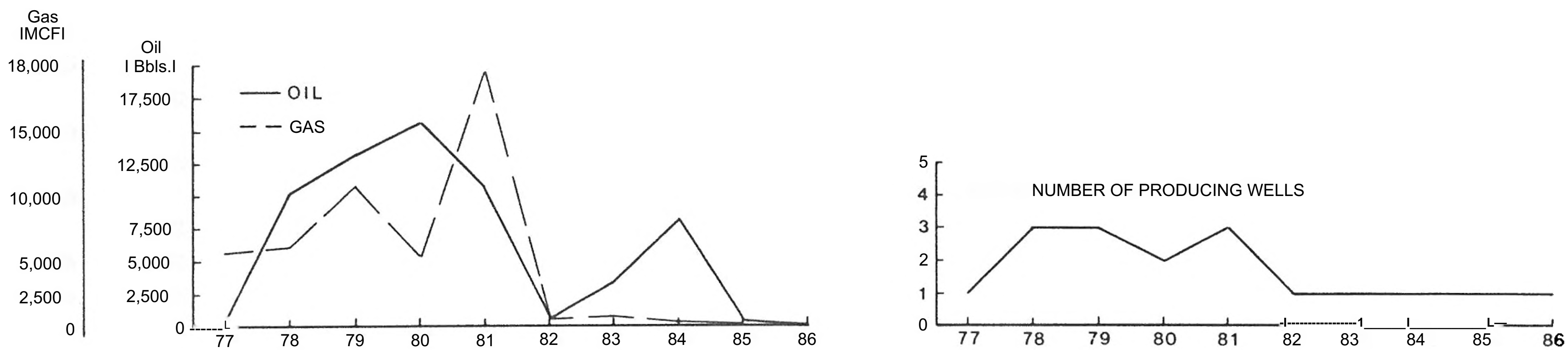


FIGURE 14: SLIGO POOL PRODUCTION

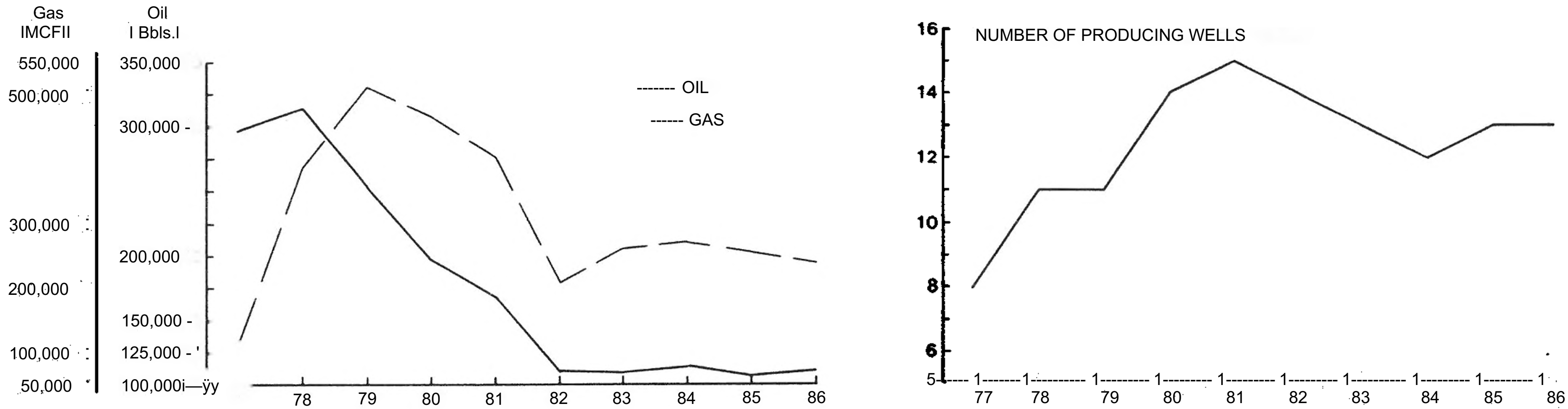


FIGURE 15: HOSSTON POOL PRODUCTION

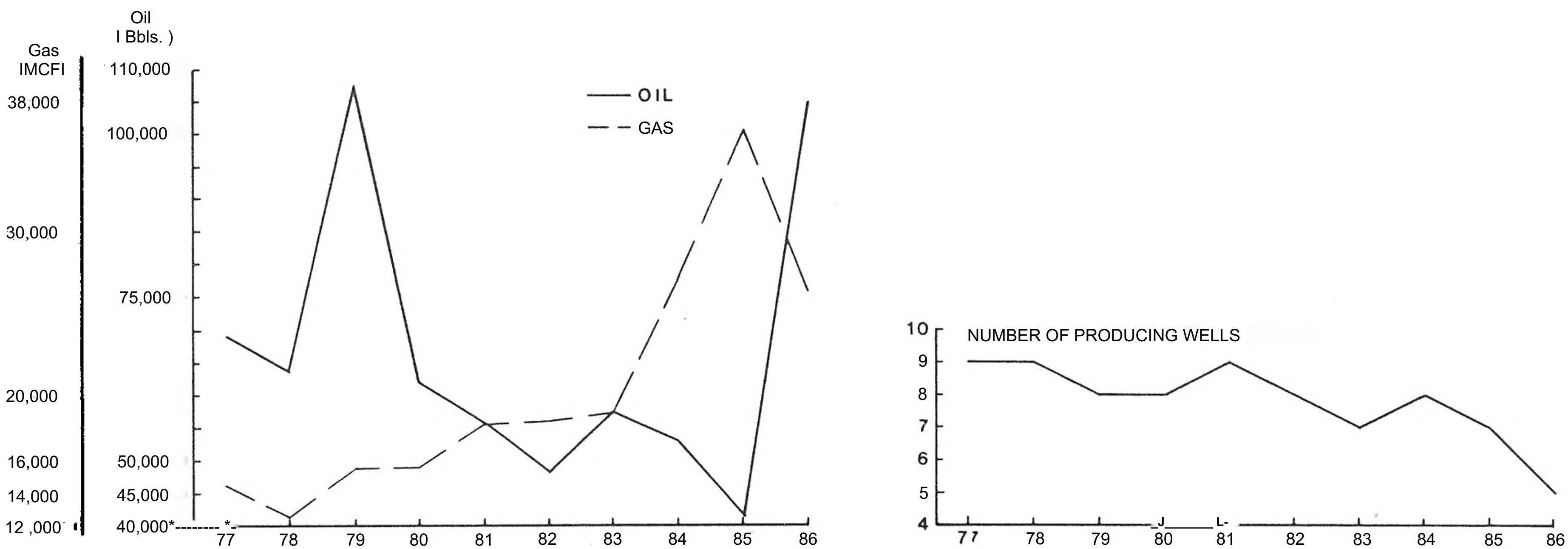


FIGURE 16: PRODUCTION FROM OTHER LOWER CRETACEOUS POOLS

have produced a total of 663,891 Bbls of oil and 203,172 MCF of gas. The oil production curve increases and decreases erratically, but both oil and gas production ultimately reach levels in 1986 higher than the 1977 values (Figure 16). The curve representing the number of producing wells decreases from nine in 1977 to five in 1986, and does not correlate with the hydrocarbon production curves.

Total production from the Lower Cretaceous section in the ten-year study period is 7,184,864 Bbls of oil and 3,805,589 MCF of gas. The production of oil from these pools generally decreases over the study interval (Figure 17). The production of gas peaks in 1979, and although it declines thereafter, production in 1986 is significantly higher than in 1977. The number of producing wells ranges from 55 to 76, the maximum occurring in 1982.

JURASSIC PRODUCTION:

Producing zones of the Jurassic section include the Upper Cotton Valley, Lower Cotton Valley, Cotton Valley, Smackover, Norphlet-Smackover, and the Norphlet pools. Several of these pools are combined into larger groups.

Cotton Valley Pools:

Dinkins and others (1968), describe the Cotton Valley as consisting of fine-grained sandstones and shales. The Cotton Valley section has been subdivided on the basis of shale color into the Schuler facies and the Dorcheat facies.

The Cotton Valley, Upper Cotton Valley, and Lower Cotton Valley pools have produced 3,162,882 Bbls of oil and 3,930,245 MCF of gas. The oil and gas production curves both exhibit sharp increases in 1984 and attain levels in 1986 well above the levels of 1977 (Figure 18). The number of producing wells generally increases, ranging from 4 to 13 wells.

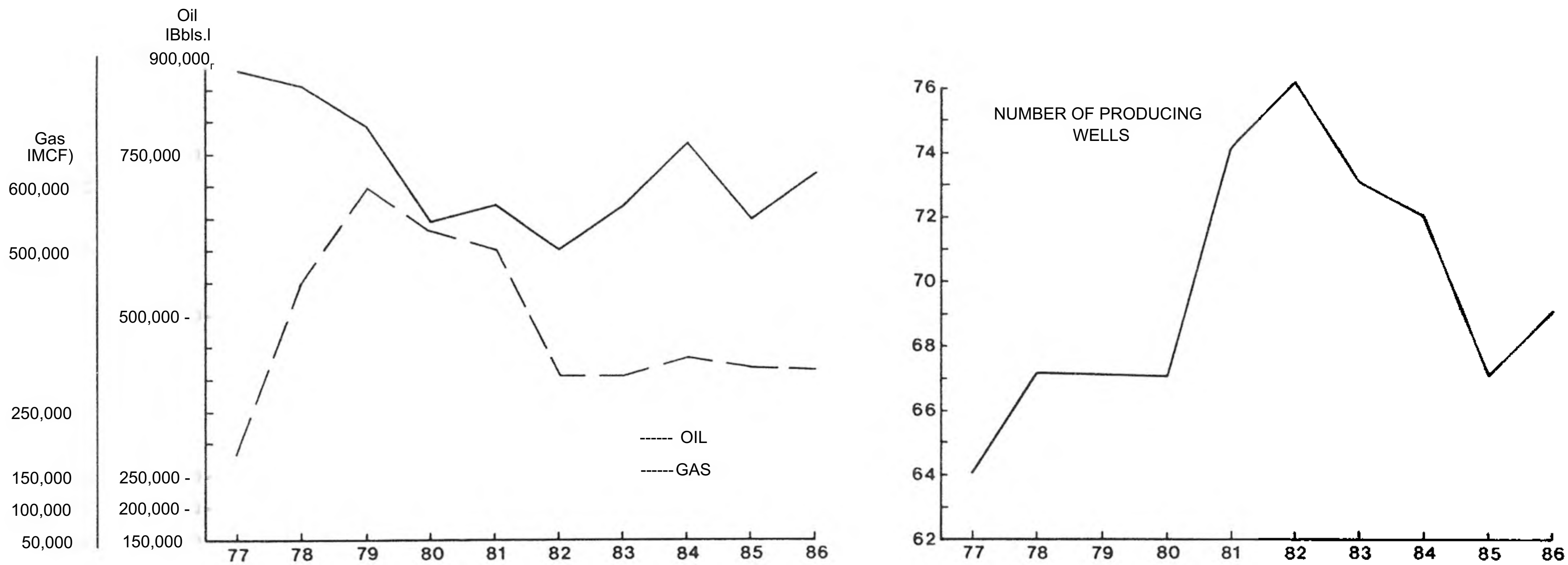


FIGURE 17: LOWER CRETACEOUS PRODUCTION

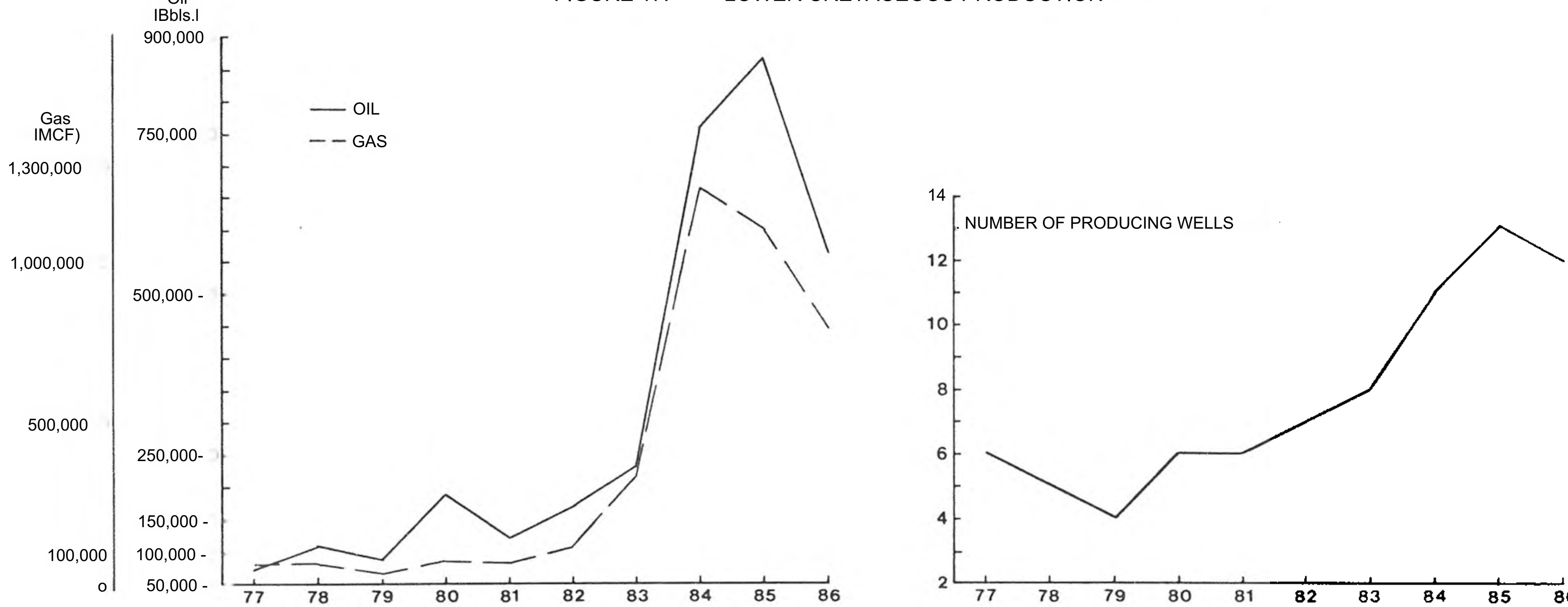


FIGURE 18: COTTON VALLEY POOLS PRODUCTION

Smackover Pools:

The Smackover can be divided into two major lithologies, the lower unit consisting of a brown, dense limestone with subordinate sandstone and dolostone, and the upper unit consisting of oolitic and dolomitic limestones (Dinkins and others, 1968). Production from the Smackover and Norphlet-Smackover pools has totaled 415,688 Bbls of oil and 10,856,314 MCF of gas. Oil and gas production generally increase from 1977 to 1986, both reaching their minimum production levels in 1980 (Figure 19). Oil and gas production maxima are in 1986 and 1985 respectively. The number of producing wells ranges from two to five over the study interval.

Norphlet Pool:

The Norphlet lithology is described as a sequence of interbedded sandstones, red silty shales, and siltstones with occurances of white sandstone. Disseminated anhydrite "blebs" may also be present in some samples (Dinkins and others, 1968; McBride and others, 1987). The Norphlet pool has produced 25,687 Bbls of oil and 732,676 MCF of gas from one well in 1978, 1979, and 1983. These data are summarized in Table 2.

Production from the Jurassic section totals 3,604,268 Bbls of oil and 15,519,235 MCF of gas. The production curves generally exhibit upward trends which peak in 1985 (Figure 20). The number of producing wells ranges from 8 to 15, increasing in correlation with the production curves.

SUMMARY OF PRODUCTION:

Table 3 is a summary of production from the Tertiary, Upper Cretaceous, Lower Cretaceous, and Jurassic sections. The Upper Cretaceous section is the largest producer of oil followed by the Lower Cretaceous, Jurassic, and Tertiary sections. The Jurassic section, however, produces the

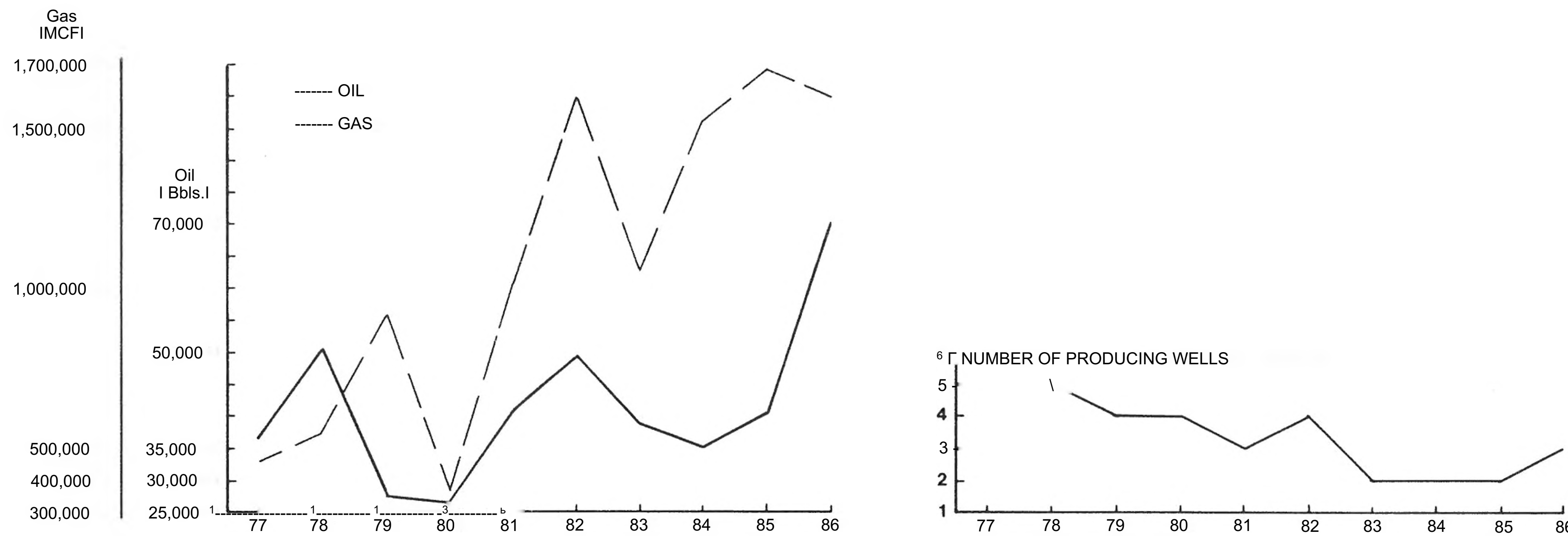


FIGURE 19: SMACKOVER POOLS PRODUCTION

	OilIBbls.I	GasIMCFI	Prod. Wells
1977	16,309	237,877	1
78	9,378	493,313	1
79	0	0	0
80	0	0	0
81	0	0	0
82	0	0	0
1983	0	1,486	1

TABLE 2: NORPLET POOL PRODUCTION

M
4^

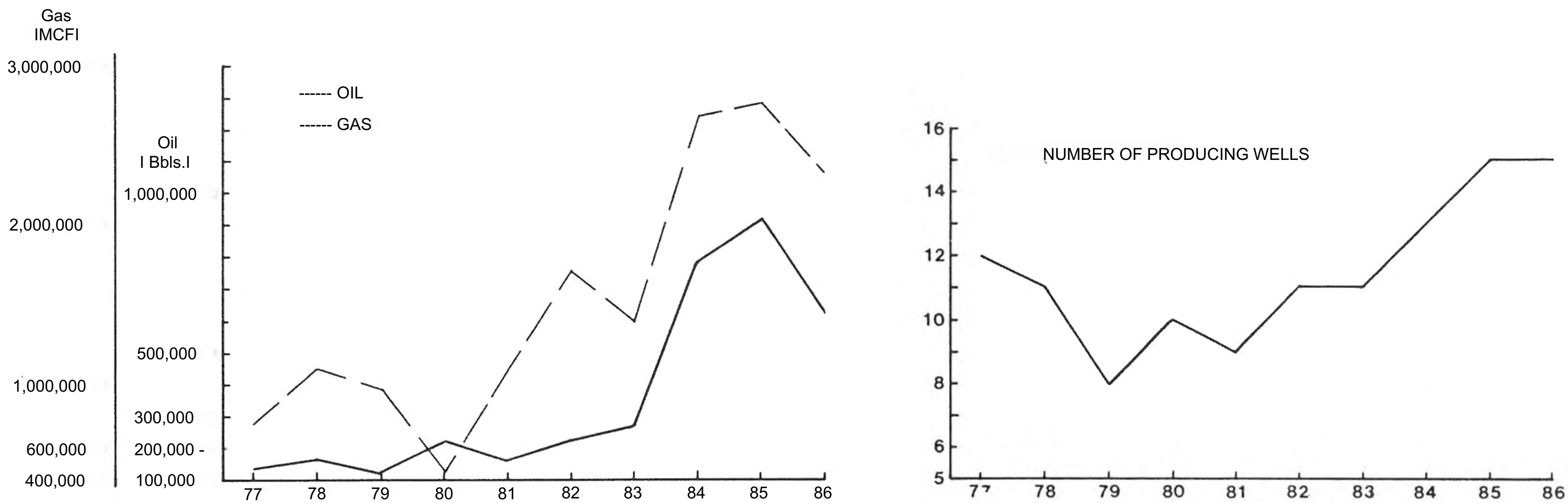


FIGURE 20: JURASSIC PRODUCTION

	Total Gas IMCFI	Total Oil I B bl s.I	Average Number of Produing Wells	Gas/Well	Oil /Well
Terti ary	55,451	142,433	1	55,451	142,433
U. Cretaceous	7,426, 910	23,485,951	270.2	27,507	86,921
L. Cretaceous	3,805,589	7, 184,864	69.6	54,600	103,083
J urassic	15,519,235	3,604,286	11.5	1,349,499	313,415

TABLE 3: SUMMARY OF PRODUCTION

to
сл

largest amount of oil per well, a rate more than three times that of the Lower Cretaceous, the section with the next highest rate.

The Jurassic section is the largest producer of gas, followed by the Upper Cretaceous, Lower Cretaceous, and Tertiary sections. Comparing the amount of gas per well, the Jurassic has a production rate more than 24 times higher than the Tertiary section with the leading production rate. Although exploration of the Jurassic would call for increased drilling expenses, this stratigraphic section appears to hold the greatest potential for significant hydrocarbon production in the study area.

CONCLUSIONS

Production within the study area comes from almost the entire stratigraphic column, from the Clayton-Selma chalk of the Tertiary/Cretaceous boundary to the Norphlet Formation of the Upper Jurassic. All of the hydrocarbon traps in this report are probably associated with salt tectonics. The Richton site should not prematurely be considered barren because only five hydrocarbon test wells have been drilled along the flanks at the northern half of the dome (Simcox and Wampler, 1982). The most recent of these wells penetrates a total of 100 feet of heavy oil-saturated sands in the Lower Cretaceous (Knight, 1985; Karges, 1975).

Knight (1985) states that Jurassic age units near the Richton site should not be viewed as reservoir targets, but the amount of surrounding production suggests otherwise. Within the study area, the Jurassic is second only to the Upper Cretaceous in oil production and is the greatest producer of gas. It also produces hydrocarbons at a far greater rate per well than the other major stratigraphic units. Jurassic production within the study area comes from the Cotton Valley, Smackover, and Norphlet units.

Furthermore, Black Creek Field, just south of the study area, produces gas from the Smackover Limestone in the Jurassic (Parker, 1974; Sassen and others, 1987), and a deep basin test well has encountered gas shows in dolostones which correlate with the Smackover (Applin and Applin; 1953). Five counties north of the study area produce significant amounts of hydrocarbons from the Smackover (Devery, 1982). Since the Jurassic sediments surrounding the Richton dome are productive, and since very few hydrocarbon tests have been made at the site itself, Jurassic production from the flanks of the dome should be considered a possibility.

Tiger Field, just north of Richton Dome, produces oil and gas from the Hosston Formation of Early Cretaceous age. Tiger Field is situated within a structural trap formed by salt movement along the same salt ridge as Richton Dome. Since the geologic history of Tiger Field and Richton Dome are related, the Hosston horizons at the Richton site, which have yet to be adequately tested, may also eventually produce hydrocarbons.

Glazier Field, approximately four miles south of the Richton site, produces oil from the Eutaw and small amounts of gas from the upper Tuscaloosa. Since the southern half of the Richton Dome has not been tested for hydrocarbons, its relationship with the Glazier salt diapir is unknown, and the Eutaw horizon’s potential at the Richton site should not be condemned.

Given the amount of production surrounding the Richton site and the lack of exploration on the flanks of the dome, hydrocarbon potential should be considered a possibility. The dome is inadequately explored geographically and stratigraphically, and the presence of significant accumulations of heavy oil improves the probability of commercial production around the large Richton structure.

REFERENCES CITED

Applin, P. L. and Applin, E. R., 1953, The cored section in George Vasen's Fee Well 1 Stone County, Mississippi: U. S. Geological Survey, Circular 298, 29 p.

Bowman, K. J., and Meylan, M. A. , 1986, Subsurface sturcture and hydrocarbon occurrence, Heidleberg-Sand Hill graben system, Southeast Mississippi: Transactions - Gulf Coast Association Of Geological Societies, v. 36, pp. 31-57.

Coyle, D. R., 1981, Depositional environment and reservoir characteristics of Lower Cretaceous Paluxy sandstones, Bolton Field, Hinds County, Mississippi (abstr.): American Association of Petroleum Geologists Bulletin, v. 65, p. 1012-1013.

Davis, D. C. and Lambert, E. H., Jr. (editors), 1963, Mesozoic-Paleozoic producing areas of Mississippi and Alabama, v. 2.

Davis, D. C. and Lambert, E. H., Jr. (editors), 1980, Mesozoic-Paleozoic producing fields of Mississippi and Alabama, v. 2., Supplement no. 8.

Devery, D. M., 1981, Compilation of producing formations in Mississippi: Mississippi Bureau of Geology, 1 sheet.

Devery, D. M., 1982 (a), Subsurface Cretaceous strata of Mississippi: Mississippi Bureau of Geology, Information Series 82-1, 24 p.

Devery, D. M., 1982 (b), An overview of oil and gas potential in Mississippi: Mississippi Geology, v. 3, no. 2, pp. 6-10.

Dinkins, T. H., Jr., Oxley, M. L., Minihan, Edward, and Ridgway, J. M., 1968, Jurassic stratigraphy of Mississippi: Mississippi Geological, Economic and Topographical Survey, Bulletin 109, 77 p.

Drumheller, J. C., Fuerst, S. I., Cavan, B. P., and Saunders, J. A., 1982, Petrographic and geochemical characteristics of the Richton salt core: report prepared by Law Engineering Testing Company for the Office of Nuclear Waste Isolation /U. S. Department of Energy, ONWI-277, 94 p.

Eargle, D. H., 1968, Stratigraphy and structure of the Tatum Salt Dome area, Southeastern Mississippi and Northeastern Washington Parish, Louisiana: The Geological Society of America, Special Paper 88, pp. 381-405.

Earth Technology Corporation, 1985, Gravity modeling study Richton Dome, Mississippi: unpublished report prepared for the Office of Nuclear Waste Isolation / U. S. Department of Energy, 66 p.

Earth Technology Corporation, 1987, Deposition of Cretaceous and Tertiary sediments in the eastern Mississippi Salt Basin (with emphasis on the Richton Dome Area): report prepared for the Office of Nuclear Waste Isolation /U. S. Department of Energy, BMI/ONWI-657, v. 1, 256 p.

Evans, Robert, 1987, Pathways of migration of oil and gas in the south Mississippi Salt Basin: Transactions - Gulf Coast Association of Geological Societies, v. 37, pp. 75-86.

Halbouty, M. T. , 1979, Salt domes-Gulf region, United States and Mexico: Gulf Publishing Company, Houston, Texas, 561 p.

Hughes, D. J., 1968, Salt tectonics as related to several Smackover fields along the northeast rim of the Gulf of Mexico Basin: Transactions - Gulf Coast Association of Geological Societies, v. 18, pp. 320-330.

Karges, H. E., 1975, Petroleum potential of Mississippi shallow salt domes: Transactions - Gulf Coast Association of Geological Societies, v. 25, pp. 168-181.

Knight, W. H. , 1985, Potential for oil and gas production in the vicinity of the Richton Dome, Perry County, Mississippi: In Milliken, L. D., 1985, Selected energy and mineral resources assessment Richton Salt Dome, Perry County, Mississippi: unpublished report prepared for the Office of Nuclear Waste Isolation /U. S. Department of Energy, 10 p.

Law Engineering Testing Company, 1982, Gulf Coast salt domes completion report: Site MRIG-9: prepared for the Office of Nuclear Waste Isolation /U. S. Department of Energy, ONWI-120, v. 6, 464 p., v. 7, 549 p.

McBride, E. F., Land L. S., and Mack, L.E., 1987, Diagenesis of eolian and fluvial feldspathic sandstones, Norphlet Formation (Upper Jurassic), Rankin County, Mississippi, and Mobile County, Alabama: American Association of Petroleum Geologists Bullitin, v. 71, no. 9, pp. 1019-1034.

Mississippi State Oil and Gas Board, 1977, Mississippi oil and gas production annual report: 425 p.

_______ 1978, Mississippi oil and gas production annual report: 432 p.

_______ 1979, Mississippi oil and gas production annual report: 327 p.

________ 1980, Mississippi oil and gas production annual report : 329 p.

________ 1981, Mississippi oil and gas production annual report : 371 p.

________ 1982, Mississippi oil and gas production annual report :

________ 1983, Mississippi oil and gas production annual report : 401 p.

________ 1984, Mississippi oil and gas production annual report: 312 p.

________ 1985, Mississippi oil and gas production annual report: 315 p.

________ 1986, Mississippi oil and gas production annual report: 320 p.

Murray, G.E., 1983, Evaluation of potential mineral resources in the vicinity of seven selected domes in Texas, Louisiana, and Mississippi: report prepared by Law Engineering Testing Company for the Office of Nuclear Waste Isolation /U. S. Department of Energy, ONWI-169, 92 p.

Nunnally, J. D. , 1954, Lower Cretaceous stratigraphy of Mississippi: Mississippi State Geological Survey, Bulletin 79, 45 p.

Parker, C. A., 1974, Geopressures and secondary porosity in the deep Jurassic of Mississippi: Transactions - Gulf Coast Association of Geological Societies, v. 24, pp. 69-80.

Paulson, O. L., Jr., 1970, Wrench faulting as a trigger mechanism for interior salt ridges of Mississippi: Northern Ohio Geological Society, Third symposium on Salt, pp. 283-285.

Sassen, Roger, Moore, C. H., Nunn, J. A., Meendsen, F. C., and Heydari, Ezat, 1987, Geochemical studies of crude oil generation, migration, and destruction in the Mississippi Salt Basin: Transactions - Gulf Coast Association of Geological Societies, v. 37, pp. 217-224.

Schutts, L. D., 1987, Re-evaluation of gravity readings taken in the vicinity of Richton Dome, Perry County, Mississippi: report prepared by The Mississippi Mineral Resources Institute for the Mississippi Department of Energy and Transportation, 54 p.

Simcox, A. C., and Wampler, S. L., 1982, Borehole locations on seven interior salt domes: report prepared by Law Engineering Testing Company for Office of Nuclear Waste Isolation / U. S. Department of Energy, ONWI-280, 93 p.

United States Department of Energy, 1987, Energy Facts-1985: Energy Information Administration, 52 p.

Wakelyn, B. D., 1977, Petrology of the Smackover Formation (Jurassic): Perry and Stone counties Mississippi: Transactions - Gulf Coast Association of Geological Societies, v. 27, pp. 386-408.

Werner, M. L., 1986, Structure and mineralization of the Richton Dome caprock boring MRIG-9: report prepared by the Earth Technology Corporation for the Office of Nuclear Waste Isolation / U. S. Department of Energy, BMI/ONWI-610, 84 p.

APPENDIX A

APPENDIX A

FIELD REVIEW

The following section discusses the number of producing wells, the producing stratigraphic units, and the trapping mechanisms for each of the individual fields in the study area. The production data comes from the Mississippi Oil and Gas Board, Annual Reports, 1977-1986.

In Avera Field, eight wells have produced 857,059 Bbls of oil from the Eutaw, Tuscaloosa, Paluxy, Mooringsport, and Rodessa units. The hydrocarbon trap for the field is a complexly faulted anticline believed to overlie a deep-seated salt structure associated with the Heidleberg-Sand Hill salt ridge and graben system. Closure on an upthrown fault forms the hydrocarbon trap (Bowman and Meylan, 1986).

In Blackburn Field, six wells have produced 497,701 Bbls of oil and 73,004 MCF of gas from the Paluxy and Rodessa formations. The trapping style is an intergraben anticline formed by deep-seated salt movement (Davis and Lambert, 1963).

Three wells in Camp Shelby Field have yielded 318,370 Bbls of oil and 187,595 MCF of gas from the Clayton and Paluxy formations. The hydrocarbon trap is related to the emplacement of the Cypress Creek Dome, a shallow piercement salt dome (Law Engineering Testing Company, 1982). The Cypress Creek Dome is also referred to as the Agnes Dome or New Augusta Dome (Karges, 1975).

Choctaw Field consists of one well which produced 29,841 Bbls of oil from the Sligo in four years. The hydrocarbon trap is the result of faulting associated with the Heidleberg-Sand Hill salt ridge and graben system (Bowman and Meylan, 1986).

Six wells in Crawford Creek Field have produced 880,302 Bbls of oil and 392,997 MCF of gas from the Sligo and Hosston Formations. Hydrocarbons are trapped in a faulted anticline with possible permeability barriers (Davis and Lambert, 1980).

East Eucutta Field has produced 7,616,054 Bbls of oil and 489,351 MCF of gas from 90 wells. Reserves are found in the Eutaw, Tuscaloosa, Paluxy, and Hosston units. In West Eucutta Field, 18 wells have yielded 384,391 Bbls of oil and 335,506 MCF of gas from the Eutaw and Cotton Valley units. The hydrocarbon trap is a typical graben structure overlying a deep-seated salt dome (Davis and Lambert, 1963).

Eight wells in Flat Branch Field have produced 564,916 Bbls of oil. Its reserves are found in the Tuscaloosa, trapped by upthrown fault closure associated with the Heidleberg-Sand Hill graben system (Bowman and Meylan, 1986) .

Two wells in West Flat Branch Field have produced 45,064 Bbls of oil from the Paluxy Formation. Oil reserves are trapped by faulting associated with the western boundary of the Heidleberg-Sand Hill graben system (Bowman and Meylan, 1986).

In Glazier Field, 11 wells have produced 282,189 Bbls of oil from the Eutaw and Tuscaloosa units. The hydrocarbon traps are related to closure over the intermediate-depth Glazier Salt Dome and the complex faulting associated with dome emplacement (Karges, 1975).

One well in Grandy Mill Creek Field has produced 5598 Bbls of oil from the Hosston Formation. The hydrocarbon trap is probably related to deep-seated salt movement.

Laurel Field has produced 249,360 Bbls of oil and 8202 MCF of gas with seven wells from the Eutaw, Tuscaloosa, Paluxy, and Rodessa units. The emplacement of an intermediate piercement salt dome has caused complex faulting in the overlying sediments, thus creating a trapping mechanism for the hydrocarbons (Davis and Lambert, 1963) .

In Maxie Field, 28 wells have produced 126,074 Bbls of oil and 6,691,705 MCF of gas from the Eutaw and Tuscaloosa units. Hydrocarbons are trapped in an east-west faulted anticline (Davis and Lambert, 1963).

Moselle Field has produced 137,092 Bbls of oil and 15,693 MCF of gas from four wells. A faulted anticline, probably associated with deep-seated salt movement, provides the trap for hydrocarbon reserves in the Hosston Formation.

The 27 wells in Ovett Field have produced 2,448,056 Bbls of oil from the Eutaw and Tuscaloosa units. The hydrocarbons are trapped by complex faulting associated with emplacement of the deep Ovett Salt Dome (Nunnally and Fowler, 1954; Halbouty, 1979).

In Pool Creek Field 21 wells have produced 881,105 Bbls of oil and 12,824 MCF of gas from the Tuscaloosa, Washita-Fredericksburg, Paluxy, Mooringsport, Rodessa, Pine Island, Hosston, Cotton Valley, and Smackover units. The hydrocarbon trap is the result of a faulted anticline associated with the Heidleberg-Sand Hill salt ridge and graben system. The primary fault of the eastern graben boundary bifurcates the field (Davis and Lambert, 1963).

In Ralston Field, one well has produced a total of 9260 Bbls of oil and 457 MCF of gas from the Tuscaloosa in two years. The trapping mechanism for these hydrocarbons is unknown.

Reedy Creek Field has produced 4,764,792 Bbls of oil and 4,196,683 MCF of gas from 48 wells. Production comes from the Eutaw, Tuscaloosa, Washita-Fredericksburg, Paluxy, Rodessa, Sligo, Cotton Valley, and Smackover units where the reserves have been trapped by a complexly faulted northeast-southwest trending anticline (Davis and Lambert, 1963) .

In North Sand Hill Field, 24 wells have produced 1,352,726 Bbls of oil from the Tuscaloosa. Oil reserves are trapped in upthrown fault closures associated with the Heidleberg-Sand Hill salt ridge and graben system (Bowman and Meylan, 1986).

In Sandersville Field, 21 wells have produced 756,930 Bbls of oil and 9897 MCF of gas from the Eutaw. The hydrocarbon trap is associated with the Heidleberg-Sand Hill salt ridge and graben system. Closure of the upthrown Eutaw block against the Selma chalk and deeper Jurassic formations has produced the hydrocarbon trap (Bowman and MeyIan, 1986).

Shelton Creek Field has one well which has produced 256 Bbls of oil from the Cotton Valley during its one productive year within the last ten years. The oil reserves are trapped in an anticlinal structure which was probably caused by deep-seated salt movement (Mississippi Oil and Gas Board, Annual Report, 1977).

In South State Line Field, four wells have produced 249,196 Bbls of oil and 11,445,747 MCF of gas from the Smackover and Norphlet units. The hydrocarbons are trapped in an anticlinal structure probably associated with deep-seated salt movement.

In Thompson's Creek Field, 11 wells have produced 739,382 Bbls of oil from the Tuscaloosa and the Washita-Fredericksburg units. The hydrocarbon trap is a simple asymmetrical anticline within a graben associated with the Heidleberg-Sand Hill salt ridge and graben system (Davis and Lambert, 1963).

In South Thompson's Creek Field, 11 wells have produced 1,063,631 Bbls of oil and 65,871 MCF of gas from the Tuscaloosa, Washita-Fredericksburg, Paluxy, and Rodessa units. This structural hydrocarbon trap is similar to that of the Thompson's Creek Field, but separated by a low relief saddle. Although probably on the same salt ridge as its neighbor, South Thompson's Creek does not share a common reservoir with Thompson's Creek Field, thus indicating movement during different time periods for the two fields (Bowman and MeyIan, 1986).

Four wells in Tiger Field have produced 690,422 Bbls of oil and 2,656,802 MCF of gas from the Hosston Formation. The hydrocarbon trap is a faulted, elongate anticlinal structure resulting from deep salt movement associated with the Richton salt structure.

In Wausau Field, 17 wells have yielded 1,589,689 Bbls of oil from the Tuscaloosa, Paluxy, and Rodessa units. In North Wausau Field, two wells have produced 94,633 Bbls of oil and 112,294 MCF of gas from the Tuscaloosa and Rodessa units. The production zones are within a faulted anticline which is associated with the Heidleberg-Sand Hill salt ridge and graben system (Davis and Lambert, 1963).

In East Yellow Creek Field, 28 wells have produced 961,028 Bbls of oil and 592 MCF of gas from the Eutaw and Smackover units. A total of 82 wells in West Yellow Creek Field have produced 6,858,358 Bbls of oil and 478,202 MCF of gas from the Tuscaloosa and Cotton Valley units. The hydrocarbon reserves for these fields are trapped in a complexly faulted domai structure with a central graben over a deep-seated salt dome (Davis and Lambert, 1963).

The largest oil-producing fields in the area during the past ten years have been East Eucutta Field, West Yellow Creek Field, and Reedy Creek Field. The largest gas producers have been South State Line Field, Maxie Field, and Reedy Creek Field. Probably all of the fields in the study area have hydrocarbon traps caused by salt movement, and twelve of them are associated with the Heidelberg-Sand Hill Graben System. Table 4 is a summary of oil production by fields and Table 5 summarizes gas production. The number of producing wells in these fields during the ten year study period is presented in Table 6.

Table 4 - Oil Production by Field (barrels)

Field	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
Avera	49,311	60,112	59,704	125,976	128,362	96,677	77,333	95,493	91,454	72,637	12,869
Blackburn	47,677	46,142	38,875	33,767	52,316	80,284	56,208	55,153	45,939	41,340	13,984
Camp Shelby	32,085	25,246	25,496	25,140	21,935	30,024	29,363	36,565	45,040	47,476	12,881
Choctaw		2,757	6,399	9,487	2,198						
Crawford Creek	257,819	211,841	124,910	62,000	48,017	40,372	34,751	37,269	33,522	29,801	9,263
East Eucutta	945,123	810,179	753,320	774,227	773,596	781,910	728,575	698,014	674,236	676,874	202,840
West Eucutta	41,085	38,917	34,163	32,202	31,276	29,602	29,944	33,955	69,937	43,310	10,415
Flat Branch						186,239	133,746	98,548	82,362	64,021	22,667
West Flat Branch									19,423	25,641	3,719
Glazier	20,242	13,246	12,120	15,362	15,578	21,488	30,489	23,476	22,441	107,747	50,207
Grandy Mill Creek						4,326	1,272				
Laurel	10,173	11,049	10,690	11,718	17,577	17,393	24,526	47,055	62,553	36,626	8,202
Maxie	14,946	24,123	25,641	24,110	20,233	8,151	3,023	2,036	3,111	700	72
Moselle				13,313	39,730	24,336	17,321	16,119	13,962	12,311	3,874
Ovett	395,218	348,818	269,987	248,150	263,185	219,273	198,033	198,057	176,287	131,048	39,917
Pool Creek	148,795	111,855	109,536	85,179	100,119	74,634	60,586	70,478	58,808	79,453	18,338
Ralston								5,056	4,204		
Reedy Creek	227,230	274,386	229,486	318,665	238,912	318,406	443,865	931,773	1,006,344	775,725	206,666
North Sand Hill	178,758	238,036	155,291	124,637	78,231	68,441	56,011	70,926	232,339	150,056	41,323
Sandersville	75,415	88,181	91,001	68,416	77,509	77,661	66,124	87,334	71,300	53,989	14,265
Shelton Creek	256										
South State Line	30,808	19,212	19,214	9,968	20,379	31,430	30,331	28,701	33,675	25,478	8,621
Thompson's Creek	41,645	66,682	59,063	53,394	46,017	51,962	111,416	115,115	108,617	85,471	20,584
South Thompson's Creek	156,641	120,399	107,271	89,177	82,090	67,332	90,115	168,503	91,101	91,002	67,909
Tiger	8,017	89,858	118,365	96,563	82,450	46,744	58,831	65,883	62,420	61,291	19,279
Wausau	127,745	162,277	164,773	145,896	158,609	185,318	184,963	183,499	155,489	121,120	38,526
North Wausau					7,499	27,440	20,053	14,013	12,633	11,490	1,505
East Yellow Creek	42,401	49,577	55,756	48,549	54,310	49,707	49,820	48,935	45,603	19,275	795
East Yellow Creek Unit	72,967	64,580	56,145	49,016	46,344	48,497	45,420	40,731	37,934	35,461	10,809
West Yellow Creek	964,708	917,703	892,991	774,456	754,193	661,247	566,415	510,793	467,970	347,882	85,466
Totals	3,889,065	3,795,176	3,308,197	3,239,368	3,160,665	3,248,894	3,148,534	3,683,480	3,728,704	3,147,225	924,996

Table 5 - Gas Production by Field (MCF)

Field	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Avera										
Blackburn	7,149	6,892	4,601	4,925	5,646	6,554	5,648	10,780	10,200	10,609
Camp Shelby	25,779	28,411	29,374	19,709	12,690	16,183	16,088	17,115	10,931	11,315
Choctaw										
Crawford Creek	80,288	75,913	67,398	70,556	68,951	23,163	3,404	1,558	875	891
East Eucutta	48,381	40,669	37,282	49,833	77,822	91,856	53,464	36,440	32,409	29,596
West Eucutta	1,993	1,767	2,323	2,853	6,159	431	377	348	64	319,191
Flat Branch										
West Flat Branch										
Glazier										
Grandy Mill Creek										
Laurel								2,253	3,129	2,820
Maxie	882,080	1,074,317	1,057,766	1,061,270	1,009,404	603,954	267,768	212,230	377,996	144,920
Moselle				6,820	3,680	3,065	1,920	208		
Ovett										
Pool Creek	12,408	58							310	48
Ralston								246	211	
Reedy Creek	91,986	172,145	105,320	121,223	111,090	145,414	377,593	1,225,567	1,073,021	773,324
North Sand Hill										
Sandersville					9,000	897				
Shelton Creek										
South State Line	686,320	986,996	886,760	330,829	1,035,135	1,654,382	1,053,981	1,543,716	1,677,501	1,590,127
Thompson's Creek										
South Thompson's Creek	9,953	9,811	8,894	7,614	7,176	6,007	6,654	6,520	3,242	
Tiger	11,351	305,172	441,425	382,274	328,635	182,438	247,577	268,193	250,801	238,936
Wausau										
North Wausau						104		112,190		
East Yellow Creek	145	136	121	107	83					
East Yellow Creek Unit										
West Yellow Creek	40,458	42,782	36,628	39,642	51,755	48,064	39,656	47,730	68,683	62,804
Totals	1,898,291	2,745,069	2,677,892	2,097,655	2,727,226	2,782,512	2,074,130	3,485,094	3,509,373	3,184,581

Table 6 - Number of Producing Wells by Field

Field	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Avera	6	5	6	14	15	14	13	13	15	14
Blackburn	4	4	3	3	4	4	5	4	4	4
Camp Shelby	3	3	3	3	3	3	3	3	3	3
Choctaw		1	1	1	1					
Crawford Creek	5	6	5	5	5	5	5	5	5	5
East Eucutta	65	63	64	64	66	65	65	65	60	56
West Eucutta	14	14	14	13	14	16	15	16	17	16
Flat Branch				5	8	8	8	8	8	8
West Flat Branch									1	2
Glazier	3	2	2	3	4	5	6	6	5	8
Grandy Mill Creek						1	1			
Laurel	1	1	1	2	1	1	1	2	4	5
Maxie	23	22	18	17	17	17	16	17	17	15
Moselle				2	5	2	1	1	1	1
Ovett	19	19	21	21	22	23	21	21	21	21
Pool Creek	15	13	13	14	16	16	15	16	11	13
Ralston								1	1	
Reedy Creek	19	19	22	21	24	30	32	34	36	37
North Sand Hill	10	14	14	14	14	14	14	16	19	18
Sandersville	15	13	14	14	18	17	18	19	18	16
Shelton Creek	1									
South State Line	2	3	1	1	1	1	2	1	1	1
Thompson's Creek	7	7	9	7	8	7	9	8	8	8
South Thompson's Creek	8	9	8	8	8	7	7	7	6	6
Tiger	1	4	4	4	4	4	4	4	4	4
Wausau	8	9	9	10	10	14	13	12	13	14
North Wausau					2	2	2	1	1	1
East Yellow Creek	14	15	15	15	16	17	14	14	15	15
East Yellow Creek Unit	12	12	12	12	12	12	12	12	12	12
West Yellow Creek	75	71	71	72	73	69	64	62	53	51
Totals	330	329	330	345	371	374	366	368	359	354