OKLAHOMA GEOLOGY

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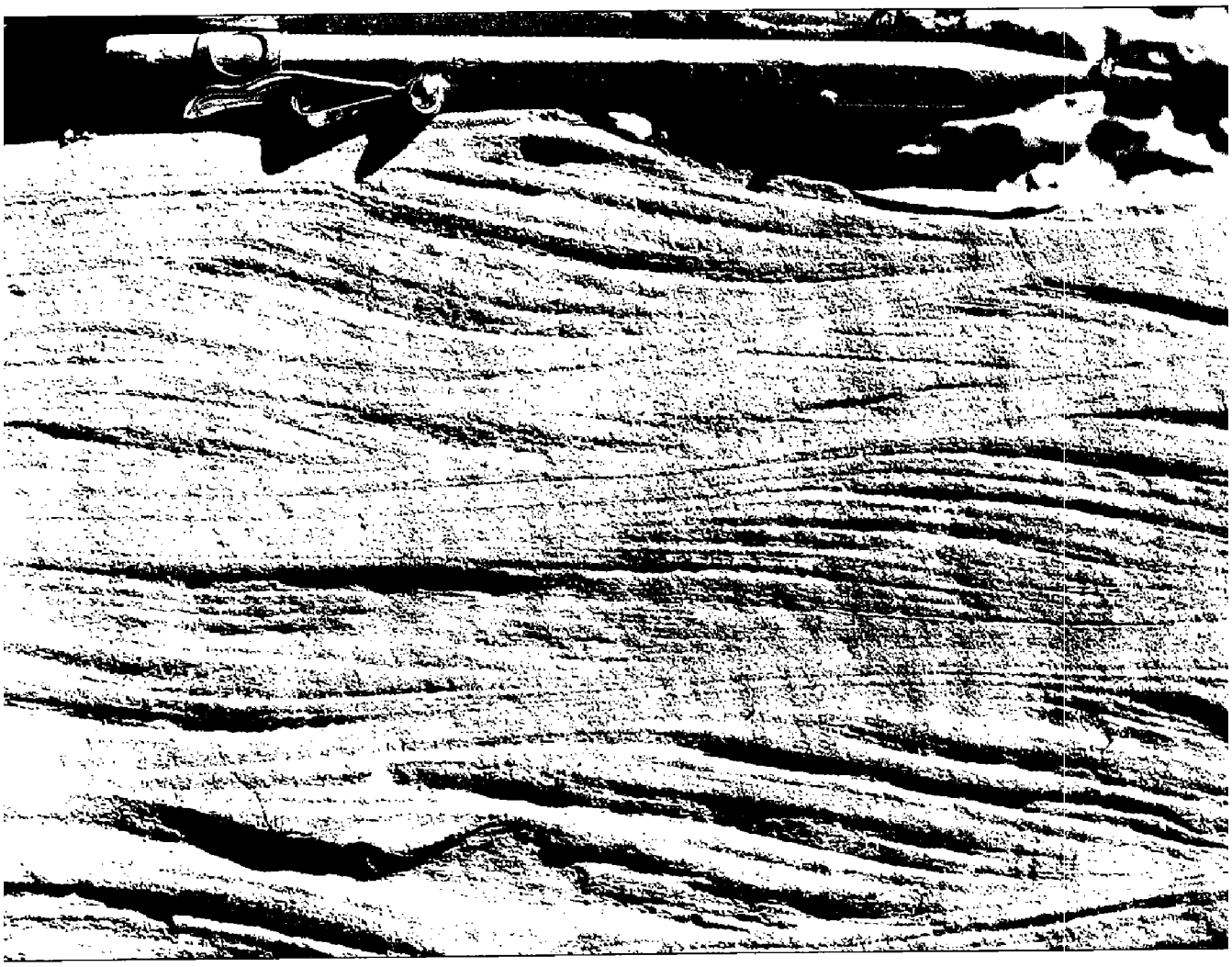

On the cover—

Climbing Translatent Stratification in a Pennsylvanian Sandstone from the Ouachita Mountains

Cross-sectional view of supercritically and subcritically climbing translatent stratification from a fine-grained sandstone turbidite in the Atoka Formation of southeast Oklahoma. These bed forms were created by migrating ripples climbing from left to right (east to west) over the top of each other. The shape of the youngest ripple in this sequence is preserved at the top of the bed. Foreset laminae of each ripple dip to the right and are thicker than the gently dipping lee-side laminae. The thickness of each ripple set and its angle of climb are functions of the current strength and sediment supply. If lee-side laminae are preserved, the angle of climb is considered supercritical. Under conditions of stronger currents and/or decreased sediment supply, the upper part of the ripple might be eroded prior to burial and preservation by the next ripple. Ripple sets bounded by erosional surfaces (lacking lee-side laminae) are termed subcritically climbing translatent strata. Both types of strata are found in this bed, indicating changing conditions of current and/or sediment supply during its deposition.

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OKLAHOMA GEOLOGY

CONTENTS

OKLAHOMA GEOLOGICAL SURVEY

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OIL AND GAS WELLS, OUACHITA MOUNTAINS, OKLAHOMA

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Introduction

Despite the long history of hydrocarbon (solid, liquid, and gas) exploration and development in the Oklahoma Ouachita Mountains, no single list of wells has ever been published for the entire region. Table 1 is an attempt to list all the oil and gas wells spudded before January 1, 1989, in the Ouachita Mountains and immediately adjacent Arkoma basin and Cretaceous overlap area. The area considered in this report includes the following townships: T. 5 N., R. 18–24 E.; T. 4 N., R. 15–27 E.; T. 3 N., R. 13–27 E.; T. 2 N., R. 12–27 E.; T. 1 N., R. 12–27 E.; T. 1 S., R. 11–27 E.; T. 2 S., R. 11–27 E.; T. 3 S., T. 12–27 E.; T. 4 S., R. 17–27 E.; T. 5 S., R. 18–27 E.; and T. 6 S., R. 23–27 E. (Fig. 1). This list primarily was compiled from the Oklahoma Geological Survey's Natural Resources Information System (based on the Oklahoma Corporation Commission Form 1002-A), with auxilliary information from Scout Tickets, published literature, and Herndon Map Service. While the authors believe that Table 1 represents the most comprehensive list of wells in the Ouachita Mountains, it is probably incomplete, and we welcome suggestions for changes and additions from users of this list.

Geologic Setting

The Ouachita Mountains in southeastern Oklahoma and western Arkansas are a late Paleozoic fold and thrust belt. The most common rock types in the Oklahoma Ouachita Mountains are sandstone and shale; Mississippian and Pennsylvanian turbidites dominate the stratigraphic section at the surface. Slightly metamorphosed to unmetamorphosed, mostly pre-Mississippian chert, shale, and minor limestone and sandstone crop out in the Broken Bow uplift, Potato Hills, and Black Knob Ridge areas (Fig. 1). Late Mississippian and Early Pennsylvanian shale, limestone, and sandstone crop out along the northern and western border of the mountains.

In Oklahoma, the Ouachita Mountains can be separated into three belts based on stratigraphy and structural style. From north to south, these are the frontal belt, central belt, and Broken Bow uplift (Fig. 1). The frontal belt lies between the Choctaw and Windingstair faults and consists of steeply tilted, imbricately thrusted, and

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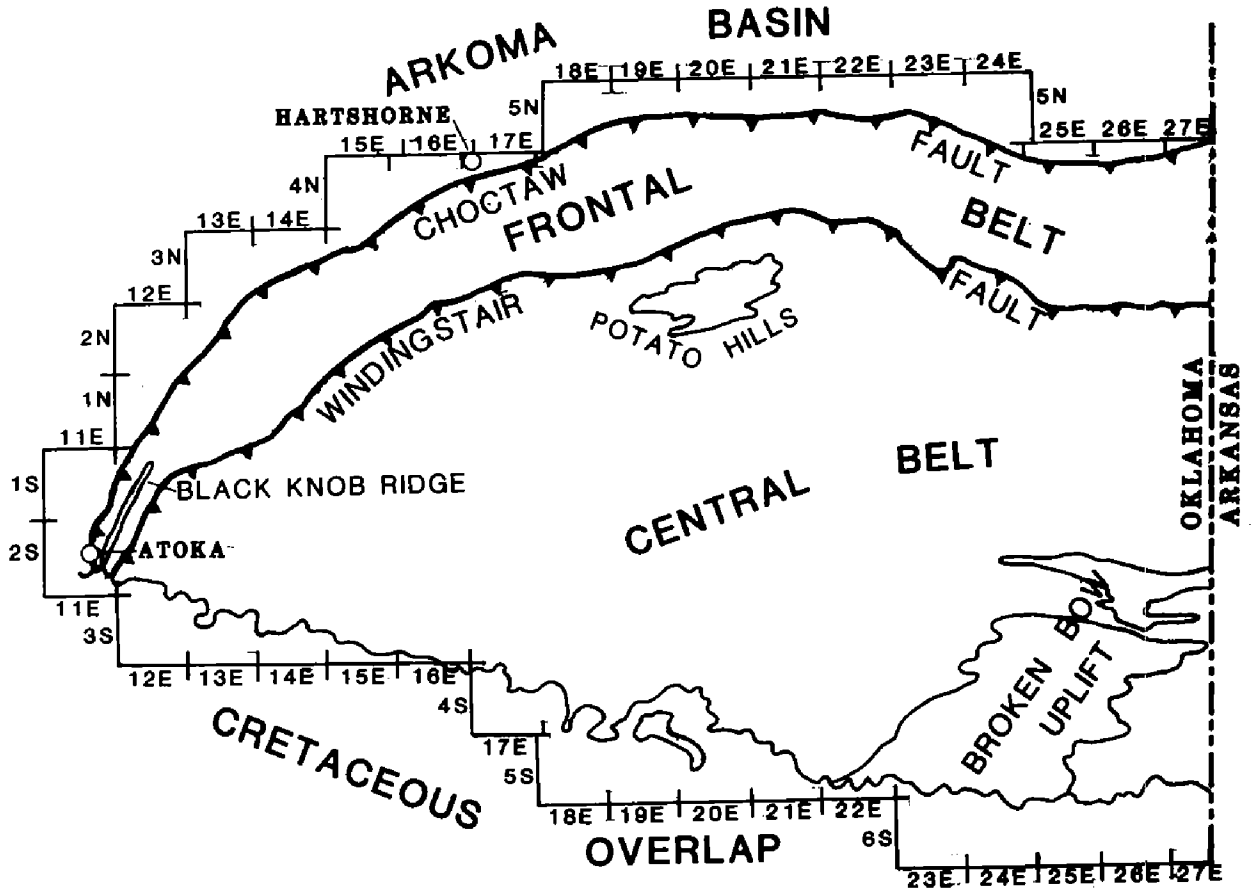

Figure 1. Generalized geologic map of the Ouachita Mountains and immediately adjacent area, showing features referred to in the text. The area studied for this report is outlined by township and range lines.

tightly folded strata. Shallow-water Morrowan strata are present in the northern part of the frontal belt, and Morrowan basinal strata (turbidites and olistostromes) occur to the south. The Morrowan units are overlain by Atokan turbidites. In the extreme western part of the frontal belt, Ordovician to Mississippian strata crop out near Black Knob Ridge. The central belt is characterized by broad, open synclines separated by tight, typically thrust-cored anticlines. Except for the tightly folded pre-Mississippian units in the Potato Hills, the only rocks exposed are Mississippian and Early Pennsylvanian turbidites. The Broken Bow uplift consists of isoclinally folded and thrusted Early Ordovician to Early Mississippian deep-water strata. The boundary between the central belt and the Broken Bow uplift is arbitrarily shown on Figure 1 as the contact between the Arkansas Novaculite and Stanley Group sediments.

Most recent hydrocarbon exploration and development has taken place in the frontal belt of the Ouachita Mountains and Arkoma basin immediately north of the mountains. The principal reservoirs are Early to Middle Pennsylvanian sandstones and limestones that are present in the footwall of the Choctaw fault and in imbricately faulted thrust sheets south of the fault. In the central belt south

of the Windingstair fault, the principal reservoirs are sandstone in the Mississippian Stanley Group and, more rarely, the Devonian Arkansas Novaculite. Most of the eastern part of the central belt in Oklahoma is virtually unexplored. Very few wells have been drilled in the Broken Bow uplift, and only one produced any gas.

Source of Data

Initial funding for the development of a data file of oil and gas wells in and near the Ouachita Mountains was from the Oklahoma Geological Survey as part of the U.S. Geological Survey's COGEOMAP (Cooperative Geologic Mapping) program. COGEOMAP is a program conceived and administered by the U.S. Geological Survey, designed to fund new geologic mapping on a cost-share basis with state geological surveys. The Ouachita COGEOMAP Project is a joint effort of the U.S. Geological Survey, Oklahoma Geological Survey, and the Arkansas Geological Commission to fund new, detailed geologic mapping of the Ouachita Mountains at a scale of 1:24,000 (7.5'-quadrangle base).

Prior to and in conjunction with the mapping, existing sources of information on the geology of the Ouachita Mountains were reviewed and cataloged. One noteworthy effort in this regard was a computerized file containing geologic and engineering data on oil and gas wells in and immediately adjacent to the mountains. The reasons for establishing this file were that (1) it would provide surface mappers with a readily accessible source of subsurface information; (2) it would identify producing wells that could be sampled for geochemical studies, and give their surface locations; and (3) it would be useful to industry personnel involved in oil and gas exploration and production.

The Oklahoma Geological Survey treated this initial effort as the first step toward the broader goal of developing an integrated system containing computerized information on the geological resources of Oklahoma. This broader effort, called the Natural Resources Information System (NRIS) of Oklahoma, was undertaken to provide more-accurate, detailed, and accessible information on the State's resources, with an initial emphasis on oil and gas production and well data. Continued funding for the NRIS activities primarily has been received through the Department of Energy, Bartlesville Project Office.

The NRIS Well File primarily is being built from historical and current completion records for wells reported to the Oklahoma Corporation Commission on Form 1002-A. Information from these completion reports includes location, casing and cementing, formations, and test data. Supplemental data for selected areas are added from well logs, scout tickets, and core and sample references. All data being added to the well file are subject to a "prescan" editorial review by geological staff; this is done in order to increase the data standardization and accuracy on the file. After the data have been keyed, verified, and processed to the well file, they are subject to a second editorial review to further assure the highest possible data quality for the system.

Oil and gas wells that are not included in the NRIS Well File are usually older wells, including those for which completion reports have been lost or misplaced, or were never filed. Several additional information sources have been reviewed

to compile Table 1. Each of these references has been assigned a code based on its primacy in compiling this well list. In each well in Table 1, the reference code in the far-right column reflects the highest-ranked reference that identified the well. The reference codes used, in order of rank (from highest to lowest) are (1) NRIS Well File (based on Oklahoma Corporation Commission Form 1002-A); (2) Scout Tickets and Petroleum Information Corp. reports (for more recent wells); (3) Published Literature (Chenoweth, 1950; Fay, 1984; Pitt and others, 1982); (4) Herndon Map Service. The NRIS well file (Ref. code 1) shows original spud date and total depth for all wells, including those that were redrilled and/or recompleted. If the well changed operators or farm name, the original operator and farm name are shown in parentheses. For wells listed from scout ticket information (Ref. code 2), the original spud date, but new (and presumably deeper) total depth, are shown for those that were redrilled. In addition, the most recent available information on operator, number, and farm name is given if any of those changed after the well was drilled. The letter "C" preceding the spud date indicates that the well was completed, rather than spudded, in that year (Ref. codes 2, 3, and 4).

Availability of NRIS Data

For those wells marked with Reference Code 1, comprehensive well information is available to the public through NRIS. As of April 1989, there were nearly 50,000 records in the NRIS Well File, including coverage for the southeastern (Ouachita Mountains and Arkoma basin) and western (Anadarko basin) areas of Oklahoma; the direction of continuing efforts is to the southwestern and south-central areas of the State. Additional information on obtaining NRIS well or production data may be requested from the Oklahoma Geological Survey.

Acknowledgments

This publication would not have been possible without the persistence and organizational abilities of David Brown, Gregg Hudson, and Michelle Summers of the Oklahoma Geological Survey, and Linda Armstrong of the Geological Information Systems at the University of Oklahoma. Marjorie Franks kindly allowed us to use the resources of the Oklahoma Geological Society's log library.

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TABLE 1.—LIST OF OIL AND GAS WELLS IN THE OKLAHOMA OUACHITA MOUNTAINS

T–R–S	Operator	No.	Farm	Spud Date	T.D.	Ref.
05N 18E 01	SINCLAIR OIL & GAS CO	1	USA JACQUELINE ANDERSON	1964 02 19	11525	1
05N 18E 02	AMBASSADOR OIL CORP	1	DAVIS UNIT	1962 04 24	11845	1
05N 18E 03	AMBASSADOR OIL CORP	1	KINNIKIN-PATE UNIT	1961 01 10	12700	1
05N 18E 04	AMBASSADOR OIL CORP	1	WOODS UNIT	1962 02 03	11808	1
05N 18E 05	AMBASSADOR OIL CORP	1	LELA SAWYER UNIT	1962 08 12	11770	1
05N 18E 06	BROCK HYDROCARBONS INC	1-6	BODDY	1981 05 27	2475	1
05N 18E 06	AMBASSADOR OIL CORP	1	CHAUDOIN UNIT	1963 03 30	12075	1
05N 18E 07	SINCLAIR OIL & GAS CO	1	GARDNER UNIT	1963 03 13	12746	1
05N 18E 07	P & F PETROLEUM CO	1	HUNT		3600	1
05N 18E 07	PETROLEUM INC	1	FERGUSON UNIT	1979 10 15	10000	1
05N 18E 08	JONES & PELLOW OIL CO	1	GEORGE MCCLAIN	1974 04 01	11515	1
05N 18E 08	AMBASSADOR OIL CORP	1	RAUNIKAR UNIT	1962 12 08	11780	1
05N 18E 09	AMBASSADOR OIL CORP	1	TOPPING-STATE	1962 09 25	11862	1
05N 18E 10	ARCO OIL & GAS CO	2-10	MCALESTER UNIT "A"	1987 12 16	12325	2
05N 18E 10	AMBASSADOR OIL CORP	1	MCALESTER A	1962 07 07	11954	1
05N 18E 11	AMBASSADOR OIL CORP	1	DAVIS A UNIT	1962 07 07	12051	1
05N 18E 11	ARCO OIL & GAS CO	2	DAVIS A	1985 08 09	14025	1
05N 18E 12	SAMSON RESOURCES CO	1	JUNIOR	1987 06 28	13260	1
05N 18E 12	AMBASSADOR OIL CORP	1	ROBINSON UNIT	1963 01 23	12087	1
05N 18E 13	ARCO OIL & GAS CO	2	WAYNE AUSTIN	1988 10 27	DRG	2
05N 18E 13	AMBASSADOR OIL CORP	1	WAYNE L AUSTIN UNIT	1962 04 15	10188	1
05N 18E 14	AMBASSADOR OIL CORP	1	PARKER E COSTILOW	1962 02 05	10074	1
05N 18E 14	ARCO OIL & GAS CO	3	COSTILOW	1988 02 08	16000	2
05N 18E 14	SAMSON RESOURCES CO	2	COSTILOW	1985 07 26	12440	1
05N 18E 15	ARCO OIL & GAS CO	2	YOURMAN	1987 02 08	15391	2
05N 18E 15	LIMESTONE OIL & GAS CO	1	NETTIE MCCURRAY	1927 05 12	4038	1
05N 18E 15	LIMESTONE OIL & GAS CO	1	MCMURRAY	1943 07 07	2750	2

05N	18E	15	AMBASSADOR OIL CORP	1	YOURMAN UNIT	1962 05 06	8920	1
05N	18E	15	CLARK & CO	1	WILSON	1936 10 31	6515	1
05N	18E	15	ARCO OIL & GAS CO	3	YOURMAN	1988 03 28	11250	2
05N	18E	16	LIMESTONE OIL & GAS CO	2	KILPATRICK	1940 04 19	2295	2
05N	18E	16	ARCO OIL & GAS CO	3	G L KILPATRICK	1988 07 30	11109	2
05N	18E	16	AMBASSADOR OIL CORP	1	KILPATRICK UNIT	1962 07 16	8758	1
05N	18E	16	ARCO OIL & GAS CO	2	G L KILPATRICK	1988 02 28	15500	2
05N	18E	17	ARCO OIL & GAS CO	2	STEVE FAZEKAS	1987 09 01	15500	2
05N	18E	17	AMBASSADOR OIL CORP	1	FAZEKAS UNIT	1962 11 21	8944	1
05N	18E	18	AMBASSADOR OIL CORP	1	BUD HAMPTON UNIT	1963 02 18	9128	1
05N	18E	19	SINCLAIR OIL & GAS CO	1	BENNETT-STATE UNIT	1963 12 14	9052	1
05N	18E	19	ARCO OIL & GAS CO	2	BENNETT STATE	1988 06 21	14430	2
05N	18E	20	AMBASSADOR OIL CORP	1	SMITH UNIT	1962 05 06	8703	1
05N	18E	20	ARCO OIL & GAS CO	2	SMITH UNIT MA	1985 08 29	12613	1
05N	18E	21	AMBASSADOR OIL CORP	1	PASCHALL UNIT	1961 12 21	8522	1
05N	18E	21	ARCO OIL & GAS CO	3	PASCHALL	1988 12 01	DRG	2
05N	18E	21	ARCO OIL & GAS CO	2	PASCHALL	1988 06 19	14170	2
05N	18E	22	ARCO OIL & GAS CO	2X	R F MCALESTER	1986 08 04	11125	1
05N	18E	22	AMBASSADOR OIL CORP	1	R F MCALESTER	1961 02 27	9343	1
05N	18E	22	ARCO OIL & GAS CO	3	R F MCALESTER	1988 11 12	DRG	2
05N	18E	22	ARCO OIL & GAS CO	2	R F MCALESTER	1985 12 28	7585	1
05N	18E	23	ANADARKO PETROLEUM CORP	2-23	WILLIAMS A	1986 07 02	12554	1
05N	18E	23	AMBASSADOR OIL CORP	1	W M WILLIAMS UNIT	1960 09 21	9704	1
05N	18E	23	ANADARKO PETROLEUM	3-23	WILLIAMS "A"	1988 09 24	DRG	2
05N	18E	24	AMBASSADOR OIL CORP	1-A	JAMES UNIT	1961 10 10	10085	1
05N	18E	24	AMBASSADOR OIL CORP	1	JAMES UNIT	1961 07 30	8991	1
05N	18E	25	SKELLY OIL CO	1	GUY VARNUM	1965 12 21	10614	1
05N	18E	25	DONALD C SLAWSON	1-25	MALITZ	1985 12 30	10956	1
05N	18E	26	SINCLAIR OIL & GAS CO	1	WATTS-JONES UNIT	1963 11 16	10407	1
05N	18E	26	FERGUSON OIL CO INC	1	WAGGONER	1973 11 12	8300	1
05N	18E	27	SINCLAIR OIL & GAS CO	1	E V ENIS UNIT	1963 04 02	9845	1

TABLE 1.—*Continued*

T–R–S	Operator	No.	Farm	Spud Date	T.D.	Ref.
05N 18E 28	AMBASSADOR OIL CORP	1	STATE C UNIT	1962 07 21	9106	1
05N 18E 29	AMBASSADOR OIL CORP	1	DOBBS-STATE UNIT	1962 06 30	8895	1
05N 18E 30	SINCLAIR OIL & GAS CO	1	JESSIE BENNETT UNIT	1964 02 11	9221	1
05N 18E 30	ARCO OIL & GAS CO	2	JESSIE BENNETT MA	1986 01 01	11188	1
05N 18E 31	TRIGG DRILLING CO	1	HUNTER-TUCKER	1976 01 13	10290	1
05N 18E 31	ARKOMA PRODUCTION CO	2	HUNTER-TUCKER	1987 11 02	11800	1
05N 18E 31	ARKOMA PRODUCTION CO	3	HUNTER-TUCKER	1988 03 17	10804	2
05N 18E 32	ARKOMA PRODUCTION CO	B-1	KENNEDY	1983 03 13	3495	1
05N 18E 32	ARKOMA PRODUCTION CO	B-2	KENNEDY	1983 06 03	11141	1
05N 18E 32	TIPCO	1-32	KENNEDY	1970 10 17	11059	1
05N 18E 33	SINCLAIR OIL & GAS CO	1	M C WATTS UNIT	1963 08 27	11468	1
05N 18E 34	COQUINA OIL CORP	1	MOSE WATTS	1974 11 04	11680	1
05N 18E 35	SAMSON RESOURCES CO	1	WATTS	1982 01 03	9770	1
05N 18E 35	SAMSON RESOURCES CO	1	MOSE	1984 03 20	11815	1
05N 18E 36	AUSTRAL OIL CO INC	1-36	MABRY	1967 03 24	8080	1
05N 19E 01	TENNECO OIL CO	1-1	SCHARFF	1984 12 05	12470	1
05N 19E 02	PAN AMERICAN PETROLEUM CORP	1	KIER UNIT	1965 03 17	15380	1
05N 19E 03	PAN AMERICAN PETROLEUM CORP	1	REUSCH UNIT	1964 05 25	12300	1
05N 19E 04	PAN AMERICAN PETROLEUM CORP	1	USA CHOCTAW TRIBE T-3	1964 11 12	11470	1
05N 19E 04	AMOCO PRODUCTION CO	2	USA CHOCTAW TRIBE T-3	1986 11 19	12000	1
05N 19E 05	PAN AMERICAN PETROLEUM CORP	1	USA CHOCTAW TRIBE T-4	1965 04 30	11485	1
05N 19E 05	AMOCO PRODUCTION CO	2	USA CHOCTAW TRIBE T-4	1987 03 30	11450	1
05N 19E 06	PAN AMERICAN PETROLEUM CORP	1	USA J W MCTIERNAN	1964 11 02	11475	1
05N 19E 07	PAN AMERICAN PETROLEUM CORP	1	QUAID UNIT	1965 10 07	12000	1
05N 19E 08	SINCLAIR OIL & GAS CO	1	D J BISHOP	1965 09 05	12550	1
05N 19E 08	SAMSON RESOURCES CO (HADSON OHIO)	1-8	EASTERN OK STATE COLLEGE	1978 07 08	11720	1
05N 19E 09	AMAREX INC	1	WILBURTON TOWNSITE	1979 12 21	12730	1

05N	19E	09	WILLIFORD ENERGY CO	1	BULLARD	1981 04 20	13639	2
05N	19E	10	DONALD C SLAWSON	1-10	IVEY	1984 05 19	11420	1
05N	19E	10	WILLIFORD ENERGY CO	1-10	POLLARD	1982 08 01	11420	1
05N	19E	11	WILLIFORD ENERGY CO	1-11	JANEWAY	1984 07 19	12510	1
05N	19E	12	WILLIFORD ENERGY CO	1-12	OTHO ENIS	1984 04 20	12350	1
05N	19E	13	TENNECO OIL CO	1-13	HEITNER	1984 02 14	13000	1
05N	19E	14	TENNECO OIL CO	1-14	LAWRENCE	1984 07 08	11900	1
05N	19E	15	WILLIFORD ENERGY CO	1	PACE	1982 05 05	11168	1
05N	19E	16	DONALD C SLAWSON	1-16	DENTON	1985 08 02	10992	1
05N	19E	16	WILLIFORD ENERGY CO	1-16	BURGER	1984 01 27	13247	1
05N	19E	16	DONALD C SLAWSON	1-16	PACE	1984 07 07	11250	1
05N	19E	17	R M AKERS	1	J U GRAY	1953 03 15	4343	1
05N	19E	17	PITCO	1-17	POTEET	1978 11 09	12601	1
05N	19E	17	HUMBLE OIL & REFINING CO	1	J D HUMPHREY UNIT	1965 10 08	12713	1
05N	19E	18	HUMBLE OIL & REFINING CO	1	COLLEGE UNIT	1962 09 25	12446	1
05N	19E	19	SAMSON RESOURCES CO	1	DREESEN UNIT	1978 09 11	6720	1
05N	19E	19	HUMBLE OIL & REFINING CO	1	CHARLES SPARKS UNIT	1963 12 13	12384	1
05N	19E	20	HUMBLE OIL & REFINING CO	1	J A RAY UNIT	1965 01 19	12400	1
05N	19E	20	FERGUSON OIL CO INC	1	MCKEOWN	1972 10 19	7558	1
05N	19E	21	TXO PRODUCTION CORP	1	GIVENS	1981 02 09	7800	1
05N	19E	21	FERGUSON OIL CO INC	1	VFW	1973 08 20	8092	1
05N	19E	21	HUMBLE OIL & REFINING CO	1	ERVIN JEWELL UNIT	1965 08 20	13360	1
05N	19E	22	SAMSON RESOURCES CO	1	GRACE	1984 06 17	8883	1
05N	19E	22	SKELLY OIL CO	1	M L JOHNSON	1966 12 29	9545	1
05N	19E	24	DONALD C SLAWSON	1-24	SMITH	1984 08 26	12180	1
05N	19E	27	EBERLY & MEADE (SHELL OIL CO)	32-27	WILLIAMS	1980 06 08	16172	1
05N	19E	29	DANIEL-PRICE EXPLORATION	1	CHURCH LAKE	1988 09 27	DRG	2
05N	19E	29	SUPERIOR OIL CO	1	BABB UNIT	1968 01 07	7751	1
05N	19E	29	ANDOVER OIL CO	29-1	VFW	1982 01 17	8290	1
05N	19E	30	AUSTRAL OIL CO INC	1-30	DIAMOND UNIT	1966 07 05	11203	1
05N	19E	30	SUN EXPLORATION & PRODUCTION CO	2	DIAMOND UNIT	1988 09 29	13800	2

TABLE 1.—*Continued*

T–R–S			Operator	No.	Farm	Spud Date	T.D.	Ref.
05N	19E	33	O EBERLY, R EBERLY, J MEADE, K MEADE	1-33	EVANS	1979 03 02	7678	1
05N	20E	01	GULF OIL CORP	1-1	W C BOOTH-STATE	1979 11 12	13424	1
05N	20E	01	DONALD C SLAWSON	1-1	FOSTER	1983 09 30	13420	1
05N	20E	02	MUSTANG PRODUCTION CO	1-2	ADAMS	1983 12 15	12359	1
05N	20E	02	MUSTANG PRODUCTION CO	1-2	BOOTH	1979 02 23	12853	1
05N	20E	03	MUSTANG PRODUCTION CO	1-3	CASH MITCHELL	1983 05 08	11577	1
05N	20E	03	MUSTANG PRODUCTION CO	1-3	CATHEY	1978 01 10	14343	1
05N	20E	04	UNIT DRILLING & EXPLORATION CO	1	HAWTHORNE	1981 12 11	11720	1
05N	20E	04	DYCO PETROLEUM CORP	1	GENTRY	1977 05 30	7671	1
05N	20E	05	UNIT DRILLING & EXPLORATION CO	1	MAXEY	1983 01 25	12283	1
05N	20E	05	DONALD C SLAWSON	1-5	MCKEE	1987 02 23	12416	1
05N	20E	06	FORTUNA ENERGY CORP	1-6	LIVELY	1984 05 06	12281	1
05N	20E	07	WILLIFORD ENERGY CO	1-7	BUTZER	1983 05 12	12890	1
05N	20E	08	UNIT DRILLING & EXPLORATION CO	1	DEAR	1988 04 15	12720	2
05N	20E	08	UNIT DRILLING & EXPLORATION CO	1	COX	1983 02 11	12400	1
05N	20E	09	UNIT DRILLING & EXPLORATION CO	1	GOLIGHTLY	1982 07 18	12205	1
05N	20E	09	DYCO PETROLEUM CORP	1	GOLIGHTLY	1975 10 24	12388	1
05N	20E	10	JIMMIE AUSTIN DBA AUSTIN PROD CO	1-10	COLVARD	1983 01 17	12000	1
05N	20E	11	MUSTANG PRODUCTION CO	1-11	ROBINSON	1981 06 14	14017	1
05N	20E	11	AUSTIN PRODUCTION CO	1-11	ROBINSON	1985 01 12	12350	1
05N	20E	12	DONALD C SLAWSON	1-12	ABBOTT	1984 10 01	12328	1
05N	20E	17	EDWIN L COX	1	SHAY	1977 11 14	7250	1
05N	20E	17	HUMBLE OIL & REFINING CO	1	SHAY UNIT	1966 02 14	14503	1
05N	20E	18	UNIT DRILLING & EXPLORATION CO	1	HARDING	1983 08 22	13550	1
05N	20E	18	UNIT DRILLING & EXPLORATION CO	1	OTHO	1988 03 14	11005	2
05N	20E	28	WELLHEAD COMPRESSION	2	SUMAR	1987 11 10	3200	2
05N	21E	01	AMOCO PRODUCTION CO	1	M C THOMAS	1988 11 16	DRG	2

05N	21E	02	SOUTHLAND ROYALTY CORP	1-2	GARNER	1981 03 17	12964	1
05N	21E	03	MITCHELL ENERGY CORP	1	RUSSEL ALBIN	1984 03 10	13876	1
05N	21E	09	PAN AMERICAN PETROLEUM CORP	1	J A JOHNSON ESTATE	1967 07 01	9686	1
05N	21E	19	BERT WHEELER	1	H T JENNINGS	1959 07 21	9761	1
05N	21E	19	AMBASSADOR OIL CORP	1	G W MUNCY UNIT	1960 11 18	12187	1
05N	21E	22	AMBASSADOR OIL CORP	1	MUSE	1964 04 14	11489	1
05N	21E	36	CITIES SERVICE OIL & GAS CORP	1	SMITH-ENGLISH A	1983 10 20	14902	1
05N	22E	04	SNEE & EBERLY	1	CAULFIELD	1968 02 20	7250	1
05N	24E	07	ARKLA GAS CO	1	USA UNIT 1	1963 06 28	12251	1
05N	24E	15	SHAFFER OIL & REFINING CO	1	WILLY HUMPHREY	1915 05 27	3395	1
05N	24E	18	AMERICAN QUASAR PETROLEUM CO OF NM	1	S L SUTTON	1974 01 21	14590	1
04N	15E	03	MUSTANG PRODUCTION CO	1-3	TURNEY	1972 09 04	4300	1
04N	15E	03	APACHE CORP	1	BARRINGER UNIT	1966 08 18	11392	1
04N	15E	04	MUSTANG PRODUCTION CO	1-4	STIPE	1973 05 12	4140	1
04N	15E	05	LEBEN DRILLING INC	1-5	HENRY	1969 05 20	9000	1
04N	15E	07	SAMSON RESOURCES CO	1	BOARDWALK	1981 10 25	10472	1
04N	15E	07	SAMSON RESOURCES CO	1	KENYON	1986 12 28	7000	1
04N	15E	08	TENNECO OIL CO	1-8	ELLIS	1982 04 13	10254	1
04N	15E	09	MUSTANG PRODUCTION CO	1-9	MCFADDEN	1982 04 06	10900	1
04N	15E	11	MUSTANG PRODUCTION CO	1-11	BARRINGER	1979 06 19	11000	1
04N	15E	15	MUSTANG PRODUCTION CO	1-15	BROWNE	1983 06 04	10500	1
04N	15E	15	TENNECO OIL CO	1-15	CROWL	1978 12	11000	1
04N	15E	16	SENECA OIL CO	1-16	BROWNE TRUST	1982 04 16	10500	1
04N	15E	17	WHITMAR EXPLORATION CO	1-17	STIPE	1982 04 16	9873	1
04N	15E	17	WHITMAR EXPLORATION CO	2-17	STIPE	1988 08 28	9500	2
04N	15E	17	WHITMAR EXPLORATION CO	1-17	AGEE	1984 03 06	10500	1
04N	15E	18	TENNECO OIL CO	1-18	CABLE	1981 08 09	10000	1
04N	15E	18	TENNECO OIL CO	1-18	ROLLINGS	1983 02 16	10000	1
04N	15E	19	SENECA OIL CO	1-19	CABLE	1982 07 31	12900	1
04N	15E	20	SENECA OIL CO	1-20	ROLLINGS	1982 11 29	11733	1
04N	15E	21	SENECA OIL CO	1-21	HACKLER	1982 10 31	12545	1

TABLE 1.—*Continued*

T–R–S	Operator	No.	Farm	Spud Date	T.D.	Ref.
04N 15E 23	OXLEY PETROLEUM CO	1	PATRICIA STEVENS	1975 08 15	10500	1
04N 15E 24	TXO PRODUCTION CORP	1	BRAZIL	1984 07 23	9601	1
04N 15E 25	OXLEY PETROLEUM CO	1	WHITING	1974 12 07	13275	1
04N 15E 26	TXO PRODUCTION CORP	1	STEVENS F	1983 08 28	9255	1
04N 15E 26	TXO PRODUCTION CORP	2	STEVENS F	1985 12 23	10426	1
04N 15E 27	TXO PRODUCTION CORP	1	CROWL	1984 05 02	9838	1
04N 15E 27	PAN AMERICAN PETROLEUM CORP	1	WEST UNIT	1968 06 24	10318	1
04N 15E 28	OXLEY PETROLEUM CO	1-28	CROWL	1984 11 15	7861	1
04N 15E 33	TXO PRODUCTION CORP	1	FUGITT	1981 06 30	9534	1
04N 15E 34	TXO PRODUCTION CORP	1	SCHERER B	1986 03 09	10283	1
04N 15E 34	TXO PRODUCTION CORP	1	RUYANA	1984 12 06	10311	1
04N 15E 35	SAMSON RESOURCES CO	1	VAN DYKE	1985 06 30	10100	1
04N 16E 01	MARATHON OIL CO	1-1	SLAUGHTER UNIT	1973 07 05	10791	1
04N 16E 01	MARATHON OIL CO	2	SLAUGHTER UNIT	1986 11 15	12098	1
04N 16E 01	SAMSON RESOURCES CO	1	KENYON	1986 12 28	7000	2
04N 16E 02	MARATHON OIL CO	2	MADDEN UNIT	1987 08 27	11968	2
04N 16E 02	MARATHON OIL CO	1-2	MADDEN	1973 11 03	10595	1
04N 16E 03	WHITMAN EXPLORATION CO	2-3	SMALLWOOD	1982 01 29	12400	1
04N 16E 03	RUBY-ANN ET AL	1	GEORGE	1932 03 01	1282	2
04N 16E 03	PAN AMERICAN PETROLEUM CORP	1	SMALLWOOD UNIT B	1964 11 28	7595	1
04N 16E 03	HEADINGTON	1	MADDUX	1974 05 16	11750	2
04N 16E 03	HADSON PETROLEUM CORP	1-3	SMALLWOOD	1980 04 30	11975	1
04N 16E 04	TEXACO PRODUCTION CO	1-4	W C CAMP	1988 07 22	13092	2
04N 16E 05	DONALD C SLAWSON	1-15	LYNN	1986 12 14	11179	2
04N 16E 07	SKELLY OIL CO	1	FRANK JAMES	1968 05 25	10600	1
04N 16E 08	GOSE PETROLEUM CO	1	COPE	1967 06 04	7660	1
04N 16E 09	UNNAMED					4

04N	16E	09	TEXAS OIL & GAS CORP	1	ROSO	1978	09	19	7600	1
04N	16E	09	PUBLIC SERVICE CO OF OKLA	3	CHOC-CHICK NATIONS	1943	08	11	1313	1
04N	16E	09	C W MCILHENNY	1	TRIBAL CHOC-CHIC	1941	11	12	1655	1
04N	16E	09	TXO PRODUCTION CORP	1	JAMES C	1982	10	27	6950	1
04N	16E	10	PUBLIC SERVICE CO OF OKLA	2	W G THOMAS	1941	12	19	1400	1
04N	16E	10	AMOCO PRODUCTION CO	2	SMALLWOOD UNIT	1985	09	11	11027	1
04N	16E	10	PAN AMERICAN PETROLEUM CORP	1	SMALLWOOD UNIT	1963	08	09	11852	1
04N	16E	11	MARATHON OIL CO	1-11	NEEDHAM UNIT	1972	10	31	11266	1
04N	16E	11	MARATHON OIL CO	3-11	NEEDHAM UNIT	1988	04	10	4850	2
04N	16E	11	MARATHON OIL CO	2-11	NEEDHAM UNIT	1987	08	04	12350	1
04N	16E	12	MARATHON OIL CO	3	LEWIS UNIT	1987	06	07	12642	2
04N	16E	12	W P LERBLANCE JR	2-12	LEWIS	1975	12	01	6802	1
04N	16E	12	MARATHON OIL CO	1-12	LEWIS UNIT	1973	08	27	11523	1
04N	16E	12	MARATHON OIL CO	3	LEWIS UNIT	1987	06	08	12642	1
04N	16E	13	WHITMAR EXPLORATION CO & GEODINE	1-13	COPE	1979	01	30	12100	1
04N	16E	14	MARATHON OIL CO	1-14	NEEDHAM	1973	09	19	11856	1
04N	16E	14	SAMSON RESOURCES CO	1	TEX	1985	06	15	13000	1
04N	16E	15	MARATHON OIL CO	1-15	LYNN	1974	02	16	11690	2
04N	16E	16	SINCLAIR OIL & GAS CO	1	J M SENSIBAUGH	1962	05	18	11775	1
04N	16E	17	OXLEY PETROLEUM CO	1	COPE	1976	10	13	8642	1
04N	16E	18	HADSON PETROLEUM CORP	1-18	THORNTON	1981	07	17	9500	1
04N	16E	19	OXLEY PETROLEUM CO	2	SCHILLER	1985	09	02	8500	1
04N	16E	19	OXLEY PETROLEUM CO	1	SCHILLER	1978	11	07	9376	1
04N	16E	20	HAMILTON BROTHERS OIL CO	1-20	THORNTON-RAILEY	1979	12	19	13060	1
04N	16E	20	SAMSON RESOURCES CO	1	TRAVIS	1984	08	21	8250	1
04N	16E	21	HAMILTON BROTHERS OIL CO	1-21	SHANN	1980	12	16	7828	1
04N	16E	22	APEXCO INC	1	WARREN SPAHN	1974	08	07	12709	1
04N	16E	24	ANDOVER OIL CO	24-1	GAYLE LYNN	1981	07	24	12539	1
04N	16E	28	TXO PRODUCTION CORP	1	ELLISON B	1983	01	20	13000	1
04N	16E	29	HAMILTON BROTHERS OIL CO	1-29	STRANGE	1981	06	28	8005	1
04N	16E	30	TXO PRODUCTION CORP	1	PENFIELD	1982	10	07	7900	1

TABLE 1.—*Continued*

T–R–S	Operator	No.	Farm	Spud Date	T.D.	Ref.
04N 16E 30	ARKLA EXPLORATION CO	1-30	LOVELESS	1980 03 26	14800	1
04N 16E 31	TXO PRODUCTION CORP	1	SCOTT G	1983 04 15	8300	1
04N 16E 31	TXO PRODUCTION CORP	1	SCOTT M	1984 07 08	8000	1
04N 16E 32	HAMILTON BROTHERS OIL CO	1-32	SPAHN	1985 03 01	8000	2
04N 16E 33	UNION TEXAS PETROLEUM CORP	1-33	BOND	1982 05 14	9732	1
04N 17E 01	KING RESOURCES CO	1-1	PATTISON	1969 08 07	11555	1
04N 17E 02	KING RESOURCES CO	1-2	MCCASLIN	1969 03 20	11555	1
04N 17E 02	ARKOMA PRODUCTION CO	2	MC CASLIN	1986 12 31	11450	1
04N 17E 03	KING RESOURCES CO	1-3	LAYDEN	1969 03 14	11890	1
04N 17E 03	ARKOMA PRODUCTION CO	1	SPARKS	1986 11 30	11762	1
04N 17E 04	ARKOMA PRODUCTION CO	2	STINE	1985 08 22	11702	2
04N 17E 04	TIPCO	1-4	STINE	1970 08 01	11010	1
04N 17E 05	TIPCO	1-5	ROCK ISLAND IMP CO	1970 05 16	11226	1
04N 17E 05	ARKOMA PRODUCTION CO	2	ROCK ISLAND	1986 12 21	11550	1
04N 17E 06	ARKOMA PRODUCTION CO	4-6	HARTSHORNE	1988 02 07	6500	2
04N 17E 06	ARKOMA PRODUCTION CO	2-6	HARTSHORNE	1983 06 20	7000	1
04N 17E 06	TIPCO	1-6	HARTSHORNE	1971 08 16	11050	1
04N 17E 06	ARKOMA PRODUCTION CO	3	HARTSHORNE	1986 12 26	10850	1
04N 17E 07	AMOCO PRODUCTION CO	1-7	ROCK ISLAND IMP CO	1972 02 08	11549	1
04N 17E 08	TIPCO	1-8	R I IMP CO	1971 05 02	12010	1
04N 17E 08	ARKOMA PRODUCTION CO	2	ROCK ISLAND	1987 07 03	12220	2
04N 17E 09	MUSTANG PRODUCTION CO	1-9	SWEET	1977 09 24	12560	1
04N 17E 09	ARKOMA PRODUCTION CO	1	ALEXANDER	1987 08 03	12450	1
04N 17E 10	UNIT DRILLING & EXPLORATION CO	1	PSO	1980 06 07	13300	1
04N 17E 11	WHITMAR EXPLORATION CO	1-11	SILVER BULLETT	1981 09 25	13036	1
04N 17E 12	EXXON CORP	1	MABRY TRUST	1988 01 08	13200	2
04N 17E 15	CONTINENTAL OIL CO	1	WALLACE 15	1974 06 05	7647	1

04N	17E	16	CONTINENTAL OIL CO	1	WAYNE WALLACE	1974 02 03	8192	2
04N	17E	17	CONTINENTAL OIL CO	1	W WALLACE 17	1971 12 27	13066	1
04N	17E	18	TXO PRODUCTION CORP	1	WRIGHT E	1985 01 19	12700	1
04N	17E	20	CONTINENTAL OIL CO	1	SPARKS UNIT 20	1974 10 01	8828	1
04N	17E	21	TEXACO PRODUCTION CO	21-1	WAYNE WALLACE UNIT	1988 12 06	DRG	2
04N	17E	24	SHELL OIL CO	1	RETHERFORD	1980 03 16	14164	1
04N	17E	27	AMOCO PRODUCTION CO	1	PATTERSON UNIT	1988 10 26	DRG	2
04N	17E	32	AMOCO PRODUCTION CO	1	ZIPPERER UNIT	1988 03 13	12600	2
04N	18E	03	SINCLAIR OIL & GAS CO	1	MOSE C WATTS	1965 02 25	3795	1
04N	18E	04	SHELL OIL CO	1-4	WILLIAMS-MABRY	1964 05 23	9541	1
04N	18E	05	SHELL OIL CO	1-5	R EVERY	1965 02 15	3467	1
04N	18E	05	SHELL OIL CO	1-5	MABRY	1965 02 15	53	2
04N	18E	05	TENNECO OIL CO	1-5	MABRY TRUST	1983 11 13	12389	2
04N	18E	07	AUSTRAL OIL CO INC	1-7	MABRY	1966 10 31	3993	1
04N	18E	09	SHELL OIL CO	1-9	MABRY	1965 07 05	13253	1
04N	18E	12	G R HAYES	1	BENNETT	1951 05 22	3005	2
04N	19E	06	ARCO OIL & GAS CO	1	HART	1988 06 19	DRG	2
04N	19E	08	WILLIFORD ENERGY CO	1-8	CLEMONS	1982 10 29	13590	1
04N	19E	11	WHITEHEAD	1-B	SEPTER	C1941 01 10	1055	2
04N	19E	11	WHITEHEAD	1	SEPTER "A"	C1940 03 01	1060	2
04N	19E	12	SHELL OIL CO	1-12	DIPPEL	1966 05 12	12926	1
04N	19E	22	PERKINS PRODUCTION CO	1	SPANISH WAR VETS	1966 02 15	960	1
04N	20E	06	EMPIRE DRILLING CO	1	PETERS	1961 05 26	1100	1
04N	20E	08	HOLLAND & BARNES	1	MCCOY	1952 12 14	850	2
04N	25E	13	STEPHENS PRODUCTION CO	1	BILL CAUGHERN	1962 09 17	8119	1
03N	13E	01	BASS ENTERPRISES PRODUCTION CO	1	BUCKNER	1985 06 09	8200	1
03N	13E	01	TEXAS OIL & GAS CORP	1	WARD E	1979 07 03	8100	1
03N	13E	05	TEXAS OIL & GAS CORP	1	NAVAL DEPOT	1977 06 02	10500	1
03N	13E	07	SOUTHERN UNION PRODUCTION CO	1-7	CRESCENT	1975 10 09	10283	1
03N	13E	08	SAMSON RESOURCES CO	1-8	THORNE	1981 05 01	7410	1
03N	13E	08	STEPHENS PRODUCTION CO	1	ENNENGA BROS	1970 02 14	10201	1

TABLE 1.—*Continued*

T–R–S			Operator	No.	Farm	Spud Date	T.D.	Ref.
03N	13E	09	SUPRON ENERGY CORP	1	COLBERT POE	1977 02 25	10790	1
03N	13E	09	DYCO PETROLEUM CORP	1-9	POE	1983 10 02	7804	1
03N	13E	11	OXLEY PETROLEUM CO	1	WARD	1972 01 16	10751	1
03N	13E	12	ARKLA EXPLORATION CO	1	GLOVER	1979 07 11	8903	1
03N	13E	14	ARKLA EXPLORATION CO	1-14	CALDWELL	1976 01 23	13770	1
03N	13E	15	SUPRON ENERGY CORP	15-1	HENRY POE	1979 05 27	9000	1
03N	13E	16	SUPRON ENERGY CORP	1-16	POE COC	1979 02 13	2200	1
03N	13E	16	CITIES SERVICE CO	1	POE A	1981 01 04	7801	1
03N	13E	17	UNION TEXAS PETROLEUM (SUPRON ENERGY)	17-2	HALL	1979 03 11	8000	1
03N	13E	17	MERCURY PRODUCTION CO	17-1	HALL	1976 02 21	10504	1
03N	13E	18	UNION TEXAS PETR (SO UNION PROD CO)	1	HALL	1975 08 06	10241	1
03N	13E	19	SUPRON ENERGY CORP	19-1	D B HALL	1979 01 25	2500	1
03N	13E	19	CITIES SERVICE CO	1	HALL-D	1980 03 17	7250	1
03N	13E	21	SKELLY OIL CO	1	PITTSBURG A	1968 04 12	8500	1
03N	13E	22	WARD A SMITH	1	SMITH	1923 08 22	2102	1
03N	13E	22	ARKLA EXPLORATION CO	1	CRESCENT	1977 09 23	11577	1
03N	13E	24	SAMSON RESOURCES CO	1	MONTGOMERY	1982 06 15	10520	1
03N	13E	25	HAMILTON BROTHERS OIL CO	1-25	SHERRILL-DANIELS	1979 02 19	12080	1
03N	13E	26	TEXAS OIL & GAS CORP	1	WEAVER D	1979 04 26	11800	1
03N	13E	27	SKELLY OIL CO	1	JAMES SHIELDS	1968 04 05	8950	1
03N	13E	28	HADSON PETROLEUM CORP	1-28	PHIPPS	1981 10 13	8906	1
03N	13E	28	SKELLY OIL CO	1	CORONADO A	1967 09 11	8683	1
03N	13E	29	CITIES SERVICE OIL & GAS CORP	1	PHIPPS A	1985 03 15	13450	1
03N	13E	32	SUNSET INTERNATIONAL PETROLEUM CO	1	BENNETT	1969 01 07	8757	1
03N	13E	35	OXLEY PETROLEUM CO	1	SNIDER	1979 04 08	11962	1
03N	14E	04	SENECA OIL CO	1-4	ECHELLE	1982 01 27	11425	1
03N	14E	05	TXO PRODUCTION CORP	1	BIGGERS	1978 05 23	9000	2

03N	14E	05	TEXAS OIL & GAS CORP	2	BIGGERS	1979	08	17	8531	1
03N	14E	06	UNION TEXAS PETROLEUM CORP	6-1	BIGGERS	1978	08	04	8200	1
03N	14E	06	UNICON PRODUCING CO (SUPRON ENERGY)	1-K	WARD	1982	01	02	7600	1
03N	14E	07	TEXAS OIL & GAS CORP	1	WARD F	1979	10	15	4350	1
03N	14E	08	TXO PRODUCTION CORP	1	BIGGERS A	1983	07	10	11639	1
03N	14E	09	TRAFALGAR HOUSE OIL & GAS INC	2-9	ECHELLE	1986	03	24	10050	1
03N	14E	09	SENECA OIL CO	1-9	ECHELLE	1981	12	05	10760	1
03N	14E	10	COTTON PETROLEUM CORP	1	KATHRYN	1982	04	17	11597	1
03N	14E	12	HAMILTON BROTHERS OIL CO	1-12	SWEETIN	1979	04	12	12000	1
03N	14E	15	HAMILTON BROTHERS OIL CO	1-15	STORRIE	1979	01	03	11891	1
03N	14E	15	WHITMAR EXPLORATION CO	1-15	HOPPER	1982	02	12	11800	1
03N	14E	16	CONTINENTAL OIL CO	1	HOPPER	1973	09	21	10636	1
03N	14E	16	COTTON PETROLEUM CORP	1	HODGENS	1981	05	07	11107	1
03N	14E	17	COTTON PETROLEUM CORP	1	STROEHMER	1982	04	15	10500	1
03N	14E	17	AMAX PETROLEUM CORP	1	STROEHMER	1968	05	20	8176	1
03N	14E	18	COTTON PETROLEUM CORP	1	BUELA MAE	1982	06	15	11235	1
03N	14E	19	SAMSON RESOURCES CO	1	DOBBS	1981	08	30	10425	1
03N	14E	20	SAMSON RESOURCES CO	1	PITTSBURG	1982	01	11	9898	1
03N	14E	20	SAMSON RESOURCES CO	2	PITTSBURG	1983	03	09	10402	1
03N	14E	21	SAMSON RESOURCES CO	1	HOPPER	1982	07	26	10344	1
03N	14E	22	AMAX PETROLEUM CORP	1	SHERRILL	1967	10	25	5861	1
03N	14E	22	SAMSON RESOURCES CO	1	SHERRILL	1982	04	03	11268	2
03N	14E	23	SAMSON RESOURCES CO	1	LEE	1984	06	22	9978	1
03N	14E	24	TXO PRODUCTION CORP	1	EUNICE A	1983	10	28	8800	1
03N	14E	25	HAMILTON BROTHERS OIL CO	1-25	HOPPER	1982	11	06	9700	1
03N	14E	25	HAMILTON BROTHERS OIL CO	2-25	HOPPER	1985	05	13	8820	2
03N	14E	26	SAMSON RESOURCES CO	1	KINNIKIN	1983	07	28	10750	1
03N	14E	27	SAMSON RESOURCES CO	1	FONTANA	1982	05	21	11090	1
03N	14E	27	GLOBAL GAS CORP	1-27	PENALUNA	1977	09	30	2894	1
03N	14E	28	SAMSON RESOURCES CO	1	SULLIVAN	1981	12	09	10548	1
03N	14E	29	HAMILTON BROTHERS OIL CO	1-29	DON SCOTT	1980	06	18	10100	1

TABLE 1.—*Continued*

T–R–S			Operator	No.	Farm	Spud Date	T.D.	Ref.
03N	14E	30	HAMILTON BROTHERS OIL CO	1-30	CHITTY-SCOTT	1978 09 27	10440	1
03N	14E	30	HAMILTON BROTHERS OIL CO	2-30	CHITTY SCOTT	1988 10 28	DRG	2
03N	14E	31	SAMSON RESOURCES CO	1	SISCO	1984 04 26	10600	1
03N	14E	31	KERR-MCGEE CORP	1-31	LEE SCOTT	1979 05 12	12200	1
03N	14E	32	SAMSON RESOURCES CO	1	ALEX	1985 02 13	11300	1
03N	14E	32	SAMSON RESOURCES CO	1	GOODIN	1983 06 07	10320	1
03N	14E	33	SAMSON RESOURCES CO	1	LITTLE	1984 07 11	11770	1
03N	14E	34	SAMSON RESOURCES CO	1	MACKEY	1984 03 11	11953	1
03N	14E	35	SAMSON RESOURCES CO	1	THOMASON	1984 04 07	9772	1
03N	14E	36	SAMSON RESOURCES CO	1	CHRISTMAN	1983 10 14	9790	1
03N	15E	01	TEXACO INC	1-1	J A GODDARD UNIT	1988 11 13	DRG	2
03N	15E	02	TEXACO INC	2-1	CARL GODDARD UNIT	1988 08 04	12140	2
03N	15E	07	SENECA OIL CO	1-7	WILLIAMS	1982 07 10	12800	1
03N	15E	07	CONTINENTAL OIL CO	1	ANNIE JONES	1974 12 21	11311	1
03N	15E	10	APEXCO INC	1	NELSON	1976 03 16	4855	1
03N	15E	10	TEXACO INC	1-10	KAY OLIVE DAY	1986 11 14	7300	1
03N	15E	10	APEXCO INC	2	NELSON	1976 06 25	3924	1
03N	15E	13	TEXACO INC	1-13	DUERD	1984 07 22	14500	1
03N	15E	14	GETTY OIL CO	14-1	SWEETIN	1982 07 08	13873	1
03N	15E	15	SAMSON RESOURCES CO	1	KAY	1987 07 22	6700	1
03N	15E	16	TEXACO INC	1-16	ISBELL	1985 11 12	13870	1
03N	15E	19	HAMILTON BROTHERS OIL CO	1-19	INDIAN NATIONS	1982 06 28	11742	1
03N	15E	20	SAMSON RESOURCES CO	1	IVERSON	1983 12 06	10925	1
03N	15E	21	SAMSON RESOURCES CO	1	DIAL	1984 05 10	12100	1
03N	15E	23	SAMSON RESOURCES CO	1	SWEETIN	1984 04 21	14537	1
03N	15E	29	HAMILTON BROTHERS OIL CO	1-29	INDIAN NATIONS	1982 07 30	9650	1
03N	15E	30	HAMILTON BROTHERS OIL CO	1-30	INDIAN NATIONS	1981 10 02	10293	1

03N	15E	31	SAMSON RESOURCES CO	1	WILKINSON	1984	01	11	9998	2
03N	15E	32	TXO PRODUCTION CORP	1	GRIFFIN B	1984	05	27	12710	1
03N	16E	02	AMOCO PRODUCTION CO	1	GARRETT UNIT A	1988	01	09	16500	2
03N	16E	05	AMOCO PRODUCTION CO	1	ROSSO UNIT	1988	06	22	DRG	2
03N	16E	07	SAMSON RESOURCES CO	1	TROSPER	1984	04	10	4342	2
03N	16E	08	TXO PRODUCTION CORP	1	HENLEY F	1984	05	09	11045	1
03N	16E	09	SAMSON RESOURCES CO	1	EUGENE	1984	06	02	12560	1
03N	16E	17	TXO PRODUCTION CORP	1	SWEETIN A	1983	10	27	12850	1
03N	18E	05	EXXON CORP	1	RETHERFORD	1984	07	25	19046	1
03N	20E	31	WYOMING OIL & GAS	1	LONNIE ALLEN	1974	03	18	3197	2
03N	20E	32	SINCLAIR OIL & GAS CO	1	A H RENEAU	1959	05	09	942	1
03N	20E	33	SINCLAIR OIL & GAS CO	1	HELEN MATTICE	1961	02	14	3000	1
03N	21E	02	SELECT OIL & GAS CO	1	LATIMER	1985	03	13	225	2
03N	21E	21	SINCLAIR OIL & GAS CO	1	H H COUSSENS	1960	10	07	2500	1
03N	21E	30	MINERAL DEVELOPMENT ASSOC		WELL "A"				2600	3
03N	21E	31	UNNAMED WELL						3000	4
03N	21E	31	KENTUCKY DRILLING & DEVELOPMENT	1	BAILEY	1960	10	14	170	2
03N	22E	15	UNNAMED WELL							4
03N	22E	15	UNNAMED WELL						1300	4
03N	22E	15	UNNAMED WELL						1300	4
03N	22E	16	KIAMICHI VALLEY GAS-OIL MNG CO	1	ALLEN	1921	01	12	1407	1
03N	22E	16	UNNAMED WELL						3505	4
03N	22E	16	UNNAMED WELL						1255	4
03N	22E	16	D & J PRODUCTION CORP	1	TAYLOR	1963	03	30		2
03N	22E	16	UNNAMED WELL						1680	4
03N	22E	16	C F MILLER	1	MC GOWAN	C1950			1300	2
03N	22E	17	D & J PRODUCTION CORP	1	WESLEY LEE	1963	08	17	1680	2
03N	22E	22	UNNAMED WELL							4
03N	22E	25	O N SELLERS	1	JONES	C1950			5005	2
03N	24E	34	W HUBBELL	1	RIND	1954	07	19	310	2
03N	24E	34	MERLE ZWEIFEL	1	BRANNON	1954	07	22	200	

TABLE 1.—*Continued*

T–R–S			Operator	No.	Farm	Spud Date	T.D.	Ref.
03N	25E	26	F A CALLERY INC	1	G DORER	1964 10 02	6543	1
02N	12E	01	TENNECO OIL CO	1-1	RUBY SEXTON	1986 01 08	9300	1
02N	12E	05	ARKLA EXPLORATION CO	1-5	MOWDY	1977 04 29	10705	1
02N	12E	06	ARKLA EXPLORATION CO	1	PRATHER	1978 04 17	10690	1
02N	12E	18	FAIN & MCGAHA	1	MURROW INDIAN ORPHANS HOME	1961 11 14	4330	1
02N	12E	20	COTTON PETROLEUM CORP	1	MC ENTIRE	1983 12 11	11110	1
02N	12E	28	DIAMOND SHAMROCK CORP	1	O V HAWKINS ET AL	1967 11 30	9628	1
02N	12E	34	COTTON PETROLEUM CORP	1	CLOTFELTER	1983 12 13	11546	1
02N	13E	03	HAMILTON BROTHERS OIL CO	1-3	VAUGHAN-DUVALL	1979 03 16	12100	1
02N	13E	07	SKELLY OIL CO	1	A R COBLE	1968 06 24	9100	1
02N	13E	12	MUREXCO PETROLEUM INC	1-12	SELF	1986 01 30	12580	1
02N	13E	24	DONALD C SLAWSON	1-24	TRAPP	1984 07 03	12208	1
02N	13E	25	TEXACO INC	25-1	CHASTAIN UNIT	1988 06 29	11730	2
02N	13E	30	G B STOBAUGH	2	MARTIN	1964 02 28	815	1
02N	13E	30	G B STOBAUGH	3	MARTIN	1964 03 20	843	1
02N	13E	30	GENE A BOREN	1	MARTIN	1959 10 11	860	1
02N	13E	30	AUBREY PRICE	1	MARTIN	1961 11 29	816	1
02N	13E	30	MARTIN & WALKER	2	MARTIN	1971 03 08	814	1
02N	13E	31	A C BURGER	1	BESS MARTIN	1964 04 29	958	1
02N	13E	35	HAMILTON BROTHERS OIL CO	1-35	PINE MOUNTAIN	1981 08 30	15225	1
02N	14E	01	TXO PRODUCTION CORP	1	ELLA MAE	1984 05 13	12605	1
02N	14E	02	SAMSON RESOURCES CO	1	ALICE	1984 06 13	11000	1
02N	14E	05	TXO PRODUCTION CORP	1	GLADYS ROSE	1984 03 09	10750	1
02N	14E	06	TXO PRODUCTION CORP	1	MCENTIRE A	1983 10 29	10281	1
02N	14E	06	TXO PRODUCTION CORP	1	MCENTIRE "B"	1985 07 26	10700	2
02N	14E	07	SAMSON RESOURCES CO	2	BLUE CREEK	1986 05 01	11626	1
02N	14E	07	HAMILTON BROTHERS OIL CO	1-7	BLUE CREEK	1981 11 28	13608	1

02N	14E	08	HAMILTON BROTHERS OIL CO	1-8	BLUE CREEK	1980 06 01	15000	1
02N	14E	09	TXO PRODUCTION CORP	1	HOEHMAN	1984 04 17	12359	1
02N	14E	11	TXO PRODUCTION CORP	1	JACK AINSWORTH A	1984 04 04	12000	1
02N	14E	16	SOUTHWESTERN EXPLORATION ET AL	1	HOEHMAN	C1955	8744	3
02N	14E	17	TXO PRODUCTION CORP	1	RUBY A	1984 06 06	12160	1
02N	14E	18	TXO PRODUCTION CORP	1	NEAL F	1984 01 30	10782	1
02N	14E	33	WHITE & MOORE		SMITH	C1920	1585	4
02N	15E	04	SUPREME OIL CO	1	HICKEY	1938 04 19	643	2
02N	15E	22	M L EDGAR	1	EDGAR	1957 03 02	710	2
02N	15E	22	JOHN F KELLY		B K LEVOE	1958 08 08	1002	2
02N	15E	22	INDEPENDENT DRILLING CO	1	E JAMES	1933 01 10	450	2
02N	15E	22	GEORGE HEDGES	1	MARY ROLAND	1956 06	750	1
02N	15E	22	WEBB & EDWARDS	1	DAILEY	1957 03 07	992	2
02N	15E	28	ABLE OIL CO	1	DALLAS JAMES	1951 11 29	537	1
02N	15E	28	ABLE OIL CO	2	DALLAS JAMES	1951 01 15	795	1
02N	15E	28	M L EDGAR	5	DALLAS JAMES	1959 05 01	488	2
02N	15E	28	ABLE OIL CO	FOUR	DALLAS JAMES	1952 10 17	365	1
02N	15E	28	G E NORWOOD DBA ARKHOMA OIL CO	4	DALLAS JAMES	1979 03 24	393	1
02N	15E	28	LIEDON OIL	6	JAMES	1967 08 15	532	2
02N	15E	28	ABLE OIL CO	3	DALLAS JAMES	1951 03 10	630	1
02N	15E	28	G E NORWOOD DBA ARKHOMA OIL CO	3	DALLAS JAMES	1979 03 24	558	1
02N	15E	28	(BESSIE) STERLING	4	JAMES	C1957	402	3
02N	15E	32	C M SMITH	2	HEWITT	1954 06 07	127	2
02N	15E	32	C M SMITH	3	HEWITT	1954 07 26	195	2
02N	15E	32	C M SMITH & BAKER	1	J G HEWITT	1953 08 20	300	2
02N	15E	32	ERNEST SMITH	1	J G HEWITT	1959 07 09	1600	2
02N	15E	33	E J MILLER	1	J M SMITH	1955 04 20	809	2
02N	15E	33	WILKERSON		SMITH	C1921	1416	4
02N	15E	33	BUCK SHORT DRILLING CO	2	E J MILLER	1956 03 14	755	1
02N	15E	33	O W SHALLER		SMITH	C1949	518	4
02N	15E	33	CARL L BOOTH	1	FREEMAN	1958 06 17	1000	2

TABLE 1.—*Continued*

T–R–S			Operator	No.	Farm	Spud Date	T.D.	Ref.
02N	15E	33	E J MILLER	2	J M SMITH	1956 03 06	760	2
02N	15E	33	BUCK SHORT DRILLING CO	1	E J MILLER	1955 03 16	818	1
02N	15E	35	ARKOMA-OUACHITA PRODUCTION CO	1	GARRETT	1982 11 22	1000	2
02N	16E	02	HALEY	1	ANDERSON	C1929	500	2
02N	16E	07	HOLD OIL CORP	1	DUTCHER	1981 10 26	1300	1
02N	16E	08	LUCKY TIGER OIL		LANER		786	2
02N	16E	08	J C CRAIG	1	WILKINS	1946 05 15	290	1
02N	16E	08	M L EDGAR	2	WILKINS	1952 09 16	227	2
02N	16E	09	HALEY ET AL		WILKERSON	1940 09 26		2
02N	16E	11	WILLIAM S. WRIGHT	1	MITCHELL	C1951	440	2
02N	16E	14	MACK OIL CO	1	KINDRED	1946 12 15	330	1
02N	16E	30	MACK OIL CO	1	SMITH	1946 11 15	345	1
02N	17E	05	GEPCO OIL & GAS	1	CLUNN	1982	1280	3
02N	17E	05	SHAWVER & SON INC	1	AVIS	1982 11 07	816	1
02N	17E	05	BAILEY PETROLEUM CORP	1	JIM	1985 10 06	1360	1
02N	17E	08	EDGE ENERGIES	8-1	DESKIN	1982 11 17	1114	2
02N	17E	20	GRAGG DRLG CO & PHILLIPS PETROLEUM	1	HEFNER	1961 08 29	3515	2
02N	17E	33	PHILLIPS & MILAN	1	ELLIOTT	1949	440	4
02N	18E	10	HERNDON DRILLING CO	1	EVERETT FLATT	1956 04 07	2000	1
02N	18E	14	MACK OIL CO	1	KINDRED	1947	330	3
02N	19E	08	GRAGG DRILLING CO	1	L L KENMAN	1961 09 03	3898	1
02N	19E	17	GRAGG DRILLING CO	1	LAYCOCK	1961 10 23	3509	1
02N	19E	20	JOHN H TURNER ET AL	1	J L STAMPER	1951 11 18	500	2
02N	19E	33	ANCHOR PRODUCTION		ESHWOOD		1125	4
02N	20E	11	AMERICAN QUASAR PETROLEUM CO	1-11	CABE	1977 02 27	15512	1
02N	20E	11	SINCLAIR OIL & GAS CO	1	SAM HERRICK	1961 01 28	3000	1
02N	24E	02	M B GARNES	1	HENDRIX	1954 07 07	100	2

02N	24E	03	MUSKOGEE WELL SERVICE	1	J D WORKMAN	1954 03 22	343	2
02N	24E	04	C C HUDSPETH SR	1	PENDLETON	1956 02	312	1
02N	24E	04	ERNEST L LIPPERT	1	NEW JERSEY OIL	1956 06 16	703	2
02N	24E	08	TONY MILTON & STANDARD SEIS CO	1	DREW HUFFMAN	1954 06 29	430	2
02N	25E	17	UNNAMED WELL				3961	4
01N	12E	15	STAUFFER PETROLEUM CORP	1-A	SANDLIN 1	1952 10 28	2169	1
01N	12E	21	ARKLA EXPLORATION CO	1-21	JOE TISDALE	1972 08 17	12943	1
01N	12E	33	ARBUCKLE DRILLING CORP	1	BROCKMIER	1956 08 02	2521	1
01N	13E	01	J W EARNEST		BURTON	C1939	800	4
01N	13E	02	TEXACO INC	2-1	SMITH F A	1988 10 13	DRG*	2
01N	13E	09	AMOCO PRODUCTION CO	1-A	L R JENKINS	1987 05 13	13468	1
01N	13E	09	AMOCO PRODUCTION CO	1	L R JENKINS UNIT	1986 11 13	10376	1
01N	13E	09	AMOCO PRODUCTION CO	2	JENKINS L R	1987 12 10	10930	2
01N	13E	10	R H PIERCE & CO INC	1	AETNA LIFE INS CO	1935 06 15	1179	1
01N	13E	10	R H PIERCE & CO INC	1	AETNA	1935 09 22	4004	1
01N	13E	10	TEXACO INC	1	LAFEVERS	1988 05 18	12850	2
01N	13E	18	ARCO OIL & GAS CO	1-18	CLARK MCENTIRE	1987 09 29	682	1
01N	13E	19	ARCO OIL & GAS CO	1-19	INGERSOLL	1987 06 07	15080	
01N	13E	21	UNNAMED WELL					4
01N	14E	03	ARKOMA-OUACHITA PRODUCTION CO	3-A	HUNT	1983 10 12	690	1
01N	14E	04	TWIN STATE	1	WEST	1919	793	3
01N	14E	04	ARKOMA-OUACHITA PRODUCTION CO	2	HUNT	1982 10 08	1010	2
01N	14E	04	ARKOMA-OUACHITA PRODUCTION CO	3	HUNT	1982 10 27	685	2
01N	14E	04	ARKOMA-OUACHITA PRODUCTION CO	1	HUNT	1982 09 29	635	2
01N	14E	04	ADVANCE ENERGY SYSTEMS	1	HUNT 4	1982 11	290	1
01N	14E	06	MARTINGALE RESOURCES INC	D-1	J C LAMBERT	1983 10 24	3020	1
01N	14E	06	ABIDE DRILLING & EXPLORATION	1	LAMBERT	1988 09 16	3393	2
01N	14E	06	MARTINGALE RESOURCES INC	1	LAMBERT	1983 08 13	1300	1
01N	14E	06	MARTINGALE RESOURCES INC	2W	LAMBERT	1983 09 15	2992	1
01N	14E	06	UNNAMED WELL				2600	4
01N	14E	06	EARNEST ET AL		WARNOCK	C1929	600	4

TABLE 1.—*Continued*

T–R–S	Operator	No.	Farm	Spud Date	T.D.	Ref.
01N 14E 13	ARKOMA-OUACHITA PRODUCTION CO	1	GABBART	1982 09 29	1020	2
01N 14E 13	SHELBY KRATTIGER TREADWAY & MORRIS	1	W WOLF	1932 07 11	451	1
01N 14E 14	UNNAMED WELL				450	4
01N 14E 23	D C EVANS	1	WYRICK	1980 03 01	983	1
01N 14E 23	WINDHAM ET AL		REDWINE		135	4
01N 14E 23	D C EVANS	1	WYRICK A	1980 03 05	1003	1
01N 14E 24	UNITED PETROLEUM & ENERGAS CORP	1-24	WYRICK	1988 07 16	2128	2
01N 14E 25	UNNAMED WELL					4
01N 14E 25	ATOKA PIPELINE	1-25	BURNS JACK	1985 07 23	7500	2
01N 14E 25	J J MADDEN	1	H A ELLIS	1953 07 14	760	1
01N 14E 26	UNNAMED WELL					4
01N 14E 26	HAL H VAUGHN		MILLER	C1953	937	4
01N 14E 26	J J MADDEN	1	BEN WYRICK	1953 10 02	551	1
01N 14E 26	US MINERAL & ROYALTY CORP	2-26	WYRICK	1981 01 31	9105	1
01N 14E 26	UNNAMED WELL				337	4
01N 14E 26	MAX PRAY	1	BEN WYRICK	1957 07 06	12088	1
01N 14E 26	HAL H VAUGHN	2	SCHOOL LAND	1952 10 25	487	2
01N 14E 26	OHIO FUEL SUPPLY CO	1	STATE	1953 07 05	993	2
01N 14E 26	UNNAMED WELL				527	4
01N 14E 26	HAL H VAUGHN	2	W W MILLER	1953 03 28	520	2
01N 14E 26	J N REDWINE	1	BILL MILLER	1930	330	1
01N 14E 26	HAL H VAUGHN	1	SCHOOL LAND	1952 10 09	902	2
01N 14E 26	US MINERAL & ROYALTY CORP	1-26	WYRICK	1978 05 24	9482	1
01N 14E 27	COCKERON		HAMPTON	C1928	416	4
01N 14E 31	UNNAMED WELL					4
01N 14E 31	ADVANCE ENERGY SYSTEMS	1	HUNT 31	1982 11	405	1
01N 14E 33	ANDY GRATZ	1	A A SPARKS	1939 02 01	453	1

01N	14E	34	UNNAMED WELL				10855	4
01N	14E	35	UNNAMED WELL					4
01N	14E	35	BUCK DRILLING CO	1	MASON	1953 04 17	1000	2
01N	14E	35	UNNAMED WELL					4
01N	14E	35	B & L DRILLING		MASON	C1953	726	4
01N	14E	35	L & L OIL CO		G A MASON	1937 08 12	300	1
01N	14E	36	UNNAMED WELL				295	4
01N	15E	04	DUROSSETTE STEVEN L	1	COLLINS	1984 09 10	1825	2
01N	15E	04	DUROSSETTE STEVEN L	3	WILSON	1985 01 25	1550	2
01N	15E	04	DUROSSETTE STEVEN L	2	WILSON	1984 09 10	550	2
01N	15E	05	HICKS ET AL	2	MORRIS	C1932	185	2
01N	15E	05	EXPLORATION TECHNOLOGIES INC	1	MARTIN	1986 03 31	1495	1
01N	15E	05	J C WILKINSON	1	GILBREATH	C1935	305	2
01N	15E	05	UNNAMED WELL					4
01N	15E	05	CARL L BOOTH ET AL	6	CROCKETT	1957 10 30	205	1
01N	15E	05	M L EDGAR	1A	GUILINGER	1966 11 27	236	1
01N	15E	05	M L EDGAR	4	CROCKETT	1953 07 10	300	2
01N	15E	05	HICKS ET AL	1	MORRIS	C1932	560	2
01N	15E	05	HICKS ET AL	3	MORRIS			2
01N	15E	05	R F MESKER	4	CROCKETT	1976 02 07	167	2
01N	15E	05	M L EDGAR	1	GUILINGER	1966 06 05	100	1
01N	15E	05	MC GILL	5	WILKINSON J C	C1938	3308	2
01N	15E	05	UNNAMED WELL					4
01N	15E	05	BLAKE ET AL	1	GILBREATH	C1933	248	2
01N	15E	05	EXPLORATION TECHNOLOGIES INC	1	SMITH	1986 04 23	981	1
01N	15E	05	BLAKE ET AL		SANDERS		45	
01N	15E	06	DUROSSETTE STEVEN L	1	ROWLAND GEORGE	1984 09 10	1805	2
01N	15E	06	GEORGE HEDGES	1	MARY ROWLAND	1956 06 16	734	2
01N	15E	07	TIME EXPL (SUNLITE ENERGY CORP)	1	FOSTER A	1984 04 12	1207	1
01N	15E	07	TIME EXPL (SUNLITE ENERGY CORP)	1	FOSTER B	1984 05 20	1305	1
01N	15E	07	TIME EXPLORATION	2	FOSTER C	1984 06 20	1236	1

TABLE 1.—*Continued*

T–R–S	Operator	No.	Farm	Spud Date	T.D.	Ref.
01N 15E 07	SUNLITE ENERGY CORP	3	FOSTER C	1984 06 10	1460	1
01N 15E 07	TIME EXPL (SUNLITE ENERGY CORP)	3	FOSTER B	1984 05 24	1299	1
01N 15E 07	SUNLITE ENERGY CORP	1	ROWLAND A	1984 06 28	1060	1
01N 15E 07	SUNLITE ENERGY CORP	1	ROWLAND BLEDSOE	1984 03 02	1080	1
01N 15E 07	TIME EXPLORATION	1	FOSTER C	1984 06 09	1200	1
01N 15E 07	TIME EXPL (SUNLITE ENERGY CORP)	2	FOSTER B	1984 05 29	1380	1
01N 15E 07	UNNAMED WELL				1320	4
01N 15E 08	FOUR NORTH INC	1	FOUR NORTH 1	1984 07 01	2248	1
01N 15E 08	DUROSSETTE STEVEN L	2	LOMAN	1984 01 12	1342	2
01N 15E 08	A & I PROPERTIES	1-A	J R	1988 12 19	2200	2
01N 15E 08	ATOKA JOINT VENTURE	1	NEWKIRK	1980 09 18	2000	2
01N 15E 08	DYNOCO CORP	1	FOSTER	1985 02 14	1450	2
01N 15E 08	ATOKA JOINT VENTURE	2	NEWKIRK	1980 09 15	2000	2
01N 15E 08	FRANK SELLMEYER	1	LOMAN	1979 12 18	552	1
01N 15E 08	DUROSSETTE STEVEN L	3	LOMAN	1984 01 25	1350	2
01N 15E 08	DUROSSETTE STEVEN L	1	KINDRED	1984 09 10	2300	2
01N 15E 08	ADENA EXPLORATION INC	1-8	ROWLAND	1984 05 24	1330	1
01N 15E 08	FOUR NORTH INC	2	FOUR NORTH 1	1984 10 15	1060	1
01N 15E 09	HAMILTON OIL CORP	3	WILSON	1985 01 03	600	1
01N 15E 09	HAMILTON OIL CORP	2	WILSON	1985 01 07	590	1
01N 15E 09	HAMILTON OIL CORP	1	WALDROP	1985 01 01	2345	1
01N 15E 13	CLAYTON INVESTMENT CO	1	KELLOGG	1982 07 23	1930	1
01N 15E 14	ALFAZAL INTERNATIONAL	2	KELLOGG	1985 08 05	492	2
01N 15E 14	ALFAZAL INTERNATIONAL	1	KELLOGG	1985 08 01	180	2
01N 15E 17	JAMES R CASSELMAN	3	MORGAN	1981 02 01	1379	1
01N 15E 18	PETER NEWMAN	1	BASKETT	C1932	165	2
01N 15E 18	WOCHER ET AL	1	BASKETT BROS	C1933	485	2

01N	15E	19	A J SANDERS	3	REDDEN	1935 08 18	1260	2
01N	15E	19	UNNAMED WELL				320	4
01N	15E	19	A J SANDERS	1	REDDEN	C1935	258	2
01N	15E	19	E B GEORGE	1	REDDEN		635	2
01N	15E	19	DILLINGHAM ET AL	3-A	REDDEN	C1937	1320	2
01N	15E	19	A J SANDERS	1-A	REDDEN	C1936	750	2
01N	15E	23	W S BRUNSON	1	GARDNER	1960 09 04	1350	1
01N	15E	24	K S SMITH ET AL		NEWKIRK	C1966	1335	4
01N	15E	24	CLAYTON INVESTMENT CO		ISOM	C1982	1368	4
01N	15E	24	UNNAMED WELL					4
01N	15E	24	CLAYTON INVESTMENT CO	4	ISOM	1982 07 23	2084	1
01N	15E	24	W S BRUNSON	1	NEWKIRK	1959 12 12	1602	1
01N	15E	24	UNNAMED WELL				1602	4
01N	15E	24	B R CAMPBAL	1	GOBBER	1976 09 21	875	1
01N	15E	26	FLORIDA EXPLORATION CO	1-26	WILLIAMS	1982 04 29	10878	1
01N	15E	27	L O SHANNON ET AL	1	GARBER	C1935	825	2
01N	15E	27	HEAD LINE OIL	1	JACKIE BACON	1972 07 01	107	2
01N	15E	27	TRANS SOUTHERN	1	BART HALL	C1938		2
01N	15E	29	W S BRUNSON	1	KELLOGG	1959 12 05	1083	1
01N	15E	29	DUROSETTE STEVEN L	1	GREENWOOD	1984 03 29	650	2
01N	16E	35	PHILLIPS PETROLEUM		HITCH	C1951	2866	4
01N	16E	36	STANOLIND		STATE	C1949	2898	4
01N	17E	06	BEAVER OIL & GAS CO		WOOD BROS RANCH		432	4
01N	17E	26	TOM LOTT	1	DEBOGORY	1949 01	625	1
01N	17E	26	SELECT OIL & GAS CO	1	J J	1985 05 05	1400	2
01N	17E	26	GARVIN & WARE	1	ROZELLE RANCH	1971 11 10	365	1
01N	17E	26	TOM LOTT	1	LOTT BLOCK	C1949	70	2
01N	17E	26	TOM LOTT	1	DEBOGORY	1949 06 13	527	2
01N	17E	26	TOM LOTT	2	DEBOGORY	1950 11 16	246	2
01N	17E	35	P F KEMP	1	L E WILLIAMS	1954 02 14	450	2
01N	17E	36	P F KEMP	1	M M UZELOK	1954 01 21	456	2

TABLE 1.—*Continued*

T–R–S	Operator	No.	Farm	Spud Date	T.D.	Ref.
01N 18E 29	SOHIO PETROLEUM CO	1-29	TROTTER-DEES	1983 12 08	15893	1
01N 20E 06	EMPIRE GAS & FUEL	1	C E WOOD	1923	3537	3
01N 21E 31	SHELL OIL CO	1-31	DIERKS	1960 08 31	5001	1
01N 23E 07	SOHIO PETROLEUM CO	1-7	WEYERHAEUSER	1987 04 25	8016	1
01S 11E 07	CENTEX OIL & GAS INC	1	PAXTON	1976 12 02	7270	1
01S 11E 08	CENTEX OIL & GAS INC	1-8	KUHN	1977 06 20	4000	1
01S 11E 18	AUSTRAL OIL CO INC	1-18	CHADWICK	1967 02 04	9450	1
01S 11E 32	LONE STAR PRODUCING CO	1	CURTIS NOEL	1969 12 19	7308	1
01S 12E 02	M C WELSCH	1	ANDREWS	1952 01 24	486	1
01S 12E 02	M C WELSCH	2	ANDREWS	1952 02 09	805	1
01S 12E 05	J M HUBER CORP	1	MCLEOD	1964 04 15	8807	1
01S 12E 19	NORTHERN ORDNANCE INC	1	FULTON RANCH	1944 02 16	7022	1
01S 12E 19	FLEETBORN OIL CORP	1	FULTON	1935 07 14	3000	1
01S 12E 22	A G BLAUNER	2	HENSON	1949	769	1
01S 13E 12	L B PRIESTLY		L B PRIESTLY	1915 06 02	1520	1
01S 13E 12	TOM BUSH	1	ABE ZWEIGER	1956 04 29	1560	2
01S 13E 18	S H BOLES	1	FRED DODD	1956	500	2
01S 13E 23	DON SUGATE ET AL	1	SUGATE	1956 10 01	1125	1
01S 13E 24	T M RINEHART	1	MINNICK	1958 02 10	1040	2
01S 13E 25	W S BRUNSON	2	LONG	1960 08 30	481	1
01S 13E 25	NOLIN OIL & GAS CO	1	KELLY-WEBB	1958 06 20	1078	1
01S 14E 02	CROXTON		MASON		295	4
01S 14E 03	CROXTON		MASON			4
01S 14E 03	KELLY SPRING				2086	4
01S 14E 03	LEWIS ET AL	1	SOUTHERN TRUST	1934 11 28	675	2
01S 14E 03	SOUTHERN TRUST		BRYANT ET AL		614	4
01S 14E 03	BOBCAT DRILLING CO	5-3	LESLIE (WELCH-GAMBLE)	1982 01 18	1150	1

01S	14E	03	UNNAMED WELL					4
01S	14E	03	BOBCAT DRILLING CO	5-3	MERLE	1982 01 23	750	1
01S	14E	03	E V CROXTON	1	SCHUMAKER	1930 10	908	1
01S	14E	03	UNNAMED WELL				250	4
01S	14E	03	QUILLEN		REED		298	4
01S	14E	03	CROXTON ET AL	1-A	SOUTHERN TRUST	1931 04 08	300	2
01S	14E	03	ZELLERS ET AL				255	
01S	14E	04	NEWMAN & GARRETT				205	1
01S	14E	04	E V CROXTON		MASON	1930	1806	3
01S	14E	04	BUCK DRILLING	1	MELTON	1953 05 28	1120	2
01S	14E	04	UNNAMED WELL				400	4
01S	14E	04	J W LEKENBAUER		SPRING ET AL	C1933	65	4
01S	14E	05	MARRELL ET AL		NEWMAN		922	4
01S	14E	08	HENSON OIL		DOWNING		302	4
01S	14E	08	NEWMAN & GARETT				605	1
01S	14E	09	C R FENSTERMACHER	4	MATTIE VAUGHN	1954 02 28	192	2
01S	14E	09	CROXTON ET AL	3	MILLER	1931 03 11	415	2
01S	14E	09	TUCKER ET AL	1	LITTLEJOHN	1932 10 25	165	2
01S	14E	09	O F MEYERS	1	A P MILLER	1942 01 24	300	2
01S	14E	09	J J MADDEN	1	JOE WINTER	1953 03 11	1000	2
01S	14E	09	MEYERS	3	E P MILLER	1943 12 14	147	3
01S	14E	09	SAM MILLER	3	MILLER	1932 11 15	310	2
01S	14E	09	CROXTON OIL CO	3-A	MILLER	1933 05 25	265	2
01S	14E	09	DOYLE E GLAZNER	1	B & G	1983 06 01	120	2
01S	14E	09	SAM MILLER	1	MILLER	1932 08 31	304	2
01S	14E	09	CROXTON	2	MILLER	1930	192	3
01S	14E	09	STENICK ET AL	4	ALENE MILLER	1934 03 14	270	2
01S	14E	09	BUFFORD ET AL	1	COOK	1932 09 28	185	2
01S	14E	09	NORTON ET AL	1	MILLER	1932 08 03	275	2
01S	14E	09	CROXTON	1	MILLER	1930	556	3
01S	14E	09	CROXTON	6	MILLER	1932 02 22	170	2

TABLE 1.—*Continued*

T–R–S	Operator	No.	Farm	Spud Date	T.D.	Ref.
01S 14E 09	C B MEYERS	1	MILLER	1944 05 02	235	2
01S 14E 09	PAUL DORAN	1	MASON	1934 06 28	603	2
01S 14E 09	MEYERS	3	A MILLER	1942	246	3
01S 14E 09	BOUKENS & JOELS	3	MILLER	1938 02 17	80	2
01S 14E 09	DAVID BLISS	4	MATTIE VAUGHAN	1966 03 15	212	1
01S 14E 09	CLARO OIL	1	FAIN	1935 07 26	50	2
01S 14E 09	WHITNEY & PHILLIPS	1	I L COOK	1934 05 23	210	2
01S 14E 09	CLARE ET AL	1	BASS	1934 08 29	1250	2
01S 14E 09	BRYANT ET AL	2	MILLER	1930 10 08	189	2
01S 14E 09	CROXTON	5	MILLER	1933	175	3
01S 14E 09	DOYLE E GLAZNER	1	MATTIE VAUGHN	1982 10 09	500	2
01S 14E 09	MEYERS	4	A MILLER	1942	230	3
01S 14E 09	SAM MILLER	2	MILLER	1932 09 21	310	2
01S 14E 09	CROXTON	4	MILLER		285	2
01S 14E 10	BRYANT ET AL	1	SOUTHERN TRUST	1930 11 04	900	2
01S 14E 16	CROXTON OIL CO	1	W N GREEN ET AL	1932 10 19	200	1
01S 14E 17	CROXTON		DOWNING		610	4
01S 14E 18	H B SEARS	1	DAVIS	1935 07 02	97	2
01S 14E 18	UNNAMED WELL				425	4
01S 14E 18	UNNAMED WELL				240	4
01S 14E 19	PAXTON & GRAY	1	NORRIS	1934 05 23	425	2
01S 14E 19	FLETCHER & WHITEHEAD	3	COLE	C1958	2405	4
01S 14E 19	JACK COLLINS	1	LEE COLE	1956 03 22	379	2
01S 14E 19	FLETCHER & WHITEHEAD	1	COLE	1958 01 21	243	2
01S 14E 19	FLETCHER & WHITEHEAD	2	COLE	1958 06 25	875	2
01S 14E 30	W S BRUNSON	1	LONG	C1960	879	2
01S 14E 30	MIKE COINER ET AL	1	LONG	1959 07 01	453	2

01S	15E	14	R C CURTIS		KANTZE	C1939	995	4
01S	15E	19	BICKLEY & PEARSON		BROWN	C1937	1289	4
01S	15E	21	A L ABERCROMBIE INC	1	HENRY SMITH	1964 10 01		1
01S	15E	21	A L ABERCROMBIE INC	2	HENRY SMITH	1964 10 28	510	1
01S	15E	27	JONES & PELLOW OIL CO	27-1	SMITH	1981 04 13	11491	2
01S	16E	04	S C ORBACH (PORTER NEWMAN)	1	BASKETT RANCH		833	2
01S	20E	15	SOHIO PETROLEUM CO	1-15	WEYERHAUESER	1984 06 10	13949	2
01S	26E	12	HARRES & HAUN		YUEGONS (MAJORS)	1925 05 13	1755	2
02S	11E	03	HAMILTON BROTHERS OIL CO	1-3	CHITWOOD	1981 04 06	11800	1
02S	11E	08	T F NORRIS	1	BUTLER-WYLIE	1923 03 01	1660	1
02S	11E	27	JAKE L HAMON	1	HARAWAY	1981 06 08	12500	1
02S	11E	31	TEXAS-EASTERN-ANDERSON-PRICHARD	1	TEXAS EASTERN-APCO LEWIS	1957 10 18	11838	1
02S	12E	06	JERRY L PUTMAN	1	CULBERTSON	1972 11	5210	1
02S	12E	08	TEXACO INC	1	LUCY	1984 12 31	16855	1
02S	12E	12	R M CAMPBELL	6-A	ROSCOE HAYES	1971 04 15	740	1
02S	12E	13	CARL R WRIGHT	1	C R NELSON	1961 11 18	1417	1
02S	12E	35	TXO PRODUCTION CORP	1	ANSON	1981 04 03	8800	1
02S	13E	03	RAYLE & PRESTCH	1	COOK	1956 03 04	675	2
02S	13E	24	AMERICAN ENERGY RESOURCES	1	N B HUNT	1960 08 25	3033	1
02S	13E	25	RAYL & BRYANT	1	ALBRIGHT	1955 12 01	500	1
02S	13E	35	T C HUDDLE	4	SNYDER	1955 07 25	475	2
02S	13E	35	GERALD J MCDERMOTT	1-A	DOK RANCH	1958 04 20	490	1
02S	13E	35	MOTEX OIL CO	9	F L SNYDER	1957 09 18	672	1
02S	13E	35	T C HUDDLE	2	F L SNYDER	1955 07 19	622	2
02S	13E	35	T C HUDDLE	5	F L SNYDER	1955 07 23	300	1
02S	13E	35	T C HUDDLE	7	SNYDER	1955 07 21	515	2
02S	13E	35	D B MALERNEE	1	DOK RANCH	1932 08 25	721	1
02S	13E	35	T C HUDDLE	6	SNYDER	1955 07 22	405	2
02S	13E	35	T C HUDDLE	3	SNYDER	1955 07 26	514	2
02S	13E	35	D B MALLERNEE	2	DOK LAND CO	1932 10 18	550	2
02S	13E	35	T C HUDDLE	1	F L SNYDER	1954 12 03	504	1

TABLE 1.—*Continued*

T–R–S			Operator	No.	Farm	Spud Date	T.D.	Ref.
02S	13E	35	MALERNEE-BASFORD	3	DOK RANCH	1932 10 05	412	1
02S	13E	35	D B MALLERNEE		DOK	C1938	4720	4
02S	13E	36	MALLERNEE	2-A	DOK	1934 04 25	4605	2
02S	13E	36	TEXAS-OKLA OIL & GAS	1	GREENVILLE NATIONAL BANK	1933 07 19	2150	2
02S	14E	19	MALLERNEE OIL	1	COLE ET AL	1933 07 19	638	2
02S	15E	03	RAWSON & VOSBIRGH	1	JORDAN	1924 07 02	1002	1
02S	15E	09	SOUTHWEST EXPLORATION CO ET AL	1	DENTON PERRIN	1956 04 17	11328	1
02S	15E	09	SIKES-BURCKHALTER	2	DENTON-PERRIN	1958 05 25	5480	2
02S	15E	10	U S MINERAL & ROYALTY CORP	1-10	BRAME	1981 11 21	2967	2
02S	15E	10	RAWSON & VOSBURGH	1	KLUTTS	1925 01 16	1000	1
02S	15E	15	U S MINERAL & ROYALTY CORP	2-15	BRAME	1981 10 27	4350	2
02S	15E	16	U S MINERAL & ROYALTY CORP	1-16	BRAME	1981 05 05	9724	1
02S	15E	16	HARVEST QUEEN MILL & ELEVATOR	1	BRAME	1961 03 21	5555	1
02S	15E	22	U S MINERAL & ROYALTY CORP	1-22	BRAME	1981 09 17	4350	1
02S	16E	22	APACHE CORP	1	DUMM	1961 02 17	5829	1
02S	17E	27	JOHN R BUNN	1	RIDLEY	1959 11 10	1536	1
02S	17E	28	HYDRO DRILLING CO	2	RIDLEY	1959 12 11	1192	2
02S	17E	29	FOREST OIL CORP	5-7	HENRY & STANSFIELD	1951 10 08	440	1
02S	21E	27	UNLIMITED LIMITED	27-221	WEYERHAUESER	1979 10 16	10500	2
03S	12E	04	TXO PRODUCTION CORP	1	BARTON F	1984 01 08	6051	1
03S	13E	07	UNNAMED WELL					4
03S	13E	35	D B MALLERNEE		BANKS	C1939	2100	4
03S	13E	35	D B MALLERNEE		DOK	C1939	400	4
03S	13E	36	J V SCRIVNER	1	KATE PLETTNER	1939 12 19	1527	1
03S	14E	30	C A LEE	A-1	SMITH BUTLER	1949 11	2400	1
03S	14E	34	GENERAL CRUDE OIL CO	1	THOMAS A HURD	1968 01 15	8875	1
03S	15E	05	GENIE OIL & GAS CORP	1	ANTLERS NUCLEAR STUDY	1971 02 03	4922	1

03S	15E	10	U S MINERAL & ROYALTY CORP	1-10	J F STEPHENSON	1977 05 08	5600	1
03S	15E	11	U S MINERAL & ROYALTY CORP	1-11	TAYLOR	1977 07 16	5000	2
03S	15E	13	U S MINERAL & ROYALTY CORP	1-13	BRAME	1977 03 25	4108	1
03S	15E	14	U S MINERAL & ROYALTY CORP	1	ALASKA PETRO-COCHRAN	1973 05 14	8236	1
03S	15E	15	U S MINERAL & ROYALTY CORP	1	BRAME	1960 02 22	8371	1
03S	15E	16	JONES & PELLOW OIL CO	1-16	URFER	1981 07 01	10651	2
03S	15E	16	MIDWEST OIL CORP	1	ALASKA PETRO-URFER	1972 12 21	6293	1
03S	15E	22	U S MINERAL & ROYALTY CORP	1-22	MACKEY	1977 07 16	4498	1
03S	15E	30	HALLIBURTON ET AL	1	BAGWELL	1937 02 17	6010	2
03S	15E	31	J T GEORGE	1	MCGEE	1922 04 17	2182	2
03S	15E	31	J T GEORGE	1	RYAN	1931 12 09	910	2
03S	15E	32	GEORGE ET AL	1	HARRY SCHWEITZER	C1931	825	3
03S	15E	32	J T GEORGE & OTHERS	1	M D JORDAN & J T GEORGE	1931 04 15	805	1
03S	15E	32	G T GEORGE	1	LANE	1931 06 10	815	2
03S	16E	06	P ROGERS & T GUNTER	1	J MOYER	1951 11 30	2226	2
03S	16E	22	MOBIL OIL CORP	1	GILLEY UNIT	1968 11 22	11149	1
03S	16E	33	C G RISSLER	1	ATTERBERRY	1952 03 10	576	2
03S	17E	20	GETTY OIL CO	1	MORRIS	1981 03 27	11606	1
03S	18E	35	WHITEHEAD OIL CORP	1	BUD MESSER	1931 09 17	3520	1
04S	18E	20	JOE MARSHALL	1	GILL	1947 07 21	343	2
04S	19E	22	DEEP WELL OIL CORP	1	CHARLES WALLS	1949 08 20	1042	2
04S	20E	16	SUNRAY MID-CONTINENT OIL CO	1	DIERKS	1961 10 20	6600	1
04S	23E	07	SOHIO PETROLEUM CO	1-7	WEYERHAUESER	1985 03 22	6721	2
05S	20E	31	E B FRANKLIN	1	STOTTS	1956 11 02	320	2
05S	23E	25	VIERSEN & COCHRAN	25-1	WEYERHAEUSER	1970 06 07	10019	1
05S	24E	22	SOHIO PETROLEUM CO	1-22	WEYERHAEUSER	1987 04 04	18986	1
06S	23E	17	OTTO PRASSEL	1	SWIFT	1931 04 21	1014	1
06S	24E	07	RANCHMANS OIL CO	1	PATTERSON	C1932	1411	1

HAZARDOUS-WASTE-DISPOSAL SYMPOSIUM
Edmond, Oklahoma, November 9, 1989

A one-day symposium on Hazardous-Waste Disposal in Oklahoma will be held November 9 under the sponsorship of the Geology Section of the Oklahoma Academy of Sciences (OAS) and the Oklahoma Geological Survey (OGS). The program, in conjunction with the OAS annual meeting on November 9–10, will be presented in Mitchell Hall Auditorium on the campus of Central State University.

The tentative program is listed below:

Welcome and Introductions, Kenneth S. Johnson, Symposium Chairman; Kenneth E. Conway, President of Oklahoma Academy of Science; and Charles J. Mankin, Chairman of Geology Section of Oklahoma Academy of Science

Hazardous Wastes Generated and Disposed of in Oklahoma, by James M. Robertson, Professor, Civil Engineering and Environmental Science, University of Oklahoma, Norman

History of Oklahoma's Regulatory Responsibility in Hazardous-Waste Disposal, by Bob Kellogg, Staff Attorney, Oklahoma State Department of Health, Oklahoma City

Geologic and Hydrologic Siting Criteria for Hazardous-Waste-Disposal Facilities, Kenneth S. Johnson, Associate Director, Oklahoma Geological Survey, Norman

Aquifer Protection and Contamination Monitoring Related to Waste-Disposal Facilities, by Robert C. Knox, Professor, Civil Engineering and Environmental Science, University of Oklahoma, Norman

Citizen Concerns of a Hazardous-Waste-Disposal Facility, by Linda M. Walker, Environmental Quality Chair, League of Women Voters of Oklahoma, Bartlesville

Relationship of Waste Disposal to Industrial and Economic Development in Oklahoma, by Julius Kubier, Vice President of Industrial Development, Oklahoma State Chamber of Commerce and Industry, Oklahoma City

Surface Disposal of Hazardous Wastes in Oklahoma, by Donald A. Hensch, Director of Permitting Services, USPCI, Inc., Houston

Deep-Well Disposal of Hazardous Wastes in Oklahoma, by Robert D. Walling, Jr., General Manager, Environmental Solutions, Inc., Bartlesville

Transportation of Hazardous Wastes in Oklahoma, by Garry Thomas, Troop Commander of Motor Carrier Safety Division, Oklahoma State Department of Public Safety, Oklahoma City

The Superfund Program in Oklahoma, by Fenton Rood, Director of Industrial Waste Division, Oklahoma State Department of Health, Oklahoma City

Program for Removal of Chemicals from Schools of Oklahoma, by Stuart Burchett, Professor, Department of Chemistry, Southwestern Oklahoma State University, Weatherford

Closure of Hazardous-Waste Facilities in Oklahoma, by Joseph Keflemarian, Technical Director of Industrial Waste Division, Oklahoma State Department of Health, Oklahoma City

Alternative Methods for Management/Disposal of Hazardous Wastes, by Robert E. Deyle, Research Fellow, Science and Public Policy Program, University of Oklahoma, Norman

The OGS plans to publish the proceedings of the symposium in the Spring of 1990. For further information and registration forms, please contact Kenneth S. Johnson, Symposium Chairman, at the OGS offices, 100 E. Boyd, Room N-131, Norman, OK 73019; phone (405) 325-3031.

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Samuel A. Friedman

FRIEDMAN ELECTED TO EMD EXECUTIVE COMMITTEE

Samuel A. Friedman, geologist with the Oklahoma Geological Survey, has been elected vice president–president elect of the Energy Minerals Division (EMD) of the American Association of Petroleum Geologists (AAPG). The two-year commitment extends through June 30, 1991.

Friedman was the first coal sub-committee Chairman of the AAPG committee on Energy Minerals (1974–77), before EMD became a Division. He was the first EMD counselor for programs and the first EMD program chairman at the 1978 AAPG-EMD convention in Oklahoma City. A founding member of EMD (1977), Friedman served EMD on the best paper award committee; he also judged papers and chaired sessions at annual meetings. In 1980–81 Friedman was appointed to the office of vice president. From 1980–89 he served EMD as chairman of the committee on conventions and as delegate to the AAPG Committee on Conventions.

Friedman encourages his colleagues in EMD to present oral papers and posters, organize symposia and field trips, and publish on the energy minerals, stressing applied coal geology. On September 25 Friedman will present a paper on coal-bed methane reserves in the Arkoma basin in eastern Oklahoma at the biennial meeting of the Mid-Continent Section of the AAPG in Oklahoma City.

REVIEW: Knapping the Chucky Stanes with DNAG

R. Nowell Donovan[1]

The two greatest figures in Scottish literary history, the poet Robbie Burns and the novelist Walter Scott only met once, in Sciennes House, Edinburgh. I have a copy of a painting by Hardie which commemorates the scene. The two were not alone; other guests in the house included the economist Adam Smith, the chemist Joseph Black and, his head sunk in (presumably timeless) reflection, the geological torchbearer James Hutton. I would like to believe that a memory of this meeting in the mind of the young Scott eventually found fruit in the famous lampoon found in the novel *St. Ronan's Well*:

> *And some rin up hill and down dale,*
> *knapping the chucky stanes to pieces wi' hammers,*
> *like sae many road makers run daft.*
> *They say it is to see how the world was made.*
>
> Sir Walter Scott
> *St. Ronan's Well*, 1824

Scott makes full use of the most enduring lay picture of the geologist: an odd harum-scarum creature who communes violently with the most solid of inanimate objects. (If he was remembering Hutton, however, he got things wrong; Hutton was not interested in how the world was made, but in how it works. He took first causes for granted.)

Perhaps surprisingly, Scott was not the first literary giant to paint a none too flattering portrait of the field geologist. In 1814 the celebrated English poet William Wordsworth, himself no stranger to Edinburgh, took an even more vitriolic stance:

[1]Texas Christian University.

He who lies with pocket hammer smites the edge
Of luckless rock or prominent stone, disguised
In weather-stains or crusted o'er by Nature
With her first growth, detaching by the stroke
A chip or splinter—to resolve his doubts;
And with that ready answer satisfied
The substance classes by some barbarous name
And hurries on; or from the fragments picks
His specimen, if but happily interveined
With sparkling mineral, or should crystal cube
Lurk in its cells—and thinks himself enriched,
Wealthier and doubtless wiser than before!

William Wordsworth
Excursion, Book III, 1814

As a definition of field behavior, this verse leaves much to be desired. Wordsworth accuses us of facility, kleptomania, and a reckless disregard for the aesthetics of rocks. In fact he adopts a line which could be straight out of the book of one of today's more extreme environmentalists. To be fair, and largely thanks to his friend Adam Sedgwick, founder of the Cambrian System, Wordsworth subsequently changed his views. He even went so far as to publish Sedgwick's five great letters describing the geology of the English Lake District in his own best-selling *Complete Guide to the Lakes.*

In all honesty, I suspect that the majority of geologists have found it relatively easy to live with their rather bizarre public image. Ever since I was a student, I can recall being regaled with stories of field experiences filled with characters of epic dimensions. One of my favorites, which may or may not be apocryphal, concerns Sir Edward Battersby Bailey, onetime head of the Scottish Geological Survey. Bailey, a man of legendary fortitude, was breaking in a young neophyte by taking him on a trip to the Scottish Highlands. At this time the road system was far from adequate and so they took the train, eventually alighting in late afternoon at a remote and lonely station on the edge of the grim and desolate Moor of Rannoch. Bailey pointed airily at a mountain about five miles off and told the neophyte that he knew a place to stay. They squelched off into a trackless peat bog. It began to rain.

Eventually they arrived at a roofless shepherd's hut set in a scene of utter desolation. Bailey instructed the neophyte to find some wood "over there," pointing to a clump of trees about a mile away. Some time later, laden with sodden wood, the neophyte returned to find that Bailey had erected a tarpaulin against a wall of the hut; this was to be their abode for the next few days. With the aid of some old newspaper which he carried in his rucksack, Bailey succeeded in lighting a fire. He then rummaged around in his sack some more and emerged with a grubby black metal pot and some oatmeal. Mixing the latter with water from the peat bog, he began to make porridge—traditional Highland fare. However, Bailey was a modern man; as the porridge bubbled away, he opened a tin of sardines and, before the awe-struck eyes of the neophyte, dumped the lot into the pot, stirring merrily away.

Sometime later he and the bewildered, emotionally comatose neophyte lay beneath the tarpaulin, listening to the rain which was now accompanied by a savage wind. Gazing out into the inky blackness, Bailey said simply, "My God, to think they *pay* us for doing this."

On a more serious note, even amidst the technological complexities of modern science, fieldwork still provides the muscle and sinew which binds the geological community together. It was therefore fitting that in its planning for the celebrations connected with a "Decade of North American Geology," the GSA determined to produce a series of six Centennial Field Guides, describing the best field stops that the country has to offer.

From the outset it was decided that the descriptions should be easy to photocopy for use in the field; each item occupies either two, four, or six pages and includes a location map as well as instructions concerning access and landownership. For the most part the text is very easy to read and the books are bound so that they Xerox easily. Unfortunately, some of the locality maps have been reduced a little too much and hence are difficult to read.

Each volume is approximately 470 pages long and purports to describe the 100 best sites representative of the geology in the area covered. Overall editorship of the South Central volume (Kansas, Arkansas, Oklahoma, and Texas) was undertaken by O. T. Hayward of Baylor University. Ken Johnson of the Oklahoma Geological Survey collated the Oklahoma contribution to the volume. Both are to be congratulated on a difficult job well done.

Oklahoma is covered by 27 sites; as is to be expected, these tend to cluster around the hilly areas, excepting the Ozarks. Thus, the Ouachitas are covered by six sites, the Arbuckles by seven, and the Wichitas by no less than 10. As the editors note in their introduction to the volume, we tend to troop to the hills, for we have a compulsion to view vertical rock faces!

The range of topics covered is broad and offers a good sampling of the available geology. Given that one of the intentions of the Guide is to provide a representative coverage of the area, the most important omissions would seem to be a stop in the Tishomingo/Blue River area to view Precambrian basement and a visit to one of the asphalt quarries in the Buckhorn area.

As I read the Guide I was struck again by the extraordinary richness and variety of the geology of Oklahoma. For example the four Recent offerings: the modern Meers fault, tufa and travertine at Turner Falls, gypsum crystals on the Great Salt Plains, and the unique barite travertine at Zodletone Mountain are a remarkable potpourri! The breakdown of the remaining subject matter reveals that three papers deal with the Permian, seven with Pennsylvanian deposits, and five with lower Paleozoic strata. The igneous rocks of the Wichitas are covered in a mammoth section by Gilbert and Powell which encompasses no less than four multipurpose sites. Pennsylvanian deformation in the Ouachitas, Arbuckles, and Slick Hills is given expanded treatment in the remaining sections.

A total of 36 authors, including several students, contributed to the Oklahoma section of the Guide (several of them more than once). The standard of work is generally high and there is much new data and fresh interpretation (for example, the genesis of the Oil Creek Sandstone receives a lucid treatment, while there is much useful information on the sedimentology and structure of the Ouachita area).

What is missing from this volume (and is in fact an omission inherent in the design of the Guides) are regional overviews which paint the broader picture. Some authors point out the regional context of their work (e.g., Stan Finney's article on Arbuckle–Ouachita facies relationships); nevertheless, I feel that the volume needs the sort of synoptic articles which are such a useful feature of recent Oklahoma Geological Survey guides.

To partially counter this criticism, let me recommend another DNAG article; Chapter 12, Southern Midcontinent region, in volume D-2 (Sedimentary Cover, North American Craton: U.S.), by Ken Johnson and others. This 53-page paper, lavishly illustrated in color, presents an excellent compilation of the regional stratigraphy, including a fresh and well-presented series of isopach maps illustrating the evolution of the area from Cambrian to Tertiary. I am told that this paper will shortly be published as a separate item by the OGS. I recommend that anyone interested in the stratigraphy and basinal development of the area obtain a copy.

As for the DNAG Field Guide: this too is a good investment. It will be particularly useful to educators trying to design something new for their students (not just in Oklahoma!). It will also serve as a stimulus to those who don't "knap the chucky stanes" as much as they used to or would like to. I don't know what the shades of Sir Walter Scott would make of the modern generation of those who "rin up hill and down dale . . . wi' hammers;" I hope that he would at least commend their diligence and curiosity.

Papers reviewed in

A. Geological Society of America, Centennial Field Guide, Volume 4, South Central Section, edited by O. T. Hayward:

UPCOMING MEETINGS

Petroleum Hydrocarbons and Organic Chemicals in Ground Water: Prevention, Detection, and Restoration Conference and Exposition, November 15–17, 1989, Houston, Texas. Information: National Water Well Association, 6375 Riverside Dr., Dublin, OH 43017; (614) 761-1711.

AAPG Southwest Section Convention, March 11–13, 1990, Wichita Falls, Texas. Information: Will Tucker, Technical Program Co-Chairman, 825 MBank Building, Wichita Falls, TX 76301.

OKLAHOMA ABSTRACTS

The following are abstracts from University of Oklahoma and Oklahoma State University M.S. theses. Permission of the authors to reproduce the abstracts is gratefully acknowledged.

Fracturing in a "Novaculite" Reservoir: A Surface Example from Black Knob Ridge, Atoka County, Oklahoma

JOHN C. WOODHOUSE, II, University of Oklahoma, Norman, M.S. thesis, 1989

Naturally fractured reservoirs in siliceous strata have an important potential for hydrocarbon reserves, as evidenced by the discovery of Port Arguello Field. One of the largest accumulations of such siliceous rocks occurs in the Frontal Zone of the Ouachita foldbelt, which covers some 162,000 km^2 from Mississippi to West Texas. The discoveries of Isom Springs, McKay Creek, and Pinon fields confirm the presence of petroleum in the Frontal Zone. The southern portion of Black Knob Ridge was mapped at a scale of 1:10,000, and the fracturing there studied as a surface analog to Isom Springs Field. The lithology of the formations exposed at Black Knob Ridge has been extensively studied, and the same formations are present in Isom Springs Field. Likewise, both areas are structurally similar, being adjacent to one of the imbricate thrust faults in the Frontal Zone.

Circular areas were chosen for the study of macrofractures because they eliminate any directional bias and facilitate the calculation of important parameters without the need to assume distributions. Macrofractures were studied at 10 stations. The trace length, termination types, aperture, fill, and attitude of each fracture was recorded, as well as the lithology, thickness, and structural setting of the host bed.

A statistical analysis indicates a lognormal distribution of fracture lengths. The orientation data show that virtually all macrofractures are perpendicular to bedding; however, the fracture distribution is multimodal, so statistics based on an elliptical distribution are inappropriate. Four maxima are present in stereographic plots of the data, corresponding to the four deformational phases of Leonhardt (1983). The two strongest maxima are generally subperpendicular and subparallel to the strike of the host bed. A comparison of the macrofracture lengths and orientations demonstrates that the longer fractures tend to be in the most common orientations. From stereographic plots of the number and of the lengths of fractures, plus the area of the circulation station, the average length and spacing were calculated for each maximum, giving the parameters required to model a fracture network.

Oriented samples for microfracture analysis were taken as near as possible to each macrofracture station. In an atempt to overcome the poor outcrop quality in the Arkansas Novaculite, 15 oriented samples were collected around the major fold; two further samples of the Bigfork Formation were also obtained. The samples

were impregnated and thin sections parallel to strike, dip, and bedding were prepared from each sample.

As was expected from the macroscopic data, the section parallel to bedding usually had the highest degree of fracturing, and the three exceptions to this rule were from unusual structural settings. A plot of microfracture intensity versus host bed thickness shows a negative exponential relationship between these parameters. Departures from the expected correspondence between microfracture intensity and structural position may indicate that those locations have "uncoupled" and isolated from the deformational stresses. A similar uncoupling on a small scale—perhaps across macrofractures—may explain the lack of correspondence between microfracture orientations and both macrofracture orientations and structural position.

A Paleomagnetic Study of Altered Permian Rush Springs Sandstones, Cement Oil Field, Oklahoma: A Relationship with Hydrocarbon Migration and Seepage

MARK C. LEACH, University of Oklahoma, Norman,
M.S. thesis, 1989

The geologic setting at the Cement Anticline, southwest Oklahoma, provides the opportunity to investigate how structurally controlled hydrocarbon migration affects diagenesis and remagnetization. A widely accepted model for hydrocarbon-induced diagenetic alteration of red beds has been developed based on previous studies conducted at Cement. The objectives of this study were to use a combination of paleomagnetic, rock magnetic and petrographic techniques to test this "Cement" model and determine if paleomagnetic analysis could be used to date the time of hydrocarbon migration.

A magnetization (decl = 344, incl = 8, k = 16, alpha–95 = 7) with both normal and reversed directions was isolated from some specimens of carbonate-cemented, bleached sandstone which were influenced by hydrocarbons. Demagnetization results and rock magnetic experiments suggest that magnetite carries the remanence, although pyrrhotite is also present. The magnetization is interpreted to be an early CRM based on a late Permian pole position (56 N/111 E), lack of stratigraphic control in the distribution of the normal and reversed directions, and the presence of spheres interpreted to be authigenic magnetite. Specimens of red "normal" sandstone away from Cement possess remanent intensities similar to the bleached sandstones and contain a southwest and shallow, Permian magnetization (decl = 166, incl = 9, k = 75, alpha–95 = 6). The magnetic and petrographic characteristics of these specimens suggest that the magnetization is a CRM residing in authigenic hematite. Specimens from a transition zone between the "normal" red and bleached sandstones contain a magnetization with either normal or reversed polarities (decl = 11, incl = 39, k = 26, alpha–95 = 5). The magnetization resides in authigenic hematite and is probably a CRM although the time of remanence acquisition is problematic. Although these new results from Cement are consistent with the suggestion that hydrocarbons can cause precipitation of authigenic magnetite,

they raise questions about the timing of events and other aspects of the "Cement" model for hydrocarbon-induced diagenetic alteration of red beds.

Integrating the results of this study with those of other hydrocarbon-impregnated sandstones will contribute to a better understanding of how fluids control diagenesis and remagnetization. Although hydrocarbons are related to authigenic magnetite, there is no increase in remanent intensity in the bleached zones because they lack the hematite present in the red zones. These results also have important implications for hydrocarbon exploration strategies based on aeromagnetic anomalies.

Seismic Stratigraphy of the Chester 'J' Limestone in the S.W. Trivoli Field, Dewey and Major Counties, Oklahoma: A Case Study in Seismic Reservoir Characterization

LARRY A. WILLIS, University of Oklahoma, Norman,
M.S. thesis, 1989

A seismic stratigraphic investigation was conducted for the S.W. Trivoli field in southern Major and northern Dewey Counties, Oklahoma. This field produces oil and gas from a 30 meter (100 ft.) interval of Chesterian carbonates at a subsurface depth of 2,530 meters (8,300 ft.). Dense well control in the S.W. Trivoli field can be used to establish the geometry of the producing interval (the Chester 'J' limestone) and the distribution of porosity within this interval. This situation provides a means to test the ability of reflection seismic data to delineate the geometry of this thin and stratigraphically complex lithologic interval and to provide evidence of the distribution of porosity within it. Theoretically, changes in acoustic impedance of the limestone are largely controlled by variations in porosity. This behavior suggests that, provided all other factors remain unchanged, reflector amplitude will diminish as the porosity of the limestone increases.

A 1977 vintage dynamite survey acquired over the productive area was reprocessing using Seismograph Service Company's Phoenix processing package on the Shell Geosciences Network VAX/VMS 11/785 at the University of Oklahoma. The reprocessed seismic data was interpreted in conjunction with geological information obtained from the well logs of 82 boreholes within and surrounding the S.W. Trivoli field. Subsequent to interpretation of the reprocessed seismic data, a subsurface-constrained seismic modelling study was conducted using the MIRA (Oklahoma Seismic Corp.) software to assess the sensitivity of the seismic signal to porosity within the Chester 'J' limestone.

The most outstanding results of this investigation are briefly summarized as follows:

(1) The total thickness of the productive unit can be mapped with seismic data comparable to that produced by the processing carried out during this investigation. This offers an indirect tool for mapping porosity in the Chester 'J' limestone, since total unit thickness is closely correlated to the occurrence of porous zones in this unit.

(2) Faulting, which cannot be conclusively demonstrated using the available well control, is shown to play a key role in the geometry of the hydrocarbon reservoir.

(3) Correlation of relative amplitude variations with porosity distributions represents an oversimplification of the problem. Subsurface-constrained seismic modelling studies indicate that the effects of thin-bed tuning play a critical role in the amplitude response of the Chester 'J' reflector. This study suggests that evaluation of the effects of interference phenomena by subsurface-constrained seismic modelling is mandatory if attempting to characterize porosity using this seismic attribute.

Depositional Environments and Diagenesis of the Tonkawa Format (Virgilian) in Woods and Part of Woodward Counties, Oklahoma

MICHAEL W. FIES, Oklahoma State University, Stillwater,
M.S. thesis, 1988

The study area is located on the northern shelf of the Anadarko Basin. It comprises some 1,420 square miles of Woods and part of Woodward Counties, Oklahoma. The Tonkawa format represents the earliest regressive-transgressive couplet of the Douglas Group in the Virgilian Series. It is bounded above and below by the Haskell and Avant Limestones, respectively. Tonkawa sandstones are widespread over much of northern and northeastern Oklahoma and extend into eastern Kansas, where surface exposures are present.

In the study area, the sandstones have been divided into four stratigraphic "packages," each representing different episodes of deposition. A package consists of one or more sand bodies that are laterally equivalent.

The interval thins dramatically to the north and northwest as it approaches the carbonate shelf area. Isopach thicknesses vary from about 160 feet adjacent to the carbonate shelf to greater than 420 feet in the south and southeast parts of the study area.

The Tonkawa sandstones probably represent a high-constructive lobate delta system. A net sandstone isolith map of the format suggests a northeast source area. The thinning of the interval probably represents the northern edge of the system in this area. Deltaic facies represented by the cores studied include prodelta, delta front, distributary-mouth bar, interdistributary bay, crevasse splay, and distributary channel.

Structure maps of the top of the limestones show a basinward dip to the south and southwest ranging from 28 to 37 feet per mile. A series of north–northeast trending anticlinal and synclinal structures are present on both limestones. These tend to be broad and gentle. No faulting was identified.

The dominant trapping mechanism in the Tonkawa sandstones is stratigraphic pinching out of sandstone bodies in an updip direction. Most of these sands probably represent distributary-mouth bar deposits.

The sands present in the cores are identified as subrounded, fine to very fine

grained, sublitharenites. Metamorphic and sedimentary clasts make up the rock fragment component. Muscovite is the most abundant detrital constituent in the sands. Porosity ranges from 0 to 14% and is almost wholly secondary. Authigenic calcite and siderite constitute the major pore filling constituents. Authigenic chlorite, kaolinite, and illite clays are present, but only in minor amounts.

The Distribution and Depositional Environment of the Basal Atokan Spiro Sandstone, Arkoma Basin, Haskell, Latimer, and Pittsburg Counties, Oklahoma

ELLEN M. OSTROFF HOOKER, Oklahoma State University, Stillwater, M.S. thesis, 1988

The Spiro Sandstone in the area of study is thought to be a shallow marine sand deposited on the stable platform prior to the rapid subsidence of the Arkoma basin. This interpretation is based on the presence of fossils, limestone, burrows and bioturbation, and chamosite. The Spiro occurs in both channel and blanket-like geometries and is characterized by three groups of deposits: (1) sandstones with fossils and/or limestone bed(s), (2) medium- to coarse-grained sandstone with no visible fossils or limestone, and (3) limestone and a fossiliferous sandstone. In general the Spiro is thicker to the south and east in the area of investigation.

Porosity in the Spiro is both primary and secondary. Primary porosity was preserved in medium- to coarse-grained rocks due to chamosite grain coatings. Secondary porosity is due mainly to dissolution of chamosite pellets, with some dissolution of fossils and shale and siltstone clasts.

The Spiro is one of the main gas producing sandstones in the Oklahoma part of the Arkoma basin. In the area of study, as of January 1988, the Spiro had produced 517 BCFG in the Kinta field, 590 BCFG in the Wilburton field, and 91 BCFG in the Red Oak–Norris field.

Interpretation of "Old" Electric Logs, Red Fork Sandstone, Payne County, Oklahoma

DONALD P. RAGUSA, Oklahoma State University, Stillwater, M.S. thesis, 1988

The interpretation of "old" electric logs seems to be as much an art as a science. An "expert" with old logs is someone who knows how the tools operated and who knows their limitations, who knows how to select apparent resistivity values from the logs, who has mastered analytical methods and knows the limitations of the analytical methods, and who has acquired additional ability empirically. Many geologic factors contribute an added degree of complexity to the interpretation of old electric logs. As a consequence, an "expert" with these old logs may be uncommonly effective in an area where he is well acquainted with the subsurface geology, geologic setting, individual reservoir's character, and stratigraphic column.

Development of a fairly easy, robust method to interpret old electric logs is a desired result of this research. In order to refine the problem to manageable proportions, "old" electric logs is limited to logs composed of a Spontaneous Potential (SP) curve, Short Normal (16-inch) curve, Long Normal (64-inch) curve, and Lateral (18-foot 8-inch) curve. The study is also limited to the Red Fork Sandstone of Payne County, Oklahoma.

Calculation of water-saturation in a direct manner using the Archie Equation is possible only if reliable values of porosity (and hence formation factor), Rw, and Rt can be obtained. Obtaining accurate estimates of porosity and Rt from old electric logs is not straightforward. If reliable estimates of porosity and Rw for a specific formation could be obtained from sources other than the old electric logs, these values could be used in the Archie Equation with Rt obtained from old electric logs, to calculate an estimate of water saturation. In doing so, the assumption of transferability of measurements of porosity and Rw is necessary. To be able to estimate water-saturation reliably from old electric logs without assuming values of porosity or Rw obviously would be advantageous.

Where the Red Fork Sandstone of Payne County, Oklahoma, is concerned, use of Ri–Rt Conversion Charts (Lane Wells, Inc., 1956) in conjunction with a Saturation Chart (specifically developed for the Red Fork Sandstone) seems to yield favorable results. This method permits the estimation of water saturation from old electric logs without the assumption of values for porosity or Rw.