SEDIMENTOLOGY AND DEPOSITIONAL ENVIRONMENTS OF THE LOWER ATOKAN SPIRO SANDSTONE IN THE WILBURTON, RED OAK, AND KINTA FIELDS, ARKOMA BASIN, OKLAHOMA

By

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CHAPTER I

ABSTRACT

The Lower Atokan Spiro Sandstone is located in the Arkoma Basin of Oklahoma. The Spiro is the main natural gas producing interval in the basin and therefore, has received much attention.

Stratigraphic cross sections, isolith maps, cores, thin sections, and outcrops were used in the study to determine the depositional environments of the Spiro Sandstone. Multiple thrust sheets in the southern portion of the study area posed some difficulty in the preparation of maps and cross sections. In order to properly map the distribution of the Spiro interval the thrust sheets were restored to their previous stratigraphic position. This was accomplished by mapping individual thrust sheets and determining the approximate value of shortening. When the value of shortening was determined the thrust were pulled back and palinspastic maps of the Spiro interval were constructed.

In the earliest Atokan a marine regression resulted in the formation of incised valleys on the shelf. These valleys were eroded into the Sub-Spiro Shale and locally into the Wapanucka Limestone; they provided a conduit for the transport of sediments from the north. During the lowstand small wave-dominated deltas were forming at the mouth of the channels. Accompanying the progradation of the deltas sedimentation in the channels began to progress updip from the deltas. A subsequent, northward marine transgression resulted in the backstepping of the deltas and infilling of the incised valleys. With continued sediment influx and continuing northward marine transgression, the

reworking of the deltas and the upper part of the incised channel fill sediments generated the Spiro Sheet Sand.

CHAPTER II

INTRODUCTION

Overview

Natural gas has been searched for since the early 1900's in the Arkoma Basin. Reservoirs both shallow and deep exist with differing controls on the potential for the production of natural gas. The Lower Atokan Spiro Sandstone in the Arkoma Basin is a prolific natural gas reservoir. Reservoirs in the Spiro Sandstone are controlled stratigraphically. Although there is significant structural control on the Spiro, structure plays a minor role in the formation of reservoirs. Porosity is the major control on reservoir extent. Porosity preservation in the Spiro is strongly influenced by the presence of clay coatings on quartz grains. The clay coatings aid in the preservation of primary porosity by reducing the effects of pressure solution of quartz grains and subsequent quartz overgrowths.

Location of Study Area

During the earliest Atokan the Spiro Sandstone was deposited in the western Arkoma Basin. The Arkoma Basin is located in southeastern Oklahoma and western Arkansas. This study focused on the Spiro Sandstone in Haskell, Latimer, and Pittsburg Counties, Oklahoma. The area of investigation incorporates thirty-five (35) townships (T. 4 - 8 N., R. 16- 22 E.) covering 1,260 square miles (Fig. 1). The complete Wilburton and Red Oak-Norris gas fields are within this area, as well as the southern portion of the Kinta gas field .

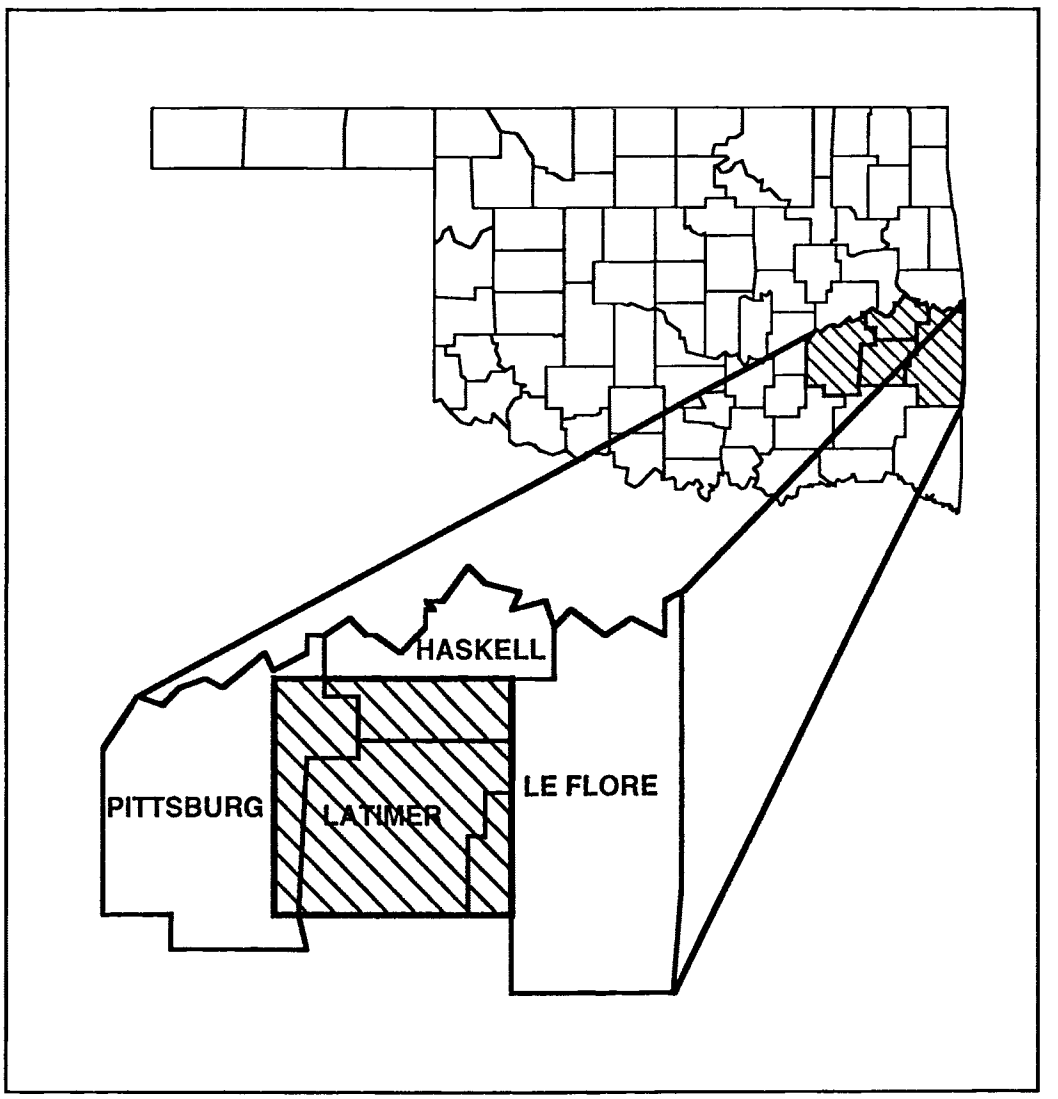


Figure 1. Location of Study Area.

Objectives

The main objectives of the present study were to:

1. Determine the lateral and vertical distribution of depositional environments in the Spiro Sandstone utilizing palinspastically restored subsurface maps, well log signatures, and cores of the reservoir rock;
2. Determine the erosional position and lateral distribution of the contact between the Spiro Sandstone and the underlying Wapanucka Limestone;
3. Restore the thrust sheets to their pre-thrusted geographic locations;
4. Determine the distribution of pore-filling chamosite as contrasted to glauconite grains as seen in thin sections taken from cores of the reservoir rock.

Methods

Subsurface information was gathered from 753 wireline logs including electric logs, natural gamma, formation density and neutron logs (Appendix A). Twenty five cores were examined for this study. Detailed petrolog descriptions (Appendix B) were prepared for 24 cores.

Six stratigraphic cross sections were constructed to show the regional correlation of the Spiro Sandstone, Foster Sandstone, Sub-Spiro Shale and Wapanucka Limestone (Plates I, II).

A structural contour map of the Wapanucka Limestone was constructed (Plate III) in order to delineate the individual thrust sheets in the frontal fault zone of the Arkoma Basin (Fig. 2). The leading and trailing edge of individual thrust sheets were mapped from the available information. The thrust sheets were then pulled back to their original stratigraphic positions beginning with the northernmost thrust and working progressively southward (Plate III). The distance of pull back was determined by the width of each thrust sheet, with the northern thrust pulled back one mile. The direction of pull back was due south.

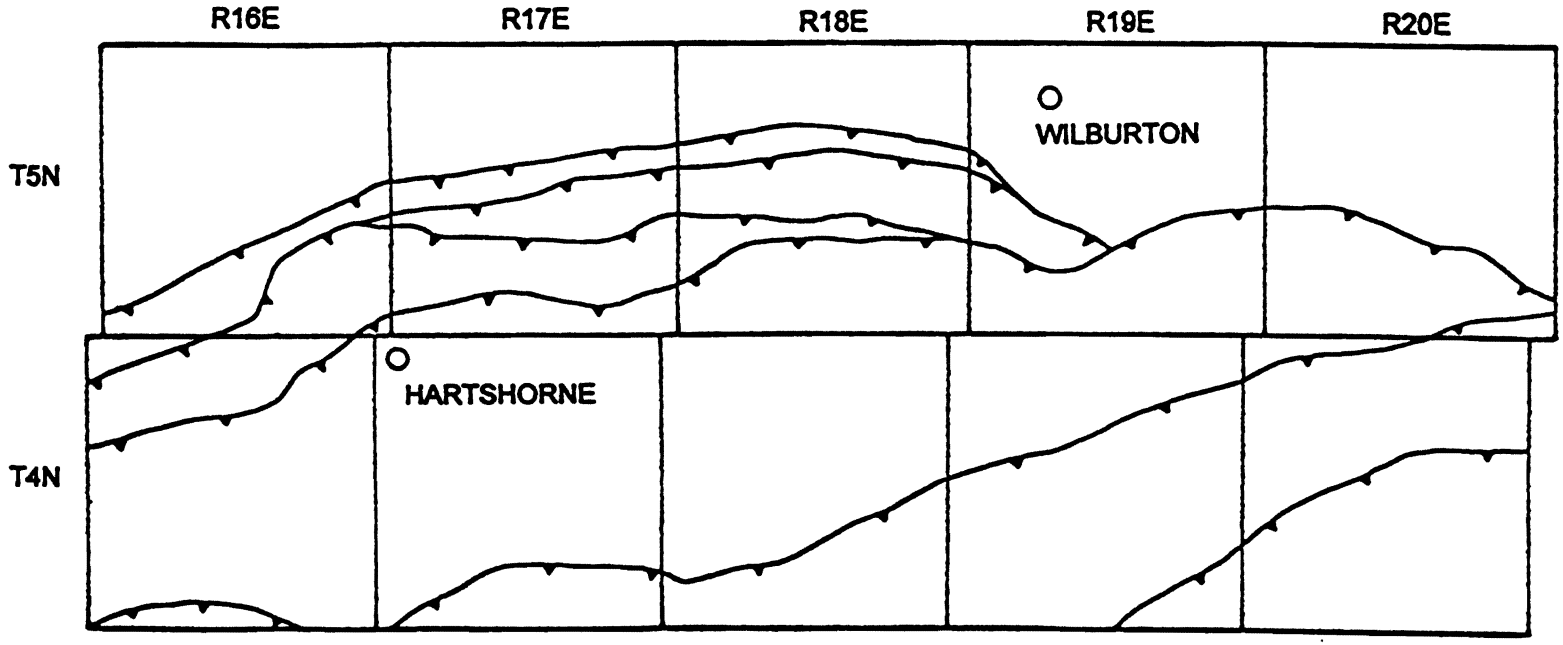


Figure 2. Subsurface Map Showing the Leading Edge of Thrust Sheets in the Study Area.

This direction was determined from previous published works of others and from the work Dr. Cemen has conducted on the geometry of the thrusts for the OCAST project.

The Foster Channels mapped by Lumsden and others (1971) as well as the Spiro Sandstone, were grouped into one unit for mapping purposes and will be considered as the Spiro Interval in this study. A net sand isolith map of the Spiro Interval (Plate IV) delineates the regional sand body geometry for the reservoir rock and aids in the facies interpretation. A Sub-Spiro Shale isopach (Plate V) was constructed to help define the degree of Foster Channel incision into this shale and into the underlying Wapanucka Limestone.

Twenty four cores of the Spiro Interval were examined (Fig. 3) in order to identify distinct types of sedimentary structures, vertical sequences of sedimentary structures, sandstone composition, and vertical changes in grain size. These characteristics served as lines of evidence for interpreting depositional facies. Core descriptions were presented on petrologs designed to show various aspects of the interval. Thin sections were made from selected zones in each core. A total of 226 thin sections were made from 16 of the cores studied. Thin sections were examined for grain composition and the presence of clay coatings. Three of the cores examined and thin sections taken from them were supplied by Amoco Production Company in Denver, Colorado.

Five outcrops of the Spiro Sandstone were examined in Latimer County for the purpose of evaluating the sandstone geometry, texture, and sedimentary structures present (Fig. 4). The quality of the exposures was not good. Extensive vegetation, structural disruption of the beds (including overturned section), extensive weathering of exposures, and difficulty in identifying the top and/or bottom of the sandstone unit made facies interpretation very difficult. Measured sections were prepared during the winter months, when it was not necessary to contend with poison ivy, rattlesnakes, or insects.

Problems were also encountered in gathering and utilizing quantitative subsurface data. Limitations existed in the collection of data to aid in the study.

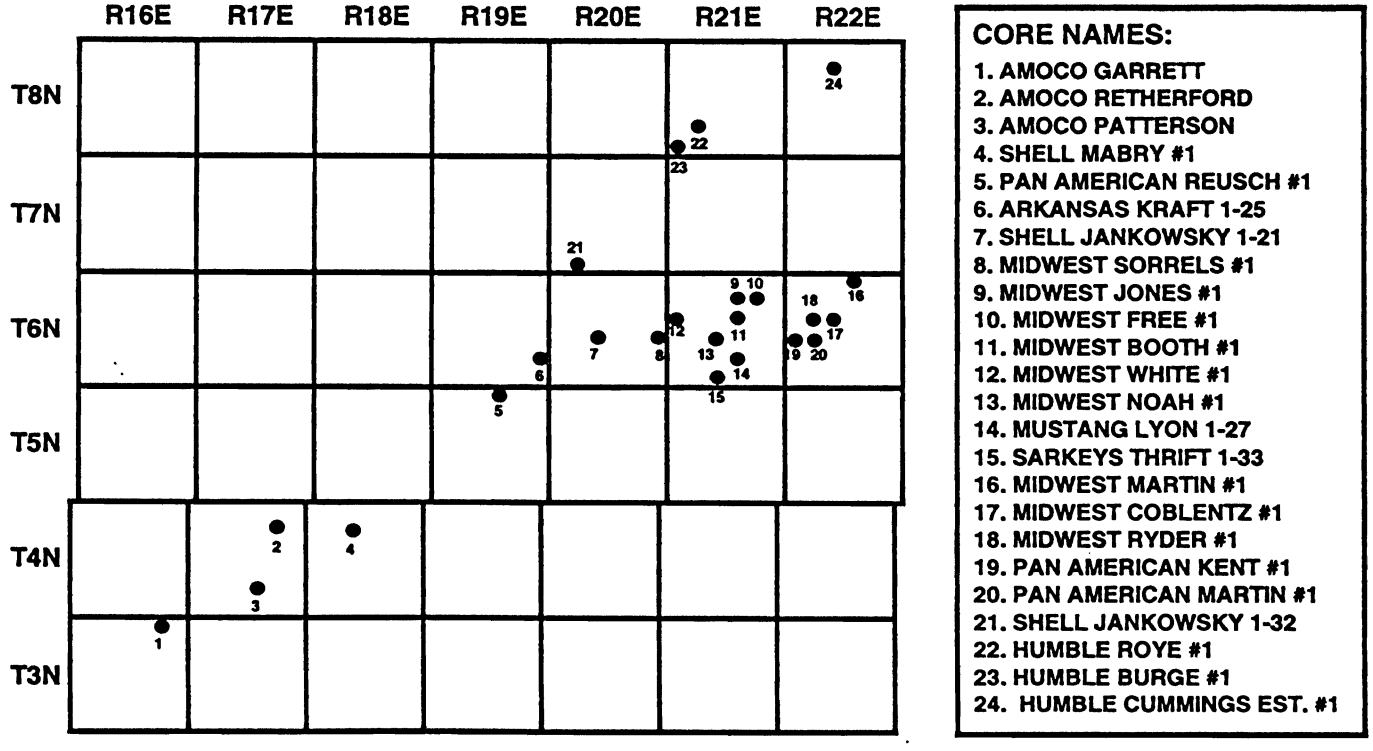


Figure 3. Distribution of Cores Used in this Study.

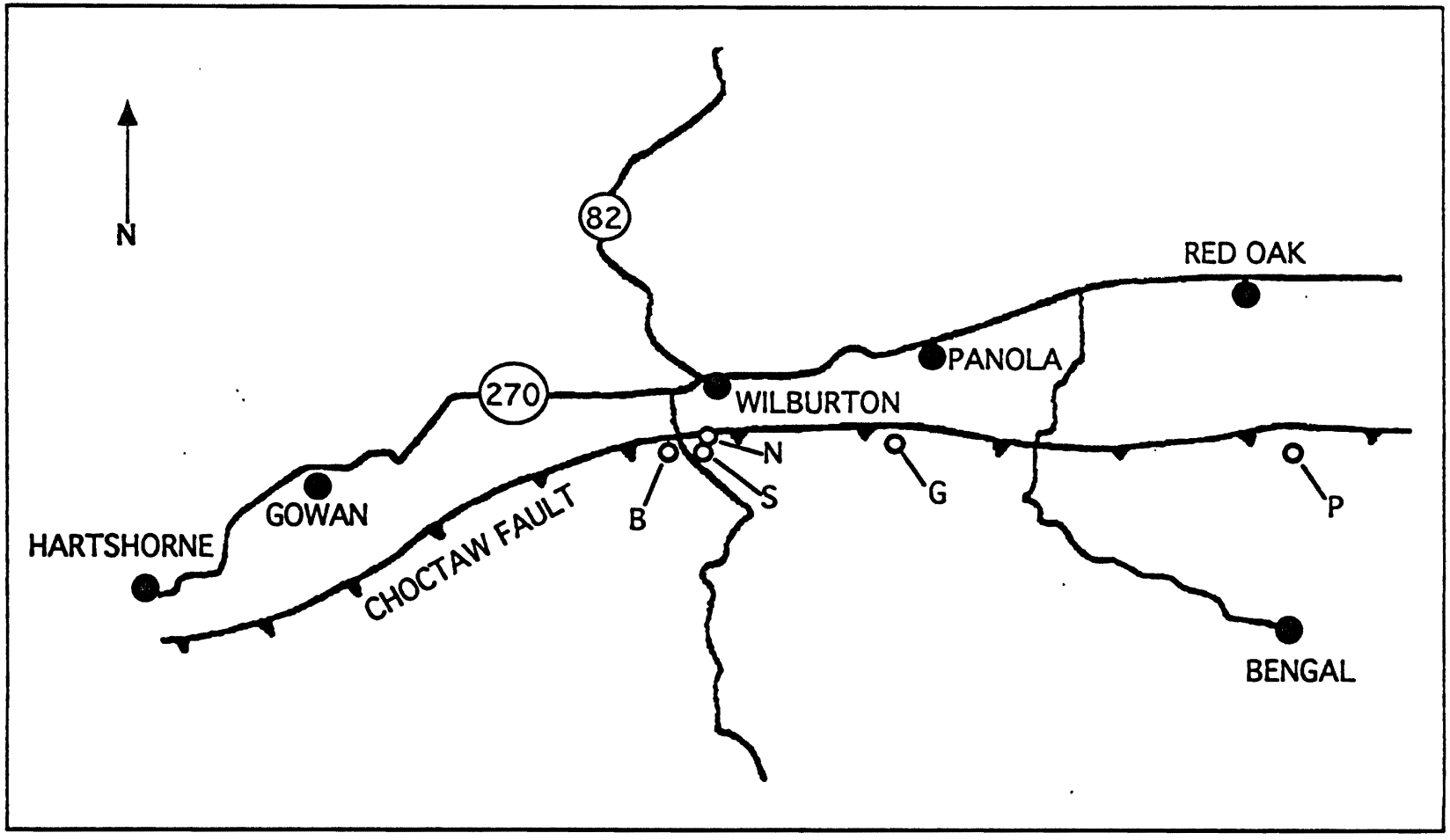


Figure 4. Location of Outcrops Along the Choctaw Fault Used in this Study. Bandy Creek (B), Wilburton Golf Course South (S), Wilburton Golf Course North (N), Buzzard Gap (G), Pigeon Creek (P).

Dip meters or directional surveys to correct for the errors in thickness or stratigraphic depth associated with deviated wells or structural dip. Wells in the thrusted portion of the study area were considered "straight" unless PI completion card or Herndon Base Map information indicated otherwise. Directional surveys from deviated wells could not be found in publicly accessible well log libraries and correction for true depth of these wells was approximated. For deviated wells the surface and borehole total depth locations were found, By using simple geometry a calculation for an approximation of true depth was carried out (Fig 5). Corrections for thickness due to tectonic dip of the Spiro were not carried out due to the lack of dip meter logs or other available data to indicate true structural dip (Fig. 6). Approximation of true thickness was calculated for wells that exhibited an unlikely thickness as determined either from adjacent wells or from repeats of the Spiro in the same well. This calculation was made by finding the percent difference in the overlying shale above the Spiro and using that value to calculate an approximate true stratigraphic thickness.

PREVIOUS WORKS

General Arkoma Basin

From 1930 to 1934 the United States Geological Survey conducted field work in the Arkansas-Oklahoma coal basin. Separate field parties worked in the area mapping the coal beds and surface features from the McAlester district eastward to the Arkansas state line. The field parties were led by Hendricks, Dane and Knechtel (Hendricks et. al. 1936).

Several models for basin formation ranging from a north-dipping subduction to a south-dipping subduction zone have been proposed by various workers (e.g. Keller and Cebull, 1973; Briggs and Roeder, 1975; Walper, 1977). Houseknecht and Kacena (1983) presented a model to show the formation of the Ouachita Fold Belt and Arkoma Basin (Fig. 7). This model was based on the

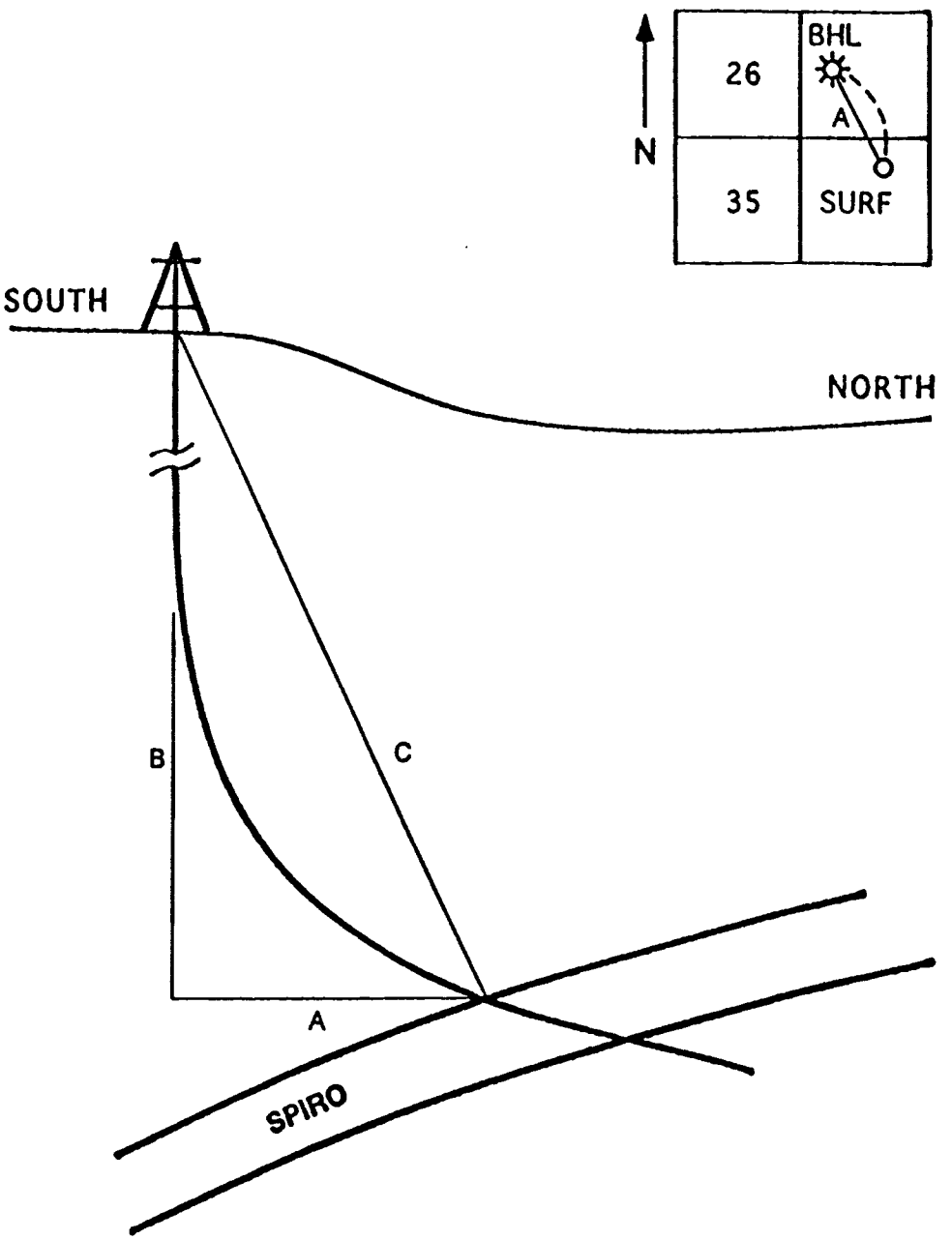


Figure 5. Method of Correcting for Deviated Wells.

ARCO OIL AND GAS CO.
WAYNE AUSTIN #2
13-5N-18E
LATIMER CO.

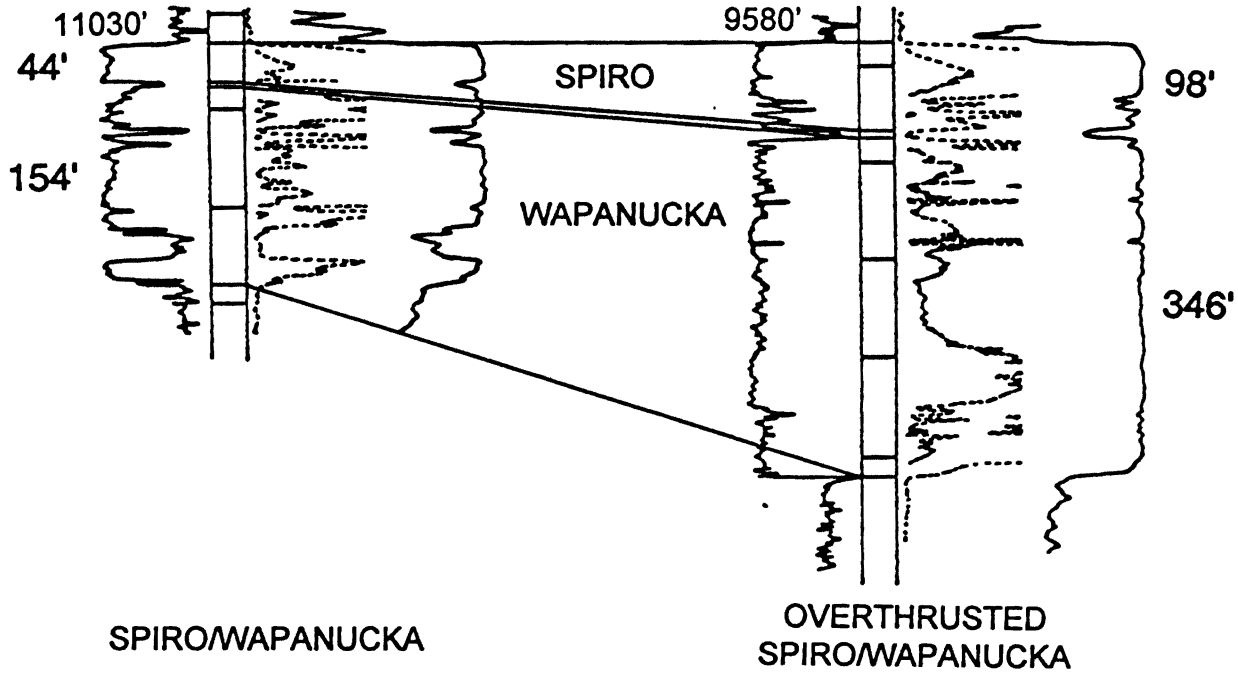


Figure 6. Log Curves Indicating Thickening Due to Structural Dip.

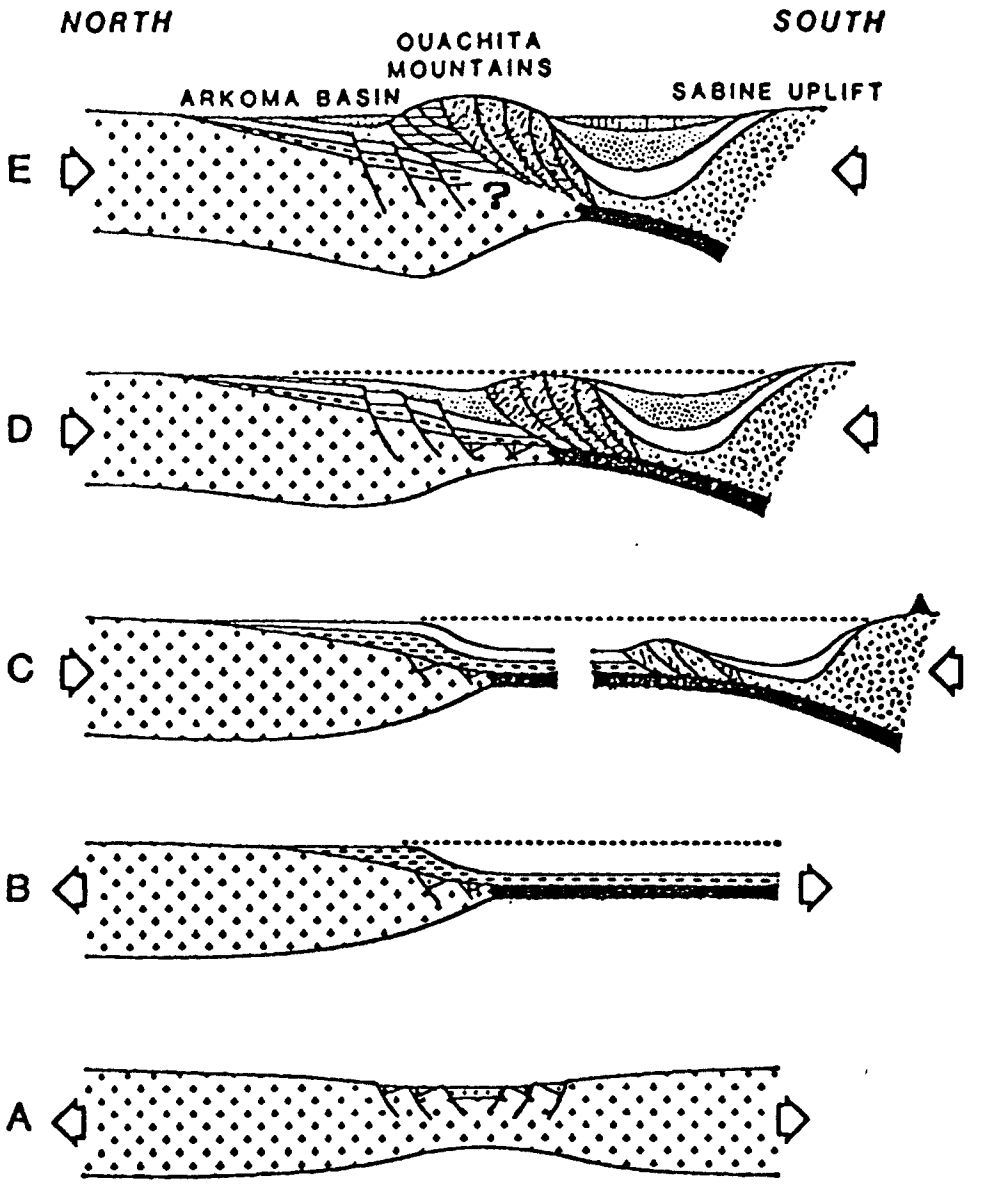


Figure 7. Model of Basin Formation (From Houseknecht, 1983).

work of previous workers. Folding in the basin is thought to have commenced in the Early Desmoinesian (Sutherland 1988). Branan (1966) divided the Arkoma Basin of Oklahoma and Arkansas into three tectonic provinces based on Ouachita deformation (Fig. 8).

Sutherland and Manger (1979) correlated Mississippian and Pennsylvanian units in the Ozark uplift of Oklahoma and Arkansas with rocks in the Arkoma basin and Ouachita mountains. Due to the exploration for hydrocarbons sandstone units in Arkansas have been given informal designations (Zachry 1983). These informal names are shown in Figure 9. Lower Atokan sands on the Northern Shelf of the Arkoma Basin in Arkansas are interpreted as high destructive delta systems and related sand complexes. The middle and upper Atokan represent high constructive delta complexes (Zachry 1983). Zachry and Sutherland (1984) described Atokan stratigraphy in the Ozark area of Oklahoma and Arkansas as well as in the Frontal Ouachitas. Sutherland (1988) discussed units of Chesterian through Desmoinesian age in the Arkoma Basin and their stratigraphic equivalents in the Ozark area to the north. He further noted that the Early Atokan in Oklahoma began with the development of meandering fluvial systems and small deltas.

Lumsden and others (1971) produced an isopach map of the Spiro Sandstone interval that identified fluvial channels that trend northwest to southeast in Haskell, LeFlore and Latimer counties of Oklahoma (Fig. 10). The channels were termed the Foster Channels. The Foster was shown to be unconformable with the underlying Sub-Spiro shale and Wapanucka Limestone. Houseknecht (1986, 1987) determined that the Spiro interval of Latimer and adjacent counties contains fluvial and marine channels with the interchannel zones containing subtidal and tidal flat facies. He suggested three sediment transport directions during the Atokan. Hooker (1988), on the basis of fossil and chamosite content in the sandstone facies, stated that the Spiro was marine. Carlson (1989) interpreted the Spiro as being a shelf sandstone or offshore bar deposits. Hinde (1992) and Grayson and Hinde (1993) interpreted the Spiro as

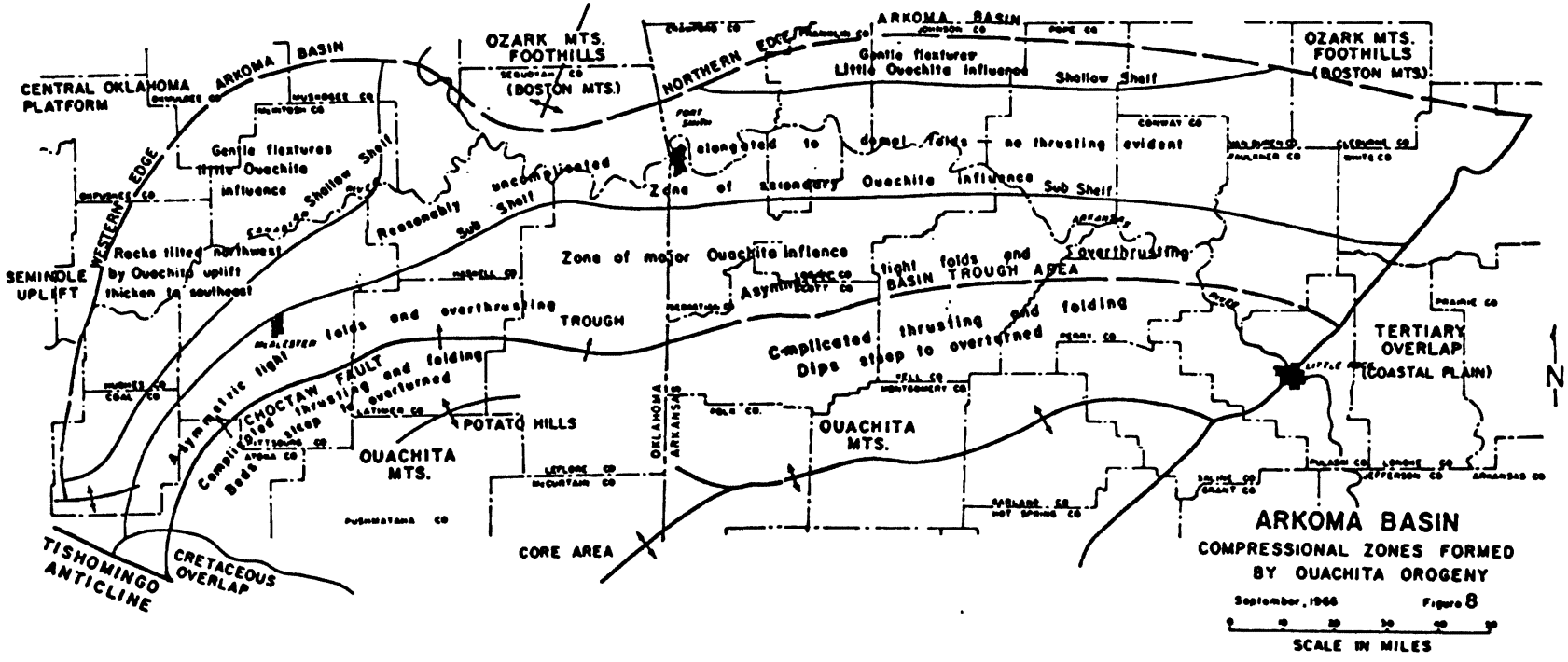


Figure 8. Tectonic Provinces Based on Structural Complexity (From Branan, 1966).

SYSTEM	SERIES	FORMATION		SANDSTONE UNIT
PENNSYLVANIAN	DESMOINESIAN	HARTSHORNE		
	ATOKAN	ATOKA	UPPER	CARPENTER "A" ALMA CARPENTER "B"
			MIDDLE	MORRIS (SELF-TACKETT) ARECI (MOYER) BYNUM(HOOD) FREIBURG (HENSON-PEARSON) CASEY (VERNON-HUDSON NO. 1)
			LOWER	SELLS (DUNN "A" MCGUIRE) JENKINS (RALPH BARTON-UPPER ALLEN) DUNN "B" DUNN "C" (DAWSON A-LOWER ALLEN PAUL BARTON (BAWSON B-RUSSEL) CECIL SPIRO (HAMM) PATTERSON SPIRO (ORR-KELLY)
	MORROWAN	BLOYD		KESSLER LS. (WAPANUCKA) BRENTWOOD LS.
		HALE		UPPER HALE MIDDLE HALE LOWER HALE

Figure 9. Informal Stratigraphic Nomenclature in Arkansas (From Sutherland, 1988).

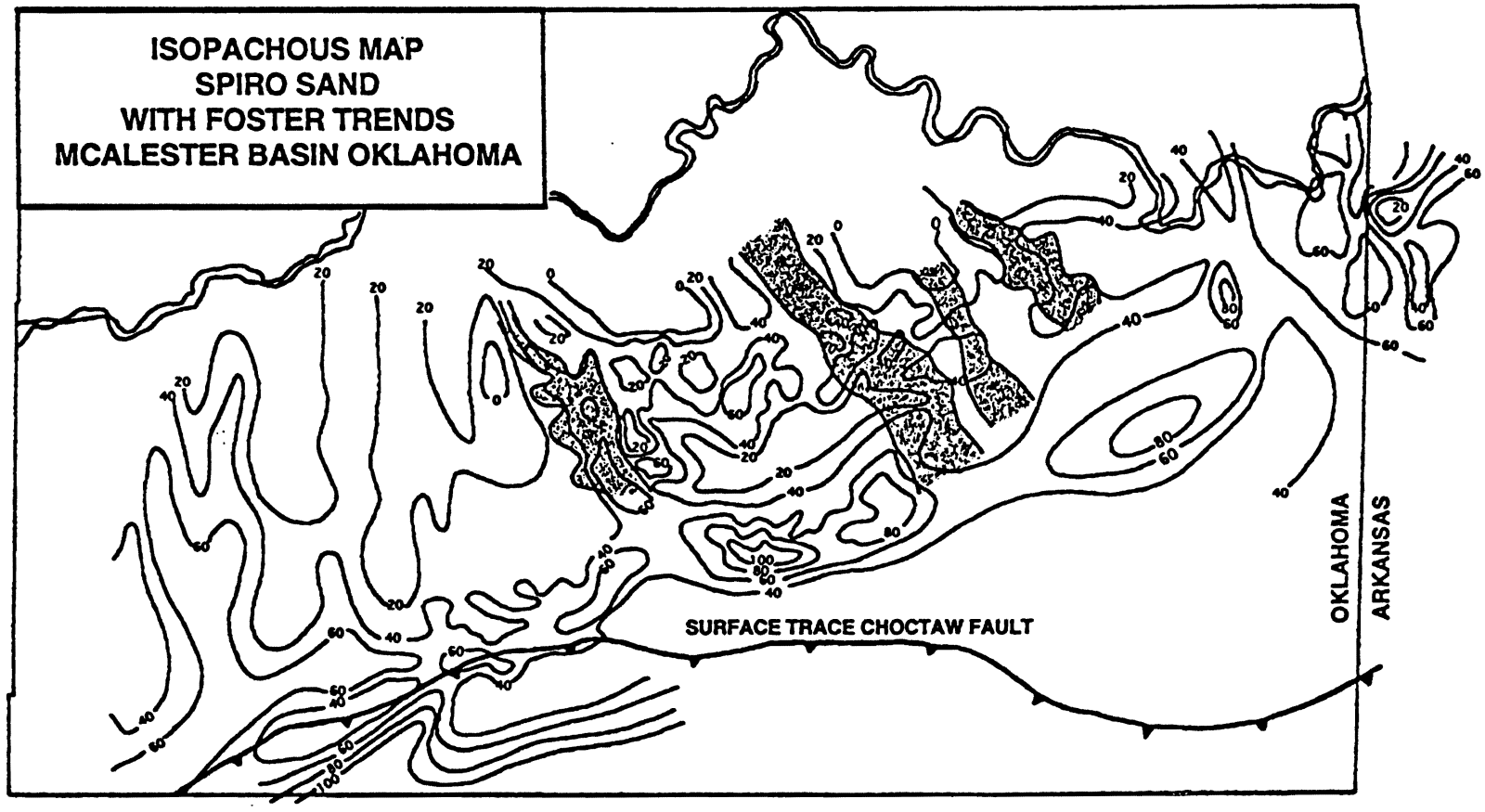


Figure 10. Sand Isopach of the Spiro Sandstone with the Foster Trends Highlighted by the Stippled Pattern (From Lumsden, 1971).

being shallow marine bars from work they carried out on outcrop (Fig. 11). Gross et. al. (1995), using cores and well logs, identified a progradational and retrogradational facies in the Spiro. They identified barrier island and river-mouth bars in the Frontal Zone of the Ouachitas west of the Arkansas state line (Fig. 12).

Chamberlain (1971) studied trace fossils in the Ouachita Mountains and found Chondrities and Zoophycus present in the Spiro Sandstone outcrops. Chondrities facies indicates a shelf to basin setting.

Pitman and Lumsden (1968) demonstrated the relationship between chlorite coatings and porosity preservation in the Spiro sandstone. Lumsden and others (1971) studied both the Spiro and Foster sandstones. The two sands were very fine- to fine-grained, with moderate to very good sorting. Both sands contained chlorite coatings. Al-Shaieb (1988) in a study on the petrology of the Spiro Sandstone in the Wilburton Field area indicated the importance of clay coatings of quartz grains in the preservation of primary porosity. He identified the clay coatings as chamosite; an iron rich chlorite. Carlson (1989) carried out a petrologic study of the surface and subsurface Atokan sandstones. The sands were fine- to medium-grained and moderately to very well sorted quartz-arenites, subarkoses, and sublitharenites. He divided the sands into northern sandstones and southern sandstones based on the presence of metamorphic rock fragments. The metamorphic fragments indicated an orogenic source, possibly from the advancing Ouachita Fold Belt. The northern sandstones were quartz-arenites derived from the Ozark Uplift.

The Red Oak-Norris field lies below the Brazil Anticline and is south of the San Bois Fault (Six 1965; Houseknecht and McGilvery 1990). The Kinta gas field underlies the Kinta and Milton Anticlines (Wonick 1965). Wonick (1965) constructed a structure contour map on the top of the Wapanucka to illustrate the anticlinal features as well as the faults. A Spiro Sand and Cromwell Sand distribution map was also presented. Berry and Trumbly (1968) prepared a structure contour map on the top of the Wapanucka in the Wilburton field area to

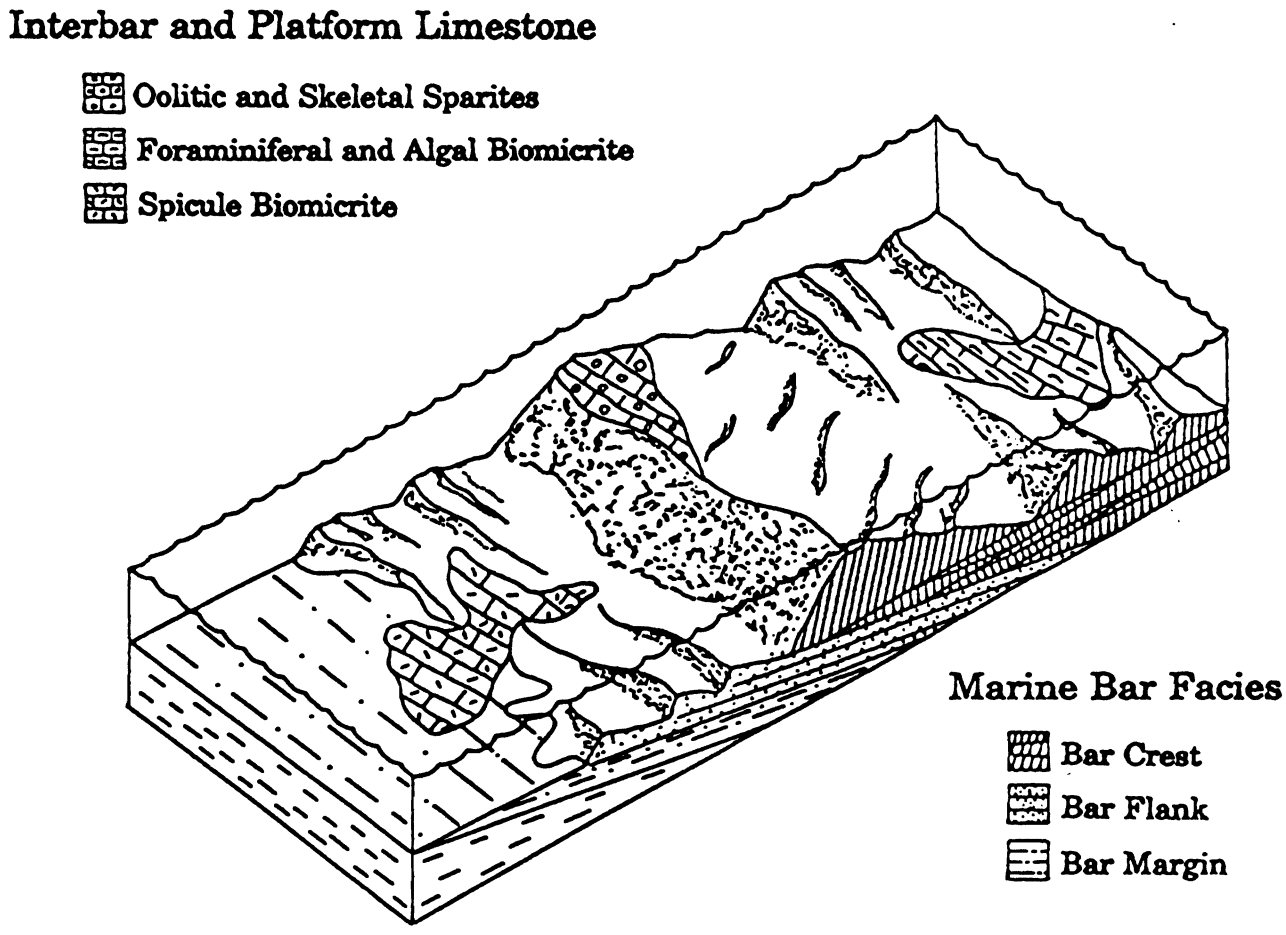


Figure 11. Model of Shelf Sand Bars (From Grayson and Hinde, 1993).

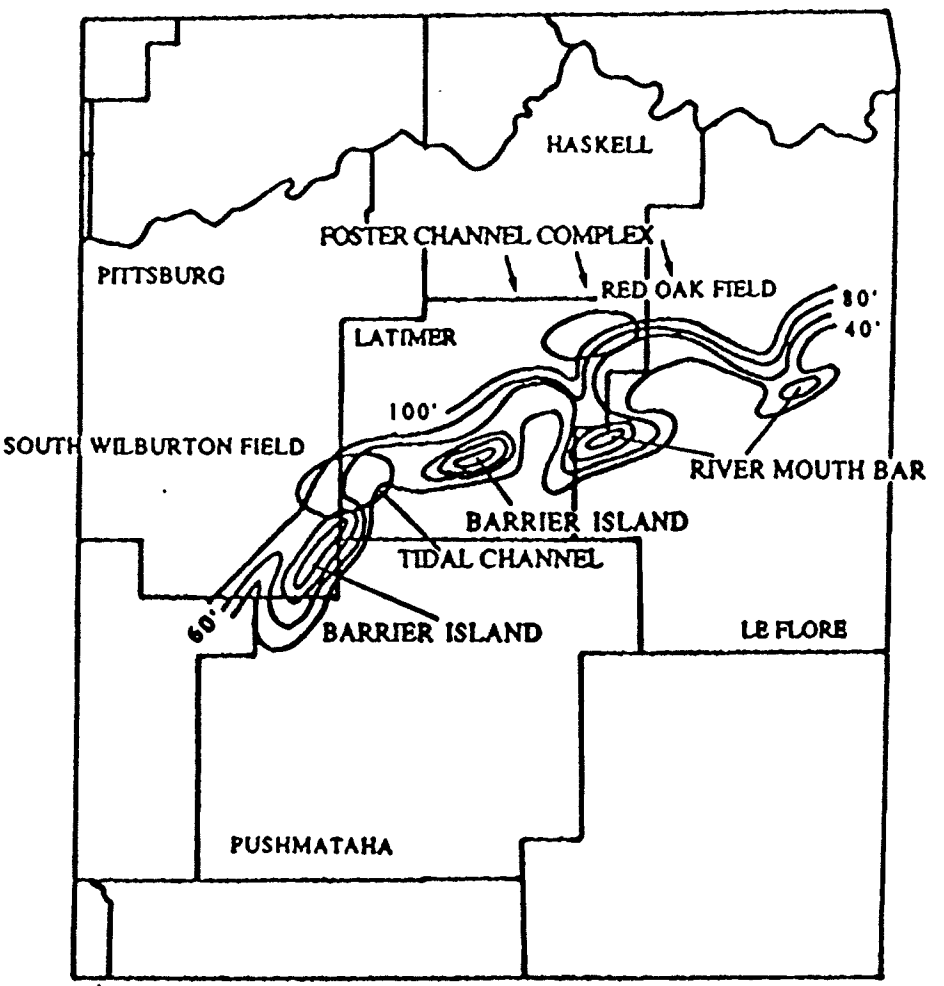


Figure 12. Isopach Map of Spiro Sandstone Facies tn the Frontal Zone of the Ouachitas (From Gross, et. al., 1995).

show the faulting and folding associated with the Carbon Fault. Branan (1968) stated that principal productive zones in the Arkoma basin are Atokan sand units. The Lower Atokan Spiro Sandstone is the main productive zone in the basin. Spiro reservoirs are controlled stratigraphically due to the development of porosity zones (Branan 1968).

CHAPTER III

STRATIGRAPHY OF THE ARKOMA BASIN

Introduction

The Arkoma Basin contains a sequence of Cambrian to Pennsylvanian sedimentary rocks with the Atokan comprising the greatest thickness. The Upper Mississippian of the Arkoma Basin in Oklahoma is represented by the Chesterian Series. The Pennsylvanian is composed of the Morrowan, Atokan, Desmoinesian, Missourian and Virgilian Series according to traditional Mid-Continent nomenclature. The Missourian and Virgilian are not present in the study area. The focus of this study is on the Lower Atokan Spiro Sandstone. In this study the Spiro Sandstone is a group term for the 'Foster Channels' and the overlying Spiro Sandstone of Lumsden et al. (1971).

Upper Mississippian

Chesterian

The Chesterian in the Arkoma basin of Oklahoma consists of two stratigraphic units (Fig. 13). The Chesterian includes a lower silty limestone unit termed the Mayes, with the upper shale unit being the Caney (Tulsa Geological Society 1961). The equivalent of the Caney in Arkansas is the Fayetteville Shale. An eastward thickening of the Fayetteville Shale indicates a possible source of siliciclastics from that direction (Sutherland 1988). Basinward, the Caney is composed of turbidites having a southeastern source; the Caney is present in outcrop in the Ouachitas (Sutherland 1988).

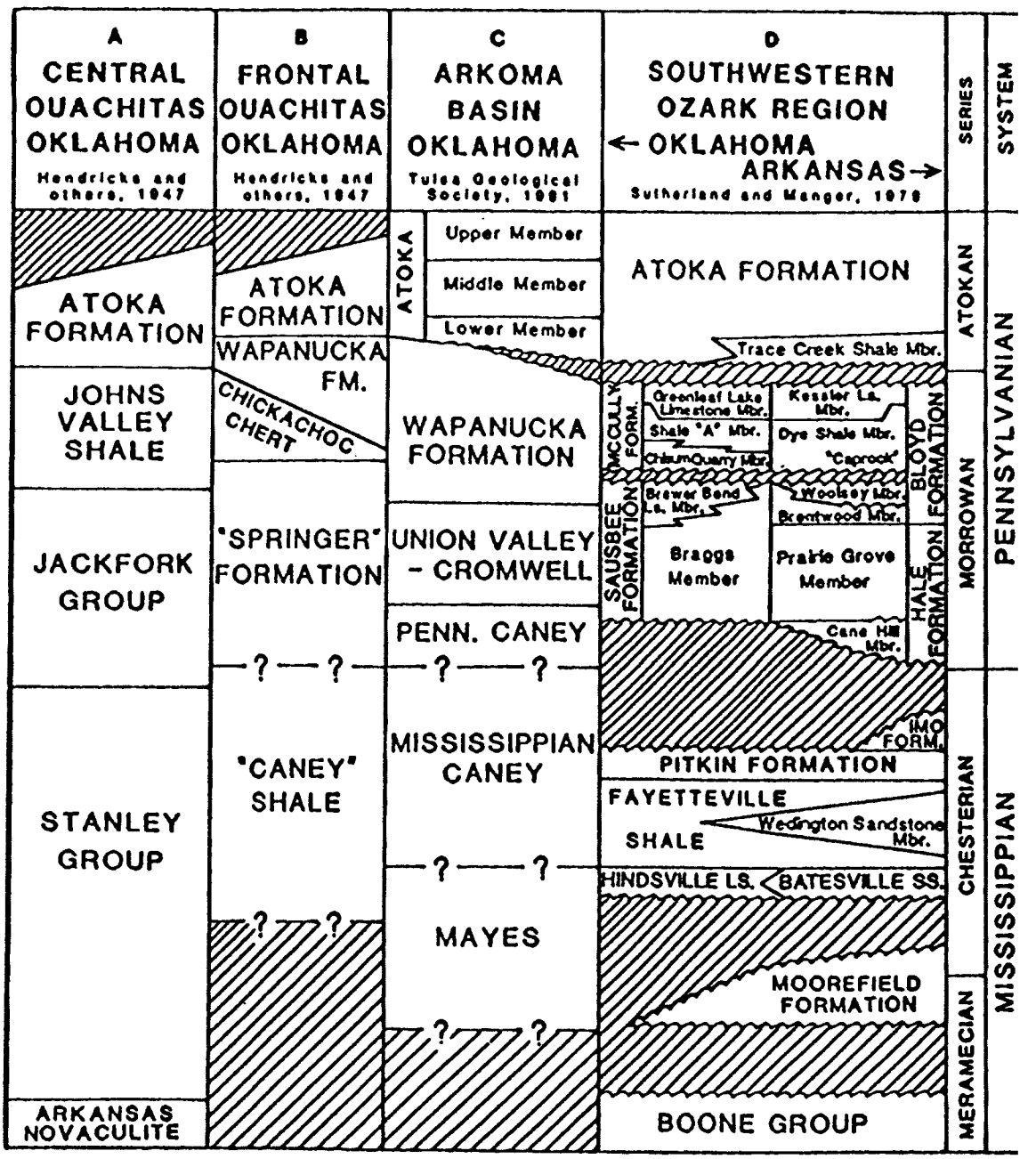


Figure 13. Stratigraphic Chart of The Arkoma Basin and Ozark Region (From Sutherland, 1988).

In the Ozark region of Arkansas the Chester crops out and is composed of interbedded limestones and shales. This involves the Moorefield Formation which is unconformably overlain by the Hindsville Limestone and Batesville Sandstone. The Fayetteville Shale, Pitkin Formation and Imo Formation are conformable with the underlying Hindsville and Batesville. Limestones in the Ozark region interfinger basinward with the Caney and the complete interval becomes progressively more clastic into the Arkoma Basin (Laudon 1959; Sutherland 1988).

Mississippian-Pennsylvanian Unconformity

In the late Mississippian a marine regression exposed Mississippian rocks on the shelf. Erosion of the Chesterian rocks in the Ozark region is evident. Southward into the basin, sedimentation was continuous into the Early Pennsylvanian (Sutherland 1988). Rascoe and Adler (1983) attribute the sea withdrawl to epeirogenic upwarping of the Cambridge Arch-Central Kansas Uplift and possible uplift of the Ozark Dome.

Pennsylvanian

Morrowan

Morrowan rocks in the Arkoma Basin in Oklahoma consist of the Pennsylvanian Caney, Union Valley-Cromwell interval and the Wapanucka Formation (Fig. 13). The Pennsylvanian Caney is similar lithologically to the underlying Mississippian Caney, so most workers use the base of the Cromwell Sandstone as the marker for the base of the Pennsylvanian (Sutherland 1988).

The Union Valley-Cromwell interval is present throughout the entire Arkoma Basin in Oklahoma. The source of the Cromwell is from the north or northwest, and the unit was deposited during a series of transgression and regressions. The Cromwell consists of a series of discontinuous sands separated by shales (Sutherland 1988). The Prairie Grove Member of the Hale Formation in Arkansas is the equivalent of the Cromwell. The Prairie Grove

Member thickens to the east and had a source from the northeast (Sutherland 1988). The orogenic, time-equivalent unit to the Cromwell is the Springer Formation which crops out in the Ouachitas.

The Wapanucka Formation contains the Wapanucka Shale and overlying Wapanucka Limestone. The Wapanucka Limestone crops out in Latimer and Pittsburg Counties, Oklahoma along the frontal thrust belt at Limestone Ridge. Northward, in the Ozark region, the Morrowan is unconformable with the underlying Pitkin and Imo formations. The Morrowan Sausbee Formation in the Ozark region consists of the Braggs Member and Brewer Bend Limestone Member, which are equivalent to the Union Valley-Cromwell. The equivalent to the Wapanucka is the McCully Formation which unconformably overlies the Sausbee Formation of Oklahoma. The McCully Formation consists of the Chisum Quarry Member, Shale 'A' Member and Greenleaf Lake Limestone Member (Fig. 13).

The equivalent to the Sausbee Formation in Arkansas is the Hale Formation and lower part of the Bloyd Formation. The Hale Formation consists of the Cane Hill Member and Prairie Grove Member. The Bloyd Formation conformably overlies the Hale formation and contains the Brentwood and Woolsey Members. The Dye Shale Member of the Bloyd Formation is unconformable with the Woolsey Member. The Kessler Limestone Member is conformable with the Dye Shale Member and is the upper unit of the Bloyd Formation. The Kessler Limestone Member of Arkansas is the same unit as the Wapanucka Formation in Oklahoma.

Atokan

The Atokan Series in the Arkoma Basin of Oklahoma is subdivided into the Lower, Middle, and Upper Atokan (Fig. 14). This division is based on the effects of syndepositional normal faults on the amount of sediment that accumulated in the Arkoma Basin. A regional unconformity separates the

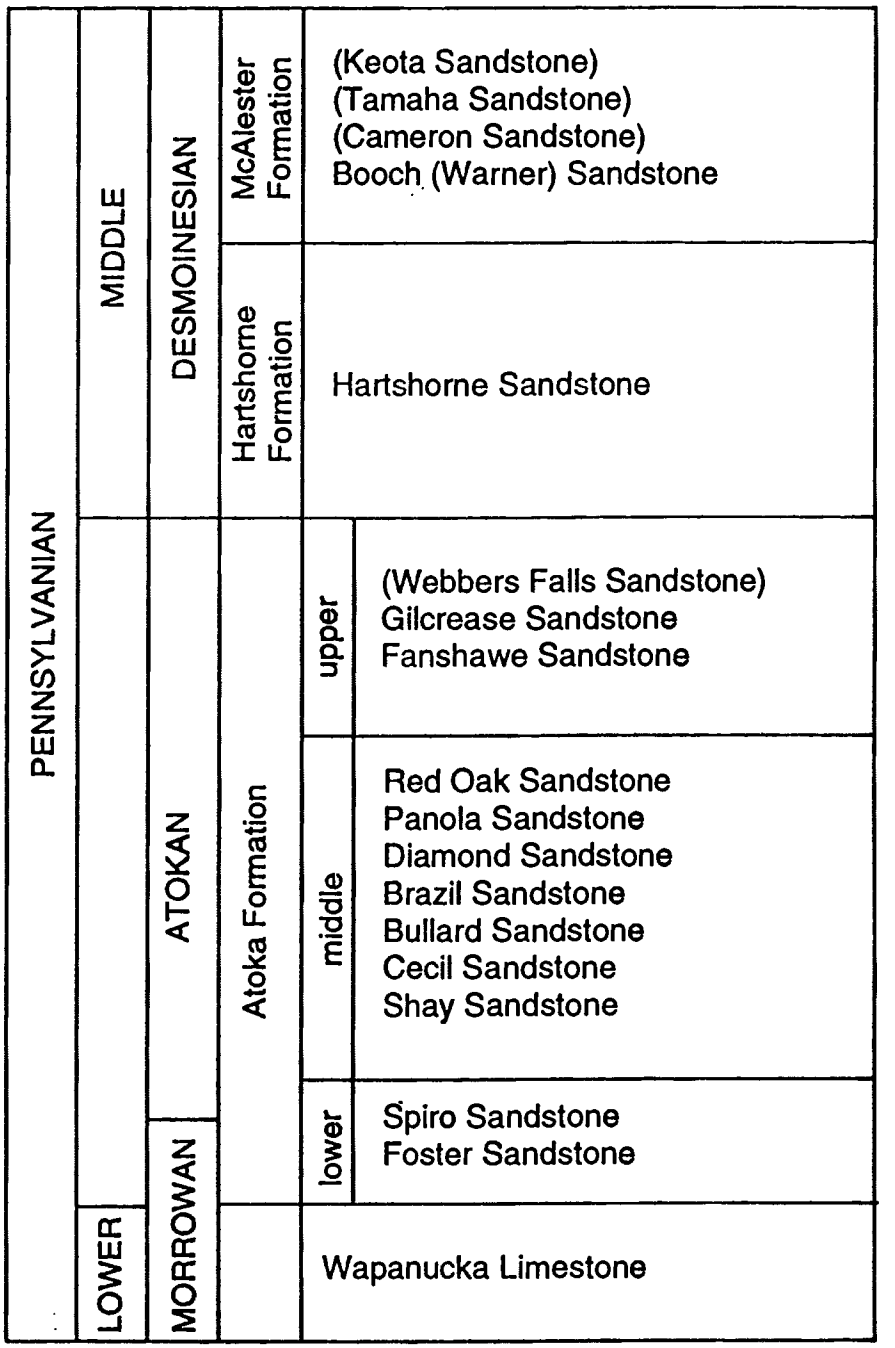


Figure 14. Stratigraphy of the Atokan and Desmoinesian in the Arkoma Basin of Oklahoma (From Suneson and Hemish, eds., 1984).

Atokan from the Morrowan in the Ozark region and on the northern margin of the basin. Sedimentation was continuous in the southern part of the basin and the pre-Atokan unconformity is absent. The lower Atokan is marked by the Spiro sandstone and an overlying and persistent shale (Sutherland 1988). The Spiro is the principal sandstone of the lower Atokan in Oklahoma. In Arkansas, the lower Atokan contains several deltaic shelf sand units separated by shales, with units ranging from 20 -200 feet thick (Zachry and Sutherland, 1984). The source for the Arkansas units is from the northeast which is evidenced by the thickening of individual sand units in a northeasterly direction. These units extend westward into the easternmost part of Oklahoma, but were not seen in the study area.

The Middle Atokan is characterized by a stratigraphic thickening on the down-thrown side of syndepositional normal faults. The Middle Atokan is predominantly shale with some discontinuous sands. The Red Oak is a major hydrocarbon producing sand unit in Oklahoma within this interval; it develops south of the San Bois fault zone. Vedros and Visher (1979) suggest that the Red Oak Sandstone was deposited in a submarine fan complex. Houseknecht and Kacena (1983) propose that the normal faults may have acted as sediment conduits which funneled sediments southwestward. Further to the east, in Arkansas, the Middle Atokan contains several sand units that accumulated in delta and tidal flat environments (Sutherland, 1988).

In the Late Atokan normal faulting ceased and Upper Atokan units do not show thickening across the faults. The Upper Atokan is composed predominantly of shallow shelf and deltaic facies, as exemplified by the Dutcher and Gilcrease sandstones.

Desmoinesian

The Desmoinesian in the Arkoma Basin is represented by the Krebs Group, Cabaniss Group and Marmaton Group (Fig. 15). Rocks of the Cabaniss and Marmaton Groups are found in the northwestern portion of the basin. The

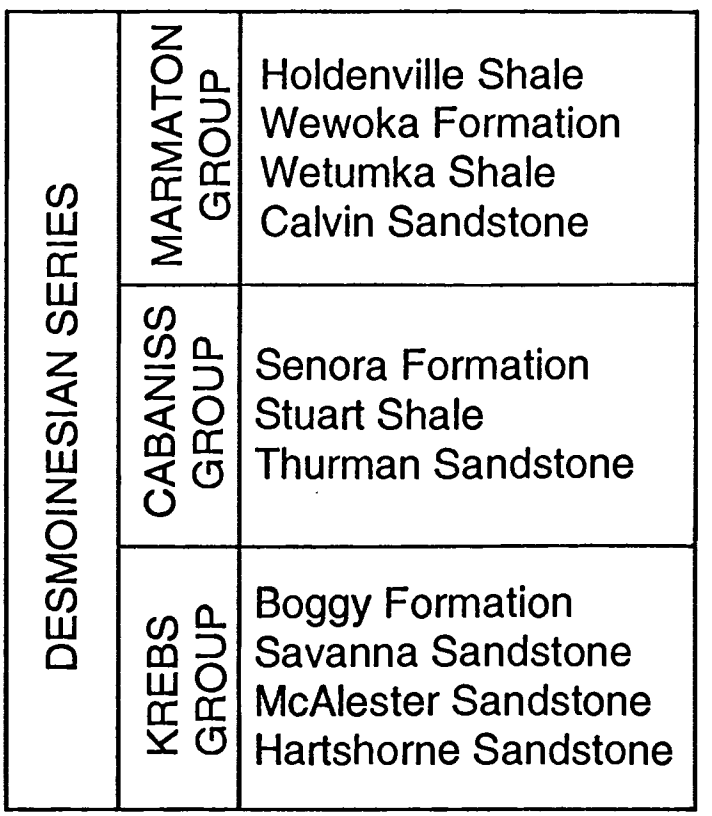


Figure 15. Stratigraphy of the Desmoinesian in the Arkoma Basin of Oklahoma (From Sutherland, 1988).

Krebs Group contains the Hartshorne Sandstone, McAlester Formation, Savanna Sandstone and Boggy Formation (Fig. 15). The Hartshorne is conformable with the underlying Upper Atokan rock units. The Hartshorne was deposited in a high-constructive deltaic system that prograded from east to west (Sutherland, 1988).

CHAPTER IV

STRUCTURAL GEOLOGY

Overview

The Arkoma basin is an elongate, gently curving arc that extends from south-central Oklahoma to east-central Arkansas. The southern border is the frontal Ouachita belt with the northern border involving the Ozark Dome and Northern Oklahoma Platform. The western boundary is the Arbuckle Uplift (Fig. 16). Many models for the formation of the Arkoma Basin have been proposed. The most generally accepted version proposes a southward subduction of the North American continent beneath the South American continent.

Basin Formation

A model for basin formation was constructed by Houseknecht (1983) and is the one used in this study. Figure 17 depicts graphically stages in the formation of the Arkoma Basin.

Formation of the Arkoma Basin began in the latest Precambrian to earliest Cambrian. This was a time of initial rifting and formation of a proto-Atlantic ocean basin (Fig. 17 A).

During the Latest Cambrian to Devonian the southern margin of North America developed into a passive Atlantic-type margin (Fig. 17 B). Subsidence occurred due to cooling as the basin opened. This lead to the formation of a shelf with a shelf-slope-rise geometry (Houseknecht, 1983). Shallow marine carbonates and sandstones and non-marine sandstones were deposited on the shelf.

Closing of the basin began in the Mississippian with the subduction of the southern margin of North America beneath the South American continent (Fig.

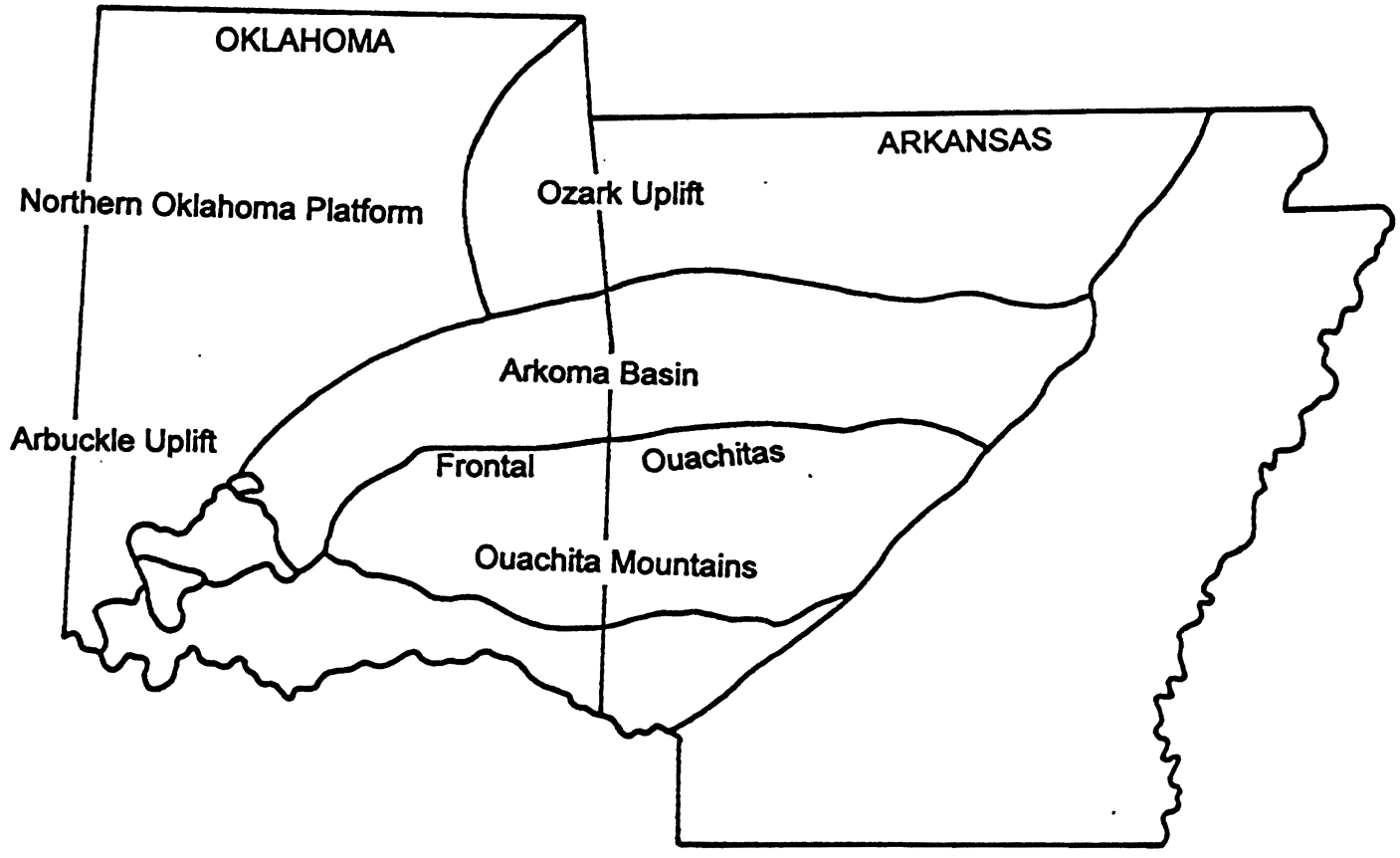


Figure 16. Location of the Arkoma Basin and Bounding Provinces (From Zachry and Sutherland, 1984).

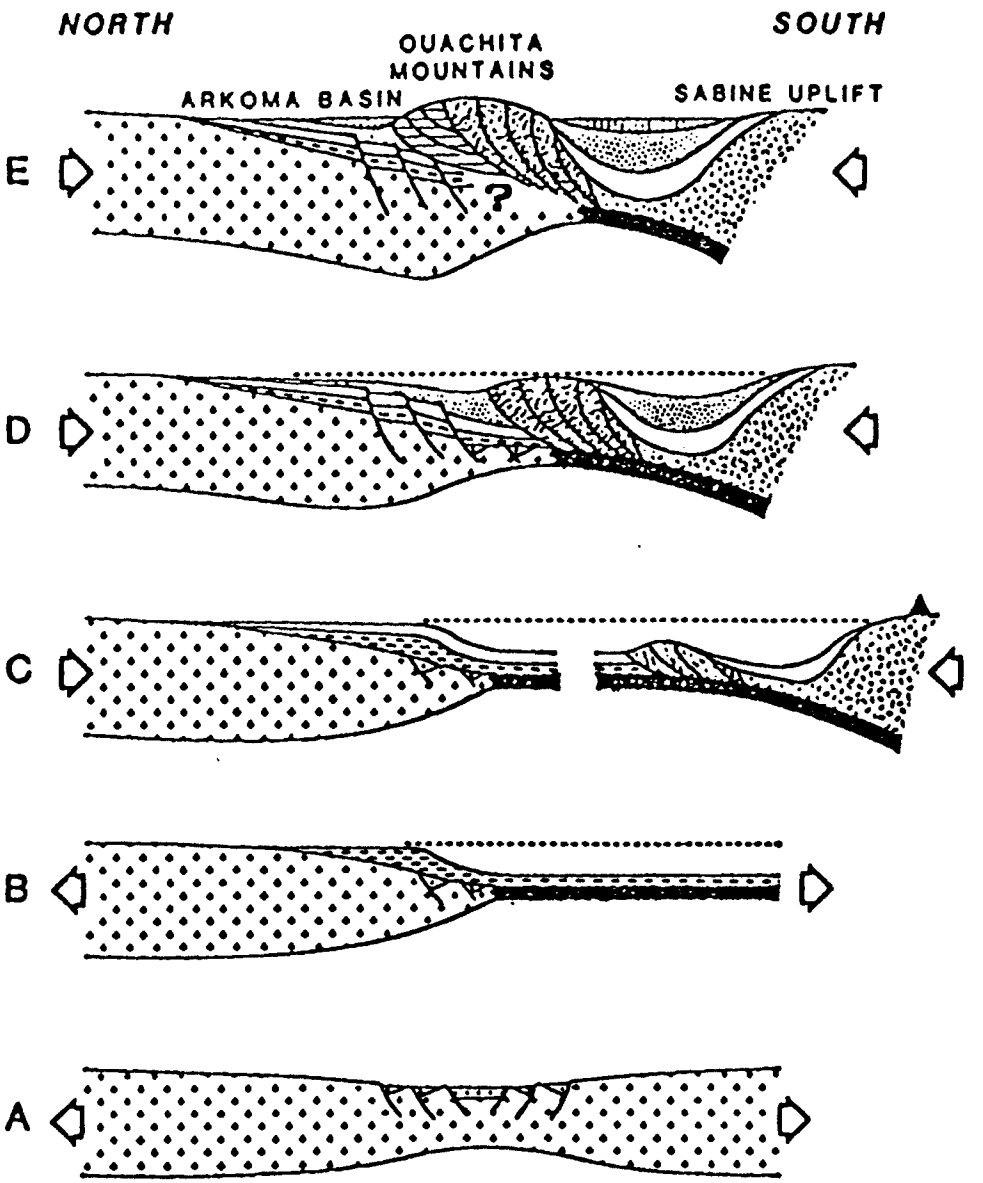


Figure 17. Model of Basin Formation (From Houseknecht 1983).

17 C). Sediments continued to accumulate in shallow marine and non-marine settings until the Atokan.

By the early to middle Atokan the northward advancing subduction complex had consumed the ocean basin (Fig. 17 D). With the advancing subduction complex, downwarping of the Arkoma shelf occurred. As a result of this downwarping, normal faulting brought about the collapse of the Arkoma Shelf following deposition of the Spiro Sandstone (Houseknecht, 1983). The collapse of the shelf lead to the formation of deeper water environments. The shallow marine rocks that characterized the Arkoma Shelf during the Cambrian through Early Atokan are overlain by deeper water, submarine units such as the Red Oak Sandstone.

During the Latest Atokan and Desmoinesian the subduction complex collided with the North American continent (Houseknecht, 1983). The collision lead to suturing of the two continental masses and uplift to form the Ouachita Mountains (Fig. 17 E). Shallow marine and fluvial sediments were then deposited on the shelf.

Faulting and Folding

During the early to middle Atokan flexural downwarping of the southern margin of North America created normal faults which offset crystalline basement, as well as strata as high as the Lower Atokan (Houseknecht, 1987). The formation of normal faults resulted in a disruption in the classic shelf-slope-rise geometry of the basin margin and instead produced a step-like geometry. The thickness of Middle Atokan strata is significantly greater on the southern side of these normal faults, thus suggesting fault movement contemporaneous with deposition (Fig. 18). Normal faulting ended before the Desmoinesian, as evidenced by the fact that Desmoinesian strata in the same area of southeastern Oklahoma do not thicken on the southern side of these faults (Houseknecht, 1986).

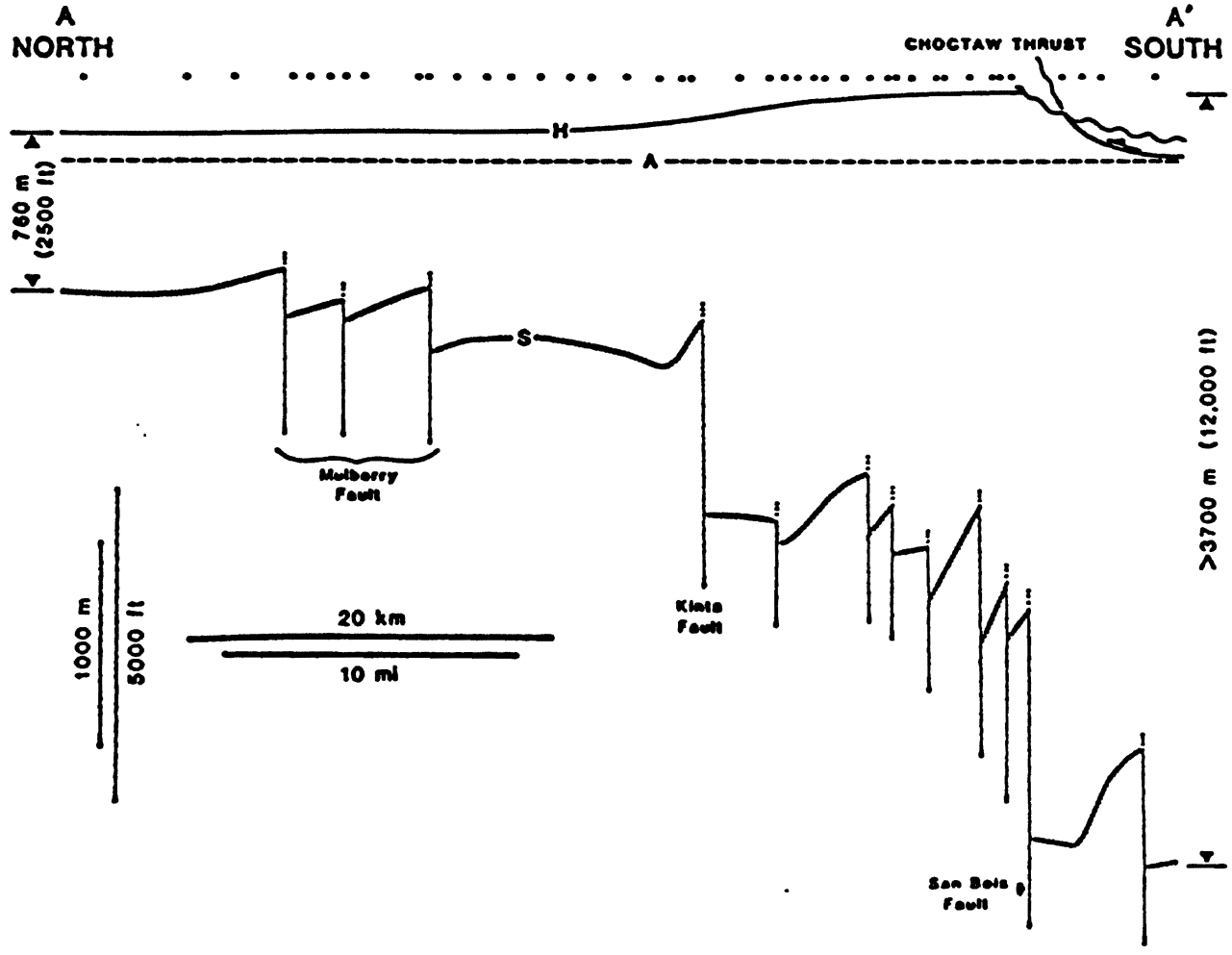


Figure 18. Thickening of the Middle Atokan as a Result of Syndepositional Faulting. The Spiro Sandstone (S) and Upper Atokan bed (A)

Folding in the Arkoma Basin apparently ceased in the early Desmoinesian. Rocks of the Krebs Group are incorporated into folds. The Thurman Sandstone which overlies the Boggy Formation of the Krebs Group is not folded (Sutherland 1988).

Structure Related to Fields

All of the important gas fields in the study area occur in association with anticlines that have surface expression. The Kinta Gas Field is located beneath the surface expression of the Kinta and Milton anticlines (Fig. 19). The Kinta Anticline trends east-west and is located in T. 8 N., R. 19 & 20 E.. The Kinta Anticline is expressed as a twin anticline at depth. The Milton Anticline trends northeast-southwest and is located in T. 8 & 9 N., R. 22-24 E. (Wonick, 1965).

The Red Oak Field is located beneath the surface expression of the Brazil Anticline (Fig. 20). The southern border of the field is the Cavanal Syncline, with the San Bois Syncline forming the northern border (Six, 1965).

The Wilburton Field underlies several surface structural features. The Wilburton anticline, the Craig and Adamson anticlines to the northwest and the Hartshorne Syncline (Fig. 21) (Berry and Trumbly, 1968).

Structure of Study Area

Thrust faulting is the predominant type of faulting in the southern part of the study area (Plate VI). This faulting has posed difficulties in previous studies of the Spiro. The Spiro in wells of T. 5 N. and T. 4 N. are repeated as much as three times in certain wells. Thrust faults below the Choctaw detachment were mapped. Six individual thrust sheets were mapped and are located in T. 4-5 N., R. 16-20 E. (Fig. 2). These thrusts are not present at the surface and terminate at a proposed 'Roof Thrust' in the Middle Atokan shales. Normal faulting is the predominant type of faulting north of T. 5 N. (Plate VI). Fault planes trend northeast and show vertical displacements of 400 to more than 4,000 feet.

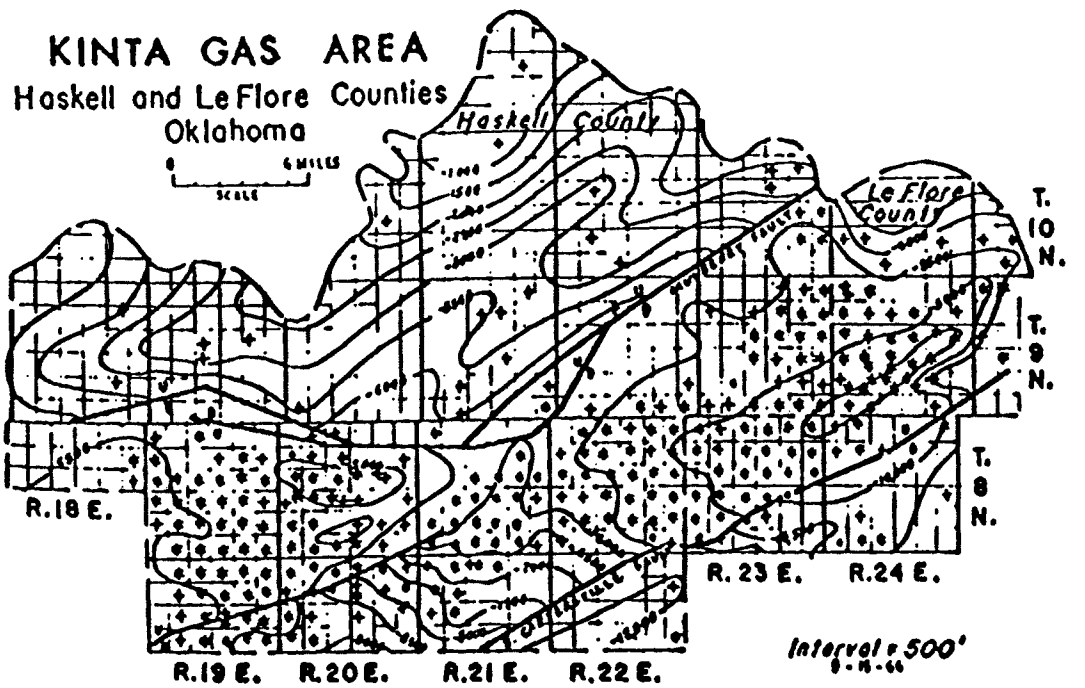


Figure 19. Structure Map: Top of The Wapanucka Limestone in the Kinta Gas Field (From Wonick, 1965).

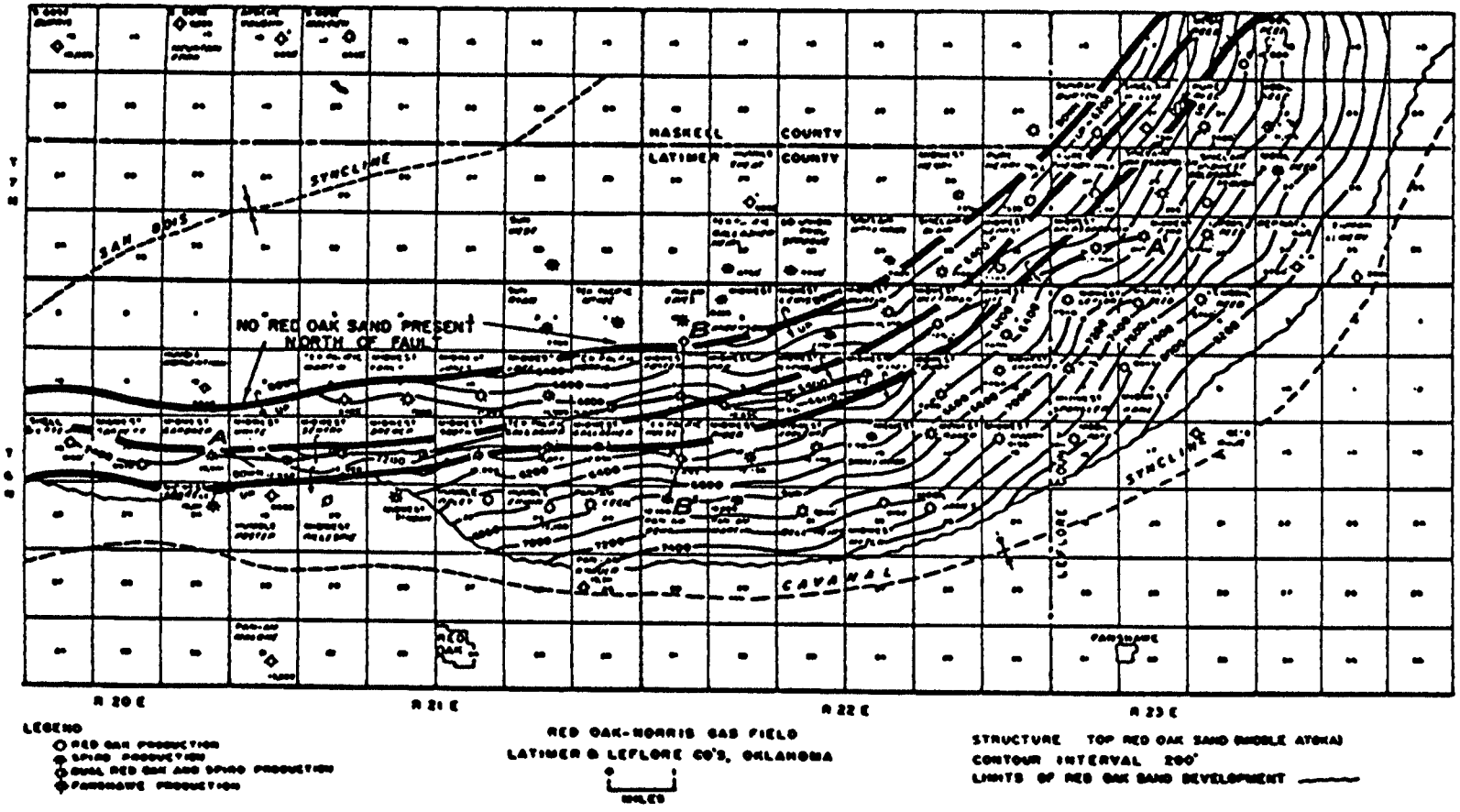


Figure 20. Structure Map: Top of The Red Oak Sandstone in the Red Oak-Norris Gas Field (From Six, 1965).

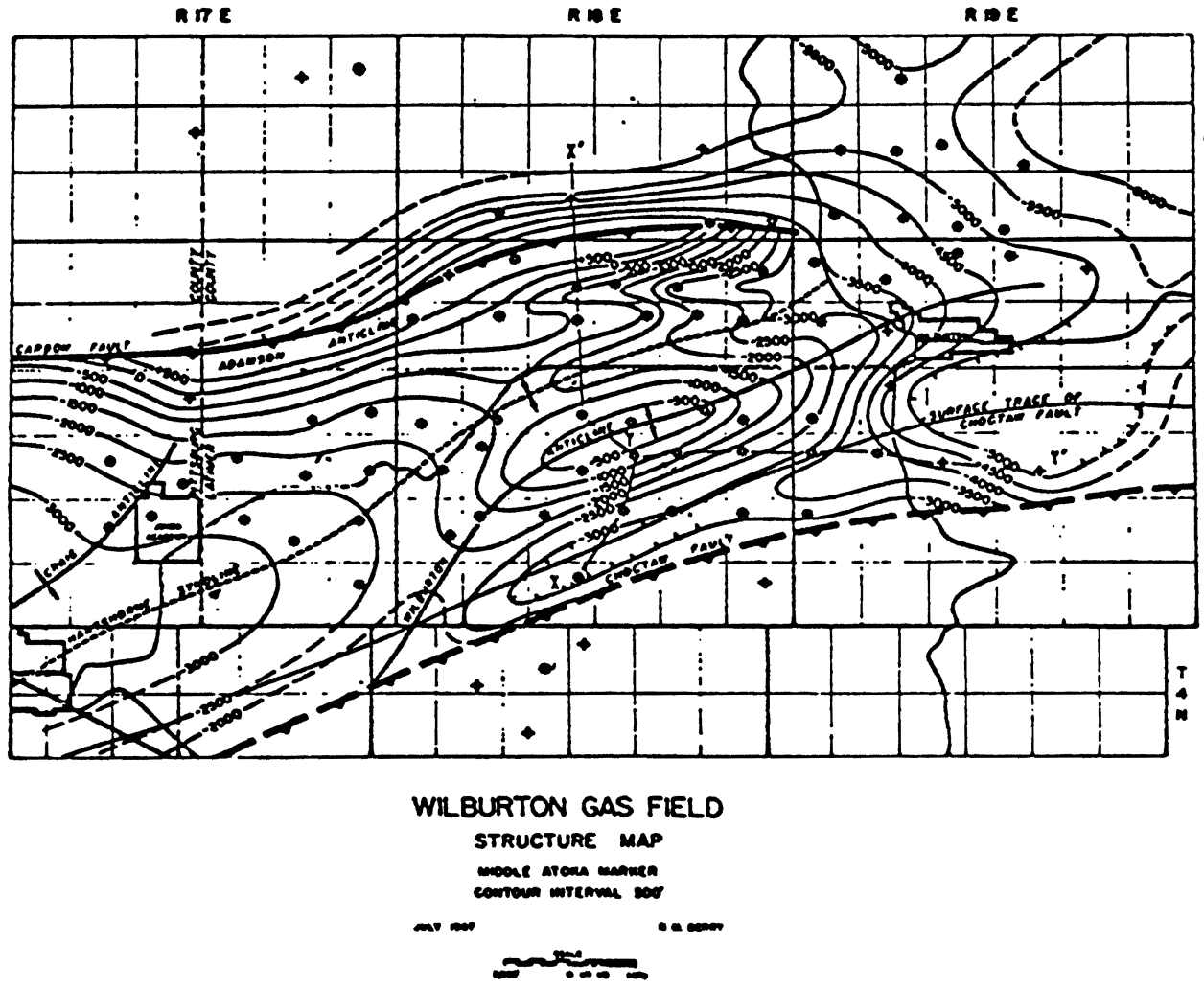


Figure 21. Structure Map: Top of Middle Atokan Marker in the Wilburton Gas Field (From Berry And Trumbly, 1968).

CHAPTER V

GEOMETRY OF THE SPIRO SANDSTONE

Introduction

Six stratigraphic cross sections were constructed to show the lateral and vertical relationships with the Spiro Sandstone, sub-Spiro Shale and Wapanucka Limestone (Fig. 22). The datum for the cross sections is a Lower Atokan marker bed above the Spiro Sandstone that is present throughout the study area. Cross sections were constructed through the southern part of the study area, where thrust faulting is the dominant structural feature. The locations of the restored positions for wells in the cross sections are shown in parentheses. Cross sections C-C' through F-F' extend southward into the thrusted zone of the study area. The cross sections were constructed using the restored locations of the thrusted units. Abrupt thickening and thinning of the Spiro and Wapanucka in the thrusted zone are assumed to be due to structural dip or faulting and not the result of deposition. Production symbols on the cross sections depict production from the Spiro or dual completions that include the Spiro. Dry holes are indications of non-Spiro production.

A Spiro net sand isolith was constructed to show the lateral distribution and geometry of the Spiro Sandstone. The isolith values include the Foster channels mapped by Lumsden and others (1971). A sub-Spiro shale isopach was constructed in order to locate erosional features in the shale and determine the locations of Spiro and Wapanucka contact.

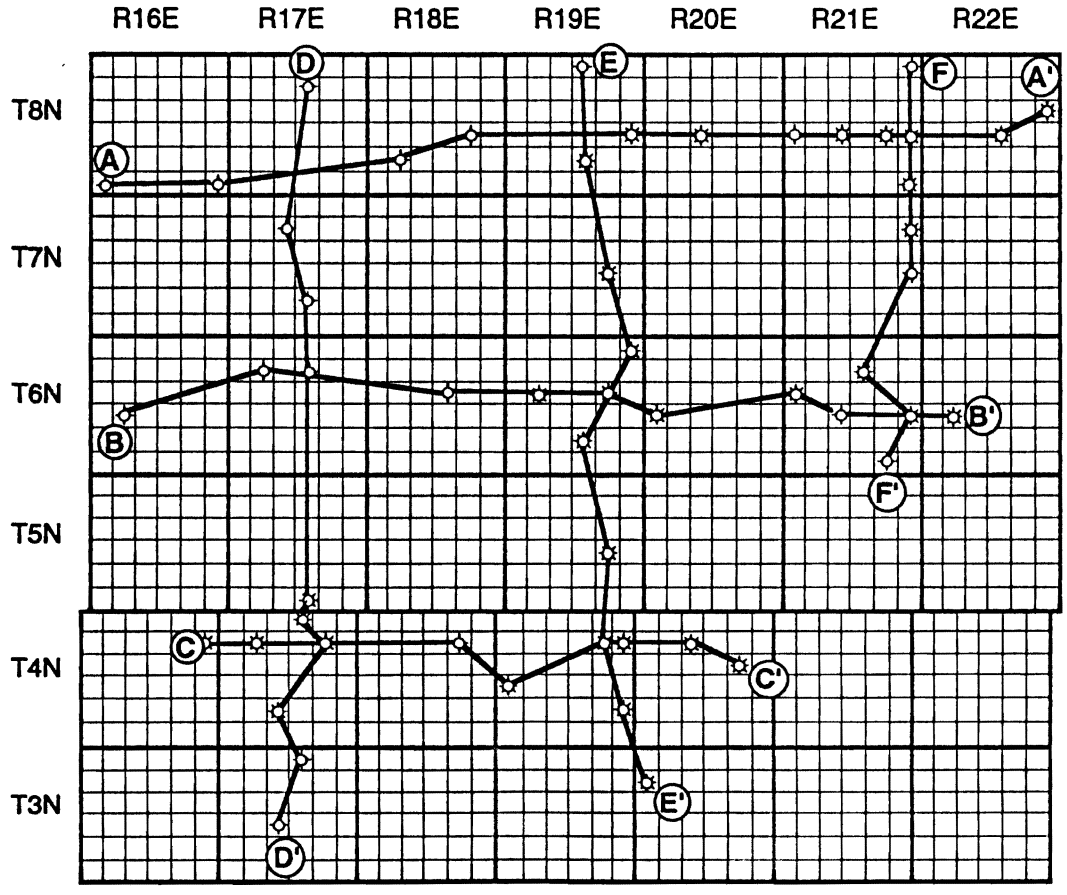


Figure 22. Location of Stratigraphic Cross Sections.

Stratigraphic Cross Sections

Cross section A-A'

Cross section A-A' extends west to east across the northern part of the study area (Fig. 22). The cross section begins in section 31 T. 8 N., R. 16 E., and continues to section 13 T. 8 N., R. 22 E. (Plate I). The Spiro sandstone is approximately 20 feet thick in the Ward Petroleum #1 Caldwell. The Spiro retains a relatively constant thickness eastward with a thickening in the Snee and Eberly #1-A Drain. The major change in the Spiro thickness is in the Humble #1 Fred Dittman and Humble #1 McCurtain wells. The thickenings in these two wells mark the Foster channels.

The sub-Spiro shale unit is very thin in the west and thickens eastward. In the Kingwood Oil Co. #1 State Hightower the sub-Spiro shale thickens to 77 feet and in the Stephens Prod. #1 Pearl Patterson the sub-Spiro shale is 67 feet thick. In the Humble #1 McCurtain the sub-Sprio shale is 22 feet thick. The thinning of the sub-Spiro shale is due in part to incision of the Foster channel. An overall thickening of this shale in non-channel areas toward the northeast suggest a deltaic source for this fine-grained detritus, perhaps in the Fort Smith area.

Cross section B-B'

Cross section B-B' extends west to east across the middle part of the study area (Fig. 22). The cross section begins with section 20 T. 6 N., R. 20 E. and continues to section 20 T. 6 N., R. 22 E. (Plate I).

The Spiro Sandstone is thicker overall here than in cross section A-A'. The Spiro is 30 feet thick in the Pan Am #1 Opal and retains a relatively constant thickness eastward with a gradual thickening beginning in the Samson Resources #1 Mollie Weaver. This thickening continues eastward with a thickness of 114 feet in the Midwest #1 Noah. The Spiro in the west contains a thin shale unit which terminates eastward. This shale is not present in the

Whitmar #1-15 Binkley. Interbedded shales are present in the Spiro of the Tenneco #1-19 Cecil. The increase in shale by intercalation continues eastward.

The sub-Spiro shale is thin to the west with a thickness of around 2 feet and thickens eastward. In the TNO #1 Owens the sub-Spiro shale is 12 feet thick. This thickness is maintained eastward, but with a definite thinning in the Tenneco #1-19 Cecil. The thinning is possibly the result of erosion.

The thickness of the Wapanucka Limestone is variable across the section. In the Oxley #1 Opal the Wapanucka is 108 feet thick. A thickening is present in the TNO #1 Owens where the Wapanucka is 141 feet thick and in the Samson #1 Mollie Weaver which has a Wapanucka thickness of 136 feet. The Wapanucka thins eastward with a thickness in the Midwest #1 White of 70 feet.

Cross section C-C'

Cross section C-C' extends west to east across the southern portion of the study area (Fig. 22). The cross section begins in section 24 T. 5 N., R. 16 E., which has been restored to section 24 T. 4 N., R. 16 E.. The cross section continues eastward to section 26 T. 5 N., R. 20 E., which is restored to section 14 T. 4 N., R 20 E. (Plate I). Thickness of units in this cross section have been affected by structural dip or faulting.

The Spiro maintains a relatively constant thickness eastward to the Sun Exploration #2 Diamond, where the Spiro reaches a thickness of 42 feet. Eastward the thickness of the Spiro increases, but with an abrupt decrease in the Texaco #24-1 D. K. Spangler. The Spiro in the west is a clean sandstone with shale beds increasing eastward from the Sun #3 R.F. McAlester. Eastward the shales increase in number and thickness. A distinct coarsening upward sequence is seen in the upper part of the Spiro in the Amoco #1 Raymond Smith.

In the Amoco #2 George Peden the sub-Spiro shale is 7 feet thick. A thickening of the sub-Spiro shale is seen in the Arco #3 McAlester which has 21

feet of shale. The thickness of the sub-Spiro shale in the Texaco #23-1 Spangler is 41 feet.

The thickness of the Wapanucka varies greatly and this can be seen in the cross section. In the Amoco #2 George Peden the Wapanucka is 145 feet thick. The Wapanucka thins to the east with a thickness of 87 feet in the Arco #3 McAlester. The thinnest Wapanucka is in the Texaco #24-1 Spangler with a thickness of less than 10 feet. The variation in thickness is most probably caused by faulting and is not due to deposition.

Cross section D-D'

Cross section D-D' extends north to south across the western portion of the study area (Fig. 22). The cross section begins in section 10 T. 8 N., R. 17 E. and continues southward to section 33 T. 4 N., R. 17 E. which has been restored to section 21 T. 3 N., R. 17 E. (Plate II). The southern part of the cross section is located in the thrusted portion of the study area.

The Spiro in the Tenneco #1 Badsen is 20 feet thick and maintains a relatively constant thickness southward. Thickening of the Spiro is seen in the Mobil #1 Goldie Sivil with a thickness of 69 feet. The Spiro continues to thicken southward up to a thickness of 118 feet in the Mobil #1-7 Bear Suck Knob. The Spiro in the Tenneco #1 Badsen contains a thin interbedded shale that thins southward and is not present in the Steve Gose #1 Hughes. Numerous thin interbedded shales are present in the Spiro further to the south with a coarsening upward sequence, approximately 30 feet thick, present at the base of the Spiro in the Exxon #1 H&H Cattle Co.

The sub-Spiro shale has a thickness of 3 feet in the Tenneco #1 Badsen. Southward the sub-Spiro shale thickens to an average thickness of 13 feet. Thickening of the sub-Spiro shale is present in the Arkoma #2 Stine and the Texaco #15-1 Wayne Wallace with a thickness of 20 feet and 24 feet respectively.

The Wapanucka is 69 feet thick in the Tenneco #1 Badsen. The Wapanucka thickens southward with a thickness of 140 feet in the Gulfstream #1-10 Raspotnik. The Mobil #1 Goldie Sivil and the Sinclair #1 Alfred Parker do not show the base of the Wapanucka. The maximum thickness of the Wapanucka is seen in the Exxon #1 H&H Cattle with a thickness of 265 feet.

Cross section E-E'

Cross section E-E' runs north to south and is located in the central portion of the study area (Fig. 22). The cross section begins in section 3 T. 8 N., R. 19 E. and extends southward to section 18 T. 4 N., R. 19 E., which has been restored to section 7 T. 3 N., R 20 E. (Plate II). The cross section extends into the thrusted zone and the wells in the thrust belt are shown in their restored positions.

The Spiro in the Samson #2-27 Wimberly is 44 feet thick. The thickness of the Spiro is relatively constant southward with a slight thickening apparent in the Pan Am #1 Reusch. A thinning of the Spiro is evident in the overthrusted unit of the Texaco H.M. Jennings as compared to the underthrusted unit in the same well. The thinning is possibly a result of thrusting, however the Wapanucka in the overthrusted unit does not thin in relation to the under thrusted Wapanucka. This could possibly point to a depositional thinning. The Spiro reaches a maximum thickness of 160 feet in the Mobil #1-7 Bear Suck Knob. The Spiro in the TXO #1 Butler Cooper consists of 3 sand units separated by thin shales. The shales pinch out southward and are not present in the Samson #2-27 Wimberly. Shales in the Spiro are present again beginning with the Texaco #23-1 Jennings.

The sub-Spiro shale is very thin in the northern part of the cross section. The sub-Spiro shale is 8 feet thick in the Samson #2-27 Wimberly. The sub-Spiro shale reaches a thickness of 21 feet in the Samson #2 Young Ranch. The maximum thickness of the sub-Spiro shale is in the Mobil #1-7 Bear Suck Knob, with a thickness of 47 feet.

The Wapanucka is 43 feet thick in the TXO #1 Butler Cooper and thickens southward. In the Samson #2-27 the Wapanucka is 90 feet thick. The maximum thickness of the Wapanucka is 211 feet in the overthrusted unit of the Texaco H. M. Jennings.

Cross section F-F'

Cross section F-F' runs north to south and is located in the eastern portion of the study area (Fig. 22). The cross section begins in section 1 T. 8 N., R. 21 E. and continues southward to section 35 T. 6 N., R. 21 E. (Plate II). This cross section does not extend into the thrusted portion of the study area.

The Spiro in the Texaco #1 Kerr McGee is 140 feet thick and contains one of the Foster channels. The Spiro thins southward where it is only 51 feet thick in the Humble #1 Eva McDaniel. The Spiro thickens in the Mustang #1-12 Kamphaus and Tenneco #1-24 Mixon with a thickness of 87 and 81 feet respectively. The thickenings correlate to channels in the Spiro. In the Midwest #1 Jones the Spiro is 37 feet thick and thickening of the Spiro continues southward.

The sub-Spiro shale in the northern part of the cross section is thicker than in the other sections. The sub-Spiro shale is 38 feet thick in the Humble #1 Hazel Falconer. Thinning of the sub-Spiro shale is evident beginning in the Midwest #1 Jones and it is nearly absent in the Mustang #1-35 Judd with a thickness of only 2 feet.

The Wapanucka is 90 feet thick in the Texaco #1 Kerr-McGee and thins southward to 30 feet in the Humble #1 Eva McDaniel. The Wapanucka thickens to 88 feet thick in the Mustang #1-12 Kamphaus and 73 feet thick in the Tenneco #1-24 Mixon. Thickness of the Wapanucka southward is unknown since the wells did not continue through the Wapanucka.

Spiro Net Sand Isolith

The net sand isolith of the Spiro is used to show the distribution and geometry of the Spiro Sandstone reservoir rock (Plate IV). Three prominent thickness trends were identified.

Channel systems were mapped in the north-central and northeastern portion of the study area. These channels coincide with the location of the Foster Channels described by Lumsden and others (1971). The width and thickness of channels increases northeastward, with the thickest channel in the northeastern part of T. 8 N., R. 22 E. The thickness of sand in this channel attains a maximum of 178 feet in the Amoco #2 Krisher well at section 25 T. 8 N., R. 22 E. These channels trend south southeast toward the shelf margin.

In the southwestern portion of the map area additional previously unknown, Foster channels have been identified. These western channels are smaller in width and thickness, with a maximum thickness of 80 feet mapped in one channel.

In the southeastern portion of the map area an elongate sand trend perpendicular to the Foster channels was mapped. Spiro thicknesses in excess of 100 feet are seen in the trends. The trend lies at the southern margin of the Foster channels and is oriented southwest to northeast. The northwest side of the trend is irregular with thickenings corresponding to the channel locations, whereas the southeast side of the trend is relatively smooth.

In the northwestern portion of the map a relatively constant Spiro thickness of approximately 20 feet is present. Several interchannel areas were mapped with a thickness of the Spiro around 20-30 feet.

Sub-Spiro Shale Isopach

The sub-Spiro shale isopach map illustrates the location of the erosional contact between the Spiro and Wapanucka (Plate V). Thinning of the sub-Spiro shale coincides roughly with the channels mapped in the Spiro Interval. In the southern part of the map, the thickness of the middle shale is questionable due

to the possibility of distortions due to faulting. The sub-Spiro shale is thicker in the northeast and thins to the south and west. This would indicate a possible source of the sub-Spiro shale from the northeast.

Vertical Log Profiles

Vertical log profiles can be used in interpreting depositional facies. The Spiro Sandstone is a very clean sand and the natural gamma signature is low. This low gamma value is present in most wells in the study area. With the Spiro having a low gamma signature representative log signatures of specific depositional environments are difficult to identify. However, several different log signatures were observed in the study area. Three of the log signatures were chosen that best illustrate the signature that relates to a particular environment (Figs. 23, 24, 25).

-Sharp base with a thin clean sand above, possibly containing thin shale intervals;

-Erosional base with thick, clean sandstone above and in some cases thick interbedded shales;

-Coarsening upward pattern

-thin, possible barrier or offshore bar environment;

-thick, possible deltas;

Three electric log profiles are used to illustrate different depositional environments of the Spiro Sandstone located in the study area. The log curves used include gamma ray, deep induction, and conductivity curves. The Channel Sand log signature does not have a gamma ray and an S.P. was used instead.

The log profile of the Spiro Sheet Sand is marked by a sharp base with a thin clean sand and sharp top. The Arkansas Louisiana Gas #1 White is an example of a log signature from the sheet sand (Fig. 23). Thin discontinuous shale interbeds are present in some wells.

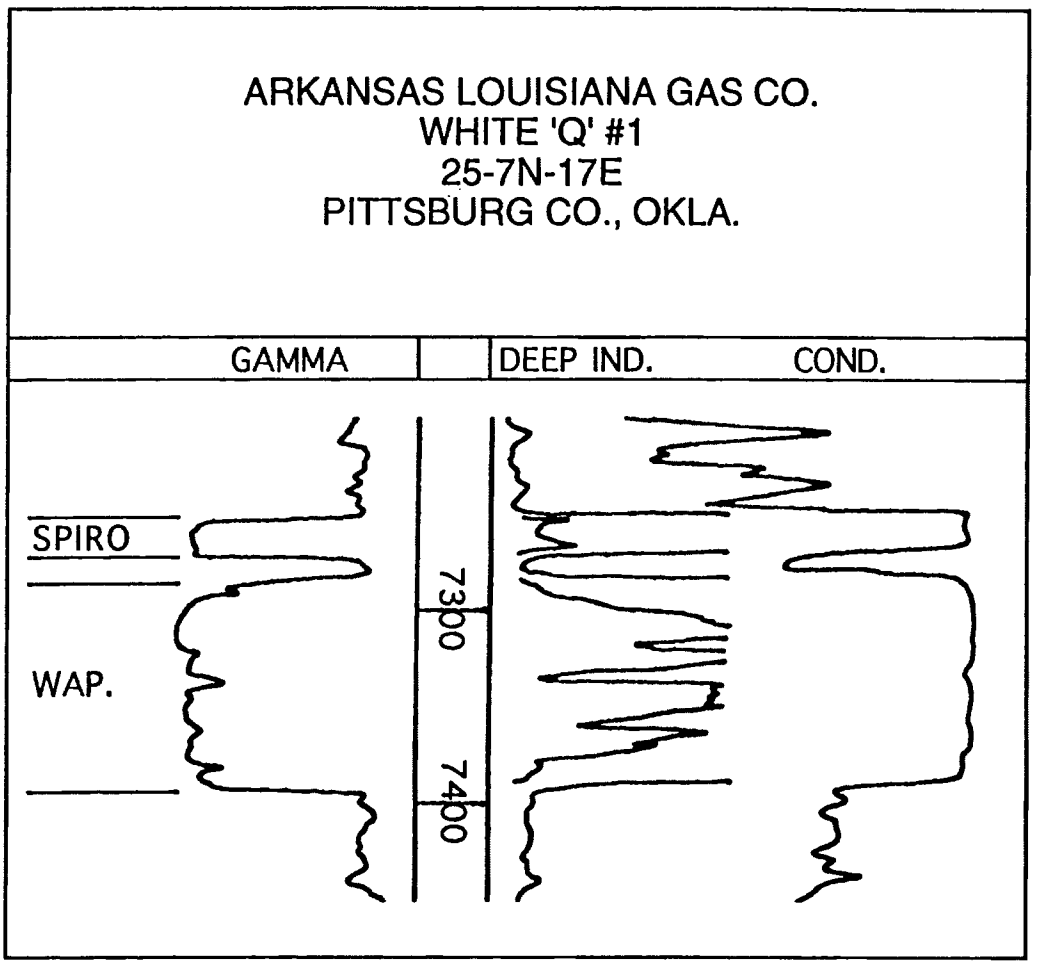


Figure 23. Wireline Log Profile of the Spiro Sheet Sand.

The log profile from the channel zone is marked by a sharp base and sharp top. Sand thickness in the channel zones are considerably greater than in the sheet sand zones. This relationship is seen in the Pan Am #1 Krisher (Fig. 24). Interbedded shales are more abundant than in the sheet sand.

The log profile from the delta facies is marked by a coarsening upward pattern. Some wells have a sharp base as well. The Amoco #2 Lyons is an example of a log signature from the delta facies (Fig. 25). Multiple shale interbeds are seen in some wells.

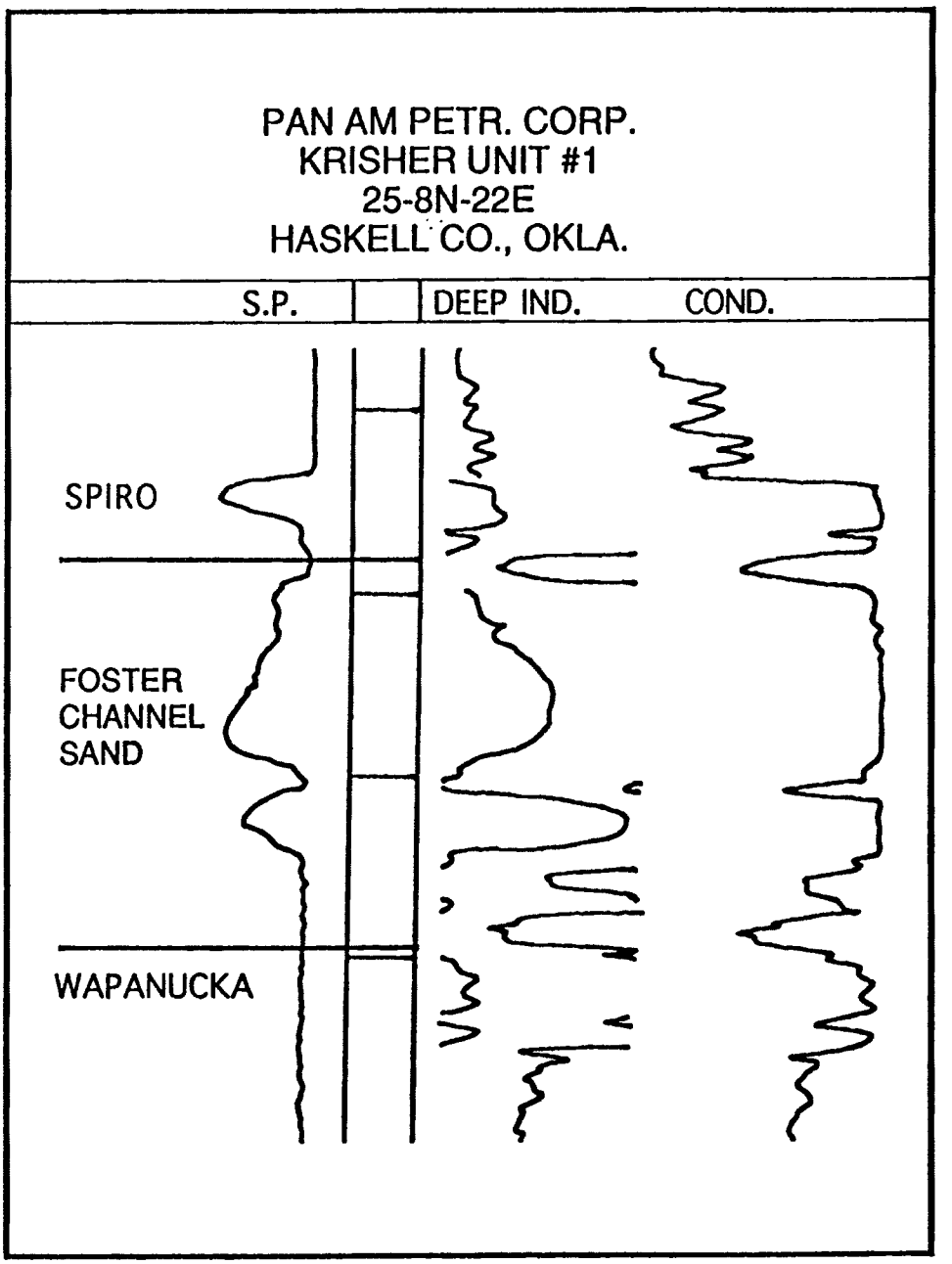


Figure 24. Electric Log Profile of the Spiro Channel Sand.

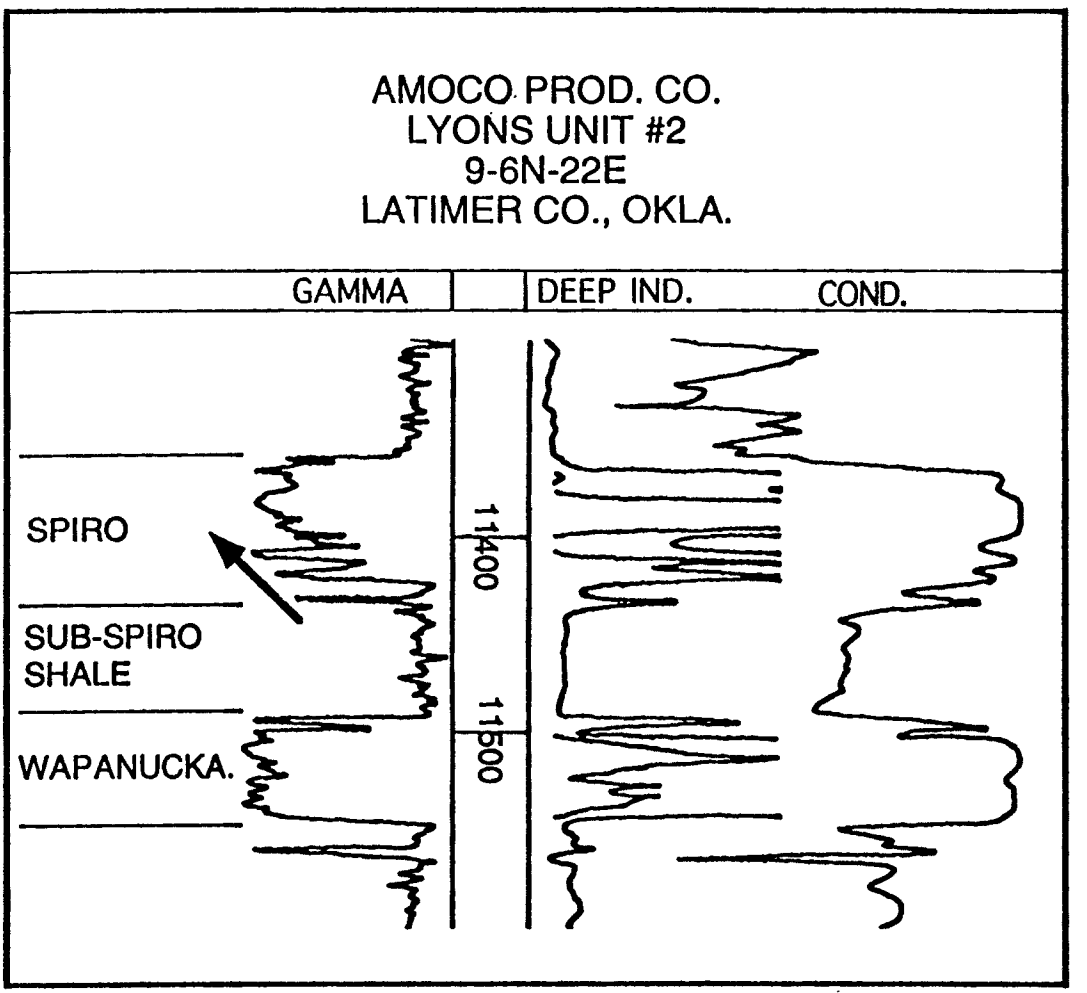


Figure 25. Wireline Log Profile of the Delta Facies.

CHAPTER VI

SEDIMENTOLOGY OF THE SPIRO SANDSTONE

Introduction

Twenty four cores were examined and described to aid in the environmental interpretation (Fig. 3). Most of the cores were obtained from the Red Oak-Norris field area. The cores contained both marine and fluvial features. Several cores were not complete regarding the Spiro interval and had one or more missing intervals. Six cores will be described in the text. They are complete cores and/or cores that contain sedimentary structures which are important for the environmental interpretation.

Five outcrops were measured and described to complement the core descriptions. The locations of the outcrops are shown in Figure 4. The outcrops examined originally were deposited basinward of the subsurface Spiro studied. Grayson and Hinde (1993) restored the thrust sheets with seismic evidence and concluded that there was 18 miles of shortening in the Wilburton and Red-Oak region. This estimate did not take into account the amount of Spiro Sandstone missing due to erosion. These outcrops were described to provide a basinward look at the Spiro and help aid in the environmental interpretation.

Description of Cores

Pan American Petroleum Corp. #1 Reusch

The Pan American #1 Reusch is located in NW/4 Sec. 3 T. 5 N., R. 19 E., in the Wilburton Field, Latimer County. The cored interval is at a depth of 11,554 feet to 11,467 feet. The Reusch is one of the better cores examined.

The Spiro and sub-Spiro Shale are present in this core, whereas the Wapanucka is not (Appendix B).

The Sub-Spiro Shale is a laminated, black, fissile shale. Burrows and thin sand lenses are seen at 11,520 foot core depth. The burrowing and sand content increase upward, with the burrowing being quite extensive at 11,509.5 to 11,505.5 feet. The contact between the sub-Spiro shale and the Spiro Sandstone is gradational over approximately six inches. There is no erosional surface associated with the boundary of the Spiro Sandstone and sub-Spiro shale.

The Spiro Sandstone consists of a tan, fossiliferous, fine- to medium-grained, sandstone with carbonate and silica cement. Chamosite is present in the core as grain coatings. These coatings have aided in the preservation of primary porosity. Where chamosite coatings are absent cementation has occluded porosity (Fig.26). Medium-scale trough cross bedding is the dominant sedimentary structure.

Midwest Oil Corp. #1 White

The Midwest #1 White is located in the E/2, SE/4, Section 18 T. 6 N., R. 21 E., in the Red Oak field, Latimer County. The cored interval is at a depth of 11,746 to 11,645 feet. The core is in fair condition with some missing intervals. The Spiro is the only unit present in this core (Appendix B).

The interval from 11,677 to 11,668 is calcite cemented. Fossil debris, composed of crinoid ossicles, are located in several intervals in the core. The main abundance of fossil debris is from 12,742 to 12,734 feet. Several zones of bi-directional cross bedding are noted within the cored interval. The zone from 11,663 to 11,661 contains interbedded shales and sandstones. Two thin shale zones are located at 11,657 and at 11,653. The shales are black and contain carbonized plant debris, mostly small pieces of stems.

The Spiro is a very fine- to fine-grained, silica cemented, well sorted sandstone. Chamosite is present as deformed grains and as grain coatings.

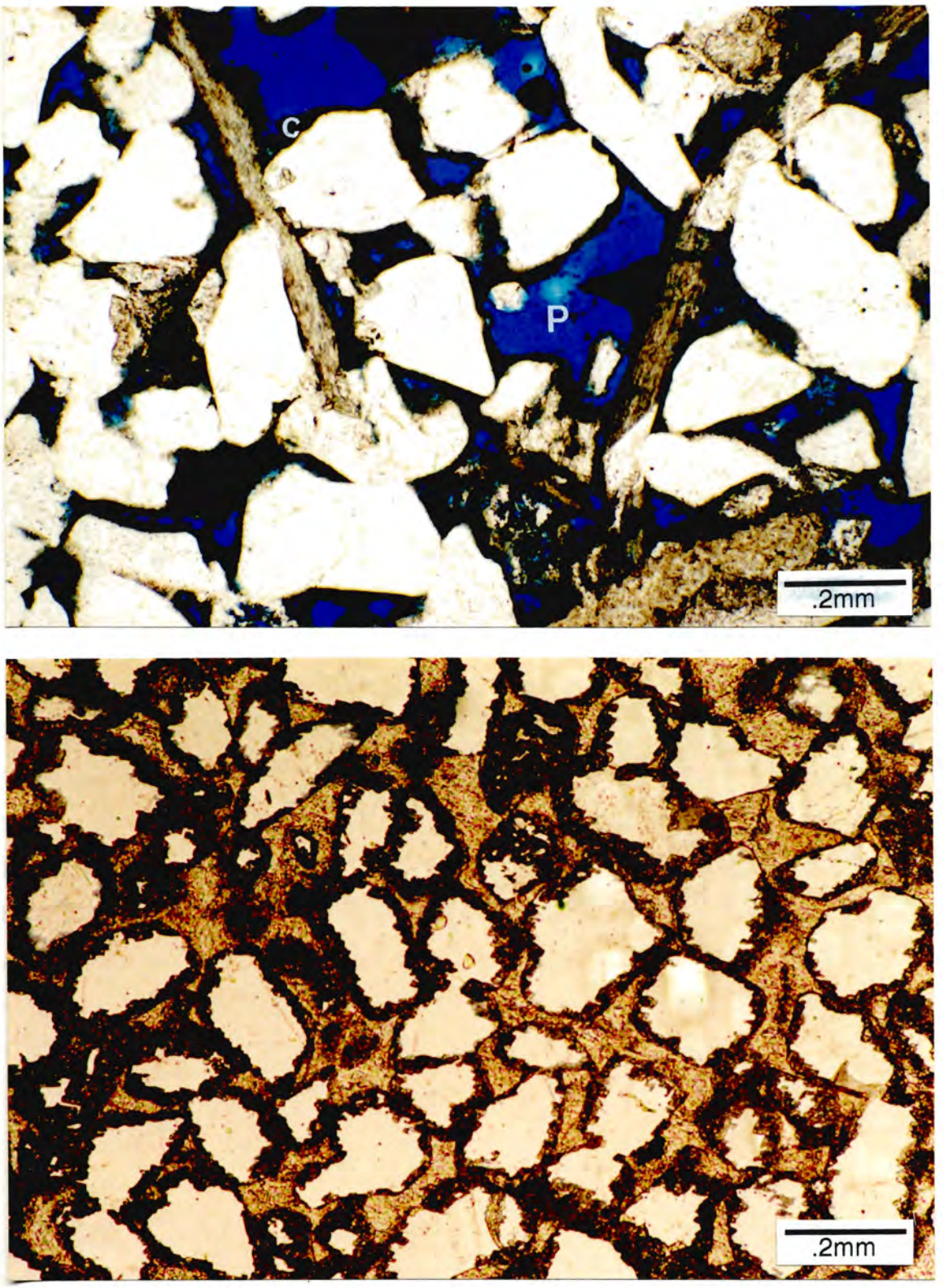


Figure 26. Upper Photo: Chamosite Clay Coatings (C) have Preserved Primary Porosity (P), Lower Photo: Chamosite Clay is Absent, Porosity is Destroyed Due to Carbonate Cement.

The chamosite has aided in the preservation of primary porosity. In the absence of chamosite coatings quartz overgrowths have destroyed the porosity (Fig.27).

Midwest Oil Corp. #1 Booth

The Midwest #1 Booth is located in the NE/4, NW/4, SE/4, Section 15 T.6 N., R. 21 E., Red Oak field, Latimer County. The cored interval is from 12,130 to 12,064 feet. The core is in good condition. The Spiro Sandstone and sub-Spiro Shale are present in this core, whereas the Wapanucka Limestone is not present (Appendix B).

The base of the core to 12,126.5 is a black fissile shale containing carbonized plant debris. Burrowing and groove marks were observed in the basal shale. The interval of core containing the contact between the shale and Spiro is missing. Whether the contact with the shale is transitional or sharp is uncertain.

From 12,107 feet to the contact with the black shale the Spiro is a fine- to medium-grained silica-cemented sandstone. Fossil debris, predominantly crinoid ossicles, is seen in the zone from 12,110 to 12,106 feet. Grain size decreases from a fine- to medium- grained sandstone to a fine-grained sandstone at 12,106 feet and consists of a fine-grained well-sorted sandstone. In the zone from 12,105 to 12,084 feet, calcite cement and silica cement are both present. Calcite cement is absent above 12,084 feet. Chamosite coatings are present in the core and have aided in preserving primary porosity. Chamosite is also found as deformed grains (Fig.28). Burrowing is present in the upper part of the core from 12,093 to 12,066 feet. Small scale bi-directional trough cross bedding was observed at 12,094 and 12,072 feet.

Mustang Production Co. #1-27 Lyons

The Mustang #1-27 Lyons is located in the NE/4, SW/4, SW/4, Section 27 T. 6 N., R. 21 E., Red Oak Field, Latimer County. The cored interval is from 12,256 to 12,223 feet. The condition of the core is excellent. The sub-Spiro

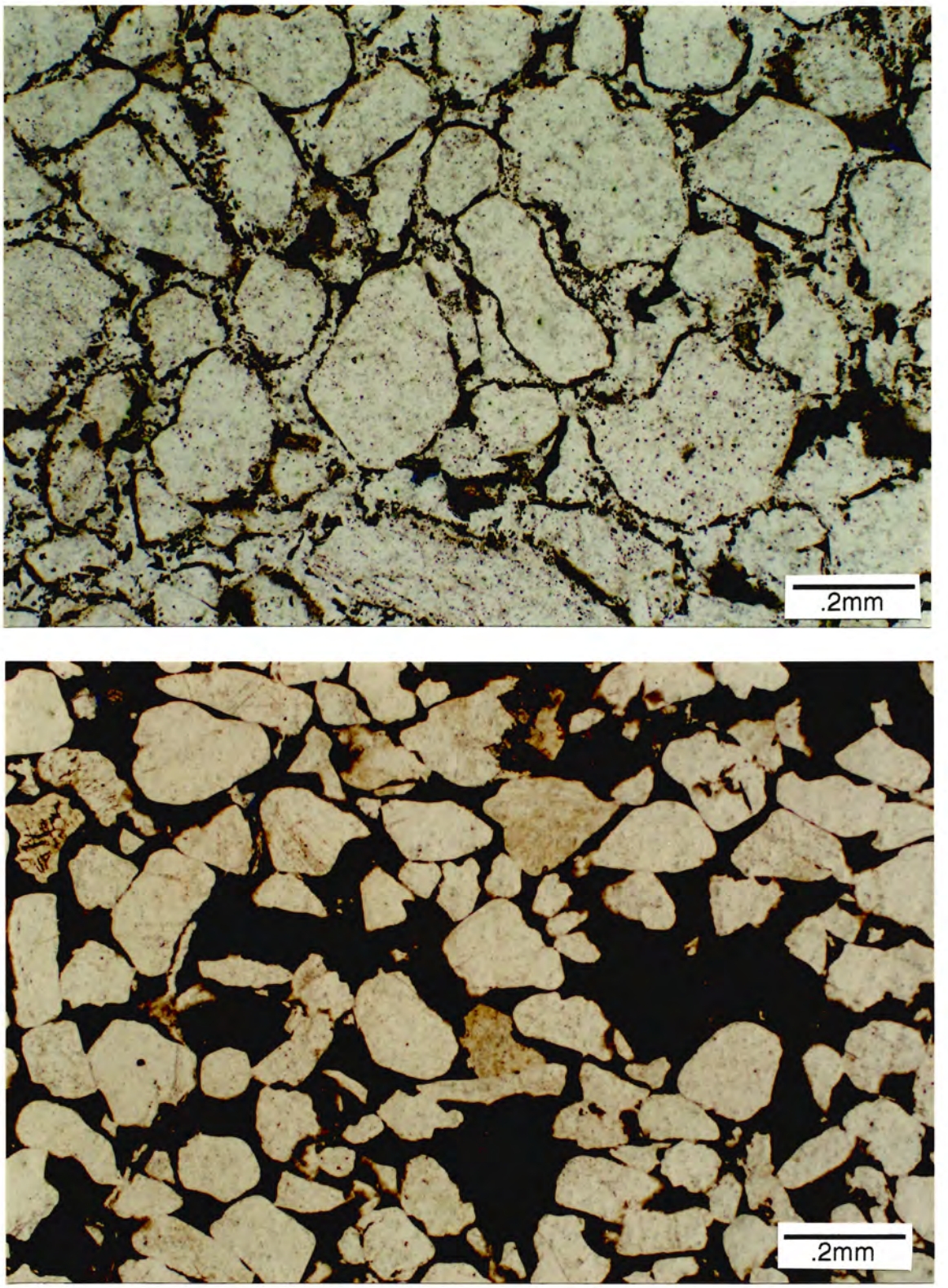


Figure 27. Upper Photo: Porosity is Absent Due to the Lack of Chamosite Coatings. Lower Photo: Chamosite is Present as Deformed Grains and Grain Coatings.

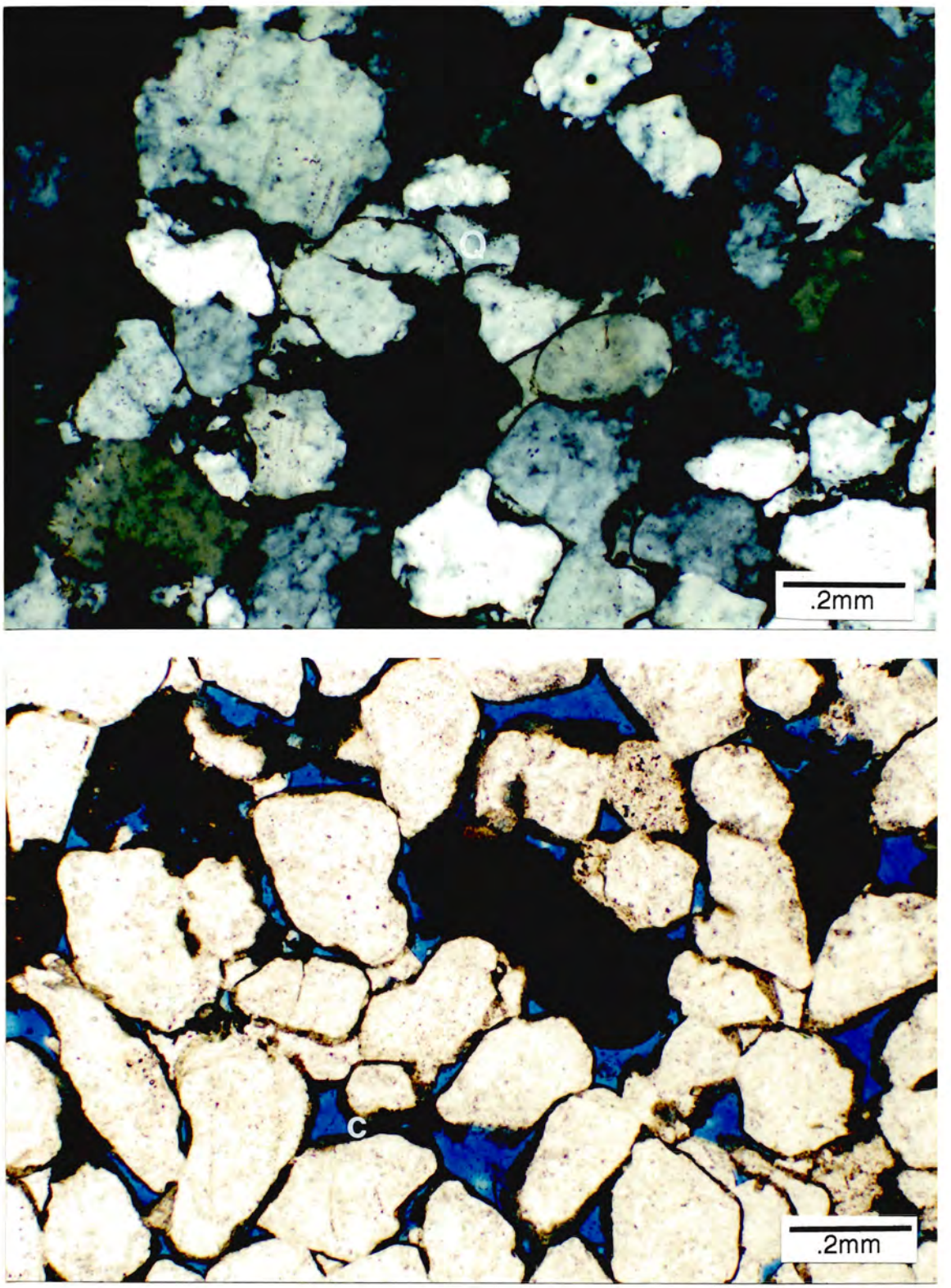


Figure 28. Upper Photo: Quartz Overgrowths (Q) have Occluded Porosity.
Lower Photo: Chamosite Coatings (C) have Preserved Porosity.

Shale and the lower portion of the Spiro Sandstone are present in the core (Appendix B).

The Sub-Spiro Shale is a black, fissile shale with thin sand lenses. The unit is burrowed and this has resulted in a slight mixing of the sand and shale. The contact with the overlying Spiro Sandstone is sharp.

The Spiro is a fine- to medium-grained, silica-cemented, well-sorted sandstone. With an absence of chamosite, quartz overgrowths are abundant in the core (Fig. 29). Medium-scale trough cross bedding is the dominant sedimentary feature.

Midwest Oil Co. #1 Sorrels

The Midwest #1 Sorrels is located in the N/2, S/2, NE/4, Sec. 24 T. 6 N., R. 20 E., Red Oak field, Latimer County. The cored interval is from 13,708 to 13,621 feet. The condition of the core is good. The Spiro and sub-Spiro shale are present, as well as the Wapanucka Limestone (Appendix B).

The Wapanucka is present in the lower part of the core from the base of the core to 13,699 feet. The Wapanucka contains abundant crinoidal debris from 13,705 to 13,702. The abundance of fossil debris decreases upward.

The sub-Spiro shale is a black, laminated shale with a thickness of 2 feet. Plant debris was not observed on the shale bedding planes.

The Spiro forms a sharp contact with the underlying shale and large rounded clay clasts are present at the contact. In the interval from 13,680 to 13,595 the Spiro is a fine- to medium-grained, silica-cemented sandstone. Chamosite coatings are absent and the formation of quartz overgrowths has destroyed porosity (Fig. 30). Soft sediment flowage is present at 13,683 feet.

Humble Oil and Refining Co. #1 Roye

The Humble #1 Roye is located in the SE/4, NE/4, SW/4, Section 29 T. 8 N., R. 21 E., NE Lequire field, Haskell County. The cored interval is from 6,213

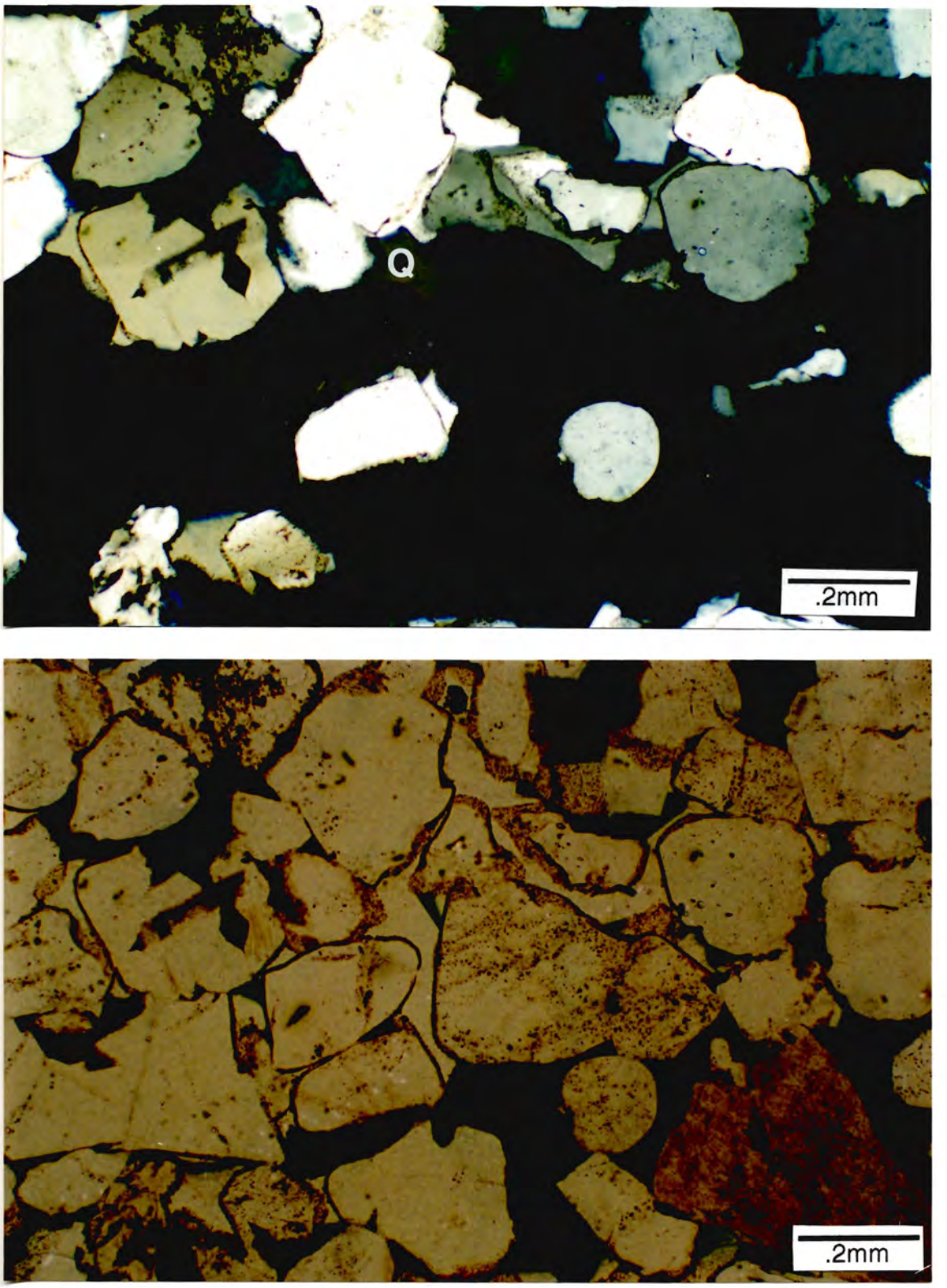


Figure 29. Quartz overgrowths (Q) have Formed from a Lack of Chamosite Coatings. Lower Photo is with Plain Polorized Light.

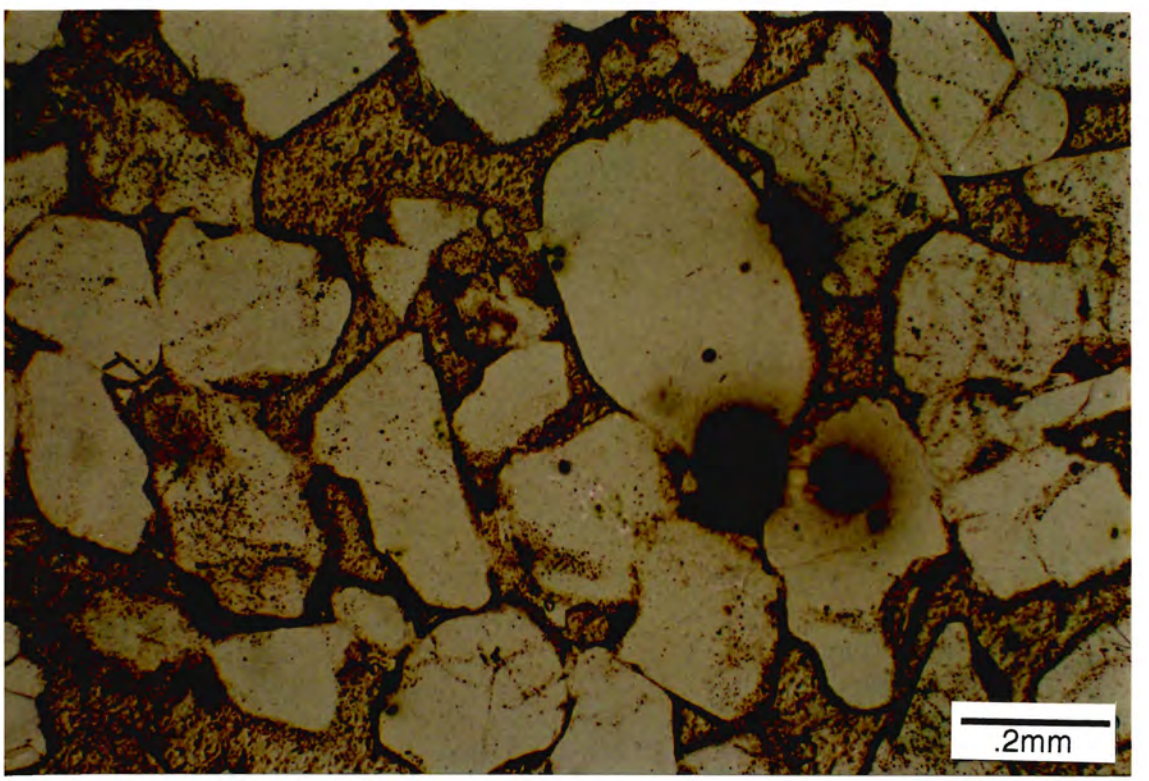


Figure 30. Lack of Chamosite Clay Coatings has Resulted in the Formation of Silica Cement.

to 6,181 feet. The condition of the core is good. This core contains the upper portion of the Wapanucka Limestone, the complete sub-Spiro shale, and the lower part of the Spiro Sandstone (Appendix B).

The Wapanucka interval contains a fossiliferous zone which grades upward into an unfossiliferous micritic mudstone. The contact between the Wapanucka and sub-Spiro Shale is abrupt.

The sub-Spiro Shale is a black, laminated shale with a thickness of seven feet. The contact between the sub-Spiro shale and the Spiro Sandstone is abrupt.

The Spiro is a fine- to medium-grained, silica-cemented sandstone. Chamosite clay is present in the form of coatings and as deformed grains. Where the chamosite exists as coatings, porosity has been preserved (Fig.31). Clay clasts, ranging from pebble to granule size, are present throughout the core. Granular size clay clast are present above the contact with the shale at 6,201 feet. Unidirectional trough cross bedding is the dominant sedimentary feature from 6,201 to 6,196 feet. A large carbonized wood fragment is located at 6,197.4 feet. Pebble-size clay clasts are present at 6,194.6 feet. From 6,194 to 6,184 consist of alternating sands and shales. The sandstones are fine-grained and silica-cemented, with shale clasts present. The contacts with the interbedded shales are abrupt. A shale sequence is present from approximately 6,186 to 6,189 feet. An erosional surface with the shale unit is present at 6,186.

Shell Oil Co. #1-32 Jankowsky

The Shell #1 Jankowsky well is located in the NW/4, Section 32 T. 7 N., R. 20 E., Kinta Field, Latimer County. The cored interval is from 9,760 to 9,852 feet. The condition of the core is good. The Spiro Sandstone is the only unit present in the core (Appendix B).

The Spiro in this core shows greater vertical variation in grain size and sedimentary structures than with the other cores examined. The Spiro ranges from coarse sandstone at the base to fine sandstone at the top. Chamosite

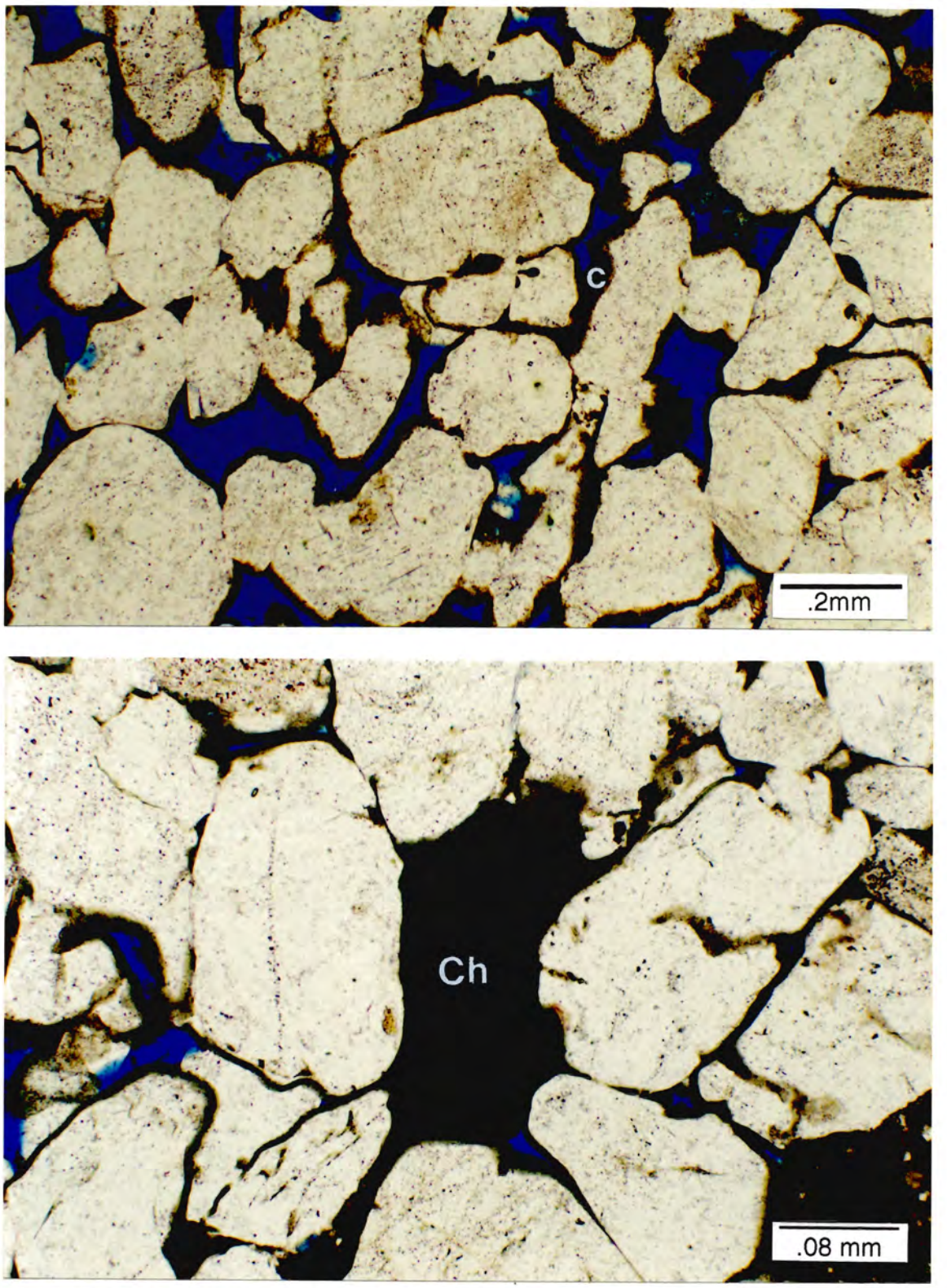


Figure 31. Upper Photo: Chamosite Clay Coatings (C) have Preserved Primary Porosity. Lower Photo: Chamosite is Present as a Deformed Grain (Ch) and as grain coatings.

grain coatings have prevented the formation of quartz overgrowths and have preserved the porosity. Where the chamosite is absent quartz overgrowths are abundant (Fig. 32). The main sedimentary structure is flowage and is present in several intervals. Two intervals from 9,835 to 9,833 feet and 9,807 to 9,806 feet contain the best-defined flowage. The core contains several fining upward sequences. The Spiro in the zone from 9,887 to 9,880 is a fine- to coarse-grained, silica-cemented, poorly-sorted sandstone.

Description of Outcrops

Bandy Creek Anticline

The Spiro Sandstone is exposed in a bar ditch on the west side of State Highway 2 south of Wilburton (Fig.33). The exposure begins in Bandy Creek and is present northward along the ditch. The dip of the Spiro is 34° south 3° west. The condition of the outcrop is poor due to extensive weathering and the limited lateral exposure of the Spiro. Loose sediment has been deposited in the ditch and further masks the in-place Spiro. The Spiro here has been divided into two basic units (Fig.34).

The lower unit (A) is 13 feet thick and the upper unit is 31 feet thick. The lower unit is a massive, light brown, medium-grained sandstone with faint cross bedding. Soft sediment deformation structures are seen at the top of the massive unit.

The Spiro in the upper unit (B) is a friable fine- to medium-grained brick red sandstone with thin zones of resistant sand containing small to medium scale cross bedding.

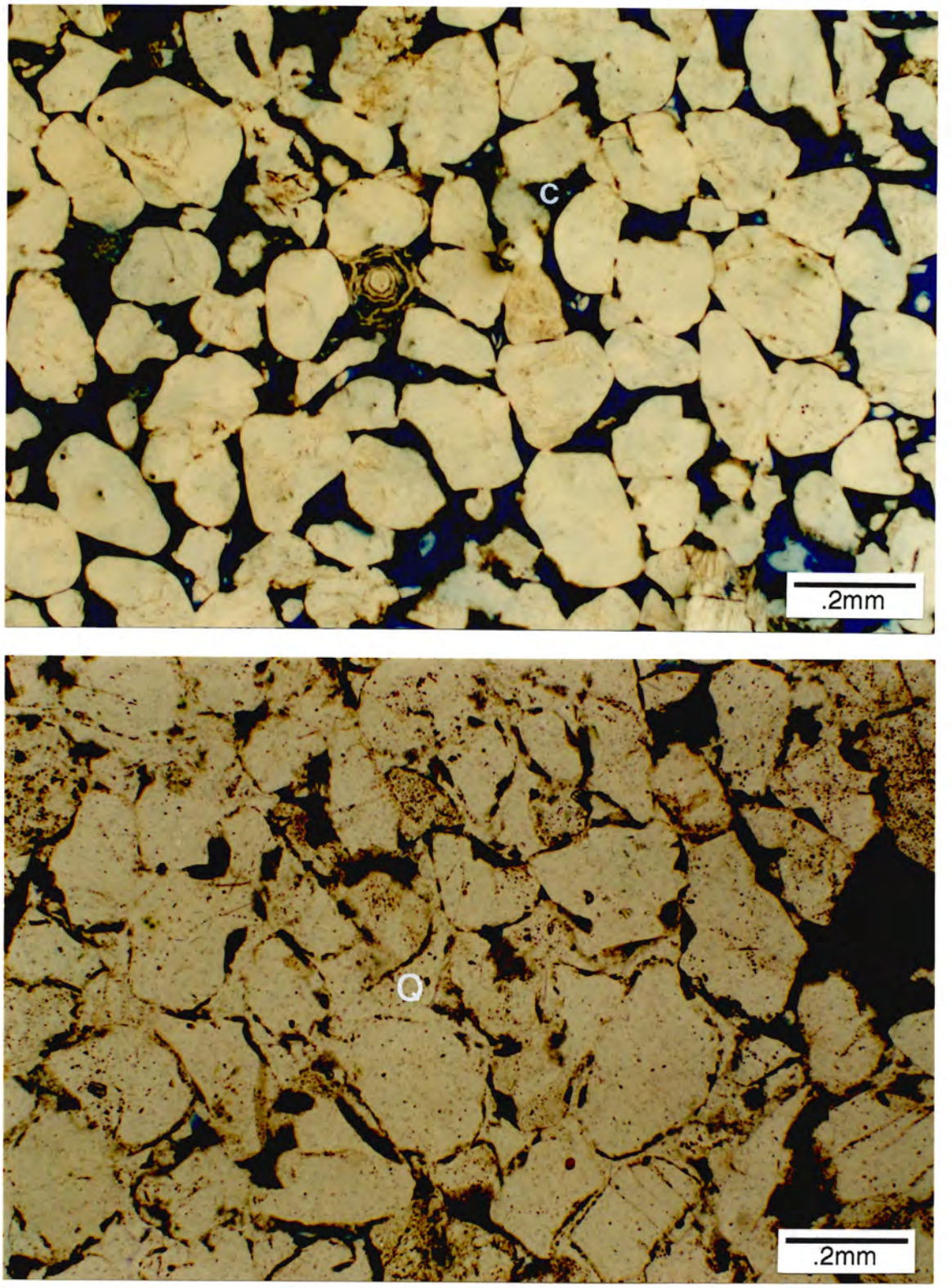


Figure 32. Upper Photo: Chamosite Clay Coatings (C) have Preserved Primary Porosity and Prevented the Formation of Quartz Overgrowths. Lower Photo: Chamosite is Absent and Quartz Overgrowths (Q) have Occluded Porosity.

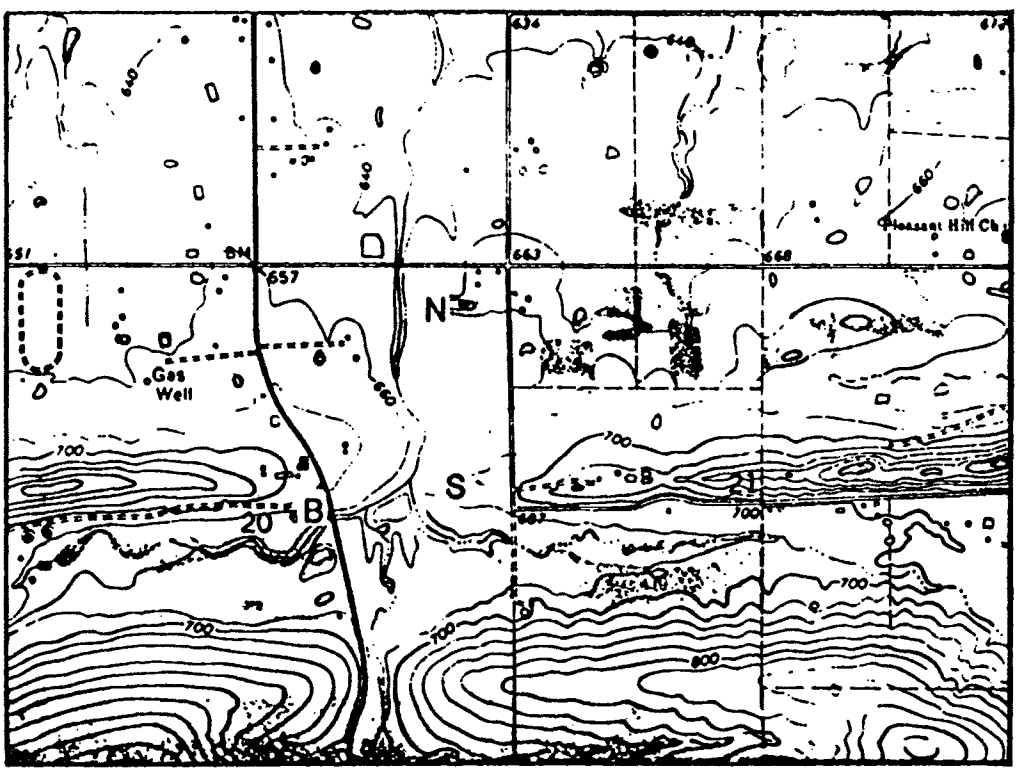


Figure 33. Location of Bandy Creek (B), Golf Course South (S), And Golf Course North (N) Outcrops.

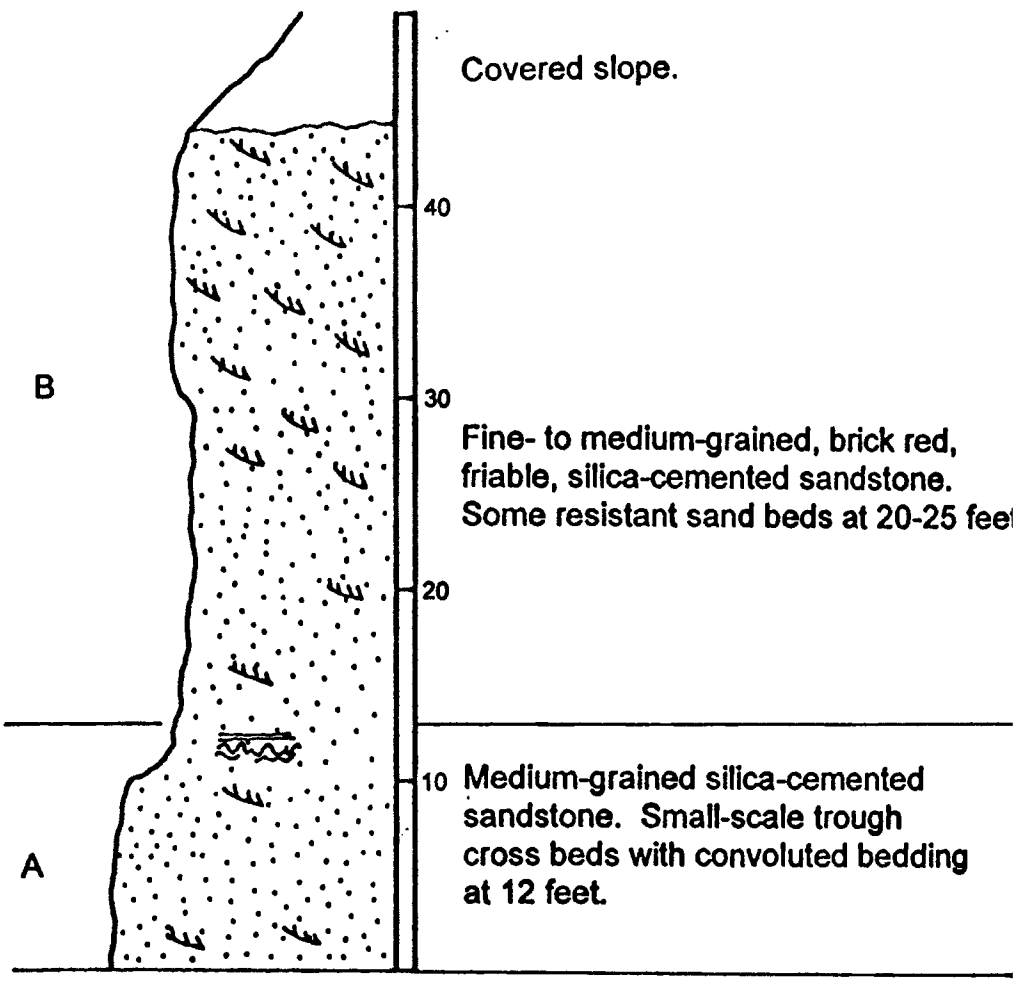


Figure 34. Vertical Profile of the Bandy Creek Anticline Outcrop.

Wilburton Golf Course South

The Spiro is exposed west of the club house on the Wilburton golf course (Fig.33). The Spiro dips at 31° south 7° east. The lateral extent of the Spiro is good but the vertical interval is limited to less than 15 feet (Fig. 35).

The Spiro in outcrop is massive, light tan, fine- grained, silica-cemented sandstone. Ripples and small- to medium-sized trough cross beds were observed throughout the interval. Symmetrical ripples were noted on the top of individual bedding planes near the top of the outcrop.

Wilburton Golf Course North

The Spiro is exposed on the north side of the Wilburton golf course (Fig. 33). The Spiro dips at 53° south 5° east. The exposure of the Spiro is good and the outcrop has been divided into three units (Fig. 36). The measured thickness of the outcrop is 50 feet.

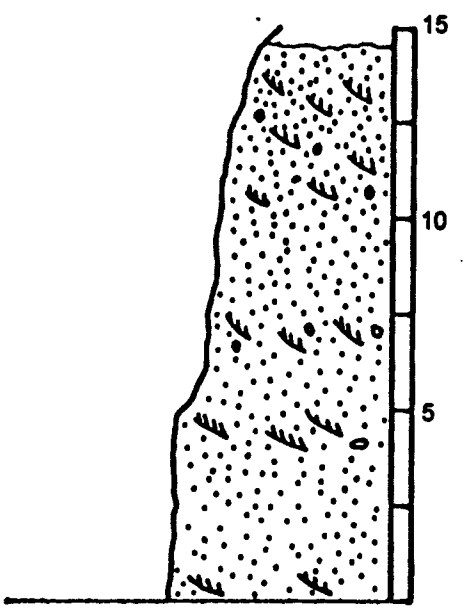
The lower unit (A) is a 14 foot thick, massive, fine-grained, well-sorted sandstone, with a basal calcareous, crinoid-bearing unit. Small-scale troughs are present throughout the basal unit.

The middle unit (B) is 14 feet thick and has weathered back and is covered with rubble. There is a crinoidal hash layer at the base of the middle unit. Nine feet above the base of unit B is a layer of mud pebble rip-ups.

The upper unit (C) is a massive, medium-grained, silica-cemented, moderately-sorted sandstone. Small scale trough cross bedding is present in the upper part. The top of the unit is a fine-grained, moderately-sorted, silica-cemented sandstone with symmetrical ripples.

Buzzard Gap

Buzzard Gap is located 4.25 miles east of the Wilburton golf course (Fig. 37). The Spiro dips at 68° south 6° west. The Spiro is 136 feet thick and is



Massive, fine- to medium-grained, silica-cemented sandstone. Small-scale trough cross bedding. Weathered clay clast and possible fossil molds. Ripples are present on top of bedding planes.

Figure 35. Vertical Profile of the Golf Course South Outcrop.

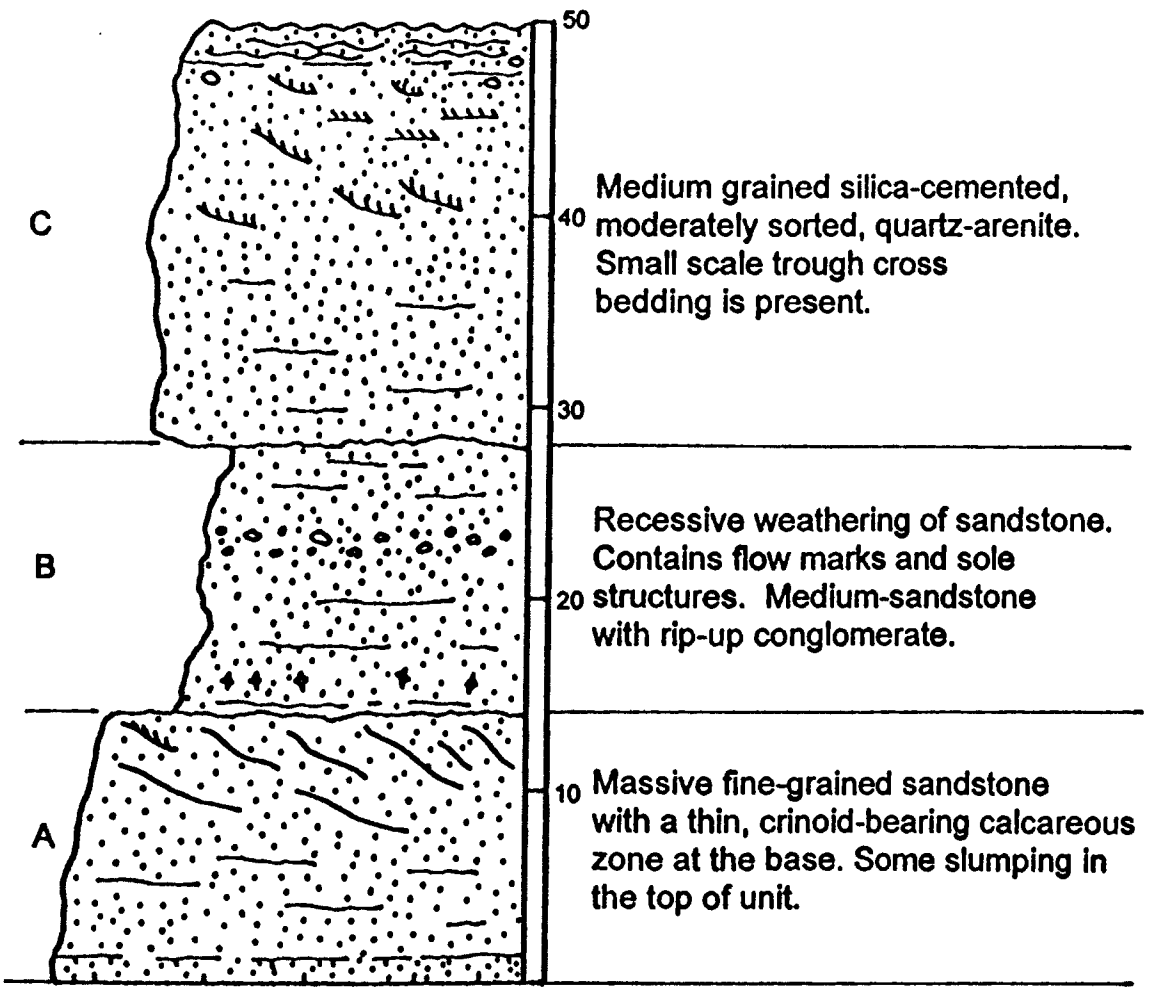


Figure 36. Vertical Profile of the Golf Course North Outcrop.

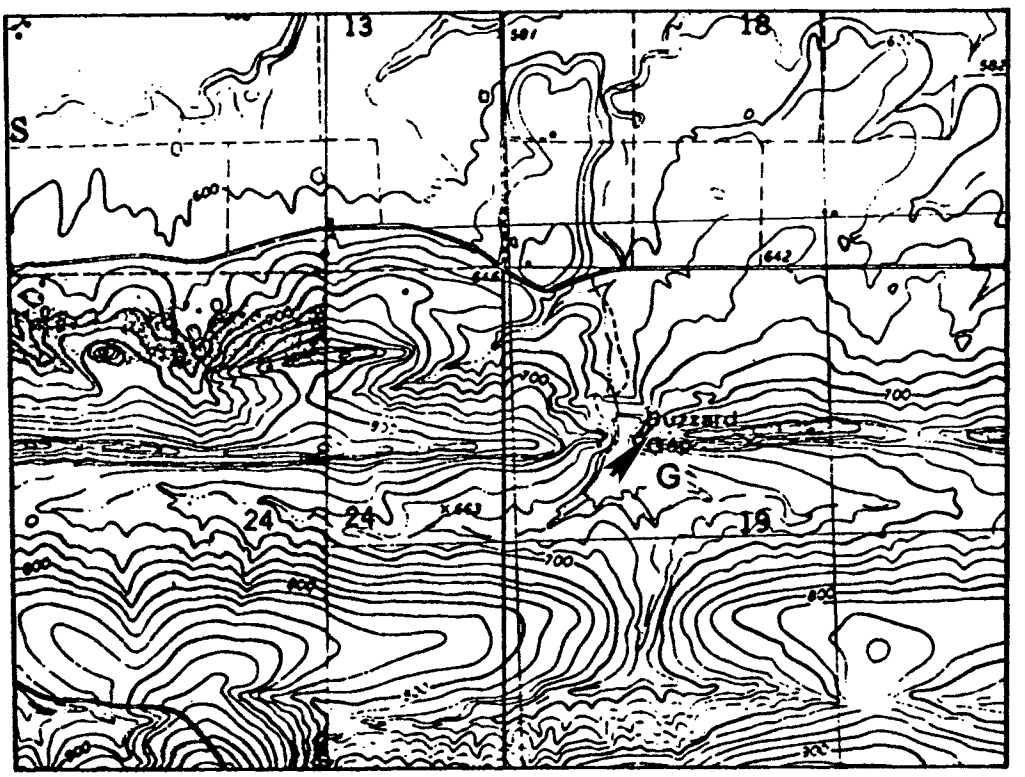


Figure 37. Location Map for Buzzard Gap Outcrop.

divided into four basic units (Fig. 38). The condition of the outcrop is good, however the base and top of the Spiro cannot be seen.

The basal portion unit (A) is 36 feet thick and is covered with rubble, but has two thin resistant beds exposed.

Unit (B) is 32 feet thick and is consists of a massive, fine-grained, silica cemented, well-sorted, reddish sandstone. Large-scale troughs are the dominant sedimentary feature. In the upper part of unit B cavities in the sandstone are possibly due to the weathering of rip-up clasts.

Unit (C) is 24 feet thick and consist of a fine to medium-grained, silica-cemented sandstone. The sandstone is poorly cemented and has weathered back to form a rubble covered slope.

Unit (D) is 10 feet thick and consists of a thick, massive unit overlain by two resistive units. The basal contact of the upper unit contains flute casts. The unit is a fine to medium-grained, silica cemented sandstone with some thick hematite bands. Small scale trough cross beds were observed.

Pigeon Creek Anticline

The Pigeon Creek outcrop is located on the west side of State Highway 82 south of Red Oak (Fig. 39). The Spiro is in an overturned anticline with a dip of 79° south 15° east. The outcrop is 200 feet thick and is divided into 6 units, labeled A through F (Fig.40). The exposure is very good.

Unit A is 55 feet thick and consists of a thick sequence of very fine- to fine-grained siltstones. Within this sequence thin beds of more resistant siltstones are seen. Burrowing was noted in the lower part of the unit with an increase in burrows in the upper most ten feet.

Unit B consists of nine feet of shale which is reddish at the base and grades upward to a black shale near the top. The contact of unit B with A is sharp.

Unit C has a sharp contact with unit B and is composed of a massive very fine- to fine-grained, silica-cemented sandstone. Unit C is 68 feet thick. The

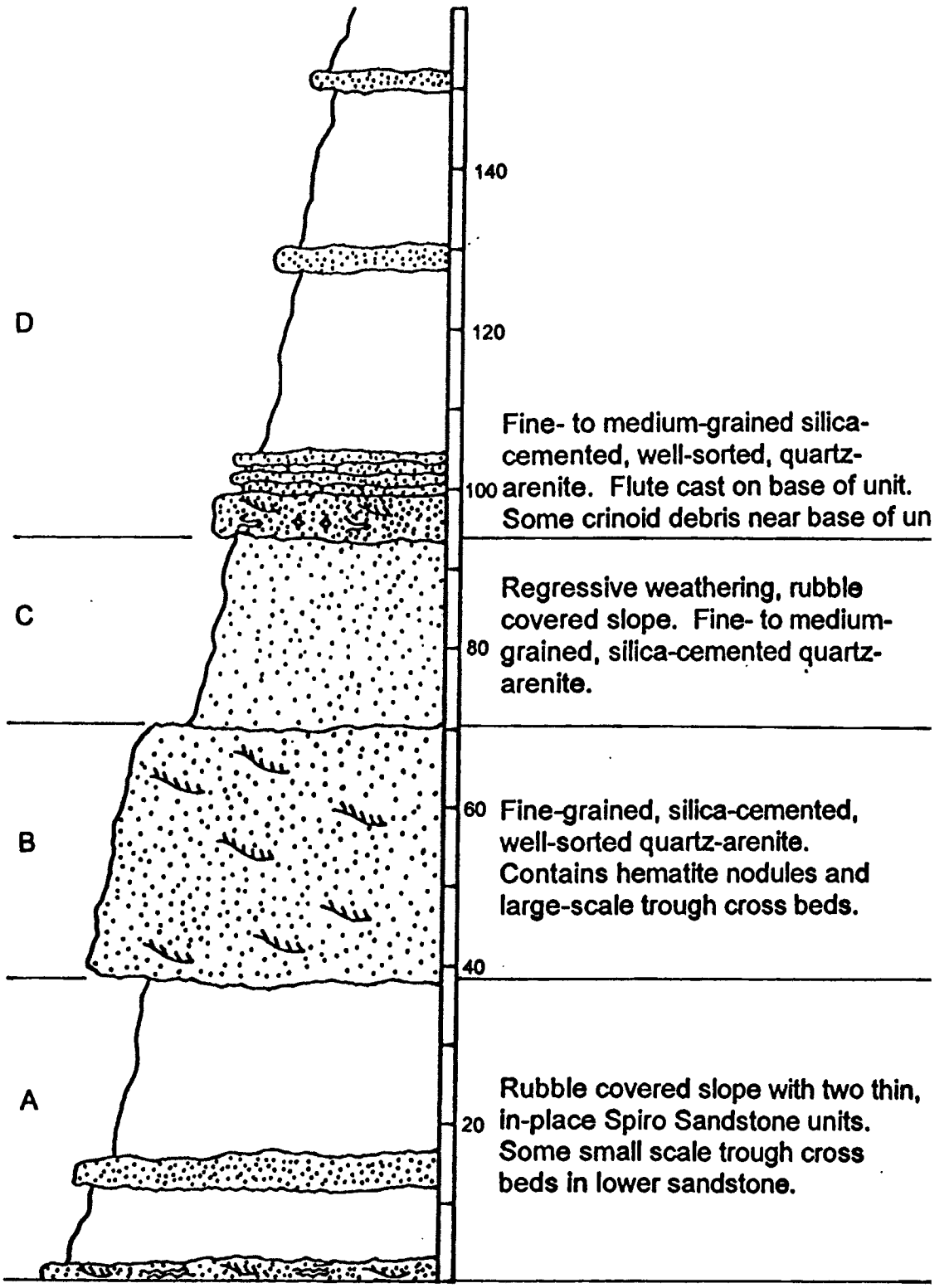


Figure 38. Vertical Profile of the Buzzard Gap Outcrop.

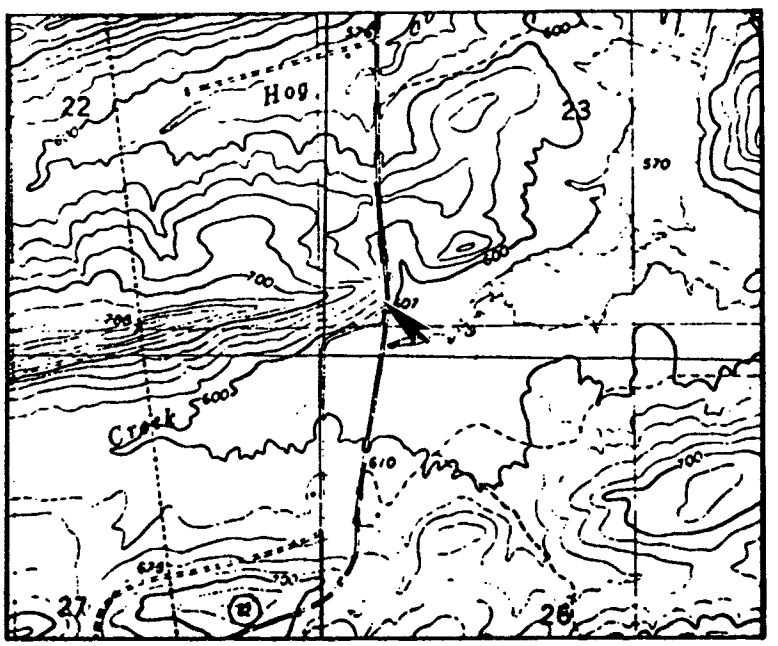


Figure 39. Location of the Pigeon Creek Anticline Outcrop.

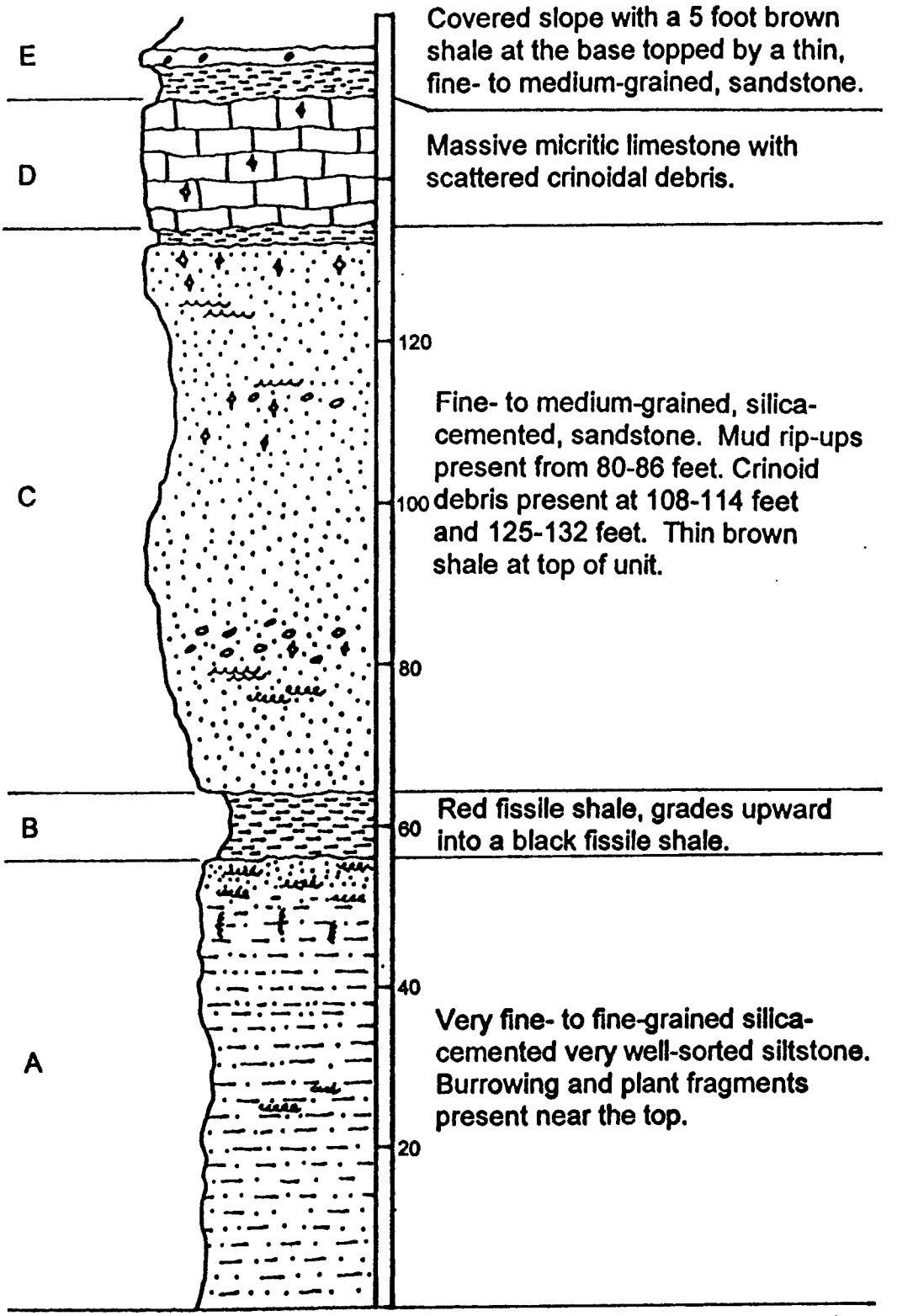


Figure 40. Vertical Profile of the Pigeon Creek Anticline Outcrop.

lower six feet contains burrows and ripples. Burrowing is again present 15 feet above the base of unit C. A zone of mud rip-ups occurs 17 feet above the base and is approximately 3 feet thick. The top of unit C is marked by an eight foot thick crinoid bearing sandstone overlain by a two foot thick brown shale.

Unit D is a 16 foot thick limestone unit. The base of the unit contains an abundance of crinoidal debris with the abundance of grains decreasing upward.

Unit E is 43 feet thick, with most of the interval being covered. The base of the unit is marked by a five foot thick, light brown, fissile shale. Overlying the shale is a thin sandstone bed consisting of fine to medium grained crossbedded sandstone containing clay clasts. The rest of unit E is covered except for a thin sand unit eight feet from the top.

CHAPTER VII

PALEOENVIRONMENTAL ANALYSIS

Introduction

The Spiro Sandstone was deposited on the stable Arkoma Shelf and unconformably overlies the Wapanucka Limestone and Sub-Spiro Shale. The Spiro has been interpreted as being a shallow marine sand by most workers who have dealt with the regional stratigraphy of the unit (Hooker, 1983; Grayson and Hinde, 1993; Sutherland, 1988; Carlson, 1987; Lumsden, et. al., 1971).

The Spiro has been given several different interpretations regarding depositional models applicable to the unit. Hinde (1992), and Grayson and Hinde (1993), interpreted the Spiro as being shallow marine sand bars based on surface exposures (Fig. 11 pg.19). Their evidence was the upward coarsening pattern in the Spiro and the predominance of strike oriented sand bodies. Fossil content and burrowed sands were additional evidence. Lumsden et. al. (1971), Zackry and Sutherland (1984), Sutherland (1988) interpreted the Spiro interval as involving an incised channel facies environment and an adjacent shoreline complex. Northward transgression of the sea generated coastal sand complexes and thus formed the sheet sand. Houseknecht (1987) interpreted the Spiro in the Arkoma Basin as fluvial and marine channels with interchannel deposits characteristic of sub-tidal through tidal flat facies. These interpretations were based on the sedimentary structures and petrology of the Spiro Sandstone. Gross et. al. (1995) interpreted the Spiro as consisting of a progradational/ aggradational facies in the lower part of the interval and a retrogradational facies in the upper part of the interval based on work in the southern Arkoma Basin

along the entire length of the thrusted zone. They identified barrier island, tidal channel and deltaic channel mouth bar facies at different locations along the frontal thrust (Fig. 12 pg.20). Their interpretations were based on evidence from cores and stratigraphic cross sections.

Three general environments were interpreted in the course of this research. An incised valley fill facies zone is present in the northcentral and northeastern portion of the area and a second, valley fill complex has been found in the southwestern portion of the area. A delta facies was identified in the southeastern and southcentral portions. This probably represents the coalescence of several wave-dominated delta sand bodies fed by the incised channels during the lowstand phase of deposition. A sheet sand facies having no underlying delta-front or incised channel facies was mapped in the northwestern part of the study area.

Depositional Environments

Spiro Channel Deposits.

Foster channel deposits were observed in the Jones, Thrift, Cummings Estate, Humble Burge, Sorrels, Booth, Roye, Lyons, Jankowsky 1-32, and Jankowsky 1-21 (Fig. 41) cores and were also identified from net sand isolith mapping (Plate III). Accumulations in the channels are characterized in cores by fine- to medium-grained, moderately-sorted sandstones. Unidirectional, small- to medium-scale trough cross bedding and small-scale ripples are the dominant sedimentary features (Figs. 42, 43). Mud rip-up clasts are often associated with the channel deposits and are present in the Booth, Roye, Cummings Estate, Thrift, Jones, and Sorrels (Fig. 44) cores. Plant debris was observed in interbedded shales in the Roye and Booth cores and drag marks are present on the lower surface of a thin sand bed in the interbedded shales in the Roye (Fig. 45). Calcareous fossil fragments are rare in the channel sandstones.

The geometry and thickness of the channels is evident from the net sand isolith mapping. Erosion of the sub-Spiro shale is seen in the shale isopach.

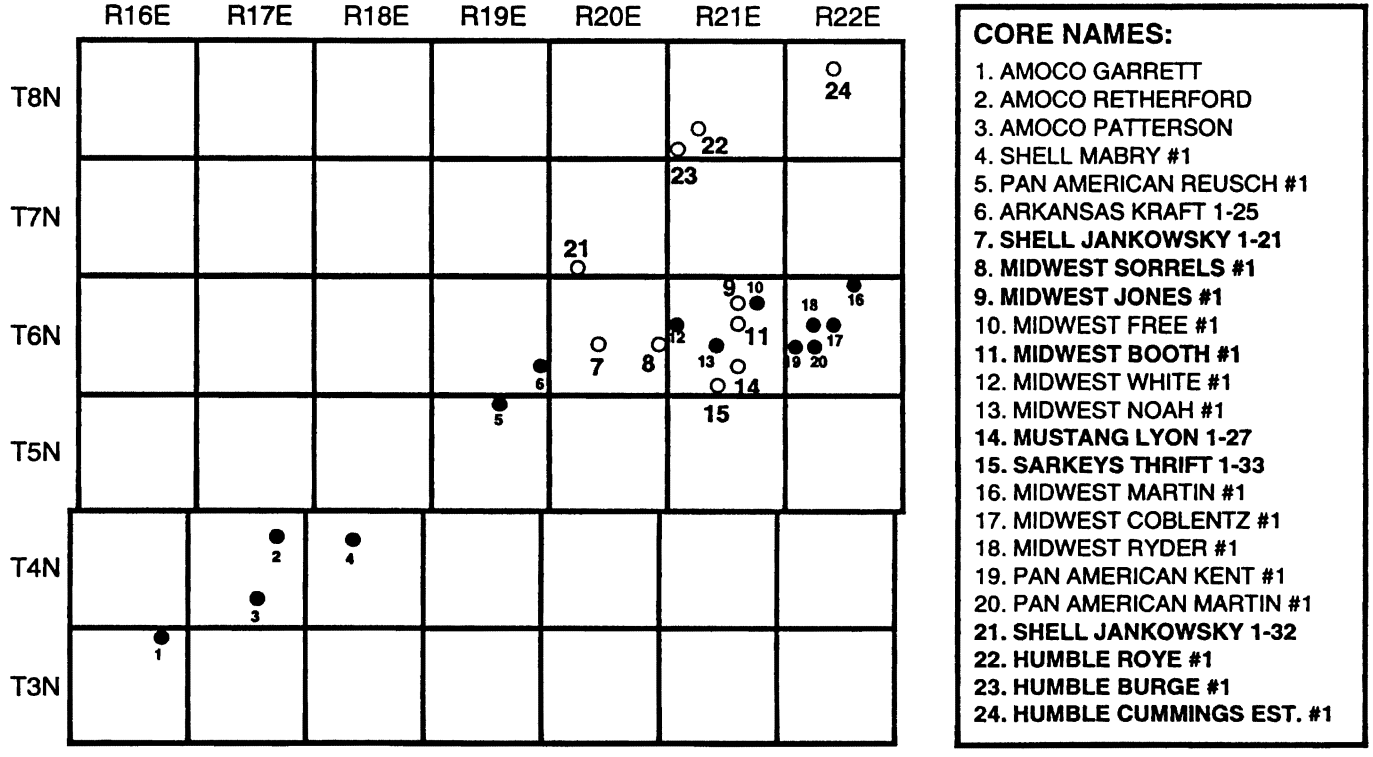


Figure 41. Location of Cores That Exhibit Channel Facies are Indicated With Empty Circles.

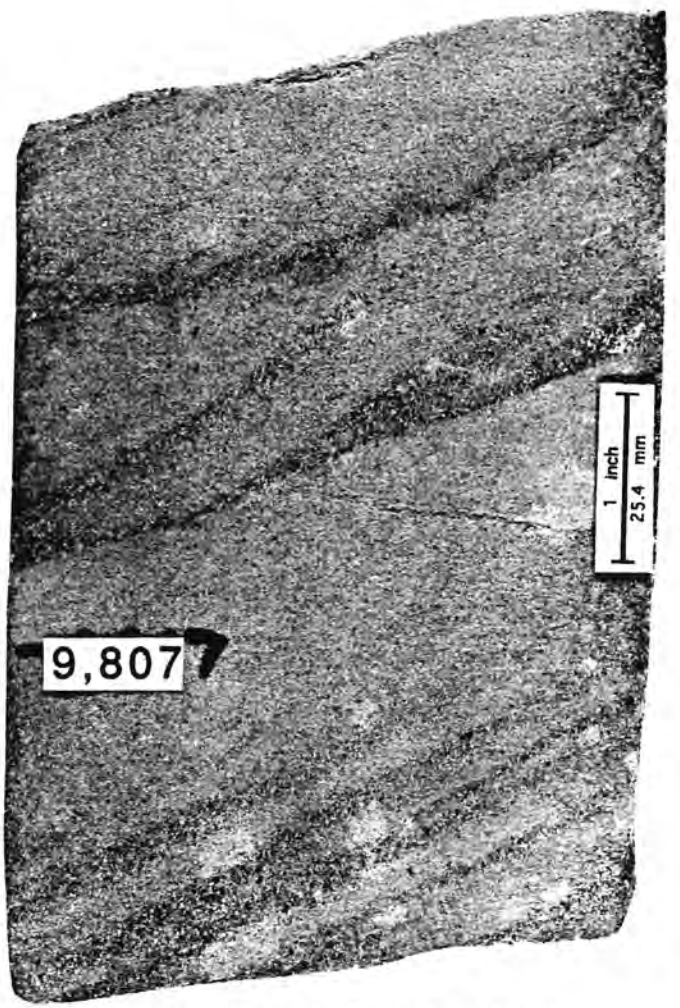


Figure 42. Core Sample from the Shell Jankowsky 1-21 with Medium-scale Cross Bedding Associated with the Channel Facies.

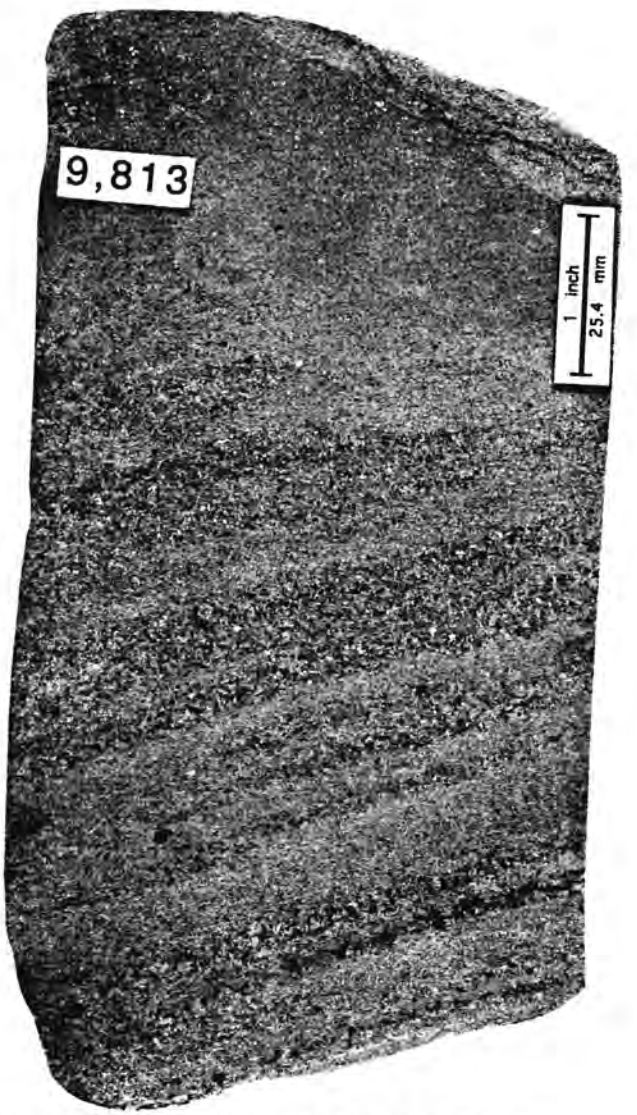


Figure 43. Core Sample from the Shell Jankowsky 1-21 with Medium-scale Cross Bedding Associated with the Channel Facies.

Figure 44. Core Sample from the Humble Roye with Mud Rip-ups Associated with the Channel Facies.

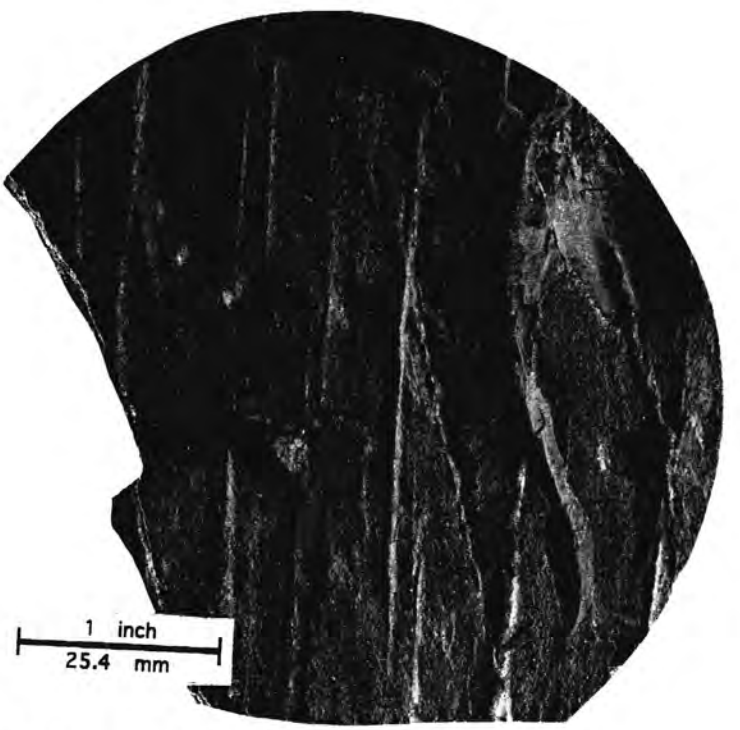


Figure 45. Core Sample from the Humble Roye with Drag Marks Associated with the Channel Facies.

The areas where the sub-Spiro shale is absent coincides with the relative position of the Spiro channels. Log signatures within the channels have an erosional base with the sub-Spiro shale and in some cases cut into or rest directly on top of the Wapanucka Limestone. Channel shape is shown in the stratigraphic cross sections with an abrupt thickening in the Spiro as well as an erosional contact with the sub-Spiro shale.

Spiro Delta Deposits

The Spiro net sand isolith map indicates an elongate sand trend perpendicular to the channel trend and parallel to the paleo-shoreline (Plate III). This sand reached the shoreline by transport through the Foster and western channels during a eustatic lowstand of sea level. This trend is interpreted as a wave dominated delta or series of small wave dominated deltas that coalesced into one undivided sand body.

The delta deposits are characterized in cores by very fine- to fine-grained sandstones containing fossil debris. Primary sedimentary structures include bi-directional cross bedding and burrowing (Figs. 46, 47). Plant debris is present on bedding planes of shales (Fig. 48). Log signatures in the delta deposits vary with both coarsening upward, and blocky signatures seen. Stratigraphic cross sections indicate thickenings associated with the delta deposits.

Spiro Sheet Sand Deposits

The Spiro net sand isolith map indicates a sandstone thickness of between 15-30 feet across the northwestern portion of the study area (Plate III). There are no abrupt thickenings in this area that might indicate channel deposition. Stratigraphic cross-sections show a thin sub-Spiro shale beneath this sheet sandstone with no evidence to point toward erosion associated with incised channels. Stratigraphic cross sections do not show significant thickness variations of the Spiro in the sheet sand zone. Log profiles indicate a very clean, thin sand with a sharp base and top.

Figure 46. Core Sample from the Humble Roye with Bi-directional Cross Bedding Associated with the Delta Facies.

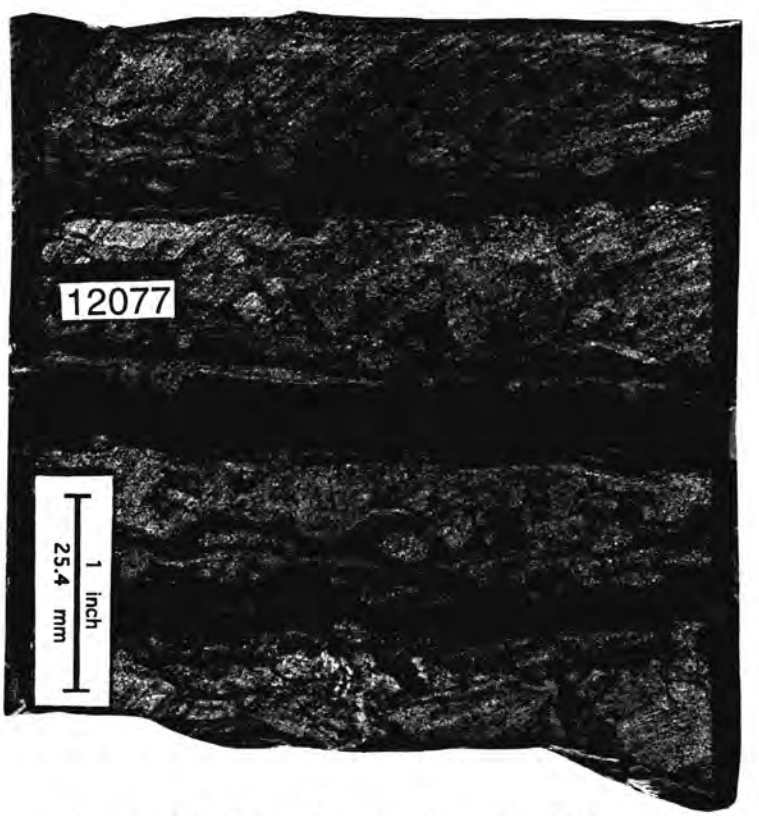


Figure 47. Core Sample from the Midwest Booth Exhibiting Burrowing Associated with the Delta Facies.

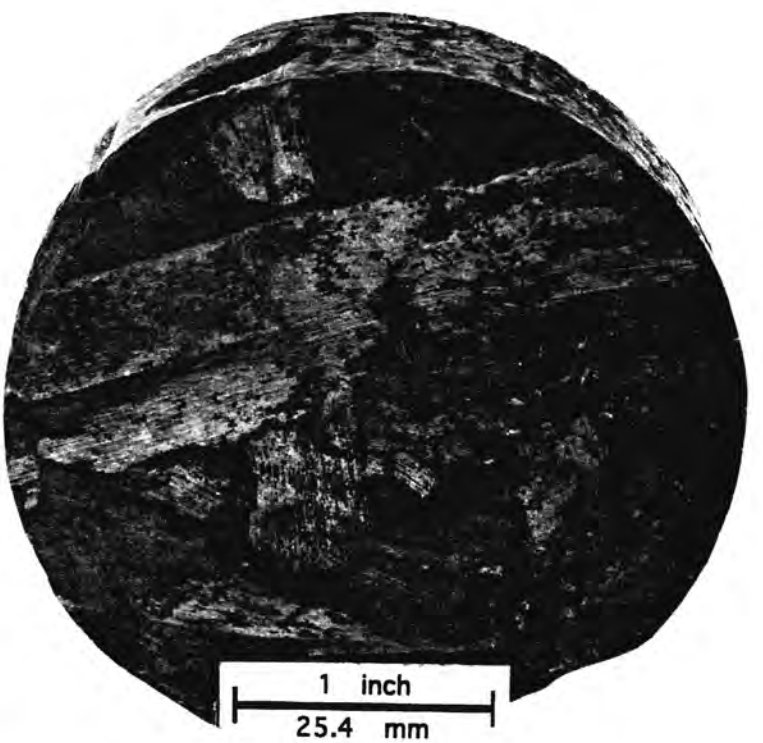


Figure 48. Core Sample from the Midwest White Containing Plant Debris Associated with the Inter-channel Marsh Deposits of the Delta Facies.

Cores from the Spiro sheet sand were unavailable for this study. However, the upper part of cores in the delta facies and channel facies contain proposed representative samples of the sheet sand. These cores are characterized by a very fine- to fine-grained sandstone, with crinoidal debris present as the main carbonate grains.

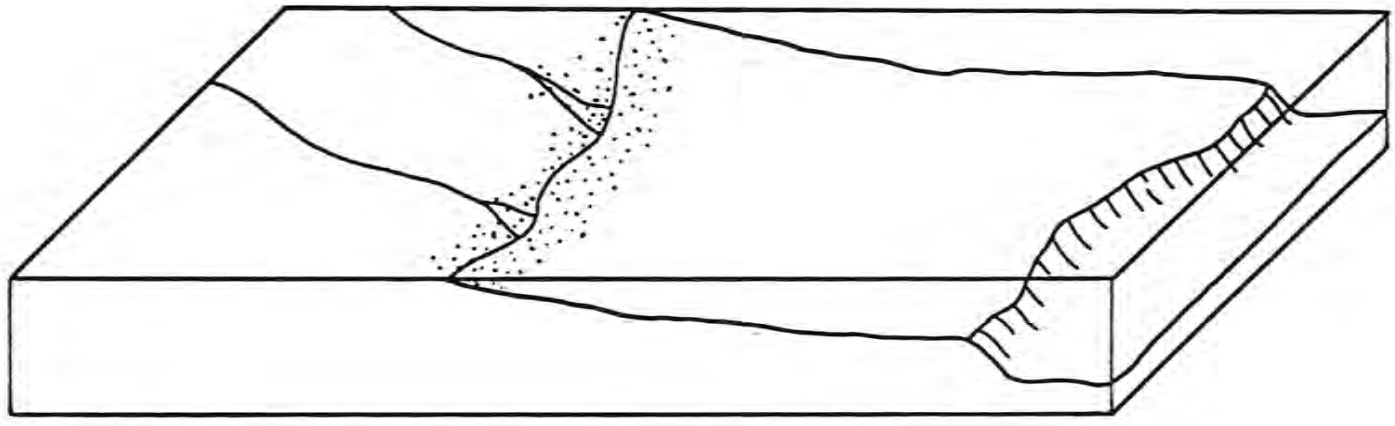
Depositional History

The late Morrowan to earliest Atokan was marked by a southward marine regression. During the lowstand the shelf was exposed, leading to the formation of incised valleys. River channels eroded valleys into the Sub-Spiro Shale and locally into the Wapanucka Limestone (Fig. 49). The incised valleys provided a conduit for the transport of sediments out onto the shelf.

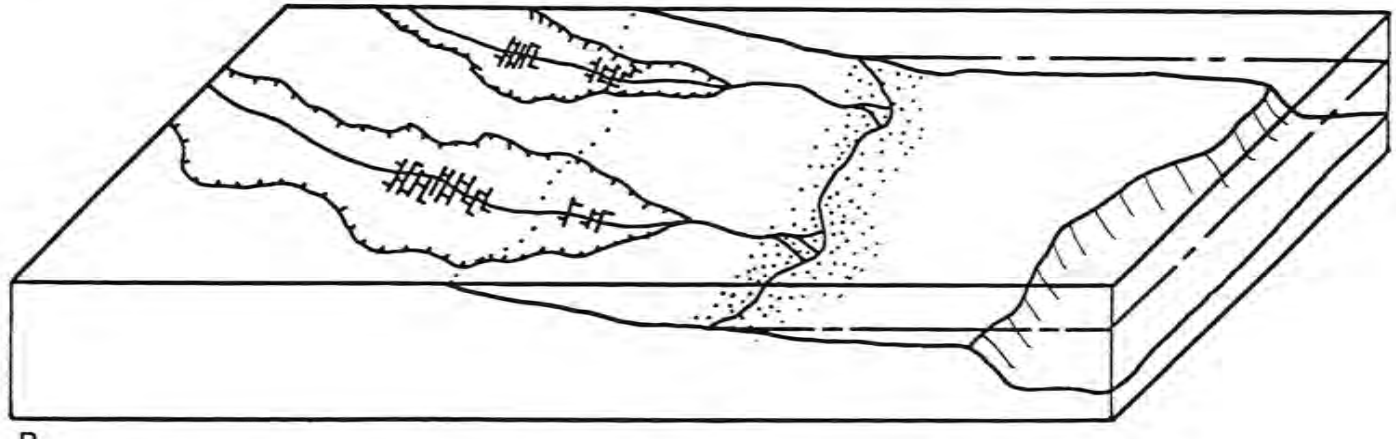
At the lowstand margin of the incised valleys small wave dominated deltas were laid down. Progradation of the deltas resulted in alluviation of the lower reaches of the incised valleys (Fig. 49). This indicates an age equivalence with the Foster Channel Sand and the lowstand deltas. With continued sedimentation the deltas fed by each of the channels coalesced into a complex of wave dominated deltas.

A northward marine transgression resulted in a northward retrogradation of the deltas. This resulted in delta sediments being deposited above the channel sands and above the Sub-Spiro Shale in the interchannel areas. With the rising sea level sedimentation in the incised valleys continued and resulted in the filling of the channels. Formation of the Spiro sheet sand was initiated with the reworking of the delta sediments. The lateral extent of the sheet sand was initially limited to narrow trends associated with the delta sands (Fig. 50).

Continued sediment influx resulted in the overspilling of the channel sediments onto the interchannel areas. This lead to the initiation of the Spiro Sheet Sand in the northern part of the area. Continued northward transgression resulted in marine reworking of the deltas and channel sediments. This lead to



A



B

Figure 49. A. Late Morrowan Setting Prior to Regression, B. Earliest Atokan, Valleys were Eroded into the Sub-Spiro Shale and Wapanucka Limestone.

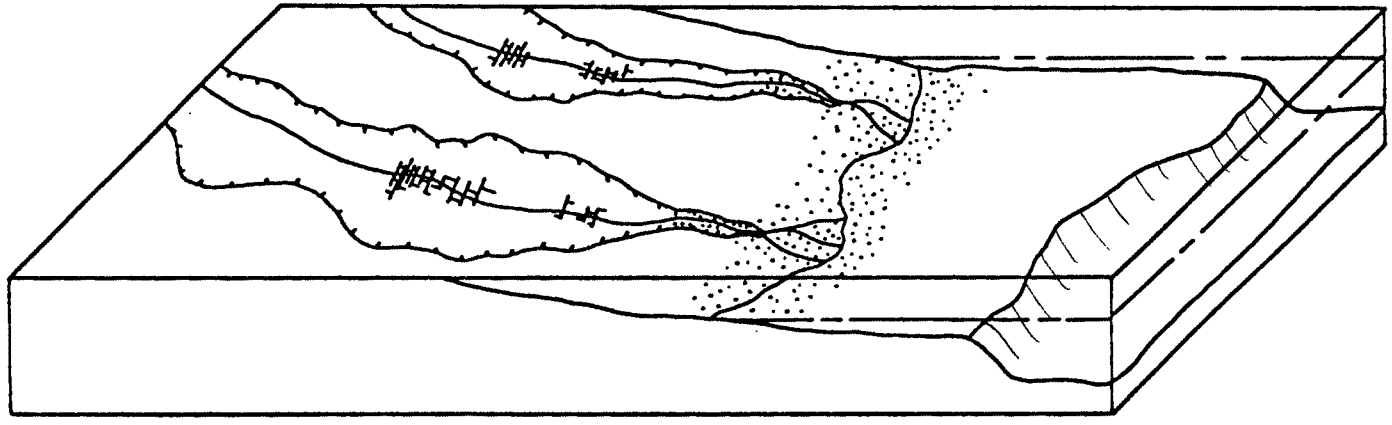


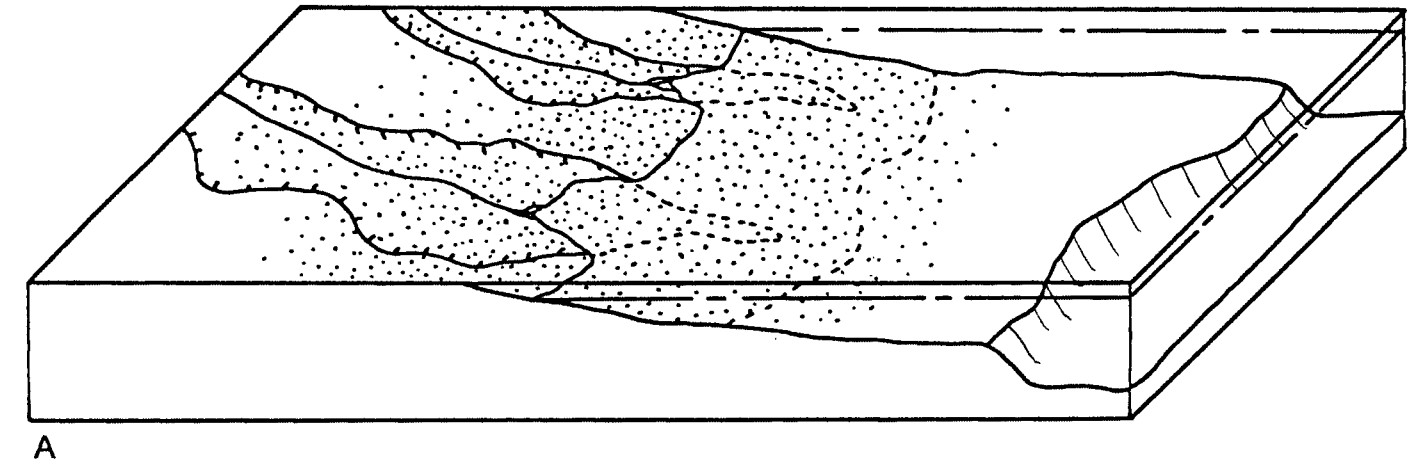
Figure 50. Vertical Accretion of Deltas and Backfilling of Incised Valleys.

the final stage of the sheet sand formation. The sheet sand overlies the Channel Facies and Delta Facies and directly overlies the Sub-Spiro Shale (Fig. 51).

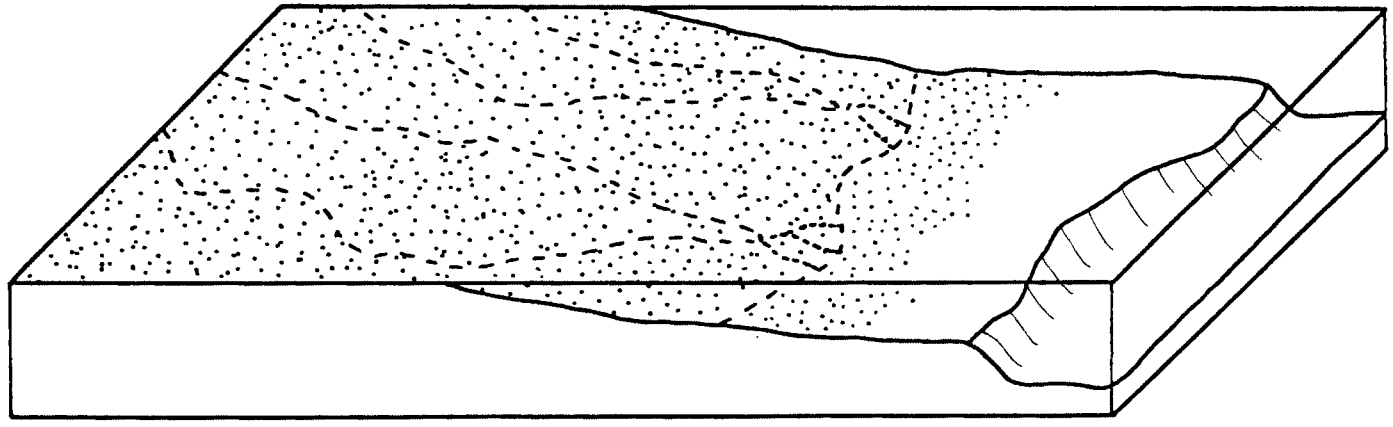
Wave Dominated Deltas

Wave dominated deltas are commonly fed by high bed load trunk streams in small drainage basins. High wave energy redistributes the sediments and prevents the formation of delta lobes, this in turn limits the basinward progradation of the delta. Constructional and destructional facies are associated with wave dominated deltas. The facies cycles cannot be distinquished vertically. The distribution of the constructive facies is limited with the destructive facies being laterally extensive. Associated features of wave dominated deltas are well developed strandplains and beaches which parallel the delta outline.

There are several modern examples of wave dominated deltas. The classic example is the Sao Francisco River delta in Brazil (Fig. 52). The high energy environments associated with the delta has resulted in a high sand to mud ratio. Wave energy and wave induced currents have prevented the formation of delta lobes and instead produced a smooth cuspate morphology lacking interdistributary bays. Other features of the delta include beach-ridge barrier sands and a dune field on the outer margin of the delta plain.



A



B

Figure 51. Northward Transgression Resulted in Backstepping of Deltas and Filling of Incised Valleys (A) and Final Stages of Sheet Sand Formation (B).

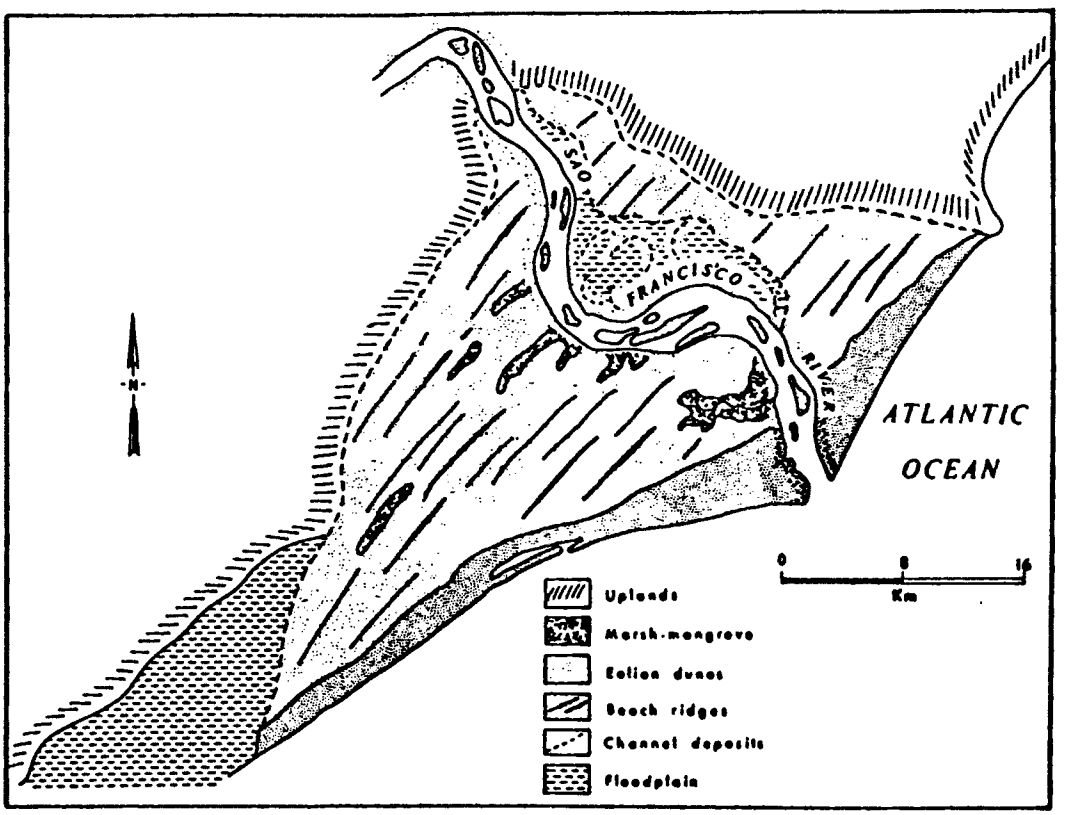


Figure 52. Diagram of Sao Francisco River Delta, Brazil (From Boggs, 1987).

CHAPTER VIII

PETROLEUM GEOLOGY

History of Development

Surface exploration for coal was the first search for fossil fuel in the Arkoma Basin. The surface mapping that was carried out by U.S. Geological Survey workers revealed the anticlines that were present in the basin. This lead to a search for oil and gas. Gas was first discovered in the Arkoma basin at Mansfield, Sebastian county, Arkansas in March 1902 on the Hartford anticline (Branan 1966). The Red Bank Oil Company No. 1 Fee located in Sec. 23 T. 9 N., R.24 E., drilled to a depth of 6,300 feet to the Spiro sandstone, this was the first significant deep gas in the basin (Branan, 1966). The Spiro Sandstone is the major producing unit in the study area. Although the Arkoma Basin is complex structurally the primary trapping mechanism is stratigraphic. Three major gas fields lie within the study area, Wilburton, Red Oak-Norris and Kinta fields.

The Wilburton Field was discovered in 1929. Spiro production was initiated in December 1960 when the Ambassador Oil Corp. completed the No. 1 Williams in Sec 23 T. 5 N., R 18 E. (Berry and Trumbly 1968). The principle producer is the Spiro Sandstone with production also in the Cromwell and Red Oak sands.

The Red Oak-Norris Field was discovered by the Gladys Belle Oil Co. in 1912 in section 10 T. 6 N., R. 21 E., with production from the Hartshorne Sandstone (Six 1965). The Red Oak Sandstone is the major producer with the Spiro Sandstone as a secondary producer.

The Kinta Field was discovered with the Continental Oil Company No. 1 Davenport located in Sec. 33, T. 8 N., R 20 E., which produced from the Spiro and Cromwell. It was plugged due to a lack of market for the gas (Branan 1966). The principle producer is the Spiro Sandstone.

Present Production

The present day Kinta Field consists of many different fields, the names of which have been discontinued (Table I). The Kinta Field with an area of approximately 258,000 acres ranks third in total production, based on size, of the three major fields in the study area. Production as of 1993 was approximately 950,344,613 MCF mainly from the Spiro Sandstone and Cromwell Sandstone.

The Wilburton field contains the Hartshorne field as well as the Wilburton South field. The Wilburton field based on size is second in production, with 73,000 acres and a total production of 805,925,226 MCF. Production is mainly from the Spiro.

The Red Oak field is made up of the Norris and Red Oak fields. Present day nomenclature combines both into the Red Oak-Norris field. The Red Oak-Norris field is third in production based on size. This field covers approximately 54,400 acres and has produced 657,496,876 MCF. Production is from the Red Oak and Spiro sandstones.

Future Locations

Potential Spiro reservoirs still exist in the southern portion of the basin south of the Choctaw fault. With production in the Spiro controlled by porosity, smaller fields may still exist in the basin north of the Choctaw Fault. The Wapanucka Limestone is productive from fractured reservoirs and new production could be found in the southern part of the basin. The Arbuckle has proven to be productive in zones associated with basement horst.

TABLE I

DISCONTINUED FIELD NAMES

Discontinued Name	New Name
Blocker SE	Kinta
Blocker South	Kinta
Bokoshe	Kinta
Bokoshe East	Kinta
Cartersville	Kinta
Cartersville NW	Kinta
Cartersville SW	Kinta
Cartersville West	Kinta
Kinta (#1)	Kinta
Kinta District	Kinta
Kinta NE	Kinta
Kinta NW	Kinta
Kinta West	Kinta
Lequire	Kinta
Lequire NW	Kinta
Lewisville South	Kinta
Lona	Kinta
Lona East	Kinta
McCurtain North	Kinta
Milton South	Kinta
Milton West	Kinta
Quinton South	Kinta
Quinton SW	Kinta
Spiro	Kinta
Spiro North	Kinta
Hartshorne	Wilburton
Wilburton North	Wilburton
Wilburton NW	Wilburton
Norris	Red Oak-Norris
Red Oak	Red Oak-Norris

CONCLUSIONS

1. An incised valley complex in addition to those mapped by Lumsden and others (1971) was found in the southwestern portion of the study area.
2. The Spiro Sandstone was initially deposited as a series of lowstand deltas and associated distal valley fill deposits.
3. Progradation of the deltas resulted in alluviation of the lower reaches of the incised valleys.
4. A northward marine transgression reworked the deltas and resulted in the backstepping of the deltas and filling of the incised valleys.
5. The Spiro Sheet Sand was formed during the transgression from the reworking of the delta sands and is present throughout the study area.
6. Chamosite clay is present in cores as both a depositional and diagenetic component. Chamosite is present in the fluvial as well as marine influenced Spiro.
7. Chamosite clay coatings aid in the preservation of primary porosity.

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Chamberlain, C.K., 1971, Bathymetry and paleoecology of Ouachita Geosyncline of southeastern Oklahoma as determined from trace fossils: AAPG Bull., v. 55, p. 34-50.

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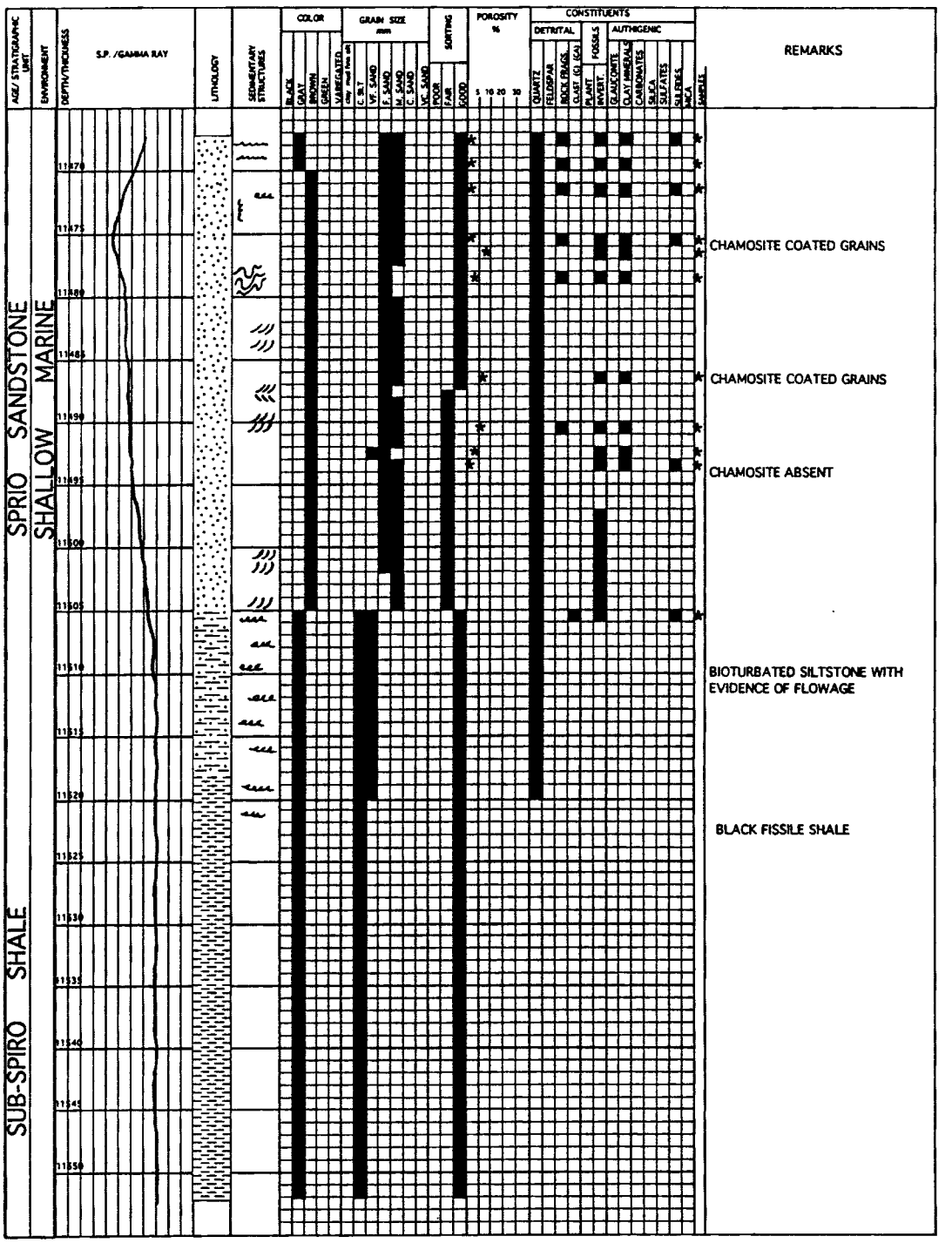
APPENDIX A

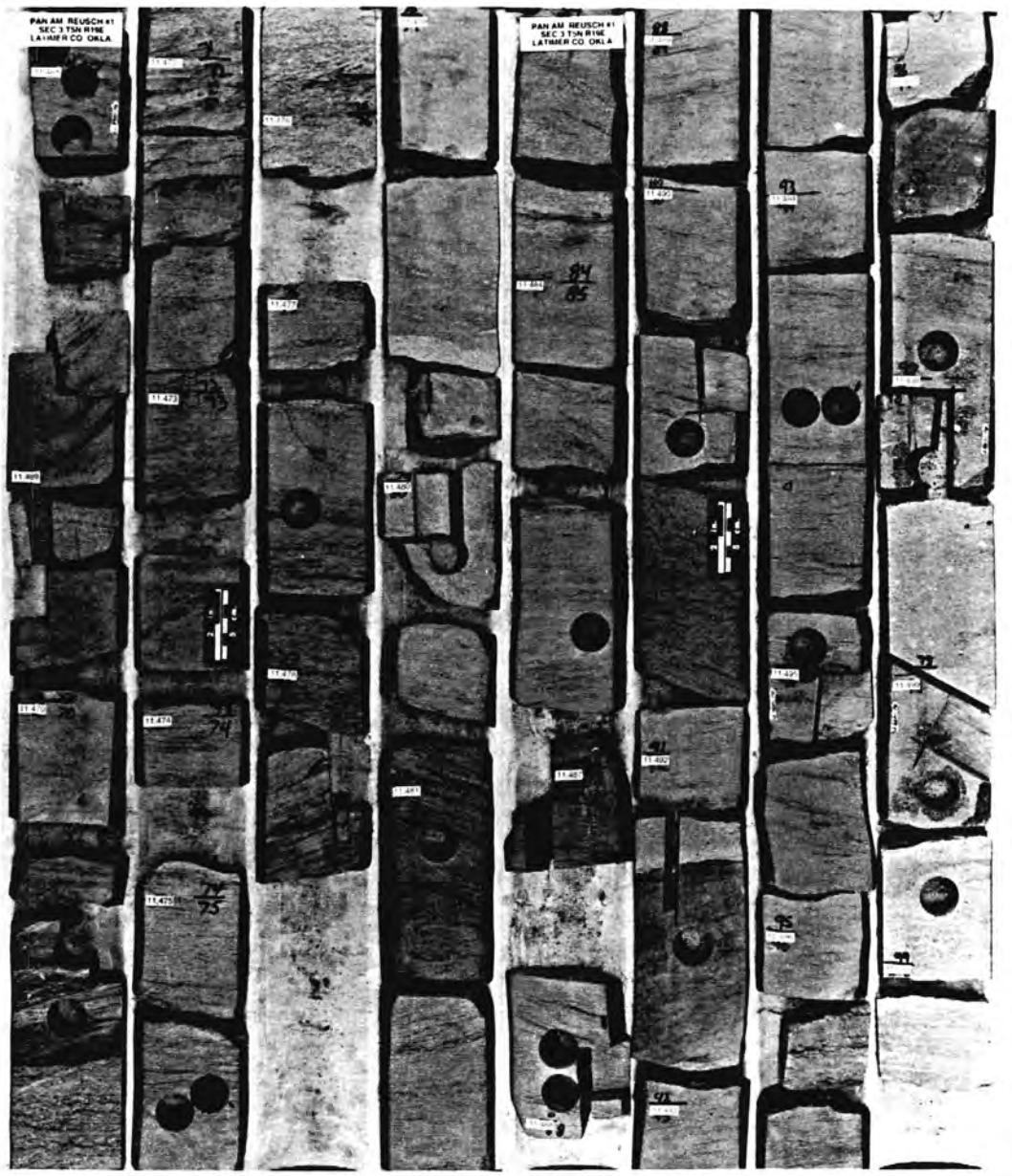
COMPANY PAN AM PETROLEUM

WELL NAME/ LOCATION REUSCH #1 SEC. 3 T. 5 N., R. 19 E.

PETROLOGIC LOG

SPIRO SANDSTONE

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LATIMER CO OKLA
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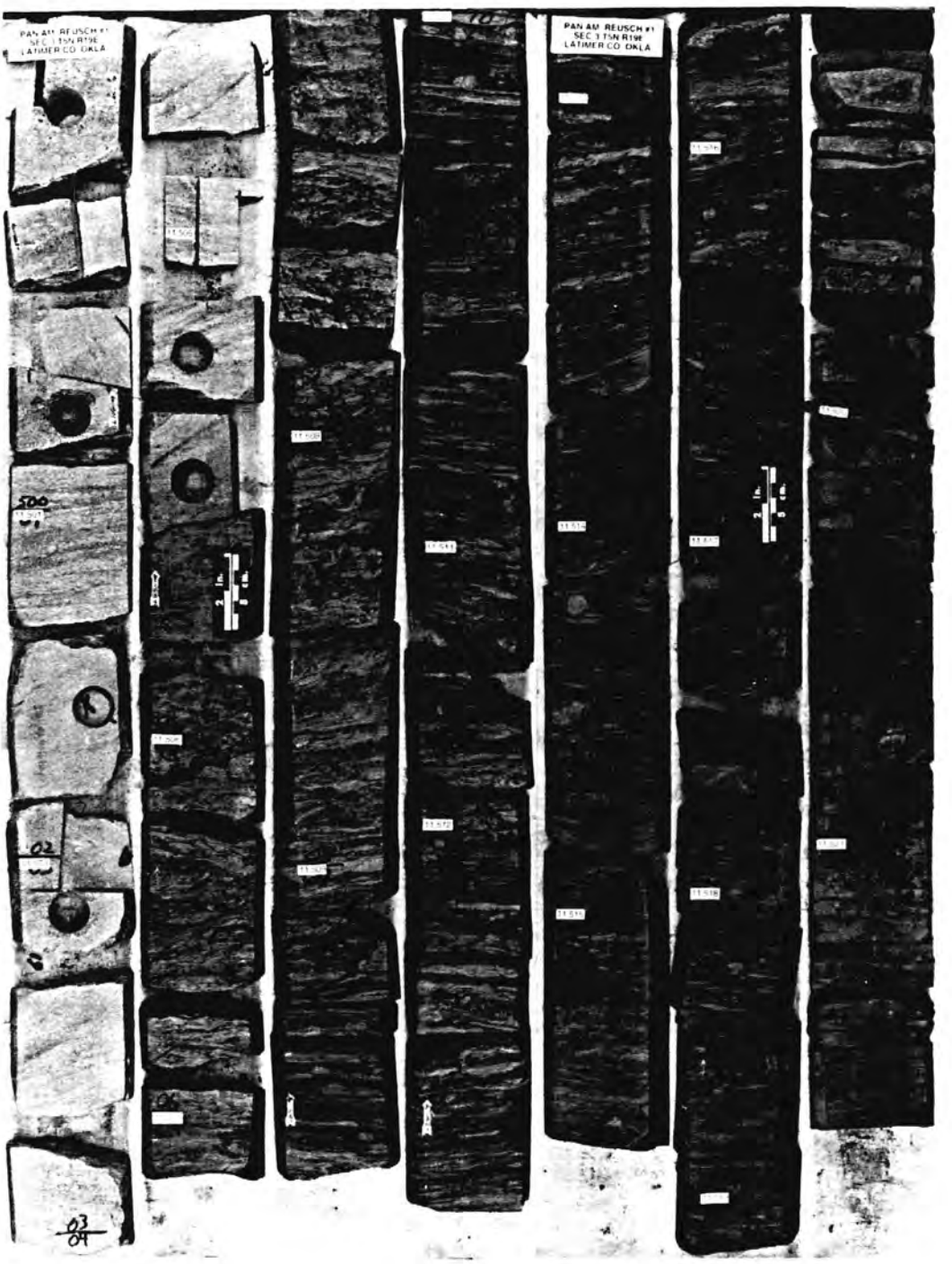
LATIMER CO OKLA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PAN AM REUSCH #1
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LATIMER CO OKLA

COMPANY MIDWEST PETROLEUM CO. #1

WELL NAME/ LOCATION WHITE SEC. 18 T. 6N., R. 21 E.

PETROLOGIC LOG

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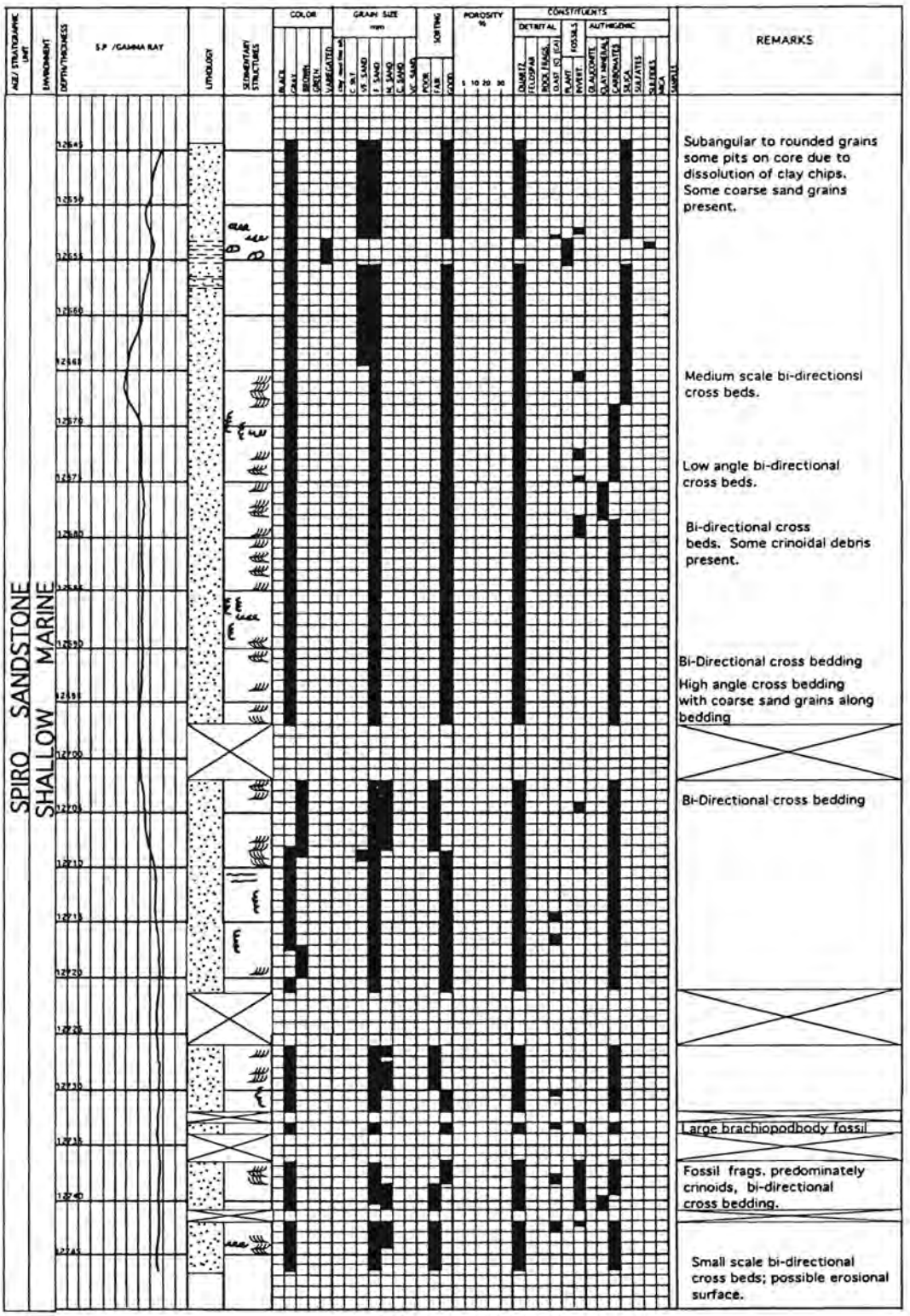

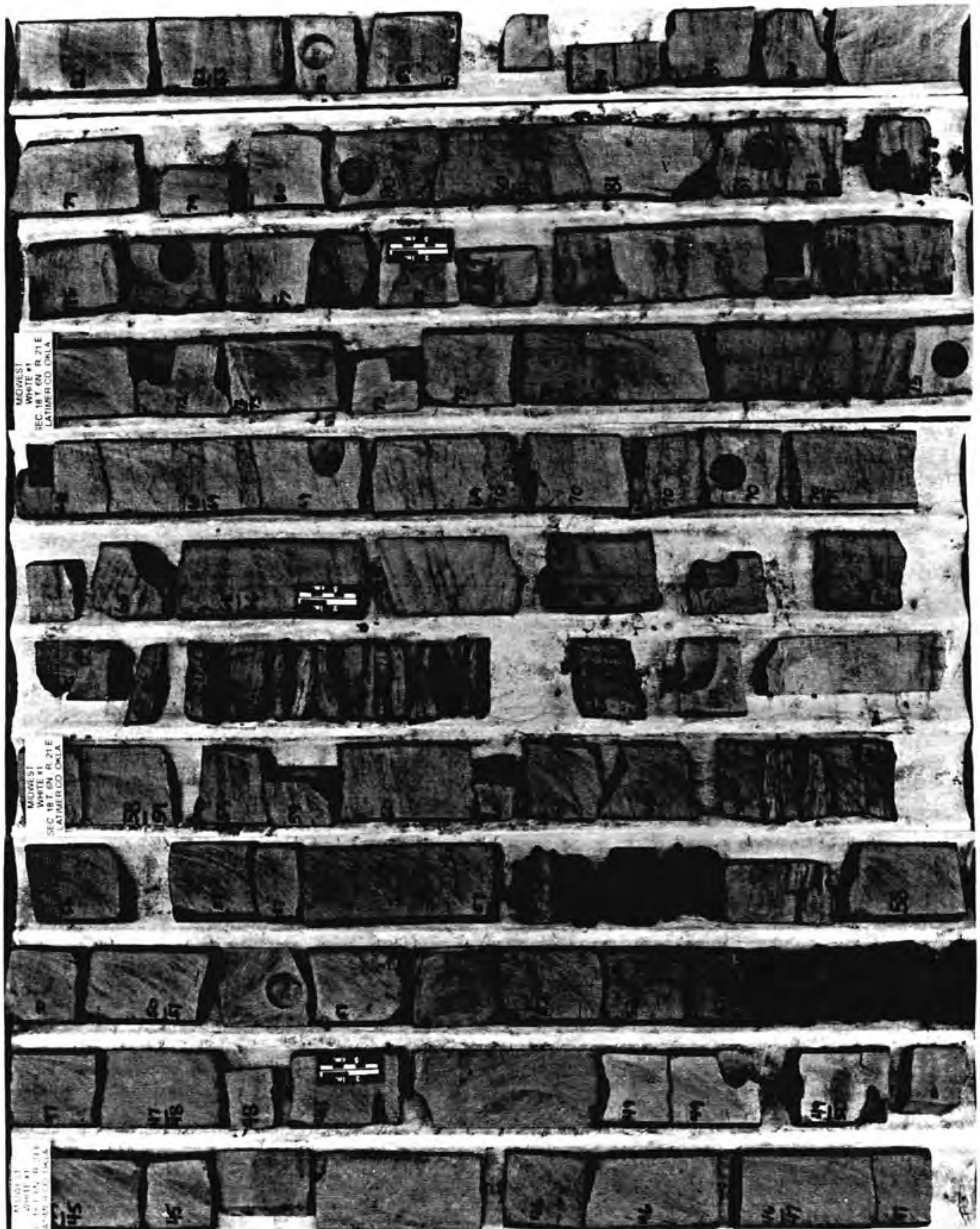
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SEC 18 T 6N R 21 E
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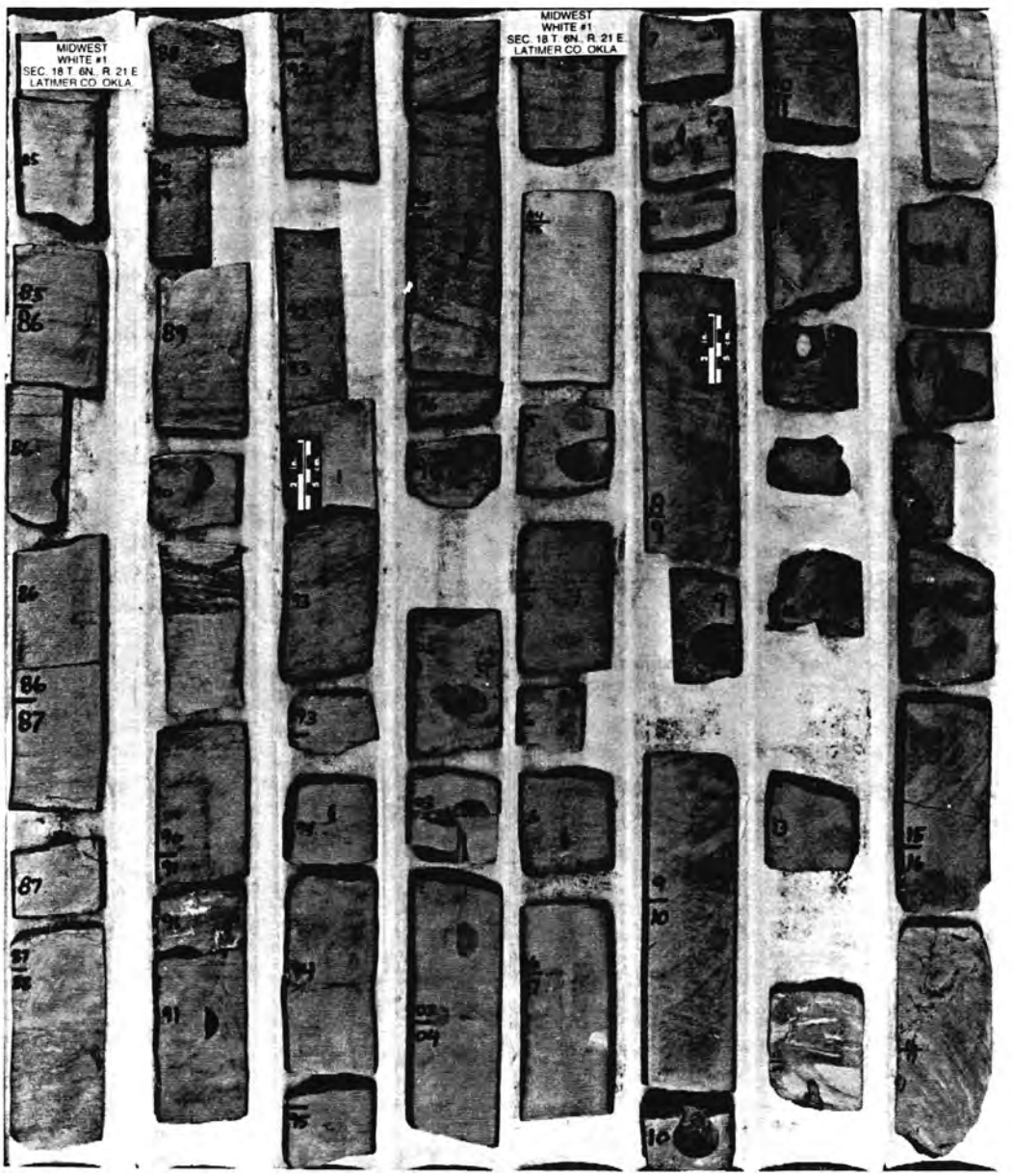
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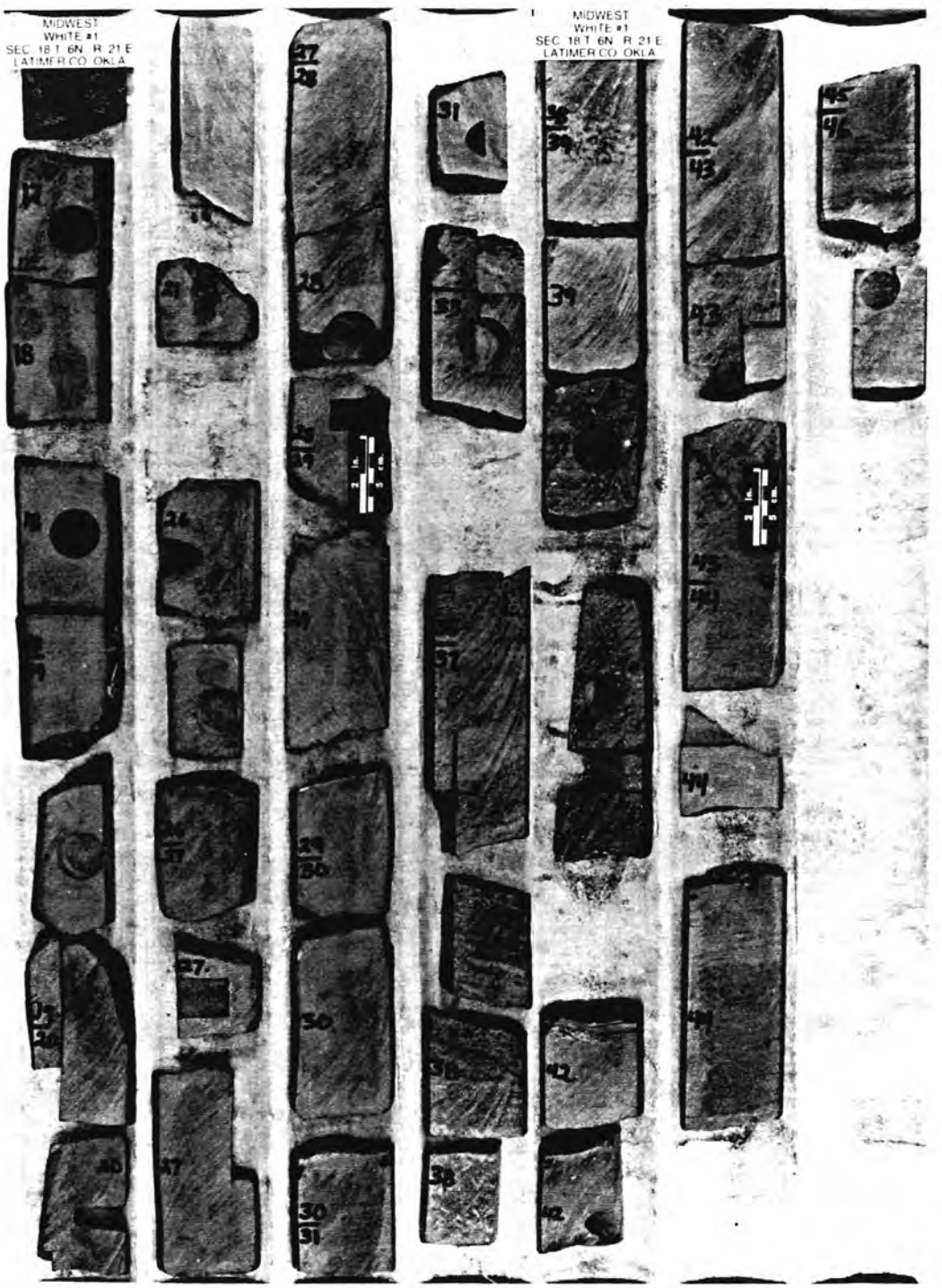
LATIMER CO. OKLA.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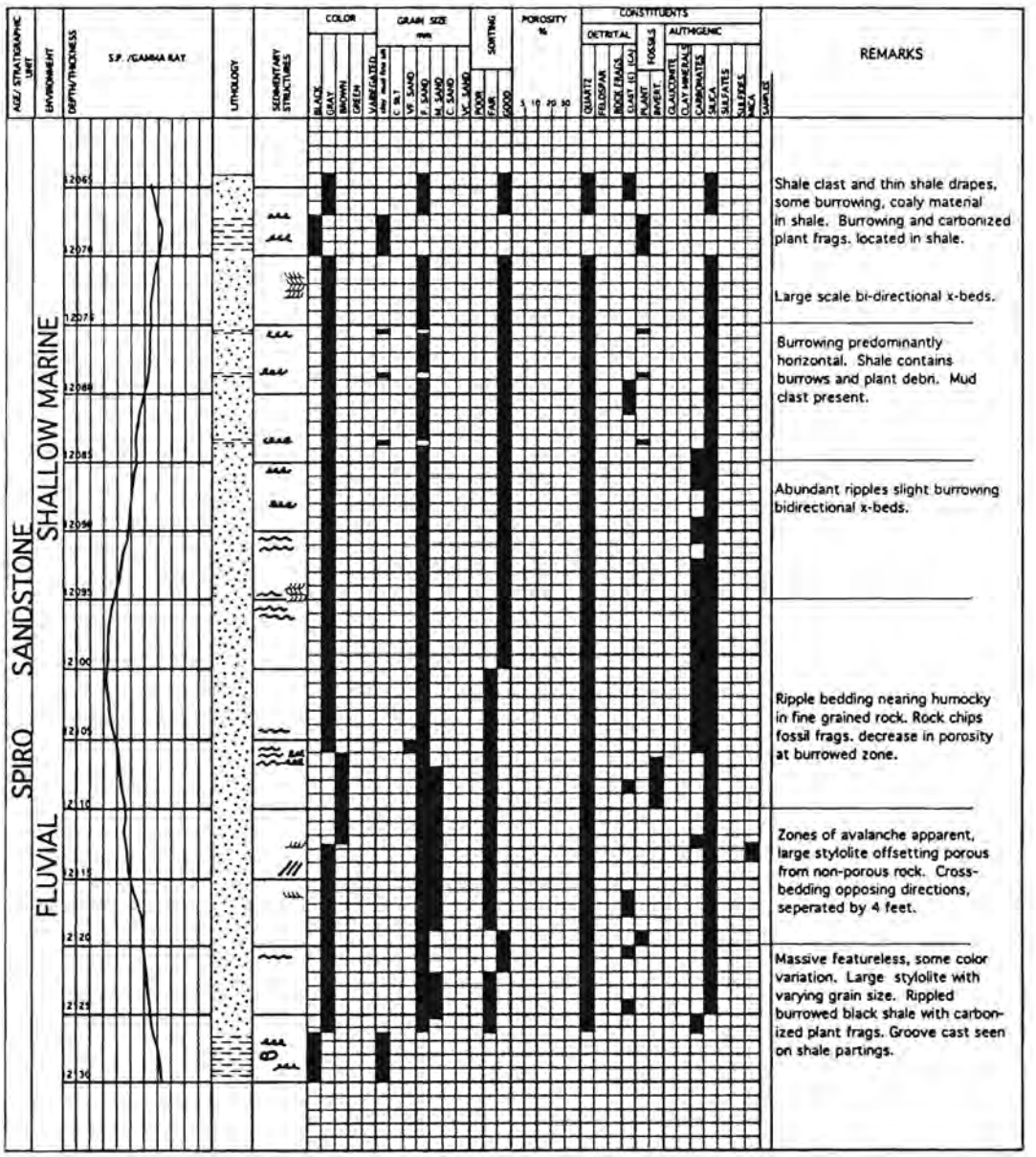
LATIMER CO OKLA
MIDWEST
WHITE #1
SEC 18 T 6N R 21 E
LATIMER CO OKLA

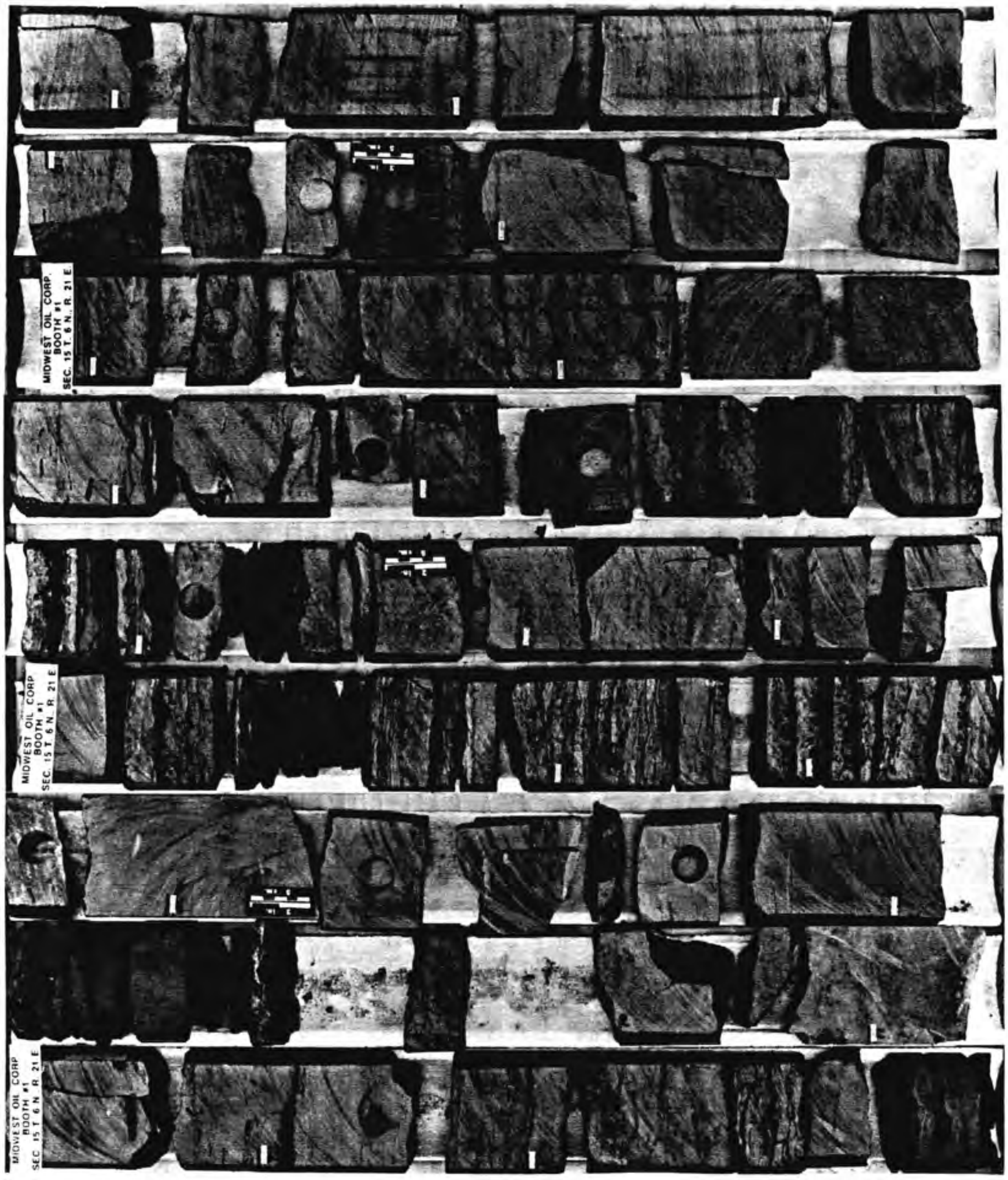
COMPANY MIDWEST OIL CO. #1

WELL NAME/ LOCATION BOOTH SEC. 15 T. 6N., R. 21 E.

PETROLOGIC LOG

SPIRO SANDSTONE

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BOOTH #1
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MIDWEST OIL CORP
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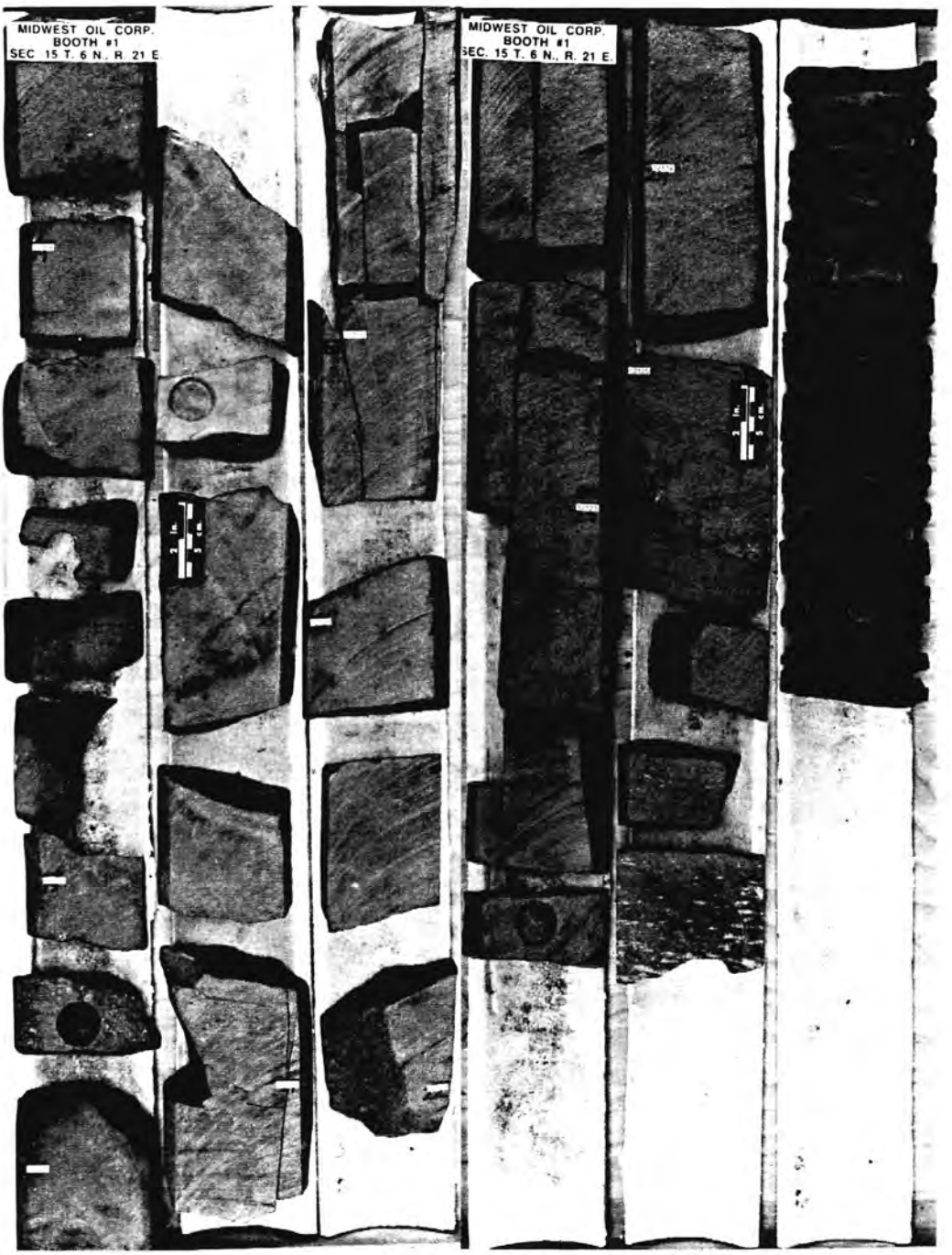
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MIDWEST OIL CORP.
BOOTH #1
SEC. 15 T. 6 N., R. 21 E.

COMPANY MUSTANG 1-27

WELL NAME/ LOCATION LYONS SEC. 27 T. 6N., R. 21 E.

PETROLOGIC LOG

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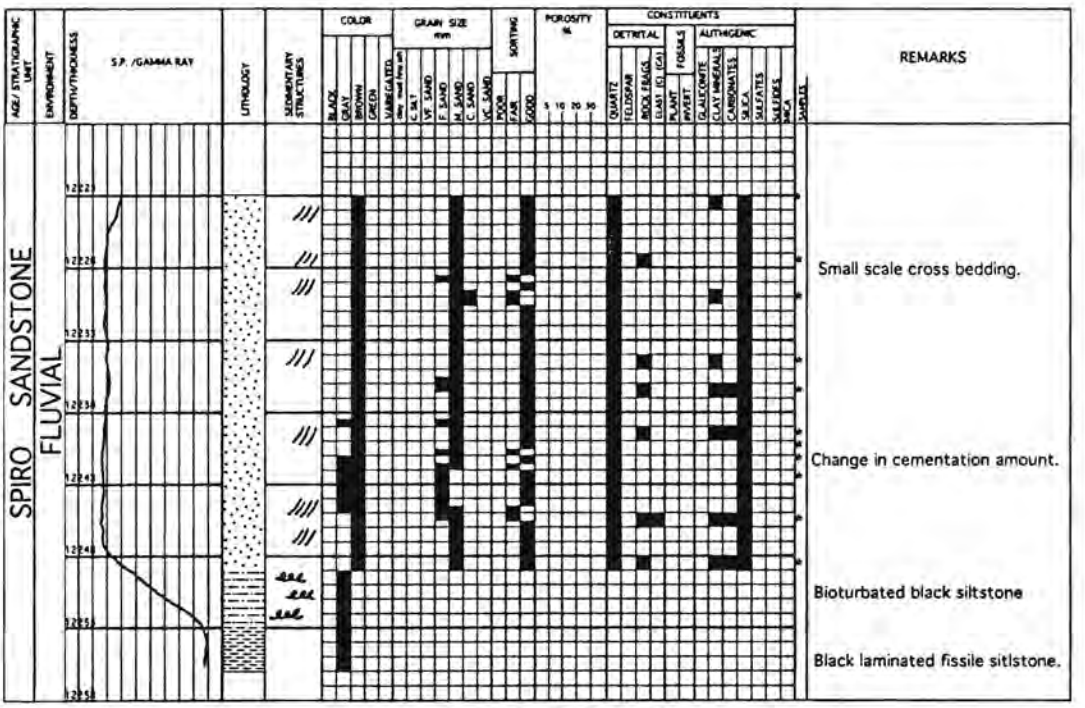

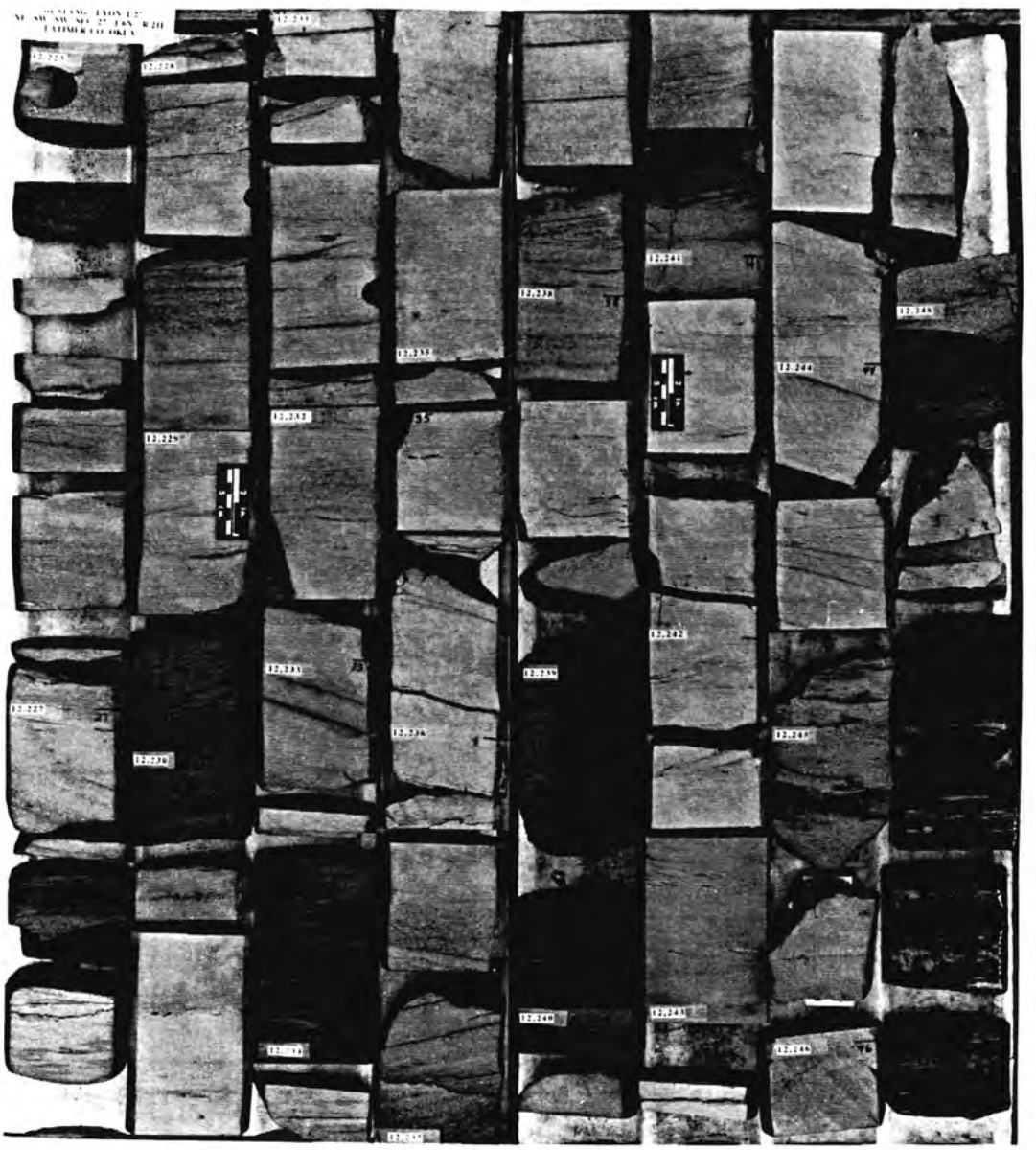

COMPANY MIDWEST OIL CO.

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PETROLOGIC LOG

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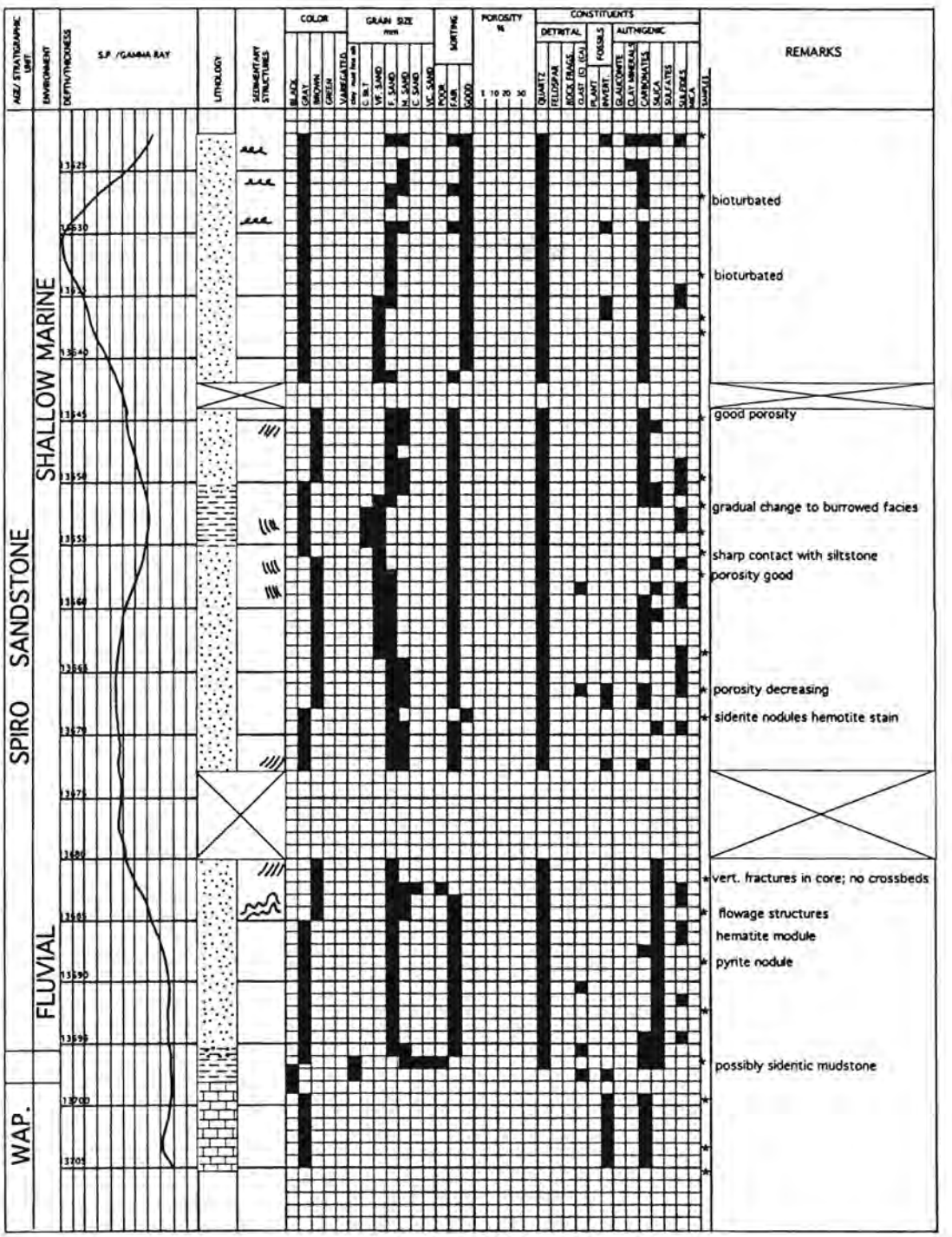

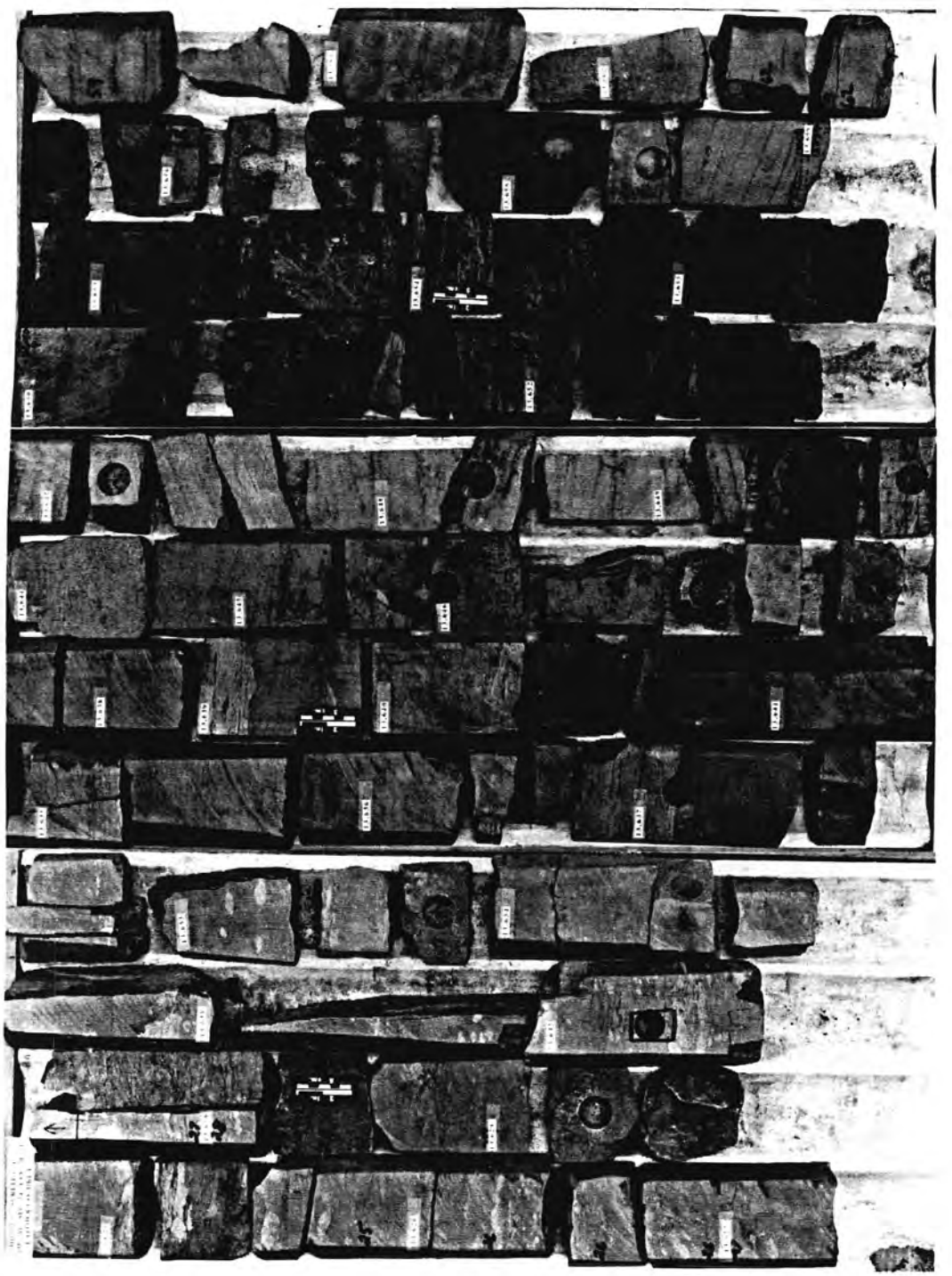

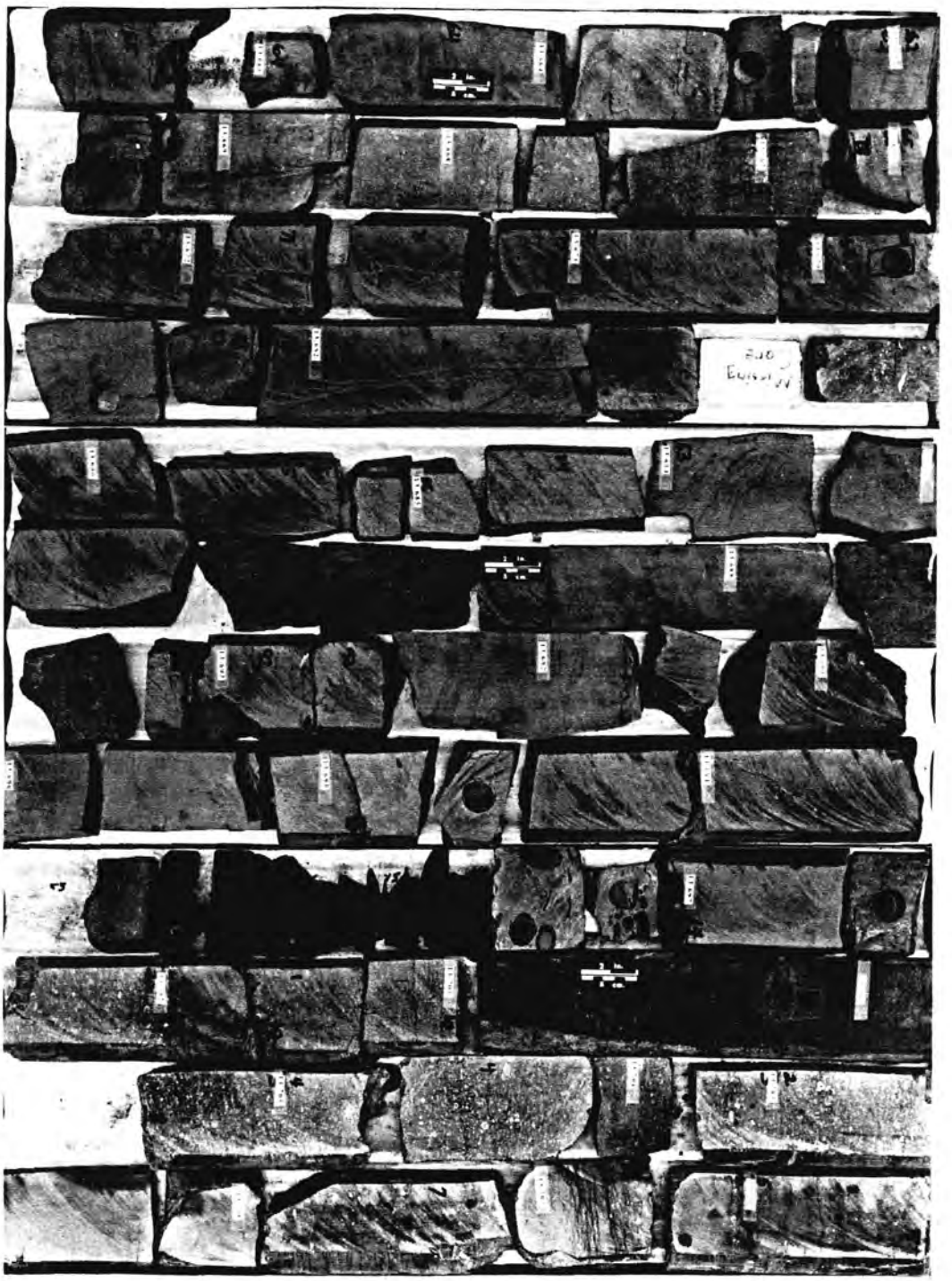

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PETROLOGIC LOG

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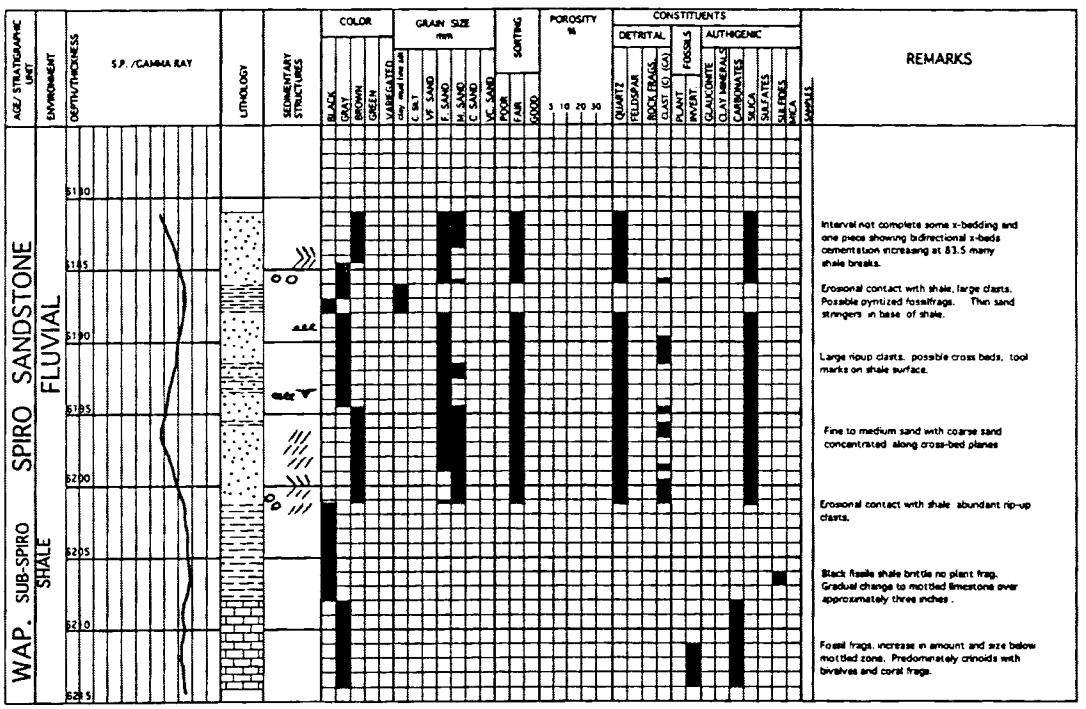

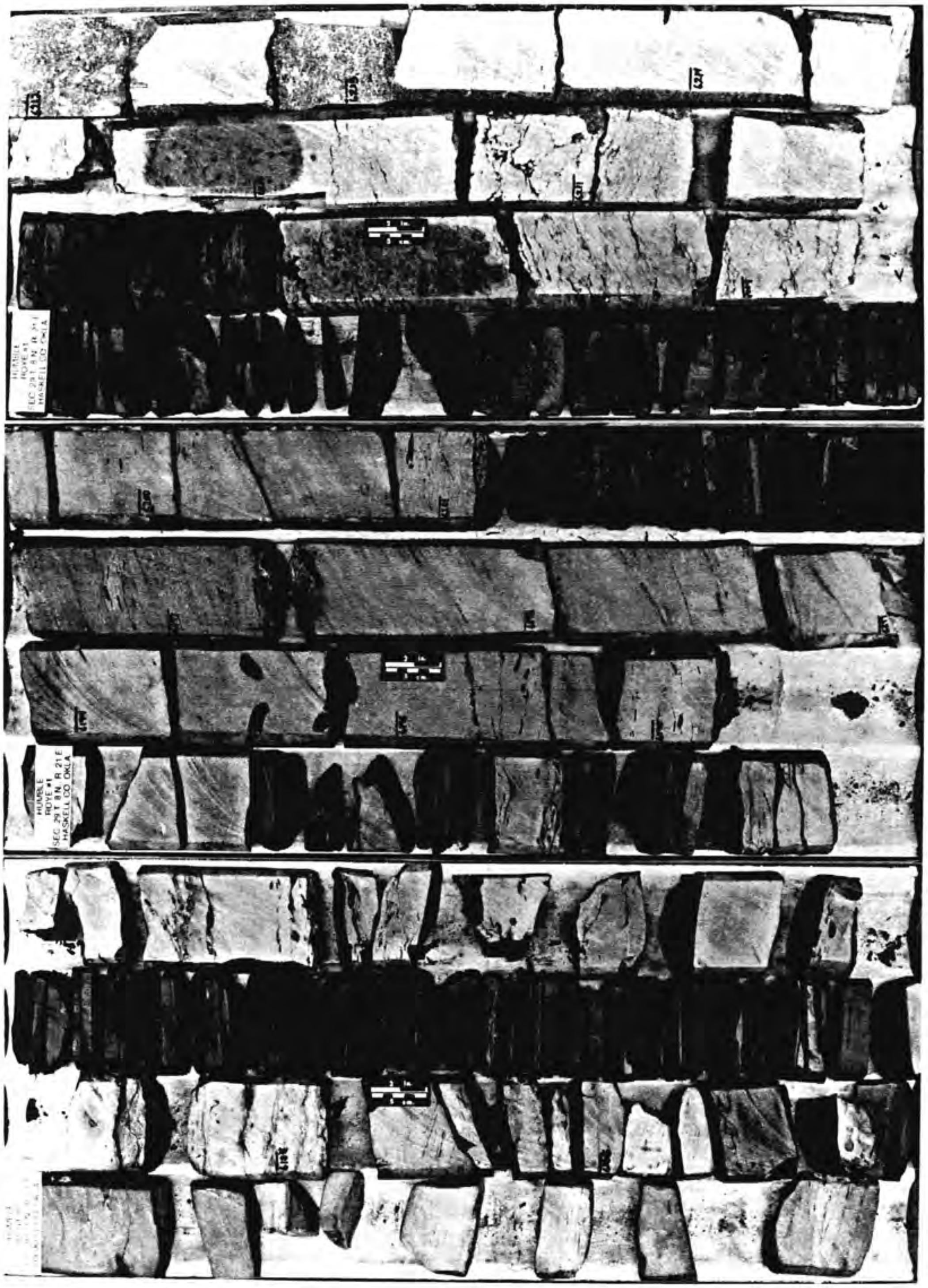
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SEC 29 T 8 N R 21 E
HASKELL CO OKLA

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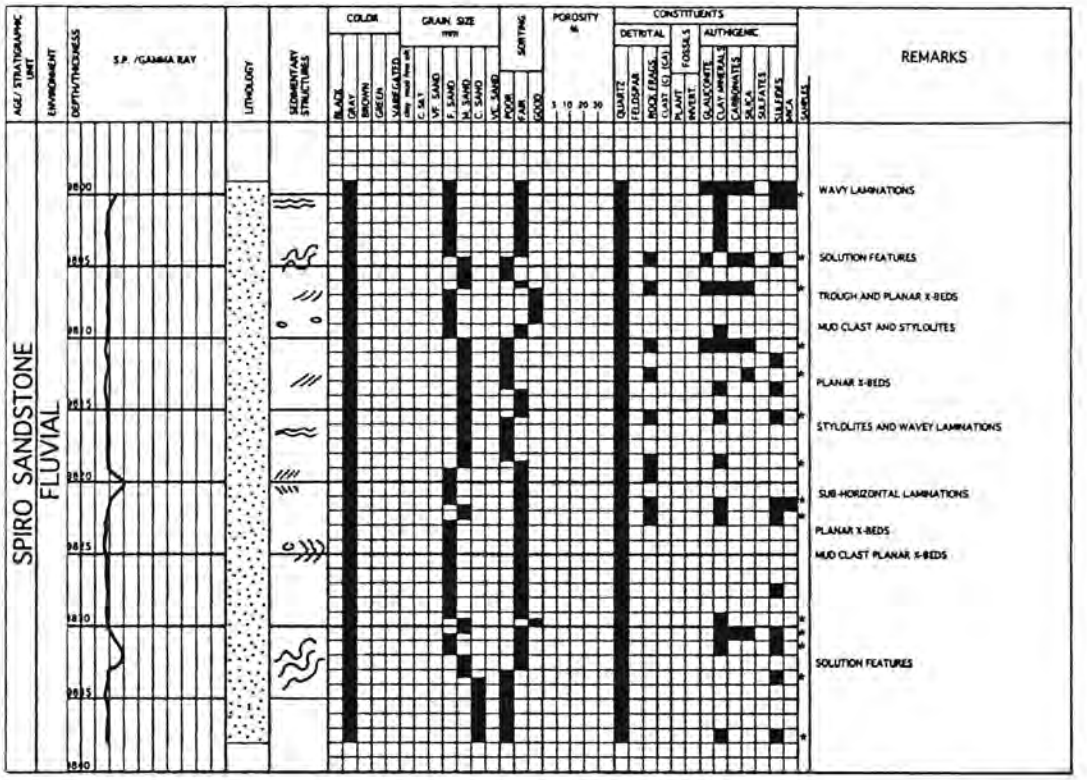

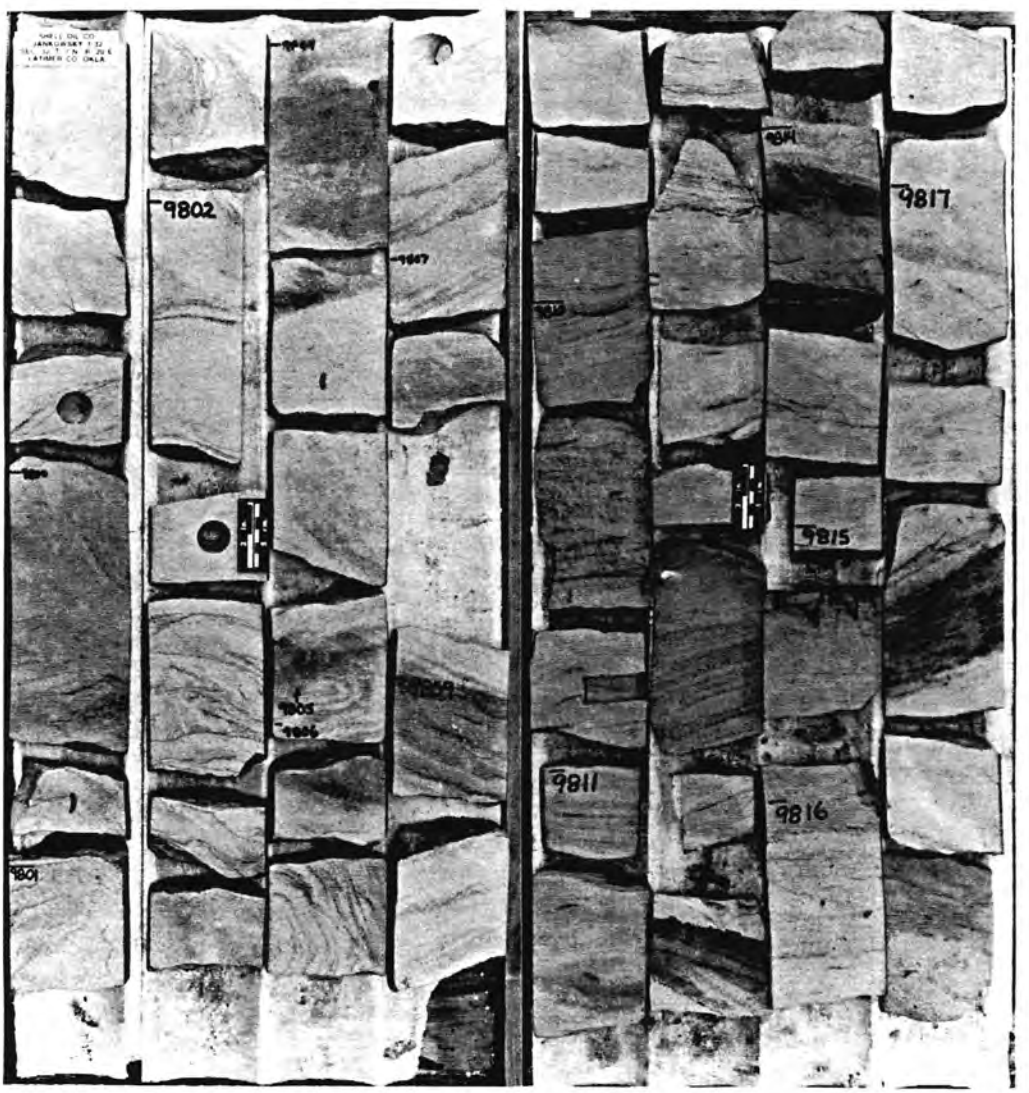
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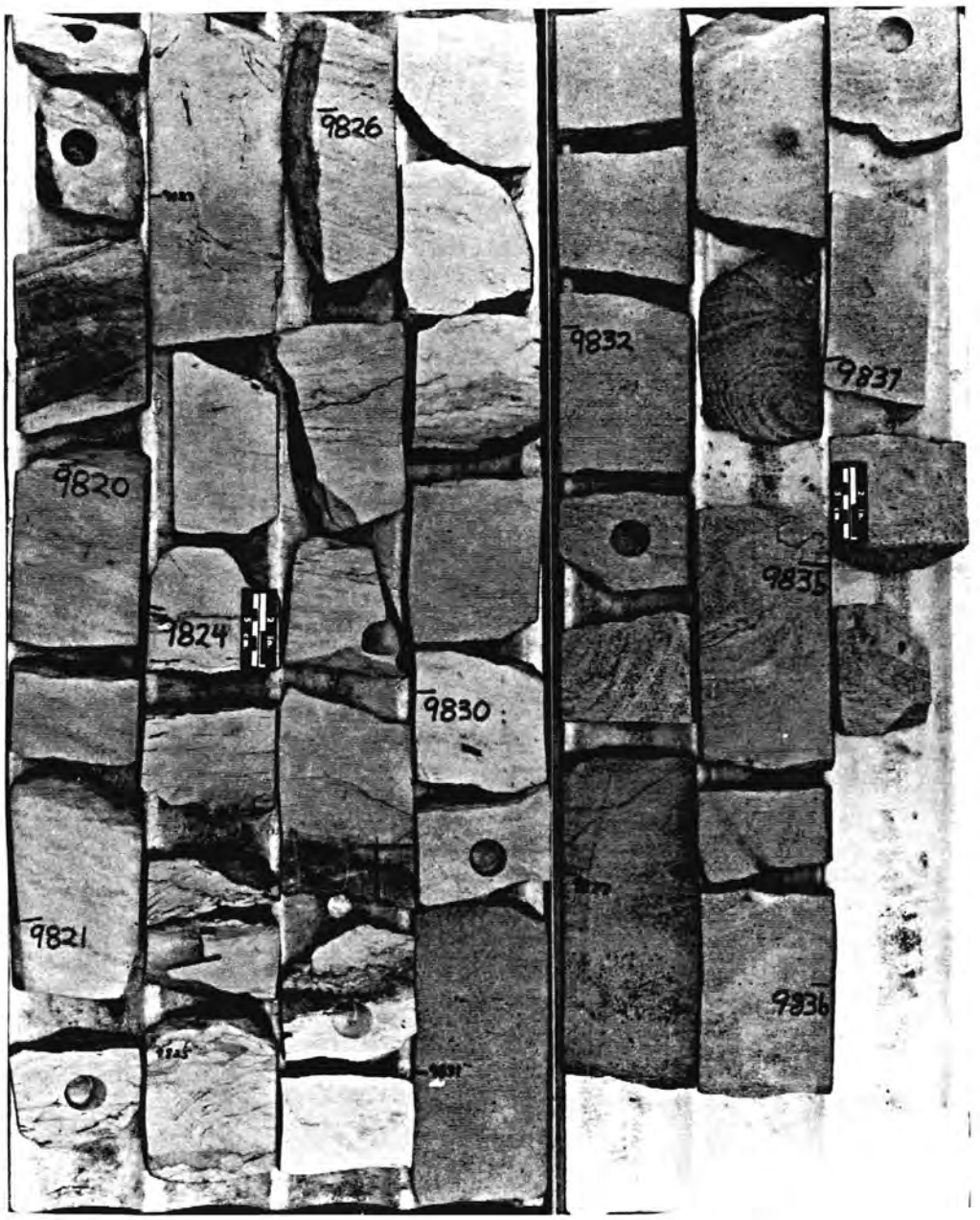
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APPENDIX B

4N-16E Operator	Well	Location	Sect.	Field	K.B.	Top Spiro	Top Wap	Top M. Shale	M Shale Thick	Spiro Isopach	Spiro Isolith	Prod.
Marathon	Slaughter 1-1	SE SE NE SW	1	Wilburton	806	9835	9905	9899	6	64 (1)	64	gas
RESTORED		SE NE SW 4N 36										
Marathon	Madden #2	2100 FNL 1670 FEL	2	Wilburton	633	10877	10937	10932	5	55 (1)	55	gas
RESTORED		SE 4N 26										
Marathon	Madden 1-2	1850 FSL 1330 FEL	2	Wilburton	646	9796	9851	9850	1	54 (2)	52	
RESTORED		NE 4N 35										
The Headington Co.	Maddox #1	NE SW NE	3	Hartshorne	679	10835	10902	10897	5	62 (1)	62	dry
RESTORED		SW SE 4N 22										
Whitmar Expl.	Smallwood 2-3	SE SE	3	Hartshorne	655	10905	10974	10967	7	62 (2)	60	
RESTORED		SE NE 4N 27										
Texaco	W.C. Camp 1-4	1785 FNL 1455FEL	4	Wildcat	662	10432	10483	10478	5	46(3)	40	gas
Texaco	W.C. Camp 1-4	1785 FNL 1455FEL	4	Wildcat	662	11356	11406	11403	3	47 (5)	34	gas
RESTORED		NE 4N 28										
RESTORED		NE 4N 9										
Amoco	Smallwood #2	SW NE SE	10	Wilburton	680	*10025	*10086	*10076	10	51(2)	44	gas
RESTORED		SE 4N 27										
PanAm	Smallwood #1	SW NE	10	Wildcat	682	10991	11048	11038	10	47(1)	47	dry
RESTORED		NE 4N 34										
Marathon	Needham 1-11	2490 FSL 1470 FEL	11	Wilburton	688	10422	10496	10490	6	68(1)	68	gas
RESTORED		SE 3N 2										
Marathon	Needham 2-11	1230 FSL 1420FWL NW	11	Wilburton	672	9969	10043	10038	5	69 (6)	57	gas
Marathon	Needham 2-11	1230 FSL 1420 FWL NW	11	Wilburton	672	11411	11481	11473	8	62 (4)	58	
RESTORED		N NW 4N 35										
RESTORED		N NW 3N 2										
Marathon	Lewis 1-12	2310 FSL 1520 FWL	12	Wilburton	700	10671	10766	10739	27	68 (1)	68	gas
RESTORED		SW 3N 1										
Marathon	Lewis #3	NW SE NW	12	Hartshorne	735	10405	10477	10468	9	63 (4)	55	gas
Marathon	Lewis #3	NW SE NW	12	Hartshorne	735	11655	11715	11710	5	55 (4)	48	
RESTORED		SW 4N 25										
RESTORED		NW 3N 1										
Whitmar Expl.	Cope #1	W E NW NW	13	Wilburton	667	11207	11285	11274	11	67 ?	?	gas
RESTORED		N NW 3N 12										
Marathon	Needham 1-14	1400 FNL 1400 FWL	14	Wilburton	689	10996	11060	11049	11	52 (1)	52	gas
RESTORED		SW 3N 2										
Samson	Tex #1	S NE NE	14	Wilburton	647	11183	11251	11242	9	59 (4)	50	gas
RESTORED		S SE 3N 2										
Marathon	Lynn 1-15	1520 FNL 2290 FEL	15	Wilburton	689	10831	10887	10881	6	50 (1)	50	gas
RESTORED		SW NW SE 3N 3										
Donald Slawson	Lynn 1-5	660 FNL 1680 FWL	15	Wilburton	708	10812	10869	10862	7	50 (2)	46	

RESTORED		SW 3N 3									
Tex-Pek Partnership	BuddySherril #16-1	230 FSL 1520 FWL	16	Pittsburg	696	*10550	*10622	*10615	7	63 (2)	60	dry
RESTORED		SW SE 3N 4										
APexco	Warren Spahn #1	C-NE-SW	22	Wildcat	770	11794	11839	11833	6	39 (?)	?	dry
RESTORED		NE NW 3N 15										
Texaco	BeltTrust 26-1	2444 FSL 624 FWL NE	26	Haileyville	955	*11801	*11888	*11880	8	77 (2)	65	gas
RESTORED		NW SE 3N 14										
Arkla	Loveless 1-30	1320 FNL 1470 FWL	30	Haileyville	653	12547	12615	12611	4	64 (1)	64	dry
RESTORED		NW 3N 18										
Tex Pek	Dromgold 'B' 32-1	320 FSL 2400 FEL	32	Wildcat	990	*10880	*10960	*10952	8	68 (2)	52	dry
RESTORED		SW SE 3N 29										
Exxon	Garrett B-1	SW SE SE	34	Hartshorne	899	11478	11564	11557	7	79 (3)	73	
RESTORED		SE NE 3N 34										
Texaco	Dromgold 'D' 35-1	1980 FSL 2310 FWL	35	Wildcat	811	12289	12375	12367	8	78 (3)	69	gas
RESTORED		SE NW 3N 26										
Texaco	Dominic Silva 36-1	NE SW	36	Wilburton	881	13776	13883	13871	12	95 (2)	85	gas
RESTORED		NW 3N 25										

4N-17E

Operator	Well	Location	Sect.	Field	K.B.	Top Spiro	Top Wap	Top M. Shale	M Shale Thick	Spiro Isopach	Spiro Isolith	Prod.
King Resources	Pattison 1-1	SE NW NW	1	Wilburton	649	10729	10815	10805	10	76 (1)	76	gas
RESTORED		NW 4N 25										
Arkoma	McCaslin #2	SE NW NE	2	Wilburton	744	10545	10616	10606	10	61 (1)	61	gas
RESTORED		NE 4N 26										
King Resources	McCaslin 1-2	SE NW NW	2	Wilburton	667	10693	10781	10775	6	82 (2)	78	gas
RESTORED		NW 4N 26										
Arkoma	Sparks #1	NE	3	Wilburton	644	10973	?	11046		73 (1)	73	gas
RESTORED		NE 4N 27										
King Resources	Layden 1-3	SE NW NW	3	Wilburton	687	11058	11156	11140	16	82 (1)	82	gas
RESTORED		NW NW 4N 26										
Arkoma Prod. Co.	Stine #2	1500 FNL 1500 FEL	4	Hartshorne	703	10114	10207	10187	20	73 (2)	59	gas
RESTORED		SE SW SE 4N 28										
Texas International	Rock Is. 5-1	990 FNL 2310 FWL	5	Hartshorne	693	10414	10492	10481	11	66 (1)	66	gas
RESTORED		NW 4N 32										
Arkoma	Rock Is 2-5	1320 FNL 1320 FWL	5	Wilburton	676	10586	10662	10652	10	66 (1)	66	gas
RESTORED		NE NW 4N 32										
JMC Expl.	Beluska #1	660 FNL 2148 FEL	6	Wilburton	713	10007	10076	10067	9	60(2)	51	gas
JMC Expl.	Beluska #1	660 FNL 2148 FEL	6	Wilburton	713	11416	11482	11477	5	61 (1)	61	
RESTORED		SW NE 4N 31										
RESTORED		NW SE 4N 7										
Arkoma Prod	Hartshorne #3	1325 FNL 1000 FWL	6	Hartshorne	705	9838	9908	9899	9	61 (4)	47	gas

RESTORED		SW NW 4N 31											
Texas Inter.	Hartshorne 1-6	SW NE NE	6	Wilburton	718	10143	10242	10232	10	89 (2)	85	gas
RESTORED		NE NE 4N 31										
Amoco	Rock Is #1-7	1260 FSL 1320 FEL	7	Wilburton	782	10516	10578	10573	5	57 (2)	53	gas
RESTORED		SW 3N 6										
Arkoma	Rock Is #2-8	1320 FNL 1320 FEL	8	Hartshorne	776	11250	11335	11324	11	74 (1)	74	gas
RESTORED		NE 3N 5										
Arkoma	Alexander #1	660 FNL 1320 FEL	9	Wilburton	660	11545	11630	11618	12	73 (1)	73	dry
RESTORED		NE 4N 33										
Whitmar	SilverBullet 1-11	1320 FNL 2640 FWL	11	Hartshorne	689	11637	11736	11726	10	89 (3)	83	gas
RESTORED		E NW 4N 35										
Exxon	Mabry Trust 1	NE NW SE	12	Wilburton	655	11752	11864	11861	36	109 (1)	109	gas
RESTORED		SW SE 4N 36										
Texaco	Wayne Wallace 15-1	SW SE SE	15	Hartshorne	865	13125	13288	13264	24	101 (1)	90 (.73)	dry
RESTORED		SE SE 3N 3										
Continental	Wayne Wallace 17#1	SW SE NW	17	Wildcat	741	12011	12099	12089	10	78 (2)	73	gas
RESTORED		NW SW 3N 8										
TXO	Wright E #1	1040 FNL 880 FWL	18	Hartshorne	760	11809	11890	11882	8	73 (3)	64	dry
RESTORED		SW NW 3N 7										
Texaco	Wayne Wallace 21-1	SW NE NW	21	Wildcat	840	*12393	*12496	*12484	12	91 (2)	83	gas
RESTORED		SW 3N 9										
Tide West Oil Co.	Wallace 1-6	NW NE NE	21	Pittsburg	803	12589	12707	12694	13	105 (3)	100	
RESTORED		NE 3N 9										
Shell	Retherford 1-24	S N SE	24	Wildcat	674	12826	12907	12898	9	72 (4)	57	dry
RESTORED		SE 3N 13										
Amoco	Reterford 1-A	SW SE SE	25	Wildcat	748	11362	11458	11452	6	90 (2)	88	gas
RESTORED		SE 3N 24										
Amoco	Patterson #1	900 FSL 2400 FWL	27	Wildcat	996	11204 O.T.	?	11309		105 (3)	99	gas
Amoco	Patterson #1	900 FSL 2400 FWL	27	Wildcat	996	*11287	*11397	*11381	16	92 (2)	73	
RESTORED		SW 3N 22										
Texaco	Manuel Rudy	250 FSL 1320 FEL	28	Wilburton	894	11551	11681	11670	11	119 (3)	97	gas
Texaco	Manuel Rudy	250 FSL 1320 FEL	28	Wilburton	894	*12177	*12058	*12035	23	142 (3)	114	
RESTORED		SE 3N 16										
RESTORED		SE 3N 21										
Amoco	Tomlin #1	1175 FNL 1725 FEL	29	Wilburton	1080	*11911	*12098	*12085	13	90 (3)	75	
RESTORED		NE 3N 20										
Exxon	Ellis Rudy #1	SE SE SE	30	Wilburton	1052	*12330	*12418	*12410	8	78 (2)	68	
RESTORED		NW SE 3N 19										
Exxon	Elliot Davis #1	SE SE SE SE	31	Wilburton	929	10924	11010	10991	19	67 (1)	67	gas
Exxon	Elliot Davis #1	SE SE SE SE	31	Wilburton	929	*12986	*12724			67 (1)	67	
RESTORED		SE SE 3N 31										
RESTORED		SE SE 3N 30										
Amoco	Zipperer #1	SE SW SE SW	32	Scout	904	*10953	*11060	*11025	35	72(1)	72	
RESTORED		SW SW 3N 29										

Exxon	H&H Cattle Co 'A' 1	SW NW SE	33	Wildcat	742	12188	12313	12306	7	87 (4)	77	dry
RESTORED		NE SW 3N 21										
Amoco	Mose Watts 36-2	SE NE SE	36	Wilburton	888	*11294	*11384	*11381	3	87	79	gas
RESTORED		NE NW 3N 25										
4N-18E												
Operator	**Well**	**Location**	**Sect.**	**Field**	**K.B.**	**Top Spiro**	**Top Wap**	**Top M. Shale**	**M Shale Thick**	**Spiro Isopach**	**Spiro Isolith**	**Prod.**
Tennecco	Mabry Trust 1-5	SE NW	5	Wilburton	711	11374	11439	11427	12	53 (2)	39	dry
RESTORED		NE SW 4N 29										
Tex Pex	AJ Mabry	290 FSL 1650 FWL	7	Wilburton	929	12563	12636	12627	9	64 (3)	60	
RESTORED		NW 3N 6										
Shell	Mabry 1-9	NE SW	9	Wilburton	927	12178	12250	12235	15	57 (2)	50	
RESTORED		SE NW 3N 4										
BTA Oil Prod.	1-9001-JVP Mabry	NW NW SE	11	Wildcat	1065	12055	12096	12090	6	45 (5)	37	
RESTORED		SW SE 3N 2										
Arco	Dollins 1-13	800 FSL 200 FEL	13	Hartshorne	729	*13019	*13125	*13109	16	89 (1)	89	gas
RESTORED		SW SE 4N 24										
B.T.A. Oil Prod.	9001JVP Workmn1	300 FSL 1320 FEL	22	Wildcat	778	*13268	*13433	*13411	22	96 (2)	69	dry
RESTORED		SE 3N 15										
Arco	Newell 1-23	200 FSL 1320 FEL	23	Wilburton	917	*12640	*12720	*12702	18	60 (2)	46	dry
RESTORED		W NE 3N 14										
B.T.A	9001JVP Amason#1	1930 FSL 2250 FWL	24	Wildcat	933	*12629	*12714	*12699	15	70 (2)	66	gas
RESTORED		SE 3N 12										
Anadarko	Robe 'A' 1-25	1550 FSL 2340 FWL	25	Wildcat	826	12774	no spiro or					
RESTORED		SE SW 3N 24										
Exxon	Garrett A-1	330 FSL 2226FWL	26	Wildcat	1037	*13716	*13817	*13797	20	80 (1)	80	gas
RESTORED		SW 3N 23										
Exxon	Garrett A-1	SE SE SE	26	Wildcat	1036	13764	13864	13844	20	80 (3)	75	gas
RESTORED		SE SE 3N 23										
Exxon	Moore #1	SW SW SE	28	Wilburton	772	*12561	*12666	*12664	2	102 (2)	86	gas
RESTORED		SW SE 3N 21										
Exxon	Watts 'C' #1	80 FSL 2380 FWL	29	Wilburton	867	12193	12293	12283	10	90 (3)	80	
RESTORED		SE SE SW 3N 20										
Exxon	Watts Bros. A-1	1000 FSL 1360 FWL	30	Wilburton	792	*13506	*13592	*13584	8	77 (1)	77	dry
RESTORED		SE SW 3N 19										
Amoco	Retherford A 30-1	SE SE SW	30	Hartshorne	868	11590	11679	11671	8	81 (5)	60	
RESTORED		N SW 3N 19										
Exxon	Roy Rutherford B-1	SE SW SE	31	Wildcat	962	*12144	*12259	*12245	14	100 (2)	90	gas
RESTORED		NE SW 3N 30										
Amoco	Mose Watts 32-1	250 FSL 840 FEL	32	wilburton	1064	*13042	*13152	*13141	11	99 (4)	83	dry
RESTORED		SE SE 3N 29										

Exxon	Watts Bros 'B'-1	750 FSL 2352 FEL	32	Wilburton	926	*12741	*12847	*12838	9	95 (4)	80	dry
RESTORED		SE 3N 29										
Exxon	Garrett C-1	SE SE SW SE	33	Wilburton	1025	*13100	*13248	*13233	15	131 (1)	96 (.74)	gas
RESTORED		SE NW 3N 28										
Exxon	Garrett D-1	900 FNL 1780 FEL	34	Wilburton	909	*12726	*12818	*12796	22	69 (2)	59	dry
RESTORED		NE 3N 27										
Arco	TNT 1-34	1320 FSL 1320 FEL	34	Wilburton	1184	*13725	*13797	*13795	2	68 (2)	61	dry
RESTORED		SE 3N 27										
Arco	Ulysses #1	1320 FSL 2300 FEL	35	Wildcat	1032	14486	14608	14577	31	91 (2)	90	dry
RESTORED		SW SE 3N 26										

4N-19E

Operator	Well	Location	Sect.	Field	K.B.	Top Spiro	Top Wap	Top M. Shale		Spiro Isopach	Spiro Isolith	Prod.
Mobil	EM Lawless #1	500 FSL 820 FWL	1	Wilburton	952	*13446	*13548	*13534	14	85 (4)	68	gas
RESTORED		SW SW 4N 25										
Helmerich & Payne	Gary 1-5	1320 FSL 2470 FWL NE	5	Wilburton	781	*12187	*12270	*12251	19	63 (2)	55	dry
RESTORED		SE NW 4N 32										
H & P	Burger Trust 1-6	SE SE SE 2500 FSL 1180 FWL	6	Wildcat	797	*12260	*12347	*12321	26	61 (2)	53	dry
RESTORED		SE SE 4N 31										
Williford Energy	Clemons #1	1240 FWL 1320 FNL	8	Wildcat	750	12163	12250	12229	21	66 (1)	66	dry
RESTORED		NW 3N 5										
Exxon	Yourman #1	1160 FSL 2417 FWL	9	Wilburton	776	13785	13874	13847	27	62 (2)	56	dry
RESTORED		SE SW 3N 4										
Arco	Holsten #1	250 FNL 1570 FEL	11	Wildct	920	14077	14184	14150	34	73 (2)	60	dry
RESTORED		NW NE 4N 35										
Williford	Clemons #1	1320 FSL 2340 FWL NW	12	Wildcat	748	12166	12256	12231	25	65 (1)	65	
RESTORED		SE NE NW 3N 1										
Arco	James #1-17	896 FSL 40 FEL	17	Wildcat	848	*11487	*11575	*11555	20	83 (3)	57	gas
RESTORED		SE 3N 8										
H & H Star	Colony 1-23	2000 FSL 640 FWL	23	Wildcat	913	*15757	*15867	*15846	21	87 (4)	69	gas
RESTORED		NW SW 3N 11										

4N-20E

Operator	Well	Location	Sect.	Field	K.B.	Top Spiro	Top Wap	Top M. Shale		Spiro Isopach	Spiro Isolith	Prod.
Anson	Smallwood	2140 FSL 1200 FEL	3	Dipping Vat	931	*15426	*15618	*15566	52	140 (5)	90	gas
RESTORED		N SE 4N 34										
Exxon	Ellis #1	SW SE SW SE	4	Wildcat	734	15329	15507	15469	38	140 (10)	93	
RESTORED		SW SW SE 4N 33										

H&H Star	Dipping Vat 1-4	1320 FEL 1320 FSL	4	Choctaw Tru	1028	*14955	*15135	*15083	52	127 (4)	99	gas
RESTORED		SE 4N 33										
H&H Star	Lucky Strike 1-5	1720 FSL 2380 FWL	5	Choc. Trust	903	*13804	*13944	*13923	21	117 (5)	71	gas
RESTORED		SE NE SW 4N 32										
Mobil	Kiamichi 1-6	500 FSL 2350 FEL	6	Wilburton	955	*13643	*13781	*13771	10	127 (6)	88	gas
RESTORED		SW SE 4N 31										
Anadarko	Barnes A 1-9	SE NW SE	9	Wilburton	1145	*15061	*15252	*15174	78	113 (4)	90	gas
RESTORED		SE 3N 4										
An-Son	Golden 1-10	2430 FSL 1550 FWL	10	Dipping Vat	1061	*14776	*14970	*14905	65	128 (7)	95	gas
RESTORED		SW 3N 3										
Anadarko	Prentice A 1-11	2150 FSL 2840 FWL	11	Panola	1245	14666	14944	14839	173	173 (13)	129	dry
RESTORED		NW NW SE 3N 2										
Arco	Borne 1-12	400 FSL 700 FEL	12	Bengal	1132	*14325	*14579	*14471	108	145 (5)	104	gas
RESTORED		SE SE 3N 1										
Anson	Lamb #1-10	SW NW NW NW	14	Wilburton	1279	14869	14951	14937		68 (2)	62	gas
RESTORED		NW NW 3N 11										
H&H Star	Berkley 1-15	1800 FSL 1790 FWL	15	Winding Stai	1412	14008	14238	14164	74	156 (10)	127	gas
H&H Star	Berkley 1-15	1800 FSL 1790 FWL	15	Winding Stai	1412	15553	15798	15718	80	165 (13)	137	
RESTORED		SW SW 3N 15										
H&H Star	Cappers Hollow 1-16	2000 FSL 1650 FEL	16	Winding Stai	1232	*15839	*16035	*15966	69	126 (2)	123	gas
RESTORED		NW SE 3N 9										
Mobil	Bear Suck Knob 1-7	1640 FSL 1320 FWL	18	Wilburton	931	*15548	*15756	*15709	47	160 (4)	120	dry
RESTORED		SW 3N 7										

5N-16E

Operator	Well	Location	Sect.	Field	K.B.	Top Spiro	Top Wap	Top M. Shale		Spiro Isopach	Spiro Isolith	Prod.
Hamilton Bros	Bernardi Jones 1-10	NE	10	Wildcat	661	10449	10549	10539	10	90 (3)	85	dry
RESTORED												
Midwest	Barnes #1	NW SW NE	13	Wildcat	612	11208	11269	11257	12	49 (1)	49	
Tenneco	Moss A 1-13	SE SE	13	Wilburton	643	8290	8370	8368	2	78 (7)	68	gas
RESTORED		SE SE 5N 24										
Texas Oil & Gas	Cook K #1	SW SE	14	Hartshorne	615	11145	11216	11213	3	68 (3)	66	dry
Tenneco	CC & CC 1-15	660 FSL 660 FWL	15	?	695	10455	10523	10513	10	58 (3)	42	dry
Sinclair	George B Hall #1	N S SW	17	Wildcat	752	8972	9030	9025	5	53 (1)	53	dry
Daniel price	George B Hall	840 FSL 1320 FWL	17	Wildcat	763	8990	9049	9047	2	57 (4)	53	
Hamilton Broth.	Stansel Welch 1-18	S NE	18	Bache	720	9031	9240	9130	10	99 (2)	83	dry
Williford	Armco #1	N N NE	20	Bache	783	10070	10149	10145	4	75 (1)	75	dry
Daniel Price	Randel #1	810 FSL 810FWL	22	Pittsburg	671	9799	no spiro					
RESTORED												
Samson	McBee #1	SE SE	23	Wilburton	612	8386	NDE	8426		40 (1)	40	gas
RESTORED		SE SE 5N 26										

Sun Oil Co.	Ernest L Cook #1	1980 FSL 860 FWL SE	23	Wilburton	615	9915	no spiro					
RESTORED		SW SE 5N 26										
Amoco	George Peden #2	SW	24	Wilburton	684	8400	8451	8442	9	42 (2)	39	gas
Amoco	George Peden #2	SW	24	Wilburton	684	9516	9563	9556	7	40 (3)	37	
RESTORED		SW 5N 25										
RESTORED		NW NE 4N 12										
Sun	George Peden #1	NW SE	24	Wilburton	629	8615	8722	8705	17	90 (4)	78	gas
RESTORED		SW NE 5N 36										
ORYX	George Peden #3	245 FSL 2000 FWL	24	Haileyville	642	8356	8401	8393	8	37 (1)	37	
ORYX	George Peden #3	245 FSL 2000 FWL	24	Haileyville	642	8833	8881	8874	7	41 (1)	41	
RESTORED		NW NE 4N 12										
RESTORED		SW 5N 25										
Marathon	Mass #1	1450 FSL 1650 FEL	25	Wilburton	736	9198	9280	9274	6	76 (3)	66	
RESTORED		SW NW NW 4N 18										
Marathon	Mass #2	NW	25	Wilburton	682	9056	9111	9102	9	46 (3)	41	gas
RESTORED		SW SE 4N 12										gas
Atlantic Pitchford	R A King #1	NW SE SW NE	26	Wilburton	680	8651	8696	8688	8	37 (1)	37	gas
RESTORED		SW SW SW 4N 12										
Daniel Price	Miller #1	1320 FSL 1980 FWL NE	26	Wilburton	650	8855	8908	8903	5	48 (5)	34	
RESTORED		SW 4N 12										
Daniel Price	Miller #1	E NE	26	Wilburton	650	8857	8900	8893	7	36 (3)	31	Gas
RESTORED		SW 4N 12										
Samson	Honea #1	S N NW	27	Wildcat	690	9857	9903	9900	3	43 (2)	41	dry
RESTORED		NW 5N 34										
Atlantic Pitchford	US Gov 27-2	2310 FNL 660 FEL	27	Wilburton	630	8780	8830	8827	3	47 (3)	37	gas
RESTORED		N NW 4N 14										
Atlantic Richfield	US Gov. '27' #1	S SE	27	Wilburton	632	8978	9022	9018	4	40 (1)	40	
RESTORED		SW NW 4N 14										
Samson	Monroe #1	720 FSL 1320 FWL	28	Wilburton	803	9979	10049	10047	2	68 (1)	68	gas
RESTORED		S SW 5N 33										
Mustang	McClean 2-30	400' W of C SE	30	Bache	681	11044	11109	11105	4	61 (5)	48	dry
RESTORED												
Davis Oil Co	Payne #1	1320 FNL 2300 FEL	33	Hartshorne	663	11093	11148	11143	5	50 (3)	43	dry
RESTORED		E NE 4N 4										
D-Pex Operating	Almerito #1	W/2 NE NE	34	Wilburton	645	9750	9819	9817	2	67 (4)	58	gas
RESTORED		N SW 4N 14										
Daniel Price	Haileyville Townsite	E W SE	35	Wilburton	674	10366	10426	10423	3	57 (5)	48	gas
RESTORED		SW SW 4N 24										
Marathon Oil Co.	Woods Prosp #2	1170 FSL 1170 FEL	36	Wilburton	671	9805	9872	9866	6	61 (5)	52	gas
Marathon Oil Co.	Woods Prosp #2	1170 FSL 1170 FEL	36	Wilburton	671	11015	11077	11069	8	54 (2)	51	gas
RESTORED		SW SW 4N 30										
RESTORED		SW NW 4N 19										
Marathon	Woods Prospect #1	NW SW NE	36	Haileyville	673	10569	10627	10617	10	48 (1)	48	
RESTORED		SE SE 4N 13										

5N-17E Operator	Well	Location	Sect.	Field	K.B.	Top Spiro	Top Wap	Top M. Shale		Spiro Isopach	Spiro Isolith	Prod.
Arco	Sharp #1	S SW	2	Wildcat	723	10794	10831	10814	17	20 (1)	17	dry
Coquina Oil Co.	Tobe #1	W NE	5	Wildcat	897	9403	no spiro					
Gulfstream	Randel 1-9	SW NW SE	9	Hartshorne	626	12024	no spiro					
Gulfstream	Raspotnik 1-10	SW	10	Hartshorne	643	11536	11577	11560	17	24 (2)	21	
Sinclair	Dungan 'A' #1	N SE	13	Wilburton	612	7816	7876	7858	18	42 (1)	42	gas
RESTORED		SE NE 5N 36										
Arco	Dunagan #2 'A'	NE SE NW	13	Wilburton	652	9073	9131 mirr	9115	16	42 (3)	38	gas
RESTORED		NE SE NW 5N 24										
Mobil	#1 Kent Heirs	W W SE	14	Wilburton	625	8119	8183	8173	10	54 (2)	51	gas
RESTORED		W SE 5N 23										
Samson	Kent #1	E W SW SE	15	Wilburton	616	8305	8354	8351	3	26 (2)	43	gas
RESTORED		SW SE 5N 22										
Samson	Bobo #1	SE SE	16	Wilburton	612	9020	9040	NA	0	20 (?)	?	gas
RESTORED		SE SE 5N 21										
NEw Gulf Stream	Duran #1	S N SE	18	Wilburton	645	11355	11395	11388	7	33 (2)	32	dry
TXO	Webber 'A' 1	N SW SE	18	Hartshorne	840	8630	8687	8683	4	53 (3)	47	gas
RESTORED		SW SE 5N 19										
Exxon	Anderson K #2	NW SW SE	19	Wilburton	686	8868	8926	8924	2	56 (6)	45	gas
RESTORED		NW SE 5N 31										
Humble	K. Anderson 1	NW SE SE	19	Wilburton	635	8277	8342	8335	7	57 (4)	48	
RESTORED		NE NE NW 4N 8										
Sinclair	Pauline Bowman #1	SW NE	20	Wilburton	803	8461	8525	8517	8	56 (1)	56	gas
RESTORED		SW NE 5N 32										
Arco	Pauline Bowman #3	SE NW SE	20	Wilburton	753	8497	8581	8577	4	80 (1)	80	
RESTORED												
NICOR	Bowman #4	SW NE SW	20	Wildcat	702	8368	8448	8444	4	76 (5)	54	
NICOR	Bowman #4	SW NE SW	20	Wildcat	702	8788	8878	8874	4	86 (4)	78	
NICOR	Bowman #4	SW NE SW	20	Wildcat	702	11307	11354	11349	5	42 (1)	42	
RESTORED		SW NE SW 5N 32										
RESTORED		SW NE SW 5N 29										
Sinclair	Pauline Bowman #1	1210 FNL 1320 FWL (SE)	21	Wilburton	787	8835	8915	NA	0	80 ?	?	gas
RESTORED		NW SE 5N 33										
Mobil	Goldie Sivil #1	NW SW NE	22	Wilburton	682	8488	8557	NA	0	69 (1)	69	gas
RESTORED		NE SW 5N 34										
Samson	Sams 1	SE NW SE	22	Wilburton	756	8764	8827	8825	2	61 (3)	56	gas
RESTORED		SW SE 5N 34										
Mobil	Darby Subdivision	NW NW SE	23	Wilburton	842	9088	9166	9150	16	72 (1)	72	gas
RESTORED		W SE 5N 35										

Mobil	Darby #2	1320 FNL 1300 FWL	23	Gowen	654	8399	8451	8440	11	41 (4)	35	gas
RESTORED		SW NW 5N 35										
Marathon	Fabbro #1	NW SE	24	Wilburton	846	8274	8353	8336	17	62 (1)	62	dry
RESTORED		SE SE 4N 1										
Marathon	Fabbro #2	NE	24	Wilburton	703	8697	8766	8751	15	54 (4)	47	gas
RESTORED		SE NE 5N 36										
Sinclair	JL Henley #1	NE SE NW	25	Wilburton	796	9216	9297	9283	14	67 (1)	67	gas
RESTORED		SE 4N 12										
Amoco	Caudron #2	NE SE NW	26	Wilburton	722	8438	8504	8499	5	61 (4)	52	gas
Amoco	Caudron #2	NE SE NW	26	Wilburton	722	11314	11428	11401	27	87 (10)	63	
RESTORED		SE 4N 11										
RESTORED		SE 4N 2										
Arco	Parker Alfred #2	W E NW	27	Wilburton	733	8472	8527	faulted?	0	55 (1)	55	gas
Arco	Parker Alfred #2	W E NW	27	Wilburton	733	9486	9545	9538	7	52 (2)	50	
RESTORED		SE 4N 10										
RESTORED		SE 4N 3										
Arco	USA Anderson #2	NW NW SE	28	Wilburton	720	10246	10300	10298	2	52 (3)	49	gas
RESTORED		NE SE 4N 9										
Sinclair	P. D. Bowman #1	SW SW NE	29	Wilburton	676	9869	9942	9934	8	65 (1)	65	gas
RESTORED		NE SE 4N 8										
Arco	P D Bowman #2	SW NE SW	29	Wilburton	665	10059	10125	10122	3	63 (5)	53	gas
RESTORED		SW SE 4N 8										
Arco	Richards Edith #3	N S NW	30	Wilburton	634	8931	8995	8982	13	51 (3)	47	gas
Arco	Richards Edith #3	N S NW	30	Wilburton	634	9298	9362	9353	9	55 (4)	47	
RESTORED		NW SE 4N 7										
RESTORED		NW NE NE 4N 6										
King Resources	Pettit 1-31	SE NW SE	31	Wilburton	662	9680	NDE	9743		63 ?	?	gas
RESTORED		NW SW 4N 29										
Sun	Charles Casteel A #2	990 FSL 810 FWL	32	Wilburton	682	10318	10390	10386	4	68 (6)	48	gas
RESTORED		SE SW 4N 20										
Arkoma	Pitichny #2	N N S NW	33	Wilburton	697	9893	9976	9969	7	76 (4)	68	gas
RESTORED		SW SE 4N 21										
Arkoma	Whitney #2	1120 FSL 970 FWL	34	Wilburton	915	10538	10603	10597	6	59 (2)	57	
RESTORED		SW SE 4N 22										
Arkoma	Whitney #3	2000 FSL 1320 FWL	34	Wilburton	712	9988	10051	10046	5	58 (3)	52	gas
RESTORED		NW SE 4N 22										
Arco	Kucilke Andrew #2	NW SE NW	35	Wilburton	684	10294	10361	10353	8	59 (5)	52	gas
RESTORED		SE 4N 14										
Arco	Lerblance #2	NE SW NE	36	Wilburton	734	9577	9648	9644	4	67 (2)	63	gas
Arco	Lerblance #2	NE SW NE	36	Wilburton	734	10320	10391	10377	14	57 (1)	57	
RESTORED		SW NW 4N 19										
RESTORED		SW SW 4N 18										

5N-18E Operator	Well	Location	Sect.	Field	K.B.	Top Spiro	Top Wap	Top M Shale		Spiro Isopach	Spiro Isolith	Prod.
Sinclair Oil & Gas	USA Anderson #1	SW SW NE	1	Wilburton	675	10725	NDE	10766		41 (1)	41	gas
Ambassador Oil Corp	Davis #1	SW	2	Wilburton	701	10977	11032	11017	15	40 (1)	40	gas
Ambassador Oil	Kinnikin Pate #1	SW NE SW	3	Wildcat	693	10966	11022	11004	18	38 (1)	38	gas
Ambassador	Woods #1	SE	4	Wilburton	699	10958	11011	10994	17	36 (1)	36	gas
Ambassador	Sawyer #1	NW SE NE	5	Wilburton	659	10981	11041	11023	18	42 (1)	42	gas
Ambassador	Chaudoin #1	NW NE SE	6	Wilburton	661	11276	11329	11319	10	43 (1)	43	dry
Sinclair	Gardner #1	NW	7	Wilburton	642	11358	11408	11392	16	34 (1)	34	gas
Ambassador	Raunikar #1	NW NE	8	Wilburton	663	10985	11041	11029	12	44 (1)	44	gas
Jones Pellow	McClain #1	SE SE	8	Wilburton	664	10721	10784	10766	18	45 (1)	45	dry
RESTORED		SE SE 5N 17										
Ambassador	Topping State #1	NE	9	Wilburton	683	11028	11082	11067	15	39 (1)	39	gas
JMC Explor	Topping State #2	1150 FEL 660' FSL	9	Wilburton	666	10153	10215	10204	11	51 (2)	47	gas
JMC Explor	edit for lower	overturned beds	9	Wilburton	666	11014 base	10860	11073		59 (2)	58	
RESTORED		SE NE 5N 16										
RESTORED		SE SE 5N 16										
Ambassador	McAlester A #1	SW NE NE	10	Wilburton	684	11069	11131	11111	20	42 (1)	42	gas
Ambassador	Davis A #1	SW NW NE	11	Wilburton	693	11215	11275	11260	15	45 (1)	45	gas
Arco	Davis A #2	NE NW SE	11	Wilburton	690	11402	11458	11445	13	43 (1)	43	gas
Samson	Junior #1	660 FSL 990 FWL	12	Wilburton	675	11591	11653	11638	15	47 (1)	47	dry
Ambassador	Robinson #1	NW	12	Wilburton	727	11235	11338	11278	60	43 (1)	43	gas
Arco	Wayne Austin #2	1720 FSL 2440 FEL	13	Wilburton	688	8886	8987	8984	3	98 (4)	85	gas
Arco	Wayne Austin #2	1720 FSL 2440 FEL	13	Wilburton	688	10342	10388	10386	2	44 (1)	44	
RESTORED		NW SE 5N 24										
RESTORED		NW NE 5N 36										
Samson	Costilow #4	660 FSL 1630 FWL	14	Wilburton	674	7854	7926	7915	11	61 (1)	61	gas
RESTORED		S NW 5N 35										
Samson	Costilow #5	900 FSL 1200 FEL	14	Wilburton	682	8110	8186	8173	13	63 (2)	60	gas
RESTORED		NE 5N 35										
Ambassador	Costilow #1	E NW SE	14	Wilburton	683	7875	7947	7922	25	47 (2)	43	gas
RESTORED		N NE 5N 35										
Arco	Yourman #3	1470 FNL 1320 FWL	15	Wilburton	676	7813	7877	7868	9	55 (1)	55	gas
Arco	Yourman #3	1470 FNL 1320 FWL	15	Wilburton	676	9625	9684	9674	10	49 (1)	49	
RESTORED		SW 5N 27										
RESTORED		NW 5N 22										
Arco	Kilpatrick 2-16	1896 FNL 1600 FEL	16	Wilburton	667	7936	8003	7993	10	57 (1)	57	
Arco	Kilpatrick 2-16	1896 FNL 1600 FEL	16	Wilburton	667	9503	9565	9551	14	48 (1)	48	
RESTORED		SE 5N 28										
RESTORED		NE SW NE 5N										
Arco	Kilpatrick #3	2296 FNL 2000 FEL	16	Wilburton	662	8031	8094	8087	7	56 (1)	56	gas
Arco	Kilpatrick #3	2296 FNL 2000 FEL	16	Wilburton	662	9567	9626	9610	16	43 (1)	43	

RESTORED		SW SE 5N 28										
RESTORED		SW NE 5N 21										
Ambassador	Kilpatrik #1	SW NE SE	16	Wilburton	660	7910	7971	7962	9	52 (1)	52	gas
RESTORED		NE NE 5N 33										
Arco	Steve Fazekas #2	SE NW SE	17	Wilburton	659	7892	7962	7946	16	54 (1)	54	dry
Arco	Steve Fazekas #2	SE NW SE	17	Wilburton	659	9615	9668	9659	9	44 (1)	44	
RESTORED		NW NE 5N 32										
RESTORED		NW SE 5N 20										
Vastar Resources	Fazekas #3	660 FSL 2326 FWL	17	Wilburton	645	7835	7908	7890	18	55 (1)	55	
Vastar Resources	Fazekas #3	660 FSL 2326 FWL	17	Wilburton	645	9716	9773	9763	10	47 (1)	47	
RESTORED		SE NW 5N 32										
RESTORED		SE SW 5N 20										
Ambassador	Fazekas #1	E SW	17	Wilburton	658	8124	8203	8181	22	57 (1)	57	
RESTORED		E NW 5N 32										
Arco	Bud Hampton #2	830 FSL 660 FEL	18	Wilburton	655	8420	8503	8484	19	64 (1)	64	dry
Arco	Bud Hampton #2	830 FSL 660 FEL	18	Wilburton	655	10826	10876	10866	10	40 (2)	38	
RESTORED		NW NE 5N 31										
RESTORED		SE 5N 19										
Ambassador	Hampton #1	E SW	18	Wilburton	647	8383	8461	8438	23	55 (1)	55	gas
RESTORED		E SW 5N 31										
Arco	Bennett State #2	1500 FNL 1500 FEL	19	Wilburton	646	7843	7905	7889	16	46 (1)	42	dry
Arco	Bennett State #2	1500 FNL 1500 FEL	19	Wilburton	646	10086	10143	10141	2	55 (2)	54	
RESTORED		SE 5N 31										
RESTORED		NE 5N 30										
Arco	Smith MA #2	1838 FWL 1336 FSL	20	Wilburton	632	7364	7419	NA	0	55 (1)	55	
Arco	Smith MA #2	1838 FWL 1336 FSL	20	Wilburton	632	8444	8518	8500	18	56 (2)	51	gas
Arco	Smith MA #2	1838 FWL 1336 FSL	20	Wilburton	632	10019	10069	10057	12	38 (1)	38	
RESTORED		NE 4N 8										
RESTORED		NE 4N 5										
RESTORED		SW 5N 29										
Arco	Paschall #2	1960 FNL 1640 FWL	21	Wilburton	667	8244	8322	8308	14	64 (1)	64	dry
Arco	Paschall #2	1960 FNL 1640 FWL	21	Wilburton	667	9755	9808	9795	13	40 (1)	40	
RESTORED		SW 5N 33										
RESTORED		NW 5N 28										
Arco	RF McAlester #3	1600 FEL 2000 FSL	22	Wilburton	677	7945	7977	7976	1	31 (1)	31	dry
Arco	RF McAlester #3	1600 FEL 2000 FSL	22	Wilburton	677	8247	8311	8306	5	59 (1)	59	
Arco	RF MCAlester #3	1600 FEL 2000 FSL	22	Wilburton	677	10791	10853	10843	10	52 (1)	52	
RESTORED		NW NW 4N 11										
RESTORED		NW NW 4N 2										
RESTORED		NW SE 5N 27										
Ambassador	McAlester #2	N SW NW	22	Wildcat	678	7604	7679	7670	9	66 (1)	66	
RESTORED		SW SW 5N 27										
Anadarko Petro	Williams A #3	2465 FNL 1890 FWL	23	Wilburton	690	8310	8388	8375	13	65 (1)	65	gas
Anadarko Petro	Williams A #3	2465 FNL 1890 FWL	23	Wilburton	690	10812	missing	10891		79 (9)	55	

RESTORED		SE SW 5N 35										
RESTORED		SE NW 5N 26										
Ambassador	Williams #1	NW	23	Wildcat	691	8102	8179	8166	13	64 (1)	64	gas
RESTORED		SW 5N 35										
Arco	James Unit #2	1600 FNL 1500 FWL	24	Wilburton	707	8312	8389	8375	14	63 (1)	63	dry
Arco	James Unit #2	1600 FNL 1500 FWL	24	Wilburton	707	10753	10818	10804	14	51 (1)	51	
RESTORED		N SW 5N 36										
RESTORED		NW 5N 25										
Ambassador	James 'A' #1	NE SW NW	24	Wildcat	686	8322	8389	8376	13	54 (1)	54	gas
RESTORED		NW SW 5N 36										
Donald Slawson	Malitz 1-25	S NE NE	25	Wilburton	964	9750	9868	9837	31	87 (2)	81	gas
RESTORED		NW 4N 19E 19										
Skelly	Guy Vernum #1	1285 FSL 1355 FWL	25	Wilburton	782	9658	9753	9728	25	70 (1)	70	gas
RESTORED		SE 4N 24										
Arco	Watts Jones #2	200 FSL 990 FEL	26	Wilburton	770	9873	9950	9939	11	66 (2)	62	gas
Arco	Watts Jones #2	200 FSL 990 FEL	26	Wilburton	770	12260	12325	12310	15	50 (2)	46	
RESTORED		SW SW 4N 24										
RESTORED		SW NW 4N 13										
Arco	EV Enis #2	1600 FNL 1600 FWL	27	Wilburton	730	9194	9276	9262	14	68 (2)	68	gas
RESTORED		NE 4N 22										
Arco	State 'C' #2	1500 FNL 2000 FWL	28	Wilburton	703	8398	8473	8462	11	64 (1)	64	dry
Arco	State 'C' #2	1500 FNL 2000 FWL	28	Wilburton	703	10843	10900	10890	10	47 (1)	47	
RESTORED		NE 4N 21										
RESTORED		SE 4N 9										
Ambassador	Dobbs State #1	1320 FSL 1470 FWL	29	Wilburton	642	8066	8138	8119	19	53 (1)	53	gas
RESTORED		NE 4N 20										
Arco	Dobbs State #2	NE SE NW	29	Wilburton	664	8133	8181	8164	17	31 (1)	31	
Arco	Dobbs State #2	NE SE NW	29	Wilburton	664	9110	9179	9164	15	54 (4)	46	
Arco	Dobbs State #2	NE SE NW	29	Wilburton	664	10772	10824	10806	18	34 (1)	34	
RESTORED		SE SE 4N 17										
RESTORED		SE SE 4N 8										
RESTORED		NE SE 4N 5										
Arco	Jesse Bennett #2	1825 FNL 1900 FWL	30	Wilburton	663	9117	9188	9171	19	54 (3)	49	gas
Arco	Jesse Bennett #2	1825 FNL 1900 FWL	30	Wilburton	663	10288	10347	10332	15	44 (2)	41	
RESTORED		SE SE 4N 7										
RESTORED		SE SE 4N 6										
Arkoma	Hunter Tucker #3	1320 FWL 1000 FNL	31	Wilburton	649	9163	9236	9226	10	63 (1)	63	gas
Arkoma	Hunter Tucker #3	1320 FWL 1000 FNL	31	Wilburton	649	9959	10031	10025	6	66 (1)	66	
RESTORED		W NE 4N 19										
RESTORED		W SE 4N 18										
Arkoma	Hunter Tucker #2	NE	31	Wilburton	646	9823	9895	9882	13	59 (1)	59	gas
RESTORED		SW NW 4N 20										
Arkoma	Kennedy B-2	1143 FSL 1497 FWL NW	32	Wilburton	660	10257	10331	10314		57 (1)	57	gas
RESTORED		N NE 4N 29										

Sinclair	Mc Watts #1	C NE	33	Wilburton	753	10608	10678	10667	11	59 (1)	59	gas
RESTORED		SW NW 4N 27										
Coquina Oil Co.	Watts #1	NE	34	Wilburton	730	10760	10873	10830	7	70 (1)	70	gas
RESTORED		NW 4N 26										
Samson	Mose #1	1320 FNL 660 FWL	35	Wilburton	881	10679	10761	10758	3	79 (1)	79	gas
RESTORED		W NE 4N 26										

5N-19E

Operator	Well	Location	Sect.	Field	K.B.	Top Spiro	Top Wap	Top M Shale		Spiro Isopach	Spiro Isolith	Prod.
PanAm	Kier #1	SE NW	2	Wilburton	683	14467	14512	14511	1	44 (1)	44	dry
PanAm	Reusch #1	SW	3	Wilburton	658	10802	10877	10852	25	50 (1)	50	gas
Amoco	USA Choc Tribe T-3 #2	2340 FNL 1660 FEL	4	Wilburton	634	11084	11148	11129	29	45 (1)	45	gas
Amoco	USA Choc Tribe T-4 #2	NE NE SW NE	5	Wilburton	646	10546	10605	10596	9	50 (2)	48	gas
PanAm	USA JW MCTierman #1	SE NW	6	Wilburton	639	10661	10726	10708	18	47 (1)	47	gas
PanAm	Quaid #1	NE SE NW	7	Wilburton	747	11066	11129	11114	15	48 (1)	48	gas
Hadson Oilto Oil	EOSC #1-8	NW NW	8	Wilburton	673	10918	10988	10974	14	56 (1)	56	gas
Amoco	Wilburton Townsite	SE NE	9	Wilburton	701	11819	11899	11869	30	50 (1)	48	dry
Pitco	Poteet #1-17	E E SW	17	Wilburton	659	11519	11611	11598	13	79 (2)	69	dry
Exxon	College Unit #2	NW SE NW	18	Wilburton	677	10613	10683	10670	13	57 (1)	57	dry
Exxon	College Unit #2		18	Wilburton	677	11899	11973	11962	11	63 (1)	63	
RESTORED		SE NW 5N 19										
Humble	J A Ray #1	NW	20	Wilburton	683	11567	11635	11621	14	54 (1)	54	gas
Humble	Envir Jewel #1	SE SW NW	21	Wilburton	745	12506	12557	12545	12	39 (1)	39	dry
Texaco	HM Jennings 23-1	200 FSL 2858 FEL	23	Wildcat	864	12952	12996	12990	6	38 (1)	38	gas
Texaco	HM Jennings 23-1		23	Wildcat	864	14146	14227	14223	4	77 (2)	74	
RESTORED		SE SE 4N 11										
Texaco (sidetrack)	DK Spangler #24-1	2470 FSL 1680 FWL	24	Wildcat	787	13108	13218	13177	41	69 (2)	62	gas
RESTORED		N SE 4N 12										
Shell	Williams #32-27	NE	27	Wilburton	1073	12829	12905	12887	18	58 (2)	48	
Shell	Williams #32-27		27	Wilburton	1073	14339	14383	14381	2	42 (1)	42	
RESTORED		NW 4N 14										
Chapparal	VFW 1-29	SW	29	Wilburton	886	11022	11099	11077	22	55 (2)	52	dry
RESTORED		SE 4N 20										
Daniel Price	Church Lake #1	2180 FSL 1120 FWL	29	Wilburton	805	12165	12242	12215	27	50 (2)	48	dry
Sun Expl.	Diamond #2	SW	30	Wilburton	847	10433	10524	10509	15	76 (2)	72	gas
RESTORED		SW SE 4N 19										
Amoco	A J Mabry #1	NW SE	31	Wilburton	1344	11427	11517	11500	17	73 (3)	69	
RESTORED		E SE SE 4N 30										
Amoco	Virginia Walker #1	NW NW SE SW	32	Wilburton	898	11657	11726	11711	15	54 (1)	54	gas
RESTORED		SE 4N 29										
Amoco	Erlaine Wheeler 25-1	SE NW NE NE	36	Wilburton	979	6824	6953	6951		127 (7)	101	gas

Amoco	Erlaine Wheeler 25-1	BHL NE NW SE 25	36	Wilburton	979	13816	13956	13940		124 (8)	101	
RESTORED		NW SW 4N-20E 19										
5N-20E												
Operator	**Well**	**Location**	**Sect.**	**Field**	**K.B.**	**Top Spiro**	**Top Wap**	**Top M Shale**		**Spiro Isopach**	**Spiro Isolith**	**Prod.**
Donald Slawson	Foster 1-1	SW	1	Panola	650	12539	12616	12612	4	73 (7)	59	dry
Mustang	Booth 1-2	200 SE OF C	2	Panola	610	11929	12007	11992	15	63 (1)	63	gas
Mustang	Cathey #1	1470 FNL 1450 FEL	3	Wildcat	596	12049	12129	12119	10	70 (2)	66	gas
Mustang	Robinson 1-11	1320 FEL 1980 FSL	11	Wilburton	585	13124	13225	13218	7	94 (6)	74	dry
Arco	Rock Island 1-15	400 FSL 1000 FEL	15	Wilburton	613	14982	no sp or wap					dry
Humble	Shay #1	SW NE SW	17	Wildcat	626	13723	13808	NA	0	85 (1)	85	dry
Unit Drilling	Harding #1	1320 FSL 1980 FWL NE	18	Panola	576	12924 td	no spiro wap					
Anson	Buzzard Gap 1-19	1674 FSL 2537 FWL	19	Panola	833	12957	13059	NA	0	102 (4)	88	gas
RESTORED		W NW SW 4N 8										
Anson	Hardcastle 1-20	2446 FSL 1340 FWL	20	Wilburton	685	13255	13345	13335	10	80 (4)	70	gas
RESTORED		NW SW 4N 9										
Anson	Cindy 1-21	500 FSL 1300 FWL	21	Wilburton	718	12801	12924	12916	8	143 (8)	88	gas
Anson	Cindy 1-21	500 FSL 1300 FWL	21	Wilburton	718	15293	15402	15400	2	107 (4)	95	
RESTORED		SW SE 4N 9										
Anson	Sinner 1-23	216 FSL 1407 FWL	23	Panola	683	14568	14646	14631	15	63 (5)	48	
Anson	Long Creek 1-25	1070 FSL 2340 FWL	25	Panola	861	14718	14877	14828	49	110 (4)	94	
Amoco	Raymond Smith #1	1700 FSL 985 FWL	26	Panola	701	12582	12723	12688	35	106 (5)	87	gas
Amoco	Raymond Smith #1		26		701	13039	faulted	13149		110 (6)	84	
Amoco	Raymond Smith #1	NE SW NW	26		701	13385	13499	13469	30	84 (4)	70	
RESTORED		SE 4N 23										
RESTORED		SE 4N 14										
Amoco	Jack Bouman #1	SW NE NE	27	Wilburton	750	13960	14079	14050	29	90 (5)	79	gas
Anson	Turney 1-28	1957 FSL 1085 FEL	28	Wildcat	1111	?						gas
Anson	Turney 1-28	1957 FSL 1085 FEL	28	Wildcat	1111	13062	13171	13162	9	100 (5)	84	
Anson	Turney 1-28	1957 FSL 1085 FEL	28	Wildcat	1111	13889	NDE	13989		100 (10)	74	
RESTORED		N SW 4N 15										
Chaparral	VFW 1-29	???????	29	Wilburton	886	11022	11099	11078	21	56 (1)	56	
Amoco	Bobcat Ridge #1	NE SW NW	30	Wilburton	887	13637	13781	13778	3	141 (7)	121	
RESTORED		NE 4N 18										
Anadarko	H&H Cattle Co 'A' 1-31	601 FEL 1292 FSL	31	Wilburton	867	14381	14523	14516	7	135 (9)	101	gas
RESTORED		SE NE SW 4N 20										
Anson	Dead Mule #32	1160 FSL 2420 FWL	32	Cravens	868	14232	14345	14325	20	93 (7)	71	
RESTORED		SE SE 4N 20										
Anson	Turner 1-33	(SW SE) SE NE NW	33	Cravens	1046	14297	14431	14413	18	116 (7)	88	gas
RESTORED		SE SE 4N 21										
Arco	Norman 1-34	NE SE SE SE	34	Red Oak	942	13556	13714	13684		128		gas
Arco	Norman 1-34	NE SE SE SE	34	Red Oak	942	14418	14458	14433		15		

Arco	Norman 1-34	NE SE SE SE	34	Red Oak	942	15015		15121				
RESTORED		SE SE SW 4N 26										
RESTORED		SE SE SW 4N 23										
Anson	Spring Creek Gap 1-36	2350 FWL 1600 FSL	36	Wilburton	846	6550 ?	7250 ?					gas
Anson	Spring Creek Gap 1-36	2350 FWL 1600 FSL	36	Wilburton	846	?	16360 ?					

5N-21E

Operator	Well	Location	Sect.	Field	K.B.	Top Spiro	Top Wap	Top M Shale		Spiro Isopach	Spiro Isolith	Prod.
Southland Royalty	Garner #1-2	E NW	2	Red Oak	613	11997	12118	12100	18	103 (4)	94	dry
Mitchell Energy	Russell Albin #1	SW	3	Wildcat	625	12315	12444	12438	6	123 (4)	113	dry
Anadarko Petroleum	Alford 'A' 1-15	1980 FSL 1980 FWL	15	Wildcat	850	15590	15624	15621	3	31 (4)	28	
Ambassador	Muse #1	NW NW	22	Wildcat	559	10634	10726	10686	40	52	52	dry

6N-16E

Operator	Well	Location	Sect.	Field	K.B.	Top Spiro	Top Wap	Top M Shale		Spiro Isopach	Spiro Isolith	Prod.
Arco	Lake Eufala 1-2	2315 FSL 1892 FEL	2	Wildcat	690	7761	7794	7780	14	19 (1)	19	
Oxley Petroleum	Hudgens #1	1120 FNL 1832 FEL	3	Blocker	621	7314	7347	7333	14	19 (2)	12	dry
Oxley Petroleum	Ward A	116 FSL 1070 FEL	9		651	7983	8013	7998	15	15 (1)	15	
Oxley Petroleum	Baldwin #1	SE NW SE	10	Wildcat	640	7700	7734	7719	15	19 (1)	19	
Snee Eberly	Baldwin Pettitt #1	SE NW SE	11	Quinton	659	7791	7820	7811	9	20 (1)	20	
Oxley Petroleum	Davis Kemp #1	1882 FSL 1540 FWL	16	Wildcat	672	9153	8179	8174	5	21 (1)	21	
Oxley Petroleum	Kieth #1	990 FSL 2300 FWL NW	19	Wildcat	795	8699	8735	8733	2	34 (1)	34	
Oxley Petroleum	Opal #1	660 FNL 660 FWL	20		774	8666	8698	8696	2	30 (2)	28	
Tom Hutchinson	EC McKinzie #1	1951 FSL 539 FWL	23	Wildcat	631	8369	8404	8389	15	20 (1)	20	

6N-17E

Operator	Well	Location	Sect.	Field	K.B.	Top Spiro	Top Wap	Top M Shale		Spiro Isopach	Spiro Isolith	Prod.
Oxley	White Emma #3	SE SE	1	Kinta	941	9100	9135	9123	12	23 (2)	22	gas
TXO Production	Owens H-1	SW	8	Quinton	725	8545	8583	8571	12	25 (2)	23	
Steve Gose	Hughes #1	SE SE NW	10	Wildcat	804	8557	8591	8576	15	19 (1)	19	
Skelley	White 'F' #1	NW NW SE	13	Wildcat	710	9072	9103	9099	4	27 (1)	26	
Arco	Browne #1	251 FNL 2028 FEL	28	Wildcat	994	8645	8674	8661	13	16 (1)	16	
Magnolia	Fred Manschereck #1	SE NE	28	Wildcat	963	8931	8957	8950	7	19 (1)	19	
Hamilton Brothers	Winship Browne #1	1320 FSL 1120 FWL NE	31	Wildcat	891	9479	9516	9508	8	29 (1)	29	
Mustang	Brown #1-33	NE	33	Wildcat	821	9322	9356	9341	15	19 (1)	19	

6N-18E Operator	Well	Location	Sect.	Field	K.B.	Top Spiro	Top Wap	Top M Shale		Spiro Isopach	Spiro Isolith	Prod.
Mobil	Glenn #1	NW NE SW	2	Quinton	920	9090	9133	9111	22	21 (1)	21	dry
Texaco	White 'B' #2	NW	3	Kinta	786	9158	9185	9178	7	20 (1)	20	gas
Texaco	White 'C' #2	2600 FSL 1320 FEL	4	Kinta	843	9278	9317	9302	15	24 (1)	24	gas
Eberly and Meade	Mary White $4-8	NW	8	Quinton	785	8903	8953	8939	14	36 (2)	34	gas
Exxon	Wilson McCrabb #2	NW NW	9	Kinta	953	9348	9389	9375	14	27 (1)	27	dry
Samson	lake Wayne #1	S SE NE	11	Ash Creek	850	9220	9267	9249	18	29 (1)	29	gas
Galaxy Oil	Galaxy Imp. Am. State #	NW NW SW	12	Kinta	871	9192	9246	9242	4	50 (1)	50	dry
Samson	State 'A' 3-13	900 FNL 660 FWL	13	Kinta	1186	9316	9370	9349	21	33 (1)	33	dry
Galaxy	State 'A' #1	SE NW SE NW	13	Kinta	1018	9432	9480	9459	21	27 (1)	27	gas
Snee and Eberly	Scruggs 1-14	NE	14	Kinta	1281	9323	9369	9348	21	25 (1)	25	dry
Whitmar Exploration	Binkley 1-15	NW NW	15	Kinta	1322	9397	9548	9426	22	29 (1)	29	dry
Cleary Petroleum	Carver #2-23	C E	23	Wilburton	1176	10985	11035	11014	21	29 (1)	29	dry
BHP	Wildlife #2	SE	24	Wilburton	732	10663	10705	10702	3	39 (1)	39	dry
Monsanto	Wildlife #1	500 E 200 N OF C	24	Wilburton	832	10669	10720	10701	19	32 (1)	32	gas
Amoco	USA Anderson Prit. #2	840 FSL 740 FWL	25	Wilburton	783	10927	10982	10966	16	39 (1)	39	gas
Pan Am	Doremus #1	150 N OF C NW SE	26	Wildcat	1039	11213	11271	11255	16	42 (1)	42	dry
Sinclair	Mitchell #1	NW NW SE	32	Wilburton	715	10915	10964	10952	12	37 (1)	37	gas
Sinclair	RH Lowry #1	SW NE	33	Wilburton	673	10850	10902	10887	15	37 (1)	37	dry
Brock	Billy Hickman #2-34	1000 FSL 1650 FWL	34	Wilburton	732	10589	10642	10623	19	34 (1)	34	dry
Samson	Sunflower #1-35	SE SE	35	Wilburton	745	10531	10586	10572	14	41 (1)	41	gas
JMC Exploration	Federal Church #2	1470 FNL 1495 FWL	36	Wilburton	680	10723	10760	10750	10	27 (1)	27	gas

6N-19E Operator	Well	Location	Sect.	Field	K.B.	Top Spiro	Top Wap	Top M Shale		Spiro Isopach	Spiro Isolith	Prod.
Samson	Choctaw #1	NE NE	1	Kinta	1025	8765	8814	8807	7	42 (1)	42	gas
Sun Exploration	WA Bratton #1	SW	2	Kinta	1452	8843	8908	8903	5	60 (3)	55	dry
Exxon	Clayton Browne #2	SW	3	Kinta	1085	8905	8955	8933	22	28 (1)	28	gas
Samson	Bratton #1	660 FSL 2040 FEL	4	Wilburton	1016	8902	8949	8928	21	26 (1)	26	gas
Mobil	Weaver C #1	NE SW	5	Kinta	1187	8983	9023	9007	16	24 (1)	24	gas
Mobil	Dovie Weaver 'C' #2	NE	5	Kinta	1318	9132	9175	9157	18	25 (1)	25	gas
Mobil	Weaver #1	SW NE	6	Kinta	1377	9007	9048	9030	18	23 (1)	23	gas
Arco	Dept. Wildlife #2	SW	7	Kinta	984	9186	9228	9210	18	24 (1)	24	gas
Sinclair	Wildlife Cons. #1	SE SW NE	7	Kinta	1140	9076	9117	9092	25	16 (1)	16	gas
Mobil	Dovie Weaver F-2	SW	8	Kinta	983	9117	9157	9139	18	22 (1)	22	dry
Eberly and Meade	Slawson #2-9	SE	9	Robber Cave	1239	8926	8980	8957	23	31 (1)	31	

Mobil	Fred Slawson #1	NE SW NE	9	Kinta	1128	8907	8956	8938	18	31 (1)	31	gas
Mobil	Clayton Browne #1	SW NE SW	10	Kinta	1437	8923	8978	8964	14	41 (1)	41	gas
Samson	Rothbaum #1	SE	13	Kinta	1487	15000 TD	no sp or wap					
Pitco	Shaw 1-14	N SW SW	14	Wilburton	1229	9699	9752	9739	13	40 (1)	40	gas
Mobil	Homer Johnson #1	NE SW NE	15	Kinta	1388	8899	8952	8933	19	34 (1)	34	gas
Mobil	Homer Johnson #2	SW	15	Kinta	1248	9366	9422	9401	21	35 (1)	35	gas
Oxley	Weaver #2	SE	16	Wilburton	1459	9295	9336	9323	23	28 (1)	28	gas
Oxley	Weaver #3	W NE NE	16	Kinta	1299	8991	9045	9022	23	31 (1)	31	gas
Samson	Mollie Weaver #1	SW SW	17	Kinta	1005	9715	9762	9745	17	30 (1)	30	gas
Mobil	Dovie Weaver D 1	SW NE	17	Wilburton	1142	9310	9355	9333	22	23 (1)	23	dry
Samson	Robbers Cave #2	C E NE	18	Kinta	924	9519	9567	9546	21	27 (1)	27	gas
BHP	Cave #2	NE	19	Kinta	961	10067	10114	10099	15	32 (1)	32	gas
Monsanto	Cave #1	NW SW SE	19	Wilburton	887	10546	10592	10571	21	25 (1)	25	gas
Mobil	Dovie Weaver 'B' #1	NW SE	20	Wilburton	1075	10096	10155	10134	21	38 (1)	38	gas
Mobil	Dovie Weaver 'E' #1	SE NW SE	21	Wilburton	1297	9946	9994	9980	14	34 (2)	32	gas
Mobil	CO Harrison #1	1960 FSL 1980 FWL	22	Wilburton	1047	9848	9903	9883	20	35 (2)	33	gas
Edwin Cox	Jankowsky #1	1650 FSL 231 FWL	23	Wilburton	1254	11867	NDE	11896		29 (2)	26	
Samson	Golightly #1	1495 FSL 1320 FWL	24	Wilburton	1276	12434	11494	12489	5	55 (3)	52	gas
Tenneco	Ark. Kraft 1-25	NE SW SW	25	Buzzard Gap	1240	12590	12668 (?)	12662	6	72 (3)	59	gas
Tenneco	Ark. Kraft 1-26	1220 FSL 470 FWL SE	26	Buzzard Gap	1209	12725	12791	12789	3	64 (3)	49	gas
Samson	Young Ranch #2	1550 FNL 2300 FWL	27	Wilburton	1046	10033	10091	10070	21	37 (1)	37	gas
Samson	Began #1	1825 FSL 1320 FWL	28	Wilburton	1063	10308	10367	10348	19	40 (1)	40	gas
Samson	Kilpatrick 2-29	NW	29	Wilburton	1107	10309	10365	10353	12	44 (1)	44	gas
Mobil	Hackney #2	S S NW	30	Kinta	1040	10757	10810	10798	12	41 (1)	41	gas
Pan Am	EO A&M #1	NW SE	31	Wilburton	643	10340	10403	10387	16	47 (1)	47	gas
Pan Am	Quaid 'B' 1	NW SE	32	Wilburton	675	10307	10365	10355	10	48		gas
Amoco	Adams Unit #2	E E NW	33	Wilburton	869	10276	10343	10324	19	48 (1)	48	gas
Pan Am	Adams C #1	NE SE SW	33	Wilburton	650	10375	10447	10423	24	48 (1)	48	gas
Williford	Wilshire Young #1	E E SW	34	Wilburton	854	10894	10945	10940	5	46 (1)	46	gas
Williford	Young #2	NW	34	Kinta	740	10356	10420	10400	20	44 (1)	44	gas
Tenneco	Ark. Kraft 1-35	NE	35	Buzzard Gap	972	12919	12963	12958	5	39 (2)	38	gas
Tenneco	Shaw 1-36	1765 FSL 1295 FWL	36	Wilburton	1061	?12944	13109	13104	5	60 (2)	57	gas

6N-20E

Operator	Well	Location	Sect.	Field	K.B.	Top Spiro	Top Wap	Top M Shale		Spiro Isopach	Spiro Isolith	Prod.
Tenneco	Ward 1-1	SE	1	Kinta	1004	13600	13676	13673	3	73 (5)	66	dry
Shell	Jankowsky 1-5	N NW	5	Kinta	1065	9857	9884	9878	6	21 (1)	21	gas
King Resources	Jankowsky 1-6	NW NE	6	Kinta	824	8958	9025	9019	6	61 (1)	21	gas
Whitmar	Dodson 1-7	NE	7		1276	faulted out ?						dry
Samedan Oil	Gibson 1-9	C S	9	Red Oak	1413	14130	14200	14197	3	67 (2)	62	dry
Samson	Circle 'F' Ranch	SE SE	10	Red Oak	683	11243	11337	11320	17	77 (3)	63	

Midwest Oil	Gardner #1	2052 FSL 4060 FWL	13	Red Oak	775	12436	12523	12514	9	78 (2)	72	dry
Tenneco	Jankowsky 1-18	SW	18	Panola	1581	12862	12924	12922	2	60 (?)	46	gas
Tenneco	Cecil 1-19	1785 FWL 1420 FSL	19	Panola	1058	12540	12602	12597	5	57 (2)	51	gas
Tenneco	Swart 1-20	SW	20	Panola	1210	12648	12693	12676	17	28 (2)	26	gas
Shell	Jankowsky 1-21	350 N OF C	21	Panola	1465	12235	12297	12269	28	34 (?)	?	dry
Midwest	Sorrels #1	1730 FNL 1321 FEL	24	Red Oak	1416	12192	12266	12262	4	70 (2)	?	
Mustang	Young and Cooper 1-26	SW	26	Red Oak	1663	11980	12058	12045	12	65 (3)	56	gas
Donald Slawson	PJ #27	CE	27	Panola	1571	12000	12076	12070	6	70 (3)	66	dry
Tenneco	Pierce #1-29	1800 FNL 1320 FWL	29	Panola	1156	12325	12394	12392	2	67 (4)	40	dry
Tenneco	Pierce 1-30	S NE	30	Wildcat	1363	12446	12487	12480	7	34 (2)	31	gas
Leede Oil and Gas	Wilburton Mnt. #1	2200 FEL 2500 FSL	31	Wildcat	1498	12444	12483	12460	23	16 (1)	16	gas
Mustang	Park 1-33	300 E OF C SE	33	Red Oak	1068	12220	12282	12277	5	57 (6)	41	dry
Mobil	Parks 1-33	SE SE SW	33	Wildcat	672	12412	12483	12451	32	39 (1)	39	gas
Mustang	Metcalfe 1-34	250 S OF C SE	34	Red Oak	654	11988	12086	12084	2	96 (6)	86	gas
Tenneco	Foster 1-35	1170 FSL 820 FWL	35	Panola	652	11978	12065	12058	7	80 (5)	72	gas
Mustang	Austin 1-36	200 N OF C W	36	Panola	695	11846	11899	11895	4	49 (3)	43	dry

6N-21E

Operator	Well	Location	Sect.	Field	K.B.	Top Spiro	Top Wap	Top M Shale		Spiro Isopach	Spiro Isolith	Prod.
Eberly and Meade	McKee 3-1	1320 FSL 1980 FWL	1	Red Oak	652	10899	11014	10984	30	85 (6)	72	gas
Donald Slawson	Ivanhoe 1-2	SE	2	Red Oak	719	11351	11389	11377	12	26 (4)	20	dry
ESCO Expl.	Yancey 2-9	SW	9	Red Oak	699	12306						
Midwest	Jones #1	SE NW SE	10	Red Oak	680	11155	11205	11192	13	37 (1)	37	gas
Midwest	Free #1	SE NW SE	11	Red Oak	740	11080	11180	11147	33	67 (2)	61	gas
amoco	Free #2	SW NE SW	11	Red Oak	722	11105	11189	11158	31	53 (3)	36	dry
Frankfort Oil Co.	Norris #1	836 FSL 2089 FEL	12	Red Oak	738	11090	?	11172		82 (?)		gas
Midwest	Gallagher #1	SE NW	13	Red Oak	652	11216	11319	11298	21	82 (?)		gas
Sun Exploration	William Gallagher #2	2290 FSL 1320 FWL	14	Red Oak	644	11330	11445	11440	5	110 (4)	90	gas
Midwest	Booth #1	1896 FEL 2148 FSL	15	Red Oak	650	11414	11506	11478	28	64 (3)	21	gas
Midwest	Brewer #1	1160 FEL 2290 FSL	16	Red Oak	644	11438	11545	11536	9	98 (3)	77	gas
Midwest	Sentry Roalty #1	NE NW SE	17	Red Oak	661	11679	11759	11751	8	72 (2)	35	gas
Amoco	White #2	SE SW SE NW	18	Red Oak	692	12249	12334	12328	6	79 (4)	3	gas
Mustang Prod.	Foster Exxon #1	SE NW NE	19	Red Oak	696	11944	12037	12032	5	88 (5)	76	gas
Mustang	Gillispe 2-20	NW NW	20	Red Oak	678	11774	11869	11867	2	93 (6)	51	gas
Midwest	Noah #1	790 FNL 2440 FWL	21	Red Oak	627	11639	11755	11753	2	114 (?)		dry
Exxon	Circle 'F' ranch	SW SW NE	22	Red Oak	609	11442	11549	11542	7	100 (2)	96	
Samson	Opal 1-23	1320 FWL 1320 FSL	23	Red Oak	604	11446	11548	11528	20	82 (4)	73	dry
PanAm	Cecil #1	140 E OF C NW	24	Red Oak	599	11135	11250	11244	6	109 (2)	101	gas
Pan Am	Knauer #1	E SW NW	25	RED OAK	904	12221	12344	12314	30	93		
Texas Oil and Gas	Gallagher #1	NW NW	26	Red Oak	1064	11426	11530	11511	19	85 (2)	73	gas
Mustang	Lyons 1-27	1170 FSL 970 FWL	27	Red Oak	650	11485	11608	11593	15	108 (3)	97	gas

Mustang	Noah 1-28	NW NW	28	Red Oak	771	11617	11730			113 (9)	95	dry
Mustang	Smallwood 1-28	1320 FSL 2340 FWL	28	Wildcat	639	1151	11672			121 (8)	98	gas
Whitmar	Mark Corcoran 1-29	C N NW	29	Red Oak	1542	11668	11780	11769	11	101 (3)	95	gas
Whitmar	McCreery 1-30	1320 FSL 1470 FWL	30	Red Oak	1696	11684	11749	11745	4	61 (2)	59	gas
Pan Am	Melone #1	NW NW SE	31	Red Oak	705	11858	11935	11922	13	64 (3)	52	dry
Sarkeys	Thrift 1-33	300 E OF C N	33	Red Oak	618	11587	11700	11698	2	111 (?)		dry
Mustang	Judd 1-35	SW NW SE	35	Red Oak	577	12448	12573	12571	2	123 (4)	110	dry

6N-22E

Operator	Well	Location	Sect.	Field	K.B.	Top Spiro	Top Wap	Top M Shale		Spiro Isopach	Spiro Isolith	Prod.
Amoco	Heston Martin #2	1500 FSL 190 FWL	3	Red Oak	579	10734	10882	10813	69	79 (5)	57	dry
Amoco	Lewis #3	SE NE SW	4	Red Oak	607	10597	NDE	10683		86 (7)	66	gas
Frankfort Oil Corp.	Eaves #1	715 FSL 2305 FEL	6	Red Oak	597	11079	NDE	11132		53		
Midwest	Foster #1	2520 FEL 1980 FSL	7	Red Oak	693	10969	11083	11037	46	68 (?)		gas
Amoco	Orr 'A' #2	1800 FNL 1800 FEL	8	Red Oak	600	10785	10920	10850	70	65 (4)	51	gas
Amoco	Lyons #2	NE NE SE NW	9	Red Oak	593	10764	10897	10840	57	76 (6)	53	gas
Midwest	Maxey #1	NW SE NW	10	Red Oak	573	10798	10952	10874	78	76		gas
Amoco	Charney #2	NW NW SE	12	Red Oak	716	10726	10889	10825	64	101 (8)	76	dry
Amoco	Ramer #2	SE NW SE	14	Red Oak	720	11000	11164	11090	74	90 (4)	71	gas
Midwest	Rider #1	277 E 499 S OF C	17	Red Oak	578	11363	NDE	11457		94 (2)	92	gas
Sun Exploration	Hulsey #2	SE NW	18	Red Oak	633	11088	11201	11162	39	74 (5)	58	gas
Amoco	Kent #2	NW NW SE	19	Red Oak	632	11601	11709	11678	31	77 (4)	68	gas
Pan Am	Martin #1	1560 FNL 200 W OF C	20	Red Oak	613	11682	11816	11777	39	94 (2)	91	gas
Amoco	Myton #2	190 FSL 1950 FWL NW	22	Red Oak	806	11121	NDE	11218		97 (3)	81	gas
Amoco	Park B-2	1550 FEL 1980 FNL	27	Red Oak	982	11245	11411	11340	71	95 (4)	83	gas
Amoco	DP Brewer #1	C S	29	Red Oak	782	11438	11562	11523	39	85 (2)	81	dry
Mustang	Fields 1-31	S S NW	31	Red Oak	661	11574	NDE	11650		76 (3)	70	dry

7N-16E

Operator	Well	Location	Sect.	Field	K.B.	Top Spiro	Top Wap	Top M Shale		Spiro Isopach	Spiro Isolith	Prod.
Lon and Atteberry	Browne 1-4	SE	4	Wildcat	743	5569	5598	5590	8	21 (1)	21	dry
Wilshire Oil	Browne #1	NW SW	21	Wildcat	880	6028	6053	6050	3	32 (2)	29	dry
Steve Gose	Browne #1	E NW NW SE	28	Wildcat	651	6303	6319	6315	4	12 (1)	12	dry

7N-17E

Operator	Well	Location	Sect.	Field	K.B.	Top Spiro	Top Wap	Top M Shale		Spiro Isopach	Spiro Isolith	Prod.

Transok	Browne 1 (9)	NE	9	Wildcat	795	5944	5978	5964	14	20 (1)	20	dry
Oxley Petroleum	Deborah Hughes #1	1780 FSL 2180 FWL	13	Featherston	655	5901	5933	5914	19	13 (1)	13	dry
Ark. la. Gas Co.	White 'Q' #1	1980 FSL 1320 FEL	25	Quinton	760	6490	6521	6510	11	20 (1)	20	dry
Stephens Production	White #1	1490 FSL 875 FWL	26	Quinton	664	5980	6006	5996	10	16 (1)	16	dry
Arkla	John L Martin	SE NW	27	Wildcat	670	6088	6117	6107	10	19 (1)	19	dry
Park Avenue Expl.	Cochran 1-30	800 FSL 2200 FWL	30	Wildcat	831	6242	6278	6263	15	21 (1)	21	dry
Tre State	Wallace #1	SW NE	30	Wildcat	687	6232	6262	6251	11	19 (1)	19	dry
Humble	Turner Sisters	SW NE	32	Wildcat	904	6206	6246	6234	12	28 (1)	28	dry
Oxley	Hughes Royalty	2640 FNL 1320 FWL	36	Quinton	754	8948	8988	8975	13	27 (1)	27	dry

7N-18E

Operator	Well	Location	Sect.	Field	K.B.	Top Spiro	Top Wap	Top M Shale		Spiro Isopach	Spiro Isolith	Prod.
Samson	Olson #1	SW SE	1	Quinton	603	5605	5658	5657	1	52 (3)	48	dry
Samson	Hudson Heirs #1	NW	3	Wildcat	626	5702	5740	5729	11	27 (2)	21	dry
Apache Oil	Etchinson #1	NW SE NE	4	Wildcat	606	5573	5629	NA	0	56 (1)	56	gas
ONEOK	Breedlove 1-9	NE SW NE	9	Featherston	669	5611	5633	5625	8	14 (1)	14	gas
Samson	Lash #1	1320 FSL 2490 FWL	10	Kinta	738	5860	5892	NA	0	32 (1)	32	gas
Samson	Carr #1	SE NW SE	12	Quinton	611	5762	5794	5785	9	23 (2)	21	dry
Samson	Trekell #1	SE	13	Kinta	830	5775	5805	5793	12	18 (1)	18	dry
Stephens	JC Noblin #1	2428 FSL 2428 FWL	14	Quinton	890	5892	5928	5917	11	25 (1)	21	dry
Samson	Gregg #1	NE SE NW	15	Carney	833	5946	5978	5967	11	21 (1)	20	gas
Mobil	Canfield #1	SW SE NW	20	Wildcat	646	5734	5766	5753	13	19 (1)	19	dry
Amax Petroleum	Quinton #1	NW SE	21	Quinton	730	FAULTED	6290	NA	0			dry
Texas Oil and Gas	Quinton A #1	NW NW	22	Featherston	770	6013	6046	6030	16	17 (1)	17	dry
Skelly	Jack Murdaugh #1	NW SE	27	Wildcat	895	faulted ??						dry
Skelly	William Floyd #1	NW SE	28		795	9509	9560	9540	10	31 (1)	27	dry
Oxley	White #7	1320 FSL 1120 FEL	31	Featherston	899	9372	9426	9403	23	31 (1)	29	gas
Skelly Oil	Roy Elsing #1	SW NE	33	Quinton	885	10312	10355	10338	17	26 (1)	26	
Steve Gose	Whitefuel #1	SW NE	34	Wildcat	997	9433	9474	9460	14	27 (1)	27	gas

7N-19E

Operator	Well	Location	Sect.	Field	K.B.	Top Spiro	Top Wap	Top M Shale		Spiro Isopach	Spiro Isolith	Prod.
Arco	Buford Guthrie #2	1470 FNL 1320 FWL	1	Kinta	572	5261	5333	5328	5	67 (3)	55	gas
Mobil	Coblentz-Hall #1	NE SW	2	Lewisville	573	5292	5381	5377	4	85 (?)	?	gas
Shell	Snow 1-3	NW SE	3	Kinta	567	5394	5490	NA	0	96 (1)	96	gas
Sinclair	Bullard #1	NW SE	4	Wildcat	561	5325	5359	5350	9	25 (1)	25	gas
Arco	Bullard #2	1100 FNL 1100 FEL	4	Wildcat	583	5291	5341	5339	2	48 (1)	48	gas

Arco	AH Cox #3	1620 FSL 1320 FWL	5	Kinta	586	5471	5505	5501	4	30 (1)	30	dry
Samson	Woodmore #1	SE	6	Kinta	591	5539	5564	5559	5	20 (2)	11	dry
Samson	Lackey #1	2300 FSL 2300 FWL	7	Quinton	579	5692	5727	5721	6	29 (2)	23	dry
Samson	Noblin #1	2590 FSL 1980 FEL	8	Quinton	573	5592	5638	5636	2	44 (1)	44	dry
Mobil	Ambassador Furry #2	1070 FSL 1320 FWL	9	Kinta	737	5583	5629	NA	0	46 (1)	46	dry
Mobil	Henderson #2	C N	10	Kinta	574	5326	5408	5406	2	80 (4)	73	gas
Mobil	Hendricks #2	C N SW	11	Kinta	758	5422	5529	5523	6	101 (4)	9	gas
JMC Expl.	Adams State #3	2000 FSL 1320 FWL	12	Kinta	566	5234	5266	5264	2	30 (1)	30	dry
Getty Oil	Carter Snow #2	1320 FSL 1470 FEL	13	Kinta	586	9129	9168	9166	2	37 (1)	37	dry
Kaiser Francis	Carter Snow #2-13	NW SW	13	Kinta	686	9349	9393	9388	5	39 (2)	37	gas
Mobil	Mason #1	NW SE	14	Lewisville	978	8187	8263	NA	0	76 ?		gas
Mobil	LB Burris #2	N S SE	15	Kinta	1029	9226	9279	9273	6	47 (?)	?	gas
Williford	Yancey #2-16	NW	16	Kinta	932	5613	5679	5668	11	55 (5)	53	dry
Samson	Teel #1	NW NW	17	Kinta	978	5687	5722	5712	10	25 (2)	33	dry
Samson	Coblentz #1	660 FNL 1320 FWL	18	Kinta	837	5774	5841	5829	12	55 (4)	8	dry
Samson	Powell #1	NW SE	19	Kinta	873	9462	9507	9497	10	35 (1)	33	gas
Daniel Price	Quinton #2	SE SE	20	Kinta	890	9340	9375	9370	5	30 (2)	29	gas
Oxley	Shelton #2	1320 FSL 1620 FWL	21	Kinta	954	9256	9296	9286	10	30 (4)	25	gas
Samson	Floyd #1	NE NE	22	Kinta	1050	9090	9137	9130	7	40 (1)	40	gas
Tidemark	Donnajo #1	SW NE	23	Lewisville	961	8871	8946	NA	0	75 (3)	72	gas
Samson	Rose 2-24	N SW NW	24	Kinta	667	8887	8959	NA	0	72 (?)	?	dry
Atlantic (sidetrack)	Farmers Coop #2	1600 FNL 1320 FEL	25	Kinta	1006	8715	8751	8745	6	30 (3)	24	dry
Steve Gose	Coblentz #1	1050 NW OF C	27	Wildcat	980	9222	9263	9260	3	38 (?)	?	gas
Oxley	Schwegman #3	1320 FSL 1980 FWL	28	Kinta	1107	9243	9283	9270	13	27 (1)	27	gas
Mobil	CR Butler #1	SE NW SE	29	Kinta	1026	9265	9306	9295	11	30 (1)	30	gas
Samson	Golden 'A' 1-30	SE SE	30	Kinta	1024	9386	9435	9423	12	37 (1)	37	gas
Sun Oil	Rockwell #1	S NW SE	31	Kinta	1264	9201	9242	9221	21	20 (2)	17	dry
Sinclair	Pete Parks #1	SW NE	32	Kinta	1163	9388	9437	9426	11	38 (?)	?	gas
Mobil	Schwegman Howell #1	2185 FWL 1700 FNL	33	Kinta	1106	9371	9413	9398	15	27 (?)	?	dry
Shell	Jankowsky 1-35	SW NE	35	Kinta	1117	8933	8978	8968	10	35 (2)	30	dry
Samson	Browne #1	2530 FSL 660 FEL	36	Kinta	927	8719	8771	8769	2	50 (3)	47	gas

7N-20E

Operator	Well	Location	Sect.	Field	K.B.	Top Spiro	Top Wap	Top M Shale		Spiro Isopach	Spiro Isolith	Prod.
Mustang	Bessie Goodgame #1-1	660 FSL 1320 FWL	1	Kinta	554	7583	7662	7653	9	70 (5)	61	gas
Arkoma	Horton #1	NE	2	Kinta	604	6537	6651	6598	53	61 (2)	57	
Pan Am	Warren B #1	SW NE SW	2	Kinta	528	6338	6392	NA	0	54 (?)	?	gas
Steve Gose	Doby #1	SE NW	3	Kinta	566	6304	6360	6358	2	54 (?)	?	gas
Steve Gose	Midgle #1	1880 FSL 2130 FWL	4	Kinta	528	6117	6173	6161	12	44 (?)	?	gas
JMC Expl.	Steele #2	SE	5	Kinta	536	5667	5727	5726	1	59 (5)	50	gas
Mobil	Aldridge #2	NW NW	6	Kinta	550	5155	5178	5170	8	15 (1)	15	gas

Mobil	Aldridge #2	W E E SE	7	Kinta	558	8002	8042	8038	4	36 (2)	29	dry
Steve Gose	Matthews #1	970 N 150 E OF C	8	Kinta	542	7385	7427	7423	4	38 (4)	30	gas
Cheyenne Petr.	Hertie #2-9	100 E OF C SW	9	Kinta	558	8640	8710	8708	2	68 (2)	66	gas
Apache	Day #1	SE SW	10	Kinta	561	8782	8827	8805	22	23 (1)	23	dry
Diamond Shamrock	Frank Sloan	1880 FNL 1500 FEL	11	Kinta	541	7949	7997	7980	17	31 (2)	25	dry
Apache	Rose #1	SE NW	12	Kinta	535	7883	7965	7955	10	72 (?)	?	gas
Oxley Petr.	Shobert #1	1820 FSL 1820 FWL	14		936	8836	NDE	8903		67 (4)	57	
Steve Gose	Burris #1	NE SW	15		773	8642	8702	8682	20	40 (3)	33	gas
Daniel Price	Franklin I-16	2460 FSL 1000 FWL	16	Kinta	558	8556	8580	8571	9	15 (2)	9	gas
Shell	Bulcher #1=17	1980 FSL 1980 FWL	17	Kinta	568	8634	8662	8643	19	9 (1)	9	dry
Eberly and Meade	Mason 2A-18	NE	18	Kinta	556	8975	9014	9007	7	32 (1)	32	gas
Eberly and Meade	Murphy 3-19	1872 FEL 2803 FNL	19	Kinta	636	8608	8684	8683	1	75 (4)	65	gas
Mobil	Chunn Heirs #1	1650 FSL 1760 FWL	20	Kinta	883	8518	8604	8592	12	74 (3)	66	dry
Stephens Prod.	Chester Palmer #1	NW SE NW	21	Kinta	780	8592	8620	8609	11	17 (2)	15	dry
Galaxy Oil	Imp. Am. Jankowsky #1	SE NW	22	Kinta	963	8662	8737	8724	13	62 (3)	54	gas
Hunt Energy	Jankowsky #1	SE	23	LeQuire	909	8160	8215	8201	14	41 (?)	?	gas
Frigg Drilling	Halcumb #1	NE	24	LeQuire	774	7753	7861	7848	13	95 (5)	80	dry
Samson	Prickett #1	NW NW	25		934	8216	8305	8244		28 (2)	22	dry
Arrow Oil and Gas	Milsten #2-26	C N NE	26	LeQuire	830	8212	8276	8261	15	49 (4)	45	gas
hunt Energy	Milsten #1	C N	26	LeQuire	961	8299	8349	8339	10	40 (2)	37	dry
Shell	Jankowsky #1	SW NE	28	Wildcat	697	8726	8774	8766	8	40 (?)	?	dry
Shell	Jankowsky @1-29	SW	29	Kinta	805	8775	NDE			?	?	dry
Exxon	Perry Rowe #2	1320 FSL 2000 FEL	30	Kinta	998	8904	8974	8970	4	66 (5)	53	gas
Mobil	Kinta Townsite #1	NW NW SE	31	Kinta	567					?	?	
Mobil	Dipple #1	NE SW NE	31	Kinta	931	8801	8868	8865	3	67 (4)	59	gas
Shell	Jankowsky 1-32	NW	32	Kinta	759	9006	9095	NA	0	89 (?)	?	gas
Shell	Jankowsky 1-33	1300 W OF C	33	Kinta	986	9142	9184	9177	7	35 (?)	?	dry

7N-21E

Operator	Well	Location	Sect.	Field	K.B.	Top Spiro	Top Wap	Top M Shale		Spiro Isopach	Spiro Isolith	Prod.
Daniel Price	Loyd Nix #2	SW NE SW	1	Kinta	669	6402	6511	6455	56	53 (3)	47	gas
Kaiser Francis	Wright 1-A	SW	2	Kinta	613	6622	6733	6668	65	46 (1)	46	gas
Anson	Wright #1	C N NE	3	Lequire	588	6643	6744	6688	56	45 (?)	?	gas
Anson	Slatter 'A' #1	C N NE	4	Kinta	592	6711	6791	6768	23	57 (3)	48	dry
Daniel Price	DA Martin #1	NW	5		553	7087	7187	7176	11	89 (3)	82	gas
Pan Am	Sloan #1	C SE NW	6	lequire	545	7228	7323	7300	23	72 (?)	?	gas
Mobil	Eugene Vaughn #1	NE NE SE	7	Wildcat	559	7491	7556	7547	9	56 (?)	?	gas
Deadington Co.	Bowen #1	C W NE	8	Lequire	598	7248	7342	7340	2	92 (5)	79	gas
Hadson Ohio	Craft 1-9	NW	9	Kinta	599	7071	?	7129		58 (3)	53	gas
Samson	Kennedy #2	NE NE	10	Kinta	664	6826	6926	6867	59	41 (?)	?	gas
Samson	Wright #2-11	C S SE	11	Kinta	1233	9220	NA	9277		57 (5)	50	gas

Mustang	Kamphaus #1-12	S N S NW	12	Kinta	1330	8350	8503	8437	66	87 (4)	79	gas
Donald Slawson	Snow 1-13	1980 FSL 1320 FWL	13	Kinta	1348	10582	10700	10650	50	68 (6)	54	gas
Unit Petroleum	Panther Hollow #3	C N NE	14	Wildcat	1341	9920	10015	9956	59	36 (3)	32	gas
TXO Production	Wright B1	SE SE	15	lequire	1294	11222	11311	11269	42	47 (5)	38	dry
unit Drilling	Turkey Flats #1	NW	16	Lequire	903	7037	7129	7105	24	68 (4)	64	gas
Mustang	Goldstien #1-17	1700 FNL 1600 FWL	17	Red Oak	595	7238	7316	7313	3	75 (3)	65	gas
Brooks Hall	Eppler #1	NE	18	Kinta	567	7506	7572	7565	7	59 (3)	53	gas
Mustang	Bowen 1-19	2620 FNL 1470 FEL	19	Kinta	958	8699	8875	8760	115	61 (2)	49	
Cheyenne Petr.	Wright #1-21	SE	21	Red Oak	1048	11942	12037	12002	35	60 (2)	55	dry
Samson	Furrow #1	SW SW	22	Kinta	4409	11139	11241	11200	41	61 (?)	?	gas
Samson	Kirkwood #1	NW	23	Wildcat	1547	10692	10749	10746	3	54 (6)	37	gas
Tenneco	Mixon #1-24	SW NW SE	24	Kinta	964	13006	13146	13087	69	81 (6)	70	dry
Cheyenne Petr.	Lusk 1-20	NW NW	26	Red Oak	1630	faulted	viola on	11320				
Cheyenne Petr.	Rudy 1-27	NW	27	Red Oak	1311	10742	10778	10756	22	14 (1)	14	gas
Monsanto	Parks #1	SW	28	Wildcat	1384	11516	11555	11546	9	30 (2)	24	dry

7N-22E

Operator	Well	Location	Sect.	Field	K.B.	Top Spiro	Top Wap	Top M Shale		Spiro Isopach	Spiro Isolith	Prod.
Whittington Oil Co.	Alliance trust #1	1933 FNL 2133 FWL	4	Kinta	719	faulted	hunton					
Whitmar Explor	Nunn 1-4	NW	4	Owl Creek	671	5949	6079	5999	80	50 (4)	39	gas
Texota-Gose	Horton #1	1000 N 100 W OF C	5	Wildcat	691	6077	6211	6132	79	55 (4)	29	dry
Oxley Petro.	Johnny Cake #1	1620 FSL 1320 FWL	6	Kinta	715	6255	6388	6315	73	60 (4)	52	dry
Humble	Murchison Trust #1	50 S 950 E OF C	6	Milton	957	6243	6376	6303	73	60 (6)	46	gas
Unit Drilling	Kraft A 1-7	N SW SW	7	Kinta	853	8193	NDE	8243		50 (3)	43	
Sunset International	Hart Ranch #1	1840 FSL 1470 FEL	8	Kinta	1110	faulted	12000 arb					dry
Whitmar	Ark. Kraft 1-10	SE SE	10	Wildcat	1515	11637	11775	11691	84	54 (6)	40	gas
Whitmar Expl.	Cliff Hanger 1-11	SW NW SW SE	11	Wildcat	1531	11034	11177	11104	73	70 (5)	56	dry
Sunray DX	Merchants #1	SW NE	12	Wildcat	1390	11953	12164	12128	36	175 (?)	?	dry
Whitmar	Saddleback #1	1320 FNL 1720 FEL	15	Wildcat	1465	11743	11901	11829	72	89 (6)	71	gas
Samson	Jeanette #1	2000 FSL 1320 FWL	18	McCurtain	1346	11233	11340	11286	54	53 (6)	42	dry
Donald Slawson	Ark. Kraft 1-19	1100 FWL 1900 FSL	19	Wildcat	1268	13077	13199	13141	58	64 (5)	55	dry
Hunt Energy	Caviness 1-20	SE	20	McCurtain	1497	12616	12757	12691	58	75 (4)	61	dry
Arco	McFerran #3	2640 FSL 2640 FWL	34	Red Oak	596	10687	10805	10734	71	47 (3)	37	gas

8N-16E

Operator	Well	Location	Sect.	Field	K.B.	Top Spiro	Top Wap	Top M Shale		Spiro Isopach	Spiro Isolith	Prod.
Bill Andress	Methodist Episcopal 1-2	CE	2	Canadian	835	4415	4429	4425	4	10 (1)	10	dry
Amax	Bowlby #1	SE NW	3	Wildcat	652	4502	4520	4518	2	16 (2)	9	dry

RH Siegfried Inc.	Smith #1	SW SW NE	5	Wirth	610	3524	3540	3535	5	11 (1)	11	dry
Western Divers.	Presson #1	SW NE	6	Wirth	655	3744	3760	3856	4	12 (1)	12	dry
Loward Co.	Canadian 1-7	NW	7	Wildcat	765	4525	4550	4548	2	23 (?)	?	dry
Nelson Petr.	Phillips 1-8	C N SE NW	8	Canadian	769	4451	4477	4472	5	21 (2)	12	dry
LO Ward	Morris 1-9	1134 FNL 1465 FWL	9	Canadian	736	4586	4606	4602	4	16 (1)	16	dry
Potts Stephenson	Schnieder #1	NE	23	Blocker	639	5375	5398	5393	5	18 (2)	12	dry
Potts Stephenson	HDS Corp. 1-24	SW	24	Blocker	647	4969	4987	4981	6	12 (1)	12	dry
Potts Stephenson	Estells George 1-25	SW NE	25	Wildcat	679	5021	5055	5047	8	26 (1)	26	dry
ESCO Explor.	Stevens 26-1	1980 FSL 1980 FWL	26	Wildcat	714	4999	5016	5009	7	10 (1)	10	dry
Hamilton Bros.	Lake Eufala 1-30	1320 FNL 1650 FWL	30		659	5399	5434	5431	3	32 (3)	28	dry
Ward Bros.	Caldwell #1	SW	31	Wildcat	735	5703	5744	5742	2	39 (4)	26	dry
Apache	Leak #1	NE SW	32	Wildcat	770	6136	6186	6184	2	48 (?)	?	dry
Potts Stephenson	George Trust 1-36	C N	36	Wildcat	751	5205	5230	5226	4	21 (2)	13	dry

8N-17E

Operator	Well	Location	Sect.	Field	K.B.	Top Spiro	Top Wap	Top M Shale		Spiro Isopach	Spiro Isolith	Prod.
Cities Service	Eakle A-1	SE	1		668	4607	4637	4631	6	24 (2)	20	dry
Coryell Petr.	Wagon #1	SW	2	Russelville	670	4431	4454	4442	12	11 (1)	11	dry
Tenneco	Badsen #1	S NW SE	10	Wildcat	689	4891	4914	4911	3	20 (2)	16	dry
Nelson	Badsen 1-11	SE	11	Russelville	638	4679	4708	4692	16	13 (1)	13	gas
Nelson	MG Eakle 1-12	NE	12		663	4690	4715	4707	8	17 (2)	12	gas
Oxley	Richardson #1	1461 FNL 1461 FEL	13		698	4550	4582	4580	2	30 (1)	30	dry
Kerr McGee	Roberts #2	E E SW NE	26	Blocker	715	5565	5579	5578	1	13 (1)	13	dry
SOHIO	Williams #1	SW NE	31	Wildcat	677	6033	6068	6064	4	31 (1)	31	dry

8N-18E

Operator	Well	Location	Sect.	Field	K.B.	Top Spiro	Top Wap	Top M Shale		Spiro Isopach	Spiro Isolith	Prod.
Pan Am	Trout #1	SE	1	Kinta	1134	4703	4768	4738	30	35 (1)	35	gas
Skelly Oil	H.S. Barnholt #1	700 E 330 S of C	2	Kinta	702	4939	NDE	4958		31 (1)	31	
Cities Service	Johnson H-1	S N S NW	3		761	4146	4208	4166	42	20 (1)	20	gas
MDI West Oil Co.	Wagon A-2		4		800	4185	4242	4221	21	36 (3)	31	
Cities Service	Seabolt 'A' #1	N S SE NW	5		716	4169	4201	4182	19	13 (1)	13	dry
Nelson	WW Couch 1-b	1483 FSL 1818 FEL	6	Wildcat	699	4482	4520	4515	5	33 (2)	27	dry
Nelson Petr.	Henry Eakle 1-7	NE	7		730	missing	4390					
Cities Service	Graves 'D' #1	1445 FSL 1670 FWL	9	Russelville	791	4419	4464	4454	10	35 (2)	29	dry
Cities Service	Bryant 10-A	1170 FSL 1490 FWL	10	Enterprise	698	4933	4973	4954	19	21 (1)	21	dry
Hadson Petr. Corp.	Peek 1-11	SW	11	Enterprise	776	5352	5413	5376	37	24 (1)	24	dry
Texas Oil and Gas	Eakle #1	175 FSL 660 FEL	12		970	5341	5415	5380	35	39 (3)	36	dry

Pan Am	McKinnon B1	1000 NE of C	13	Kinta	1030	5375	5416	5402	14	27 (2)	23	
TXO Prod.	Wagon A-1	1980 FSL 1100 FWL NW	15	Russellville	704	4791	4944	4936	8	45 (2)	32	gas
Txo Prod.	Bland #1	1616 FNL 1420 FWL	16	Kinta	664	4788	4838	4835	3	47 (2)	42	dry
AEPO Inc.	Elinger #1	NE SW	17	Wildcat	820	4781	4810	4792	18	11 (1)	11	dry
Kerr McGee	Eakle #1	1320 FNL 3250 FEL	18	Russellville	665	4576	4605	4594	11	18 (2)	15	gas
Pan Am	Paschall #1	SW SW NE	19	Wildcat	723	4841	Missing	5603		40 (?)	?	dry
WYTEX	Higgins #1	2000 FNL 2460 FEL	23	Quinton	775	5676	4730	5706	24	30 (1)	30	dry
Texas Oil and Gas	Whitehead #1	NW SW	24	Quinton	527	5603	5625	5618	7	15 (1)	15	dry
Steve Gose	Kelly #1	NE SE NW	27	Wildcat	743	5609	5649	5625	24	14 (1)	?	dry
AMAX	Cochran #1	NE	29	Wildcat	846	5434	5464	5456	8	22 (3)	19	dry
Wenexco	Carl Zartman 1-33	NE NE	33	Quinton	1018	5456	5491	5475	16	19 (2)	17	dry
Steve Gose	JD Thomas	NW SE	34	Wildcat	744	5677	5705	5690	15	13 (1)	13	dry
Andover	Noblin 36-1	SE	36	Kinta	718	5572	5595	5592	3	20 (2)	17	dry

8N-19E

Operator	Well	Location	Sect.	Field	K.B.	Top Spiro	Top Wap	Top M Shale		Spiro Isopach	Spiro Isolith	Prod.
TXO	HISER #1	1470 FSL 660 FWL	1	Wildcat	721	5052	5075	5071	4	19 (1)	16	dry
TXO	Mitchell 'N' #1	C W SW	2	Wildcat	719	5095	5123	5118	5	23 (2)	20	gas
TXO	Butler Cooper #1	SW	3	Whitefield	819	5060	5092	5088	4	28 (2)	26	dry
Snee and Eberly	Carter #1	NE SW	4	Kinta	814	5296	5330	5324	6	28 (?)	?	gas
Samson	Huggins #1	NE NE	4	Whitefield	789	5242	5272	5265	7	23 (1)	23	dry
TXO	Carter 'C'#1	1980 FSL 1320 FWL NW	4	Kinta	735	5155	5184	5166	18	11 (2)	10	dry
Hadson	Butler 1-5	2640 FSL 1320 FWL	5	Wildcat	749	5362	5405	5391	14	29 (3)	20	
Pitco	Cargill 1-6	NW NW SE NW	6	Enterprise	897	4492	4509	4503	6	11 (1)	11	dry
Edwin Cox	Rose #1	NW SE SW	6	Kinta	962	5409	5470	5445	25	36 (2)	33	dry
Pan Am	McKinnon #1	1000 SW OF C	7	Kinta	1142	5498	5569	5546	23	48 (2)	46	gas
Fitkin	Butler #1-8	SE	8	Kinta	809	5331	5367	5351	16	20 (1)	20	dry
Snee Eberly	Butler #2	NE SW	9	Kinta	848	5240	5273	5267	6	27 (2)	21	dry
Snee Eberly	Butler #1	NE SW	10	Kinta	622	5087	5127	5121	6	34 (3)	25	dry
TXO	Georgianna #1	NW	10	Whitefield	641	5098	5152	5143	9	45 (4)	39	dry
Ambassador	Butler #1	NE NE SW	11	Kinta	629	5115	5142	5135	7	20 (1)	20	gas
Whitmar	Butler #1-12	SW SW	12	Kinta	626	5139	5149	5147	2	8 (1)	8	dry
Apache	Lytle-Ary #1	NE SW	12	Kinta	638	missing	5286					dry
Gose Petr.	Brashers #1	1000 W OF C	13	Kinta	672	5163	5200	5193	7	30 (2)	26	gas
Apache	Williams #1	NW	14	Kinta	639	4992	5109	NA	0			gas
Ambassador	Ford #1	NW NW SE	15	Kinta	605	5201	5248	5243	5	42 (3)	26	gas
Samson	Smith Carr #2	660 FSL 2440 FWL	16	Kinta	882	5285	5323	5312	11	27 (2)	25	gas
J Lee Youngblood	Green #1	NE SW	17	Kinta	756	5425	5465	5454	11	29 (?)	?	dry
Pan Am	Cason #1	SE SW NE	18	Kinta	830	5528	5587	5568	19	40 (1)	40	gas
Pan Am	Jones 'D' #1	SW NE	19	Kinta	853	5317	5363	5347	16	30 (1)	30	gas
Apache	Jones Miller #1	NE NW SE	20	Kinta	901	5520	5580	5572	8	52		

Texaco	Johnson 'C' #2	1900 FNL 1320 FEL	21	Kinta	638	5373	5436	5422	14	49 (1)	49	gas
Apache	Wimberly 1-22	C N SW	22	Kinta	601	5276	5341	5337	4	61 (2)	54	gas
Apache	Bowers 1-23	625 FSL 2100 FWL	23	Kinta	666	5170	5231	5224	7	54 (3)	48	gas
Tidemark Expl.	Beam #1	SE SE	24	Kinta	670	5041	5072	5065	7	24 (2)	20	gas
Natomas N.A.	Cox Rushing #2	SE	25	Kinta	599	5211	5266	5259	7	48 (1)	48	dry
Samson	Wimberly 2-27	SW	27	Kinta	725	5481	5533	5525	8	44 (1)	44	gas
Samson	Judy Ann #1	1780 FEL 1980 FSL	28	Kinta	634	5531	5602	5588	14	57 (2)	53	gas
Kaiser Francis	Shelton #1	NE NE	29	Quinton	677	5420	5488	5483	5	63 (3)	47	gas
Steve Gose	Furry #1	3115 FSL 2125 FWL	30	Kinta	931	5472	5533	5527	6	55 (2)	35	dry
Samson	Cox #1	660 FWL 810 FSL	31	Quinton	685	5519	5551	5549	2	30 (1)	30	gas
Arco	Rabon Heirs #2	NE SE	32	Kinta	595	5331	5388	NA	0	57 (3)	49	gas
Sinclair	Rabon #1	NW SE	33	Kinta	583	5244	5307	5303	4	59 (2)	?	gas
Kingwood	Woodmore	NE SW	34	Kinta	578	5475	5562	5547	15	72 (1)	?	gas
Samson	Woodmore #2	SE SE	34	Kinta	625	5372	5445	NA	0	73 (4)	65	gas
Sinclair	Woodmore #1	NE SW	35	Kinta	581	5275	5350			75 (?)	?	gas
Exxon	WMJ Terrell 1 #3	1700 FNL 1320 FEL	36	Kinta	606	5178	5241	5232	9	54 (3)	46	gas

8N-20E

Operator	Well	Location	Sect.	Field	K.B.	Top Spiro	Top Wap	Top M Shale		Spiro Isopach	Spiro Isolith	Prod.
Sinclair	Hodges #1	1320 S 1220 E OF C	5	Kinta	834	6167	6234	6232	2	65 (?)	?	Dry
Hall Jones	Rodgers #1	NW SE	6	Kinta	717	6231	6276	6276	0	45 (?)	?	gas
Jones Pellow	Brashers 7-1	SE SE	7	Kinta	636	FAULTED	5482	NA	0			dry
Welser Brown	CM Hodges #1	NW	9	Kinta	600	6270	6298	6296	2	26 (2)	22	dry
Ferguson	Spessard #1	SE SW	12	Kinta	560	5170	5200	5182	18	12 (2)	10	dry
Harper	Pixler #1	SE SE SW	13	Kinta	563	4952	5026	4997	29	45 (?)	?	dry
Estopil Prod Corp	Pixler #1	1274 FSL 1182 FEL	15	Kinta	553	4917	4946	4944	2	27 (2)	21	gas
Superior	Fowler #1	NE	17	Kinta	720	4900	4935	NA	0	35 (?)	?	gas
Superior	Allred 73-18	NW SE NE	18	Kinta	687	4913	4943	NA	0	30 (?)	?	gas
Steve Gose	Rabon #1	SW NE	19	Kinta	676	5066	5089	NA	0	23 (1)	23	gas
Hazelwood	Bryant 20-1	990 FSL 990 FWL	20	Kinta	591	5076	5112	5110	2	34 (3)	31	dry
Snee Eberly	Drain 1-A	800 W 150 S OF C	21	Kinta	567	4972	5021	NA	0	49 (?)	?	gas
Service Drilling	Kaisner 1-22	N S N SW	22	Kinta	543	4889	4932	4927	5	38 (?)	?	gas
Hendrick	Coblentz	NE NE SW	23	Kinta	539	5018	5061	5042	19	24 (?)	?	dry
Texas Oil and Gas	Lackey #1	NW	24	Stigler	536	4953	5014	4993	21	40 (1)	40	dry
Steve Gose	Powell #1	850 N 200 E OF C	24	Wildcat	517	5938	6001	5986	15	48 (?)	?	dry
Roye Realty	Chad #1	SE	24	Stigler	518	4975	5042	5014	28	39 (2)	36	dry
Anson	Ford #1	1000 SE OF C	25	Kinta	521	5600	5617	5609	8	9 (1)	9	dry
TXO	Daniel H-1	E NE NW	25	Kinta	522	5048	5109	5088	21	40 (1)	40	dry
TXO	Raines #1	1320 FNL 2050 FEL	25	Kinta	504	NA	5246	NA	0			dry
Samson	San Bois #1	SW SW	26	Kinta	857	5113	5153	5138	15	25 (2)	22	gas
Hendrick Devel.	Scott 'A' #1	SW SW NE	27	Kinta	565	4917	4960	NA	0	43 (?)	?	gas

Samson	JD Bryant	NE SW SW	28	Kinta	564	5025	5065	5060	5	35 (2)	30	gas
JMC	Anderson #2	910 FSL 660 FWL	29	Kinta	610	5015	5054	NA	0	39 (3)	37	gas
Steve Gose	Smith #1	950 SE OF C	30	Kinta	598	5102	5127	NA	0	25 (2)	23	gas
Mobil	Kinta Townsite #1	NW NW SE	31	Kinta	567	5055	5087	NA	0	32 (1)	32	
Ambassador	Richison #1	NW SE	32	Kinta	568	5053	5069	NA	0	43 (?)	?	gas
Ambassador	Davenport	NE SW NE	33	Wildcat	563	4959	5019	NA	0	60 (?)	?	gas
Rodman Noel	Scott #2	NW	34	Kinta	576	5054	5094	5085	9	31 (?)	?	gas
Daniel Price	Tucker 1-34	E W SE	34	Kinta	534	5855	5886	5875	11	20 (2)	18	dry
Coquina	Scott Estate	1640 FSL 1320 FWL	35	Kinta	532	6198	6245	6237	7	39 (?)	?	gas
Mustang	Sloan 1-36	SE	36	Kinta	588	6158	6239	6185	54	27 (2)	19	dry
Samson	Sloan #1	1420 FNL 660 FEL	36	Wildcat	537	6113	6192	6181	11	68 (2)	64	gas

8N-21E

Operator	Well	Location	Sect.	Field	K.B.	Top Spiro	Top Wap	Top M Shale		Spiro Isopach	Spiro Isolith	Prod.
Texas Oil and Gas	Kerr McGee 'B' #1	770 FSL 1000 FWL	1	Lequire	609	6449	6631	6589	42	140 (5)	112	dry
King Resources	Blackman 1-2	2180 FSL 1980 FWL	2	Kinta	495	5856	5874	5865	9	9 (1)	9	
Tenneco	Hall #1	500 SW of C	3	LeQuire	497	5024	5043	5041	2	17 (1)	17	
TXO	Bailes #1-A	660 FWL 1750 FNL	4	Kinta	533	3602	3719	3699	20	97 (10)	72	dry
TXO	Fowler 'D' 1	660 FSL 1650 FWL	6	Kinta	571	3658	3732	3699	33	41 (3)	32	dry
Woods Petr.	Fowler #1	NE	8	Kinta	534	4628	4710	4686	24	58 (5)	46	
National	Hall #1	SE SE	9	Kinta	509	4745	4863	4843	20	98 (7)	81	gas
Potts Stephenson	Sutton 1-10	SW SW	10	Kinta	517	4852	4926	4888	38	36 (3)	25	dry
Pan Am	Jones 'F' #1	538 S 198 W OF C	11	Kinta	652	5823	5935	5860	75	37 (1)	37	dry
Snee Eberly	Kerr McGee #2	N SE SE	12	Kinta	646	5755	NDE	5847		92 (?)	?	dry
Harper Oil	Farafield Farms 'A' #1	SE NW	13	McCurtain	644	5816	?	5857		41 (1)	41	gas
Pan Am	Robertson #1	NE NE SW	14	Kinta	610	5786	?	5830		44 (1)	44	gas
Edwin Berry	Rees 1-15	W NW	15	Kinta	503	5155	5264	5213	51	58 (3)	50	gas
PSEC	Patton 1-16	NW	16	Stigler	528	4912	5019	5012	7	100 (4)	89	dry
PSEC Inc.	Brazeal 1-17	SE SE	17	Stigler	518	4868	4967	4960	7	91 (10)	63	
Branscum Petr	Krumsiek 1	S S NE	18	Kinta	520	4967	5036	5015	16	48 ?		
Mustang	Roye Kirkland 1-19	SE	19	Kinta	518	4985	5146	5089	57	104 (6)	60	dry
Exxon	Emil Holt #2	E SE	20	Kinta	539	5384	5459	5454	5	70 (5)	60	gas
Exxon	Claude Roye #2	1435 FSL 1545 FEL	20	Kinta	549	5951	6030	6022	8	71 (4)	63	
Humble	J Fred Ditman #1	700 NW OF C	21	Lequire	536	5345	5458	5454	4	109 (8)	95	gas
Samson	Abbath #1	SE SE	21	Kinta	565	5616	5731	5679	52	63 (4)	55	dry
Marathon	Margret Abbath 1	NW NE SW	22	LeQuire	533	6035	6117	6071	46	36		
Humble	Eva McDaniel #1	500 SW OF C	23	Lequire	569	5951	6061	6002	59	51 (?)	?	gas
Kingwood	State Hightower #1	549 N 805 W OF C	24	Lequire	565	5794	5906	5829	77	35 (1)	35	gas
Samson	Barkley #1	2500 FSL 1320 FWL	25	Kinta	590	5826	5967	5884	83	58 (4)	48	gas
Humble	Oliver Heirs	1000 SW OF C	26	Lequire	566	6110	6224	6159	65	49 (?)	?	gas

Humble	Ben McDaniels #1	SW NE	27	Lequire	536	6095	6209	6162	47	67 (2)	57	gas
Humble	William Oliver #1	547 S 731 E OF C	28	Lequire	606	5980	6074	6038	36	58 (?)	?	gas
Exxon	Oliver	1935 FNL 1935 FWL	28	Kinta	546	5965	6040	6018	22	53 (5)	45	gas
Humble	Roye #1	810 S 300 W OF C	29	Lequire	570	5567	5641	5638	3	71 (?)	?	gas
Humble	Claude Roye #1	500 SE of C	30	LeQuire	531	5925	6008	5992	16	67		
Humble	Burge #1	480 E 180 N OF C	31	Lequire	651	5957	6037	6022	15	65 (?)	?	gas
Humble	McKinney	SE	32	LeQuire	611	6409	6509	0	0	100 (5)	83	
Steve Gose	Hightower #1	SE SE NW	33	Wildcat	670	6065	6145	6118	27	53 (?)	?	dry
Resources Invest.	Smith 1-34	990 FNL 990 FWL	34	Kinta	590	6089	6179	6140	39	51 (3)	46	dry
Samson	Rex #1	S SE	34	Lequire	579	6613	6716	6660	56	47 (2)	45	dry
Steve Gose	House #1	SE SE NW	35	LeQuire	670	6176	6270	6224	46	48 (1)	48	
Humble	Hazel Falconer #1	1000 SW OF C	36	Lequire	674	6513	6626	6551	75	38 (4)	30	gas

8N-22E

Operator	Well	Location	Sect.	Field	K.B.	Top Spiro	Top Wap	Top M Shale		Spiro Isopach	Spiro Isolith	Prod.
Stephens Prod.	S. Evans #2-1	1470 FSL 1900 FEL	1	McCurtain	576	5017	5108	5052	56	35 (3)	19	dry
Leflore Gas and elec.	O Gross #1	SE NW	2	Wildcat	560	5210	5304	5254	50	44 (?)	?	gas
Potts Stephenson	Shaw 1-A	SW SW	3	Kinta	569	5361	5458	5401	57	40 (?)	?	dry
Monsanto	McCurtain	900 SW OF C	4	McCurtain	651	5571	NDE	5638		67 (?)	?	gas
BHP	Steelco #2	SE	5	McCurtain	595	5626	5796	5786	10	160 (8)	136	gas
Texas Oil and Gas	Kerr McGee 'A' #1	NE NE	6	Kinta	568	5978	NDE	6092		114 (10)	69	dry
Monsanto	Lone Star #1	2005 FEL 1880 FSL	8	McCurtain	606	5633	5771	5743	28	110 (?)	?	gas
Humble	Cummings Estate #1	1000 SW OF C	9	Milton	541	5503	5640	5616	24	113 (?)	?	gas
Exxon	DR Condo #3	N N SW NW	10		610	5309	5437	5427	10	118 (10)	67	gas
Leflore Gas and Elec.	Nelson Heirs #1	SE SE SE NW	11	Cartersville	614	5119	5220	5167	53	48 (4)	23	dry
Hanna Oil And Gas	True #1	1560 FNL 2000 FEL	12	Kinta	596	4932	5033	4971	52	39 (2)	25	gas
Stephens Prod. Co.	Pearl Patterson	NE SE SW	13	Cartersville	717	4933	5050	4983	67	50 (?)	?	gas
Humble	Price Self #1	1000 SE OF C	14	Milton	568	4970	5117	5098	19	128 (?)	?	gas
Texas Pacific	Federal College #1	NE SW	15	Milton	552	5287	5451	5431	20	144 (?)	?	gas
Sun Expl.	Federal Porter #3	1600 FWL 1920 FNL	16	Kinta	525	5435	5605	5577	28	142 (9)	112	dry
Humble	Hightower	1000 NE OF C	17	Milton	540	5589	5749	5708	41	119 (?)	?	gas
Harper Oil	Farafield Farms #1	SW NE	18	McCurtain	560	5737	5940	5860	80	123 (?)	?	gas
Charels McRay	Hightower #1	NE	19	McCurtain	654	5685	5811	5731	80	46 (4)	40	gas
Humble	Federal-Shell #1	980 E 100 N OF C	20	Milton	581	5550	5693	5669	24	119 (6)	92	gas
Enron	Joann #1	NE SE SW	21	Milton	585	5415	5575	5542	33	127 (12)	66	dry
Humble	McCurtain #1	944 W 75 S OF C	22	Milton	587	5145	5319	5297	22	152 (?)	?	gas
Humble	Rees #1	SE NE NW	23	Milton	613	4975	NDE					gas
Texas Pacific	Federal Lankford 1	975 NW of C	24	Milton	611	4890	5049	5027	22	137		
Pan Am	Krisher #1	SE NW	25	Milton	553	4788	4975	NA	0	187 (?)	?	gas
Amoco	Krisher #2	SE	25	Kinta	567	5200	5443	5422	21	222 (10)	178	gas

Amoco	McCafferty #2	E E NW	26	Kinta	569	4905	5094	5067	27	162 (13)	131	gas
Pan Am	McCafferty #1	980 SW OF C	26	Milton	585	4932	5093	5067	26	135 (?)	?	gas
Sinclair	Wantland #1	SW NE	27	Milton	569	5107	5263	5251	12	144 (?)	?	gas
Sun Explor.	Federal King #3	2055 FSL 660 FWL	28	Kinta	705	5676	5820	5775	45	99 (3)	83	dry
Anson	Thompson #1	SW NE	29	Lequire	677	5668	5804	5732	72	64 (4)	56	gas
Samson	Hightower #1	S SW	30	Kinta	685	5966	NDE	6022		56 (3)	51	gas
Leflore Gas and Elec.	Dave Roberts #1	SE SE NW	31	Wildcat	674	6365	6469	6414	55	49 (2)	45	dry
Sun Expl.	AJ Morgan #2	NE NE	32	Kinta	654	5935	6069	6000	69	65 (5)	54	gas
Donald Slawson	Hobbs 1-33	NW NW	33	McCurtain	647	5802	5968	5904	64	102 (7)	89	gas
Mustang	Beene Blake #1	NE	34	McCurtain	650	5112	5228	5207	21	95 (2)	81	gas
Samson	Beene #1	NW NW	35	Wildcat	611	5090	5189	5183	6	93 (9)	56	gas
Samson	Ramlerz #1	NE NE	36	Kinta	573	5299	5441	5435	6	135 (?)	?	gas

APPENDIX C

OPERATOR	WELL	SURFACE LOCATION	BOREHOLE LOCATION	OFFSET	WAP TVD
		4N-16E			
MARATHON	SLAUGHTER 1-1	SE SE NE SW SEC 1	SAME		
MARATHON	MADDEN #2	2100 FNL 1670 FEL SEC 2	SAME		
THE HEADINGTON CO.	MADDOX #1	NE SW NE SEC 3	SAME		
TEXACO	W.C. CAMP 1-4	1785 FNL 1455 FEL SEC 4	SAME		
AMOCO	SMALLWOOD #2	SW NE SE SEC 10	2305 FSL 649 FWL SE	1190	10082
PAN AM	SMALLWOOD #1	SW NE SEC 10	SAME		
MARATHON	NEEDHAM 1-11	2490 FSL 1470 FEL SEC 11	SAME		
MARATHON	LEWIS 1-12	2310 FSL 2160 FWL SEC 12	SAME		
TEX-PEK PARTNERSHIP	BUDDY SHERRIL 16-1	230 FSL 1520 FWL SEC 16	SE SW SE 514 FSL 1065 FWL SE	2185	10608
MARATHON	NEEDHAM 1-14	1400 FNL 1400 FWL SEC 14	SAME		
MARATHON	LYNN 1-15	1520 FNL 2290 FEL SEC 15	SAME		
APEXCO	WARREN SPAHN #1	NE SW SEC 22	SAME		
ARKLA	LOVELESS 1-30	1320 FSL 1470FWL SEC 32			
TEX PEK	DROMGOLD 'B' 32-1	320 FSL 2400 FEL SEC 32	NW SE NW 990 FSL 1650 FWL	3862	10905
TEXACO	BELT TRUST 26-1	2444 FSL 624 FWL NE SEC 35	30 FSL 1737 FWL SW SE NW SEC 26	2856	11863
MARATHON	NEEDHAM 2-11	1230 FSL 1410 FWL SEC 11	SAME		
MARATHON	LEWIS #3	NW SE NW SEC 12	SAME		
WHITMAR EXPLOR.	COPE #1	W E NW NW SEC 13	SAME		
SAMSON	TEX #1	S NE NE SEC 14	SAME		
		4N-17E			
ARKOMA PROD. CO.	STINE #2	1500 FNL 1500 FEL SEC 4	SAME		
TEXAS INTERNATIONAL	ROCK IS. 5-1	990 FNL 2310 FWL SEC 5	SAME		
JMC EXPLORATION	BELUSKO #1	660 FNL 2148 FEL SEC 6	SAME		
ARKOMA PROD.	HARTSHORNE #3	1325 FNL 1000 FWL SEC 6	SAME		
AMOCO	ROCK ISLAND #1-7	1260 FSL 1320 FWL SEC 7	SAME		
ARKOMA	ROCK ISLAND #2-8	1320 FNL 1320 FEL SEC 8	SAME		
ARKOMA	ALEXANDER #1	660 FNL 1320 FEL SEC 9	SAME		
TEXACO	WAYNE WALLACE 15-1	SW SE SE SEC 15	SAME		
CONTINENTAL	WAYNE WALLACE '17' #1	SW NE NW SEC 17	SAME		
TXO	WRIGHT E #1	1040 FNL 880 FWL SEC 18	SAME		
TEXACO	WAYNE WALLACE 21-1	SW NE NW SEC 21	NW SE NW 898 FSL 1680 FWL NW	660	12495
AMOCO	RETHERFORD 1-A	SW SE SE SEC 25	SAME		
AMOCO	PATTERSON #1	900 FSL 2400 FWL SEC 27	S S NW 440 FSL 1320 FWL NW	2433	11375

TEXACO	MANUEL RUDY	250 FSL 1320 FEL SEC 28	SE NW SE 1447 FSL 1299 FWL SE	1197	12212
AMOCO	TOMLIN #1	1175 FNL 1725 FEL SEC 29	SW SW SE 578 FSL 140 FWL SEC 20	3838	12049
EXXON	ELLIS RUDY #1	SE SE SE SEC 30	SW SW NE 271 FSL 513 FWL NE	3145	12388
EXXON	ELLIOT DAVIS #1	SE SE SE SE SEC 31	SW NE SE	1703	12716
AMOCO	ZIPPERER #1	SE SW SE SW SEC 32	2000 FSL 1320 FWL	1900	11048
EXXON	H&H CATTLE 'A' #1	SW NW SE SEC 33	SAME		
AMOCO	MOSE WATTS 36-2	SE NE SE SEC 36	NW NE NW 630 FNL 1978 FWL	3736	11399
ARKOMA	ROCK ISLAND 2-5	1320 FNL 1320 FWL SEC 5	SAME		
ARKOMA	MCCASLIN #2	SE NW NE SEC 2	SAME		
KING RESOURCES	MCCASLIN #1-2	SE NW NW SEC 2	SAME		
ARKOMA	SPARKS #1	NE SEC 3	SAME		
WHITMAR	SILVER BULLET 1-11	1320 FNL 2640 FWL SEC 11	SAME		
EXXON (NEED LOG)	MABRY TRUST #1	NE NW SE SEC 12	SAME		
		4N-18E			
ARCO	DOLLINS 1-13	800 FSL 200 FEL SEC 13	694 FNL 1227 FWL SE NW SE	1669	13119
B.T.A. OIL PROD.	9001 JV-P WORKMAN #1	300 FSL 1320 FEL SEC 22	NE NW SE 2400 FSL 1040 FWL SE	2118	13424
ARCO	NEWELL 1-23	200 FSL 1320 FEL SEC 23	918 FSL 255 FWL NW SW NE	3358	13637
B.T.A.	9001 JV-P AMASON #1	1930 FSL 2250 FWL SEC 24	SE SE NW 2000 FNL 2250 FWL	1350	12709
EXXON	GARRETT A-1	330 FSL 2226 FWL SEC 26	1500 FSL 2200 FWL	1170	13813
EXXON	MOORE #1	SW SW SE SEC 28	NE SW SW 1172 FSL 1204 FWL	1956	12658
EXXON	WATTS BROS. A-1	1000 FSL 1360 FWL SEC 30	N N SW 2480 FSL 1320 FWL SW	1480	13587
EXXON	ROY RETHERFORD B-1	SE SW SE SEC 31	NE NE SW 2200 FSL 2354 FWL SW	2264	12248
AMOCO	MOSE WATTS 32-1	250 FSL 840 FEL SEC 32	1836 FNL 1979 FWL NW SE SW	1718	13144
EXXON	WATTS BROS. 'B'-1	750 FSL 2352 FEL SEC 32	NE SE NW 844 FSL 2200 FWL NW	2832	12826
EXXON	GARRETT C-1	SE SE SW SE SEC 33	2640 FSL 2640 FWL	2722	13228
EXXON	GARRETT D-1	900 FNL 1780 FEL SEC 34	SW NE SW SEC 27	3150	12792
ARCO	TNT 1-34	1320 FSL 1320 FEL SEC 34	1306 FSL 1071 FEL NW SE NW	3059	13770
ARCO	ULYSSES #1	1320 FSL 2300 FEL SEC 35	SAME		
TENNECO	MABRY TRUST 1-5	SE NW SEC 5	SAME		
		4N-19E			
MOBIL	E M LAWLESS #1	500 FSL 820 FWL SEC 1	1980 FSL 1320 FWL C N SE	3471	13519
HELMERICH & PAYNE	GARY 1-5	1320 FSL 2470 FNL SEC 5	245 FSL 2399 FEL NE	1618	12263
H & P	BURGER TRUST 1-6	SE SE SE SEC 6	2500 FSL 1980 FWL N NE SE	2007	12338
WILLIFORD ENERGY	CLEMONS #1	1320 FNL 1240 FWL SEC 8	SAME		
EXXON	YOURMAN #1	1160 FSL 2417 FWL SEC 9	SAME		

ARCO	HOLSTEN #1	250 FNL 1570 FEL SEC 11			
ARCO	JAMES #1-17	896 FSL 40 FEL SEC 17	983 FSL 2570 FWL NE SE NW	4000	13230
H&H STAR	COLONY 1-23	2000 FSL 640 FWL SEC 23	1140 FSL 640 FWL NW SW NE	3184	15850
WILLIFORD ENERGY	CLEMONS #1	1320 FSL 2340 FWL NW SEC 12			
		4N-20E			
MOBIL	LONG CREEK 1-1	500 FSL 2240 FWL SEC1	2497 FSL 957 FWL NE NW SE	2318	NA 16841
EXXON	ELLIS #1	SW SE SW SE SEC 4			
ANSON	SMALLWOOD	2140 FSL 1200 FEL SEC 3	733 FNL 1025 FEL SW NE SE	291	15618
H&H STAR	DIPPING VAT 1-4	1320 FSL 1320 FEL SEC 4	158 FSL 1968 FWL SW SE NE	1614	15130
H&H STAR	LUCKY STRIKE 1-5	1720 FSL 2380 FWL SEC 5	1596 FNL 539 FWL NW SW NE	2877	13925
MOBIL	KIAMICHI 1-6	500 FSL 2350 FEL SEC 6	2061 FSL 2556 FWL NE NE SW	1574	13775
ANADARKO	BARNES A 1-9	SE NW SE SEC 9	598 FSL 854 FWL SE SW NE	1593	15246
ANSON	GOLDEN 1-10	2430 FSL 1550 FWL SEC 10	SE NE NW 1868 FSL 852 FEL NW	2097	14961
ANADARKO	PRENTICE A 1-11	2150 FSL 2840 FWL SEC 11	821 FSL 1514 FWL NW SE NW	1864	
ARCO	BORNE 1-12	400 FSL 700 FEL SEC 12	2500 FSL 1040 FWL NE NW SE	2284	14566
ANSON	LAMB #1-10	SW NW NW NW SEC 14	2369 FNL 863 FEL SW SE NE SEC 10	4646	16901
H&H STAR	BERKLEY 1-15	1800 FSL 1790 FWL SEC 15	826 FSL 1221 FWL NE SW NE	1760	15587
H&H STAR	COOPERS HOLLOW 1-16	2000 FSL 1650 FEL SEC 16	1382 FSL 490 FWL SW NW NE	2083	16025
MOBIL	BEAR SUCK KNOB 1-7	1640 FSL 1320 FWL SEC 18	1650 FSL 990 FWL SE NW SE	2310	15746
H&H STAR	EIGHT MILE MNT. 1-21	706 FSL 1805 FWL SEC 21	2040 FSL 2409 FWL NE NE NW	4119	
		5N -16E			
HAMILTON BROS.	BERNARDI JONES 1-10	NE SEC 10	SAME		
MIDWEST	BARNES #1	NW SW NE SEC 13	SAME		
TEXAS OIL & GAS	COOK K #1	SW SE SEC 14	SAME		
TENNECO	CC&CC 1-15	660 FSL 660 FWL SEC 15	SAME		
SINCLAIR	GEORGE B HALL #1	S N NW SEC 27	SAME		
DANIEL PRICE	GEORGE B HALL	840 FSL 1320 FWL SEC 17	SAME		
WILLIFORD	ARMCO #1	N N NE SEC 20	SAME		
HAMILTON BROS.	STANSEL WELCH 1-18	S NE SEC 18	SAME		
AMOCO	GEORGE PEDEN #2	SW SEC 24	SAME		
SAMSON	HONEA #1	S N NW SEC 27	SAME		
SAMSON	MONROE #1	720 FSL 1320 FWL SEC 28	SAME		
TENNECO	MOSS A 1-13	SE SE SEC 13	SAME		
SAMSON	MCBEE #1	SE SE SEC 23	SAME		
SUN PETR.	GEORGE PEDEN #1	NW SE SEC 24	SAME		
MARATHON	MASS #1	1450 FSL 1650 FEL SEC 25	SAME		

ATLANTIC RICHFIELD	R. A. KING #1	NW SE SW NE SEC 26	SAME		
DANIEL PRICE	MILLER #1	1320 FSL 1980 FWL SEC 26	SAME		
ATLANTIC RICHFIELD	US GOV. 27-2	2310 FNL 660 FEL SEC 27	SAME		
MUSTANG	MCCLEAN 2-30	400' W C SE SEC 30	SAME		
DAVIS OIL CO.	PAYNE #1	1320 FNL 2300 FEL SEC 33	SAME		
D-PEX OPER.	AIMERITO #1	W NE NE SEC 34	SAME		
DANIEL PRICE	HAILEYVILLE TOWNSITE	E W SE SEC 35	SAME		
MARATHON	WOODS PROS. #2	1170 FSL 1170 FEL SEC 36	SAME		
		5N-17E			
SINCLAIR	PAULINE BOWMAN #1	SW NE SEC 20	SAME		
SINCLAIR	P.D. BOWMAN #1	SW SW NE SEC 29	SAME		
SINCLAIR	PAULINE BOWMAN #1	1210 FNL 1320 FWL SE SEC 21	SAME		
MOBIL	GOLDIE SIVIL #1	NW SW NE SEC 22	SAME		
KING RESOURCES	PETTIT 1-31	SE NW SE SEC 33			
MOBIL	DARBY SUBDIVISION	NW NW SE SEC 23	SAME		
MARATHON	FABBRO #1	NW SE SEC 24	SAME		
SINCLAIR	J L HENLEY #1	NE SE NW SEC 25	SAME		
GULFSTREAM	DURAN #1	S N SE SEC 18	SAME		
TXO	WEBBER 'A' #1	N SW SE SEC 18	NE SW SE 674 FSL 702 FWL SE	318	8681
EXXON	ANDERSON K #2	NW SW SE SEC 19	SAME		
ARCO	USA ANDERSON #2	NW NW SE SEC 28			
ARCO	P D BOWMAN #2	SW NE SW SEC 29	SAME		
SUN	CHARLES CASTEEL A #2	990 FSL 810 FWL SEC 32	SAME		
ARKOMA	PITICHNY #2	N N S NW SEC 33	SAME		
ARCO	RICHARDS EDITH #3	N S NW SEC 30	SAME		
ARCO	PARKER ALFRED #2	W E NW SEC 27	SAME		
ARKOMA	WHITNEY #2	1120 FSL 970 FWL SEC 34	SAME		
ARCO	KURIKO ANDREW #2	NW SE NW SEC 35	SAME		
ARCO	LERBLANCE #2	NW SE NW SEC 36	SAME		
SINCLAIR	DUNHAN 'A' #1	N SE SEC 13	SAME		
SAMSON	SAMS #1	SE NW SE SEC 22	SAME		
MOBIL	DARBY #2	1320 FNL 1300 FWL SEC 23			
MARATHON	FABBRO #2	NE SEC 22			
ARCO	SHARP #1	S S SW SEC 2	SAME		
ARCO	DUNAGAN 'A' #2	NE SE NW SEC 13	SAME		
MOBIL	KENT HEIRS #1	W W SE SEC 14	SAME		

SAMSON	BOBO #1	SE SE SEC 16	SAME		
SAMSON	KENT #1	E W SW SE SEC 15	SAME		
AMOCO	CAUDRON #2	NE SE NW SEC 26	SAME		
		5N-18E			
SINCLAIR	USA ANDERSON #1	SW SW NE SEC 1	SAME		
AMBASSADOR	DAVIS #1	SW SEC 2	SAME		
AMBASSADOR	KINNIKIN PATE #1	SW NE SW SEC 3	SAME		
AMBASSADOR	WOODS #1	SE SEC 4	SAME		
AMBASSADOR	SAWYER #1	NW SE NE SEC 5	SAME		
AMBASSADOR	CHAUDOIN #1	NW NE SE SEC 6	SAME		
SINCLAIR	GARDNER #1	NW SEC 7	SAME		
AMBASSADOR	RAUNIKAR #1	NW NE SEC 8	SAME		
JONES PELLOW	MCCLAIN #1	SE SE SEC 8	SAME		
AMBASSADOR	TOPPING STATE #1	NE SEC 9	SAME		
JMC EXPLOR.	TOPPING STATE #2	1150 FEL 660 FSL SEC 9	SAME		
AMBASSADOR	MCALESTER A #1	SW NE NE SEC 10	SAME		
AMBASSADOR	DAVIS A #1	SW NW NE SEC 11	SAME		
ARCO	DAVIS A #2	NE NW SE SEC 11	SAME		
SAMSON	JUNIOR #1	660 FSL 990 FWL SEC 12	SAME		
AMBASSADOR	ROBINSON #1	NW SEC 12	SAME		
ARCO	WAYNE AUSTIN #2	1720 FSL 2440 FEL SEC 13	SAME		
SAMSON	COSTILOW #4	660 FSL 1630 FWL SEC 14	SAME		
SAMSON	COSTILOW #5	900 FSL 1200 FEL SEC 14	1235 FSL 1425 FWL NW SE SE	335	8179
ARCO	YOURMAN #3	1470 FNL 1320 FWL SEC 15	SAME		
ARCO	KILPATRIK 2-16	1896 FNL 1600 FEL SEC 16			
ARCO	KILPATRICK #3	2296 FNL 2000 FEL SEC 16	SAME		
ARCO	STEVE FAZEKAS #2	SE NW SE SEC 17	SAME		
ARCO	BUD HAMPTON #2	830 FSL 660 FEL SEC 18	SE NW SE 1564 FSL 895 FWL SE	1310	10797
ARCO	BENNET STATE #2	1500 FNL 1500 FEL SEC 19	SAME		
ARCO	SMITH MA #2	1838 FWL 1336 FSL SEC 20	SAME		
ARCO	PASCHALL #2	1960 FNL 1640 FWL SEC 21	SAME		
ARCO	R F MCALESTER #3	1600 FEL 2000 FSL SEC 22	SAME		
ANADARKO PETR.	WILLIAMS A #3	2465 FNL 1890 FWL SEC 23	SAME		
ARCO	JAMES #2	1600 FNL 1500 FWL SEC 24	SAME		
ARCO	WATTS JONES #2	200 FSL 990 FEL SEC 26	SAME		
ARCO	E.V. ENIS #2	1600 FNL 1600 FWL SEC 27	SAME		
ARCO	STATE 'C' #2	1500 FNL 2000 FWL SEC 28	SAME		

ARCO	JESSIE BENNET #2	1825 FNL 1900 FWL SEC 30	SAME		
ARKOMA	HUNTER TUCKER #3	1000 FNL 1320 FWL SEC 31	SAME		
SINCLAIR	MC WATTS #1	NE SEC 33	SAME		
SAMSON	MOSE #1	1320 FNL 660 FWL SEC 35	SAME		
SAMSON	WATTS #1	NW SEC 35	SAME		
AMBASSADOR	DOBBS STATE #1	1320 FSL 1470 FWL SEC 29	SAME		
DONALD SLAWSON	MALITZ 1-25	S NE NE SEC 25	SAME		
SKELLY	GUY VERNUM #1	1285 FSL 1355 FWL SEC 25	SAME		
ARKOMA	KENNEDY B-2	1143 FSL 1497 FWL NW SEC 32	SAME		
		5N-19E			
PAN AM	KIER #1	SE NW SEC 2	SAME		
PAN AM	REUSCH #1	1320 FSL 1320 FWL SEC 3	SAME		
AMOCO	USA CHOCTAW TR T-3 #2	2340 FNL 1660 FEL SEC 4	SAME		
AMOCO	USA CHOCTAW TR T-4 #2	NE NE SW NE SEC 5	SAME		
PAN AM	USA JW MCTIERMAN #1	SE NW SEC 6			
PAN AM	QUAID #1	NE SE NW SEC 7	SAME		
HADSON OIL	EOSC #1-8	NW NW SEC 8			
WILLIFORD ENERGY	OTHO ENIS #1-12	1000 FSL 1320 FEL SEC 12	SAME		
PITCO	POTEET #1-17	E E SW SEC 17	SAME		
EXXON	COLLEGE UNIT #2	NW SE NW SEC 18	173 FSL 1509 FWL SW SE NW	829	11944
HUMBLE	JA RAY #1	NW SEC 20	SAME		
FERGUSON OIL	VFW #1	SW SEC 21			
HUMBLE	ERWIN JEWEL #1	SE SW NW SEC 21	SAME		
TEXACO	HM JENNINGS 23-1	200 FSL 2858 FEL SEC 23	1623 FSL 60 FWL SW NW SE	1450	14153
TEXACO (SIDETRACK)	DK SPANGLER #24-1	2470 FSL 1680 FWL SEC 24	2412 FSL 2138 FWL NE NE SW	461	14142
SHELL	WILLIAMS #32-27	NE SEC 27	SAME		
CHAPPARAL	VFW 1-29	SW SEC 29	880 FSL 680 FWL IF SEC 32 NE NW NW	2291	10859
DANIEL PRICE	CHURCH LAKE #1	1120 FWL 2180 FSL SEC 29	330 FSL 660 FNL NW	914	12208
SUN EXPLOR.	DIAMOND #2	SW SEC 30			
AMOCO	AJ MABRY #1	NW SW NW SE SEC 31			
AMOCO	VIRGINA WALKER #1	NW NW SE SW SEC 32			
AMOCO	ERLAINE WHEELER 25-1	SE NW NE NE SEC 36	383 FNL 839 FWL NE NW SE	2709	
AMAREX	WILBURTON TOWNSITE	SE NE SEC 9	SAME		
SKELLY	JOHNSON M-1	NW SE SEC 22	SAME		
		5N-20E			
DONALD SLAWSON	FOSTER 1-1	SW SEC1	SAME		

MUSTANG	BOOTH 1-2	200 SE CENTER NW SEC 2	SAME		
MUSTANG	CATHEY #1	1470 FNL 1450 FEL SEC 3	SAME		
MEC INC.	LIVELY #2	SE SW SEC 6	SAME		
UNIT PETRO.	DEAR #1	SE NW NW SEC 8	SAME		
MUSTANG	ROBINSON 1-11	1980 FSL 1320 FEL SEC 11	SAME		
ARCO	ROCK ISLAND 1-15	400 FSL 1000 FEL SEC 15	1300 FSL 2600 FWL NE SE SW	1520	NDE 14822
HUMBLE	SHAY #1	SW NE SW SEC 17	SAME		
ANSON	HARDCASTLE 1-20	2446 FSL 1340 FEL SEC 20	392 FSL 1540 FWL SW SE NE	633	13330
ANSON	CINDY 1-21	500 FSL 1300 FWL SEC 21	SAME		
ANSON	SINNER 1-23	216 FSL 1407 FWL SEC 23	1150 FSL 1338 FWL NW SE SW	1124	14603
ANSON	LONG CREEK 1-25	1050 FSL 270 FWL SEC 25			
AMOCO	RAYMOND SMITH #1	1700 FSL 985 FWL SEC 26	NE SW NW	1930	13360
AMOCO	JACK BAUMAN #1	SE SE SE SEC 27	SW NE NE 1467 FSL 1898 FWL NE	4014	13494
ANSON (FIND LOG)	CLEAR CREEK 1-29	SW SE SE SEC 29	NE NW SE 2463 FSL 1357 FEL SE	2087	14111
ANSON	TURNEY 1-28	1957 FSL 1085 FEL SEC 28	NW SE NW 1067 FSL 1497 FWL NW	3119	12796
AMOCO	BOBCAT RIDGE #1	NE SW NW SEC 30	NE SW NW		
ANADARKO	H&H CATTLE CO. 'A' 1-31	601 FEL 1292 FSL SEC 31	990 FSL 330 FWL NW SW NE	1989	14386
ANSON	DEAD MULE #32	1160 FSL 2420 FWL SEC 32	1566 FNL 2288 FWL NE SE NW	2557	14115
ANSON	TURNER 1-33	1160 FSL 1620 FWL SEC33	1258 FNL 2617 FWL SE NE SE	3642	13963
ARCO	NORMAN 1-34	NE SE SE SE SEC 34	330 FSL 1650 FWL SW SE NE	2599	
ANSON	SPRING CREEK GAP 1-36	2350 FWL 1600 FSL SEC 36	1941 FSL 1846 FWL SW NE SW	477	16353
WILLIFORD ENERGY	WIGINTON 1-7	1740 FSL 1940 FWL NE SEC 7	SAME		
UNIT DRILLING	HARDING #1	1320 FSL 1980 FWL SEC 18	SAME		
ANSON	BUZZARD GAP 1-19	1674 FSL 2537 FWL SEC 19	SAME		
CHAPARRAL	VFW 1-29	SEC 29			
		5N-21E			
AMOCO	MC THOMAS #1	2000 FSL 1550 FWL SEC 1	SE SW SW 0 FSL 1250 FWL SW	2030	NDE
SOUTHLAND ROALTY	GARNER #1-2	E NW SEC 2	SAME		
MITCHELL ENERGY	RUSSELL ALBIN #1	C SW SEC 3	SAME		
AMBASSADOR	MUNCEY #1	SW NE SEC 19	SAME		
AMBASSADOR	MUSE #1	NW NW SEC 22			
ANADARKO	ALFORD 'A' 1-15	1980 FSL 1980 FWL SEC 15	NW SW NE 1135 FSL 134 FWL NE	2118	16302

VITA

Forrest Benjamin Hess

Candidate for the Degree

Master of Science

Thesis: SEDIMENTOLOGY AND DEPOSITIONAL ENVIRONMENTS OF THE LOWER ATOKAN SPIRO SANDSTONE IN THE WILBURTON, RED OAK, AND KINTA FIELDS, ARKOMA BASIN, OKLAHOMA.

Major Field: Geology

Biographical:

Personal Data: Born in Englewood, Colorado, March 17, 1965, the son of Mr. and Mrs. Ben E. Hess.

Education: Graduated from Weatherford High School, Weatherford Oklahoma, in May 1983; Received the Bachelor of Science degree in Geology from Oklahoma State University in July 1992; completed the requirements for the Master of Science degree at Oklahoma State University in July, 1995, with a major in Geology.

Professional Experience: Research Assistant, School of Geology 1992 to present; Professional Summer Geologist, Exxon Corp, New Orleans, Louisiana, June 1994 to August 1994; Graduate Teaching Assistant, School of Geology, Oklahoma State University, July 1992 to May 1994; Student Member of the American Association of Petroleum Geologist; Member of the Tulsa Geological Society; Member of the Oklahoma City Geophysical Society.

Plates I, II, III, IV, V, VI and VII.

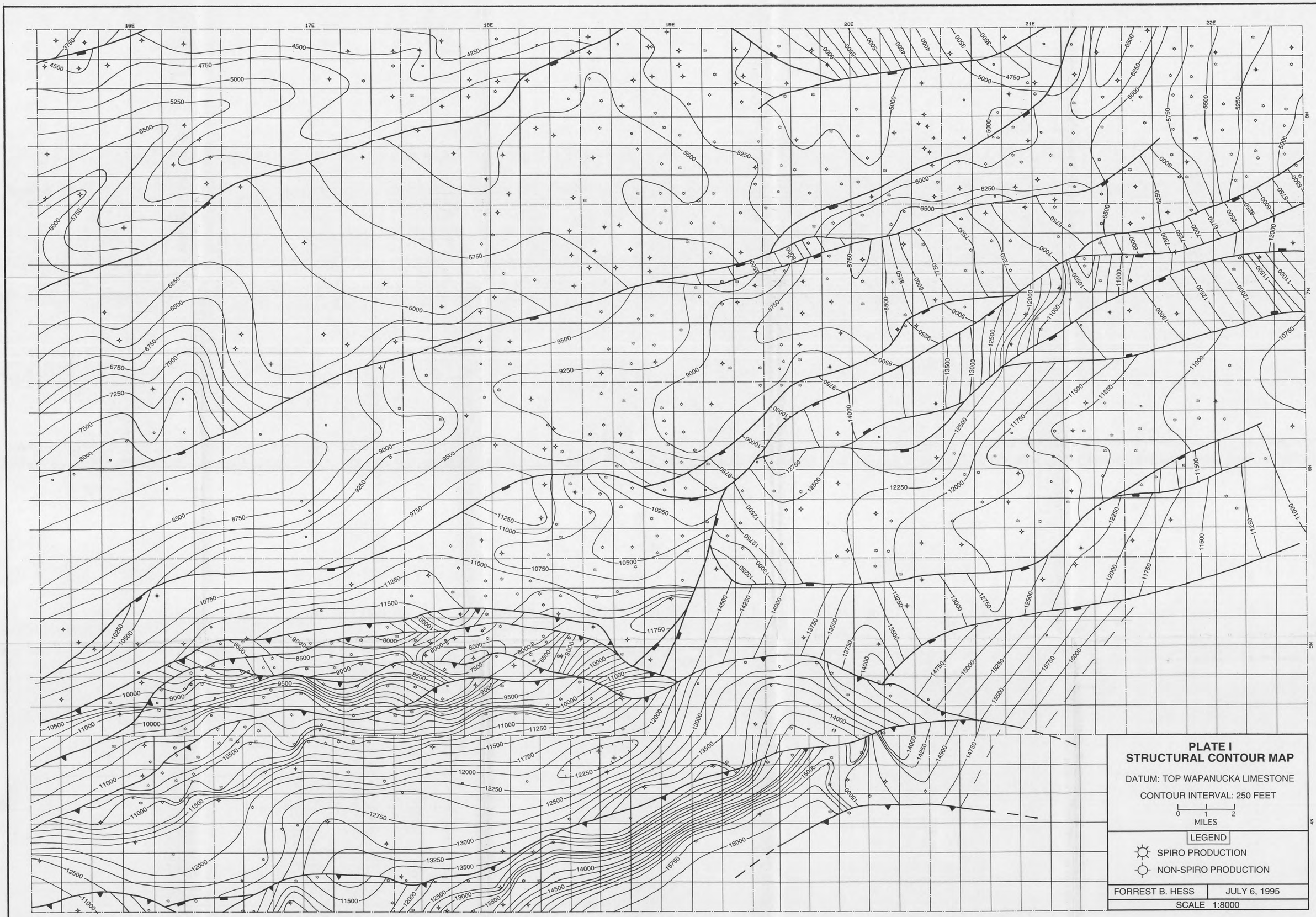


PLATE I
STRUCTURAL CONTOUR MAP

DATUM: TOP WAPANUCKA LIMESTONE

CONTOUR INTERVAL: 250 FEET

0 1 2
MILES

LEGEND

SPIRO PRODUCTION

NON-SPIRO PRODUCTION

FORREST B. HESS	JULY 6, 1995
SCALE 1:8000	

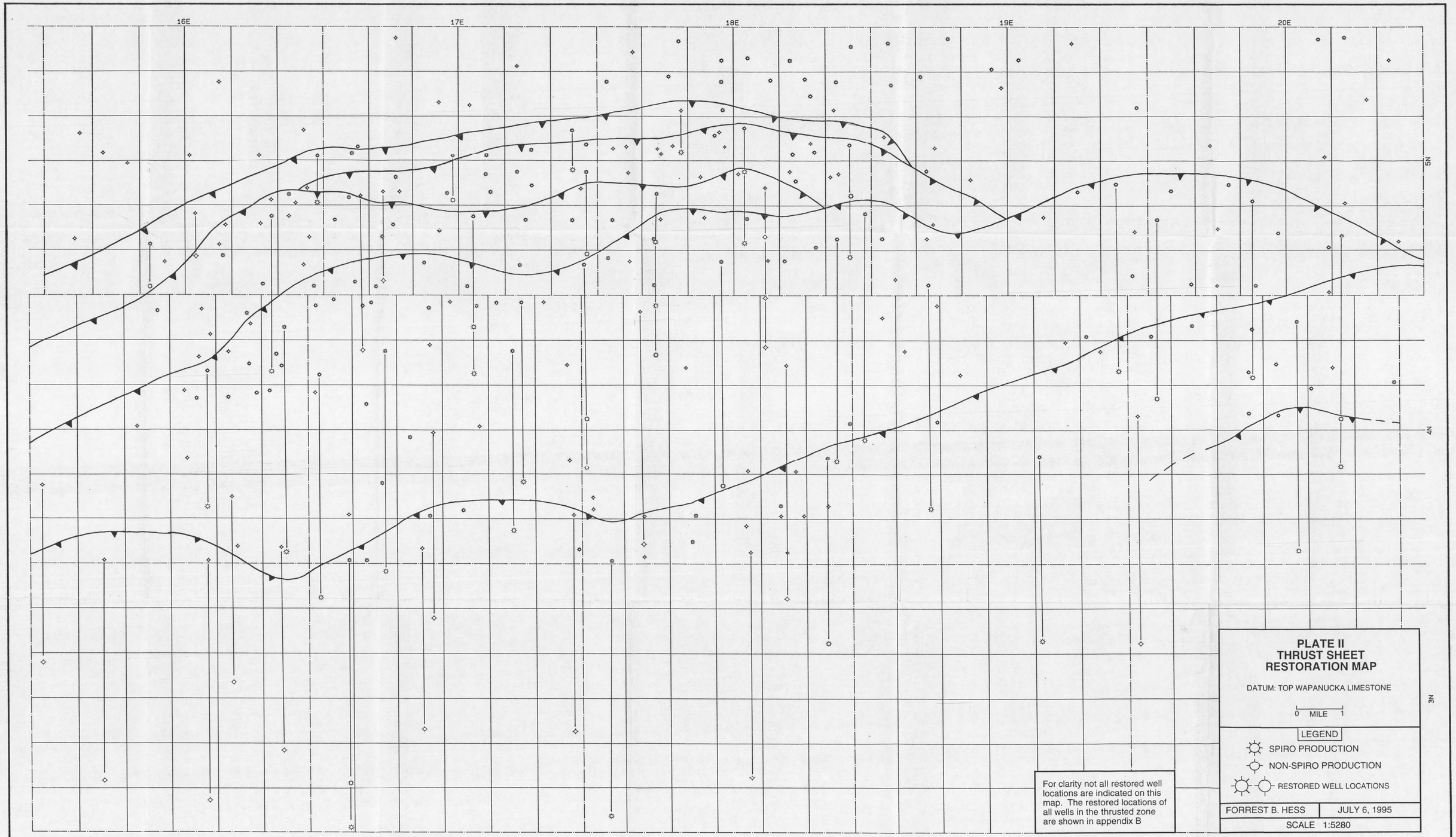


PLATE II
THRUST SHEET RESTORATION MAP

DATUM: TOP WAPANUCKA LIMESTONE

0 MILE 1

LEGEND

SPIRO PRODUCTION

NON-SPIRO PRODUCTION

RESTORED WELL LOCATIONS

For clarity not all restored well locations are indicated on this map. The restored locations of all wells in the thrusted zone are shown in appendix B

FORREST B. HESS	JULY 6, 1995
SCALE 1:5280	

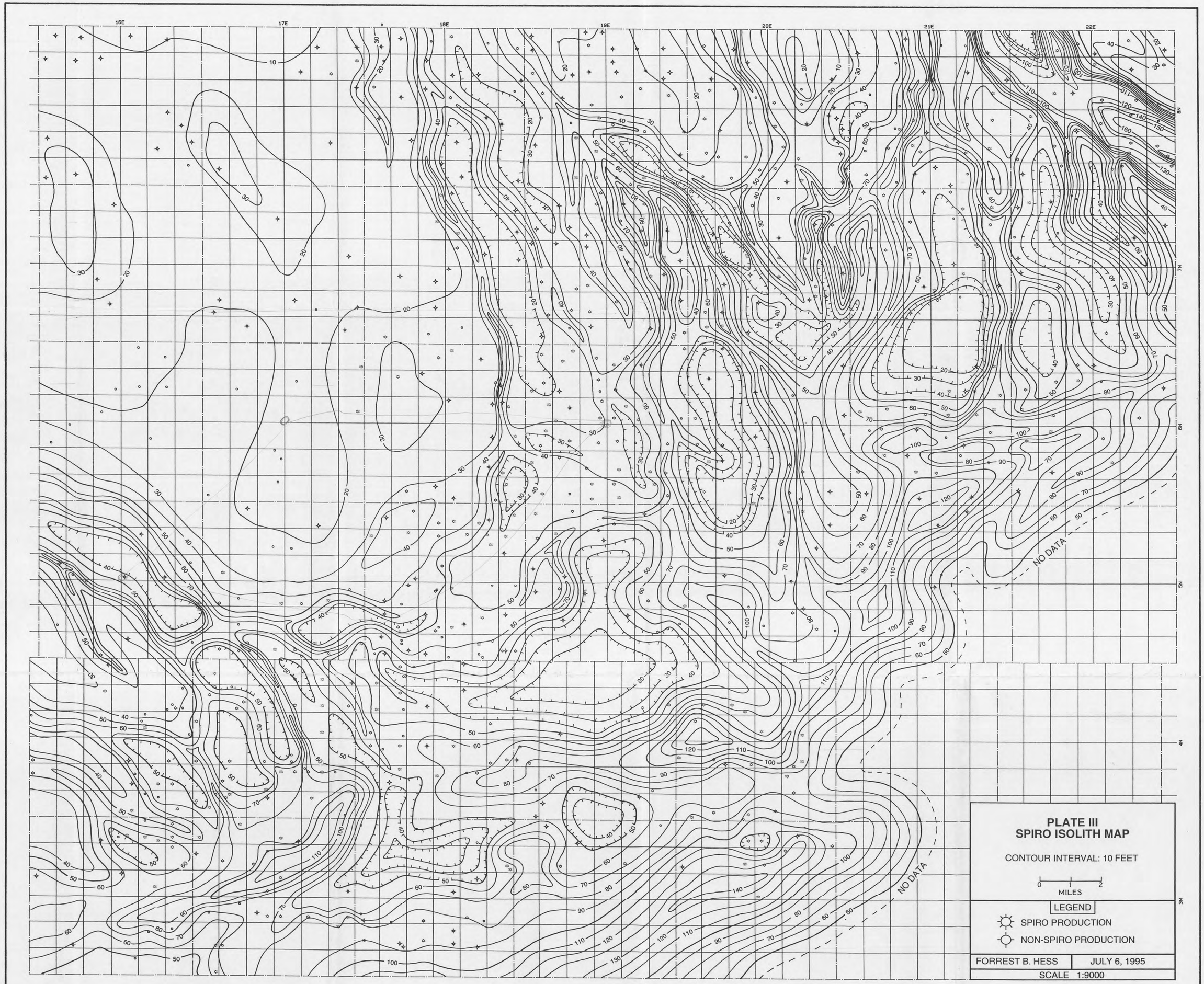


PLATE III
SPIRO ISOLITH MAP

CONTOUR INTERVAL: 10 FEET

0 1 2
MILES

LEGEND

SPIRO PRODUCTION

NON-SPIRO PRODUCTION

FORREST B. HESS	JULY 6, 1995
SCALE 1:9000	

16E 17E 18E 19E 20E 21E 22E

8N 7N 6N 5N 4N 3N

PLATE IV
SUB-SPIRO SHALE ISOPACH MAP

CONTOUR INTERVAL: 10 FEET

0 1 2
MILES

LEGEND

SPIRO PRODUCTION

NON-SPIRO PRODUCTION

FORREST B. HESS | JULY 6, 1995

SCALE 1:9000

16E 17E 18E 19E 20E 21E 22E

8N 7N 6N 5N 4N 3N

A A'

B B'

C C'

D D'

E E'

F F'

PLATE V
STRATIGRAPHIC CROSS SECTION LOCATION MAP

0 1 2
MILES

LEGEND

SPIRO PRODUCTION

NON-SPIRO PRODUCTION

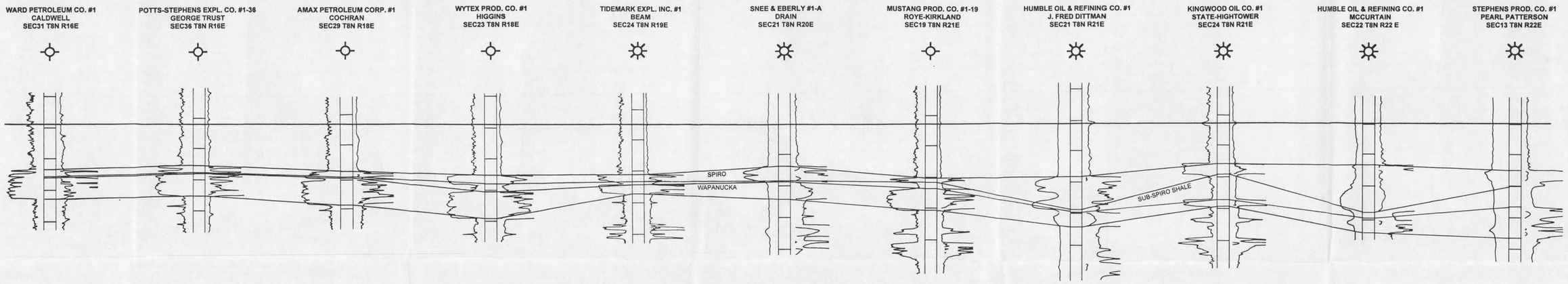
FORREST B. HESS	JULY 6, 1995
SCALE 1:9000	

WEST

EAST

A

A'

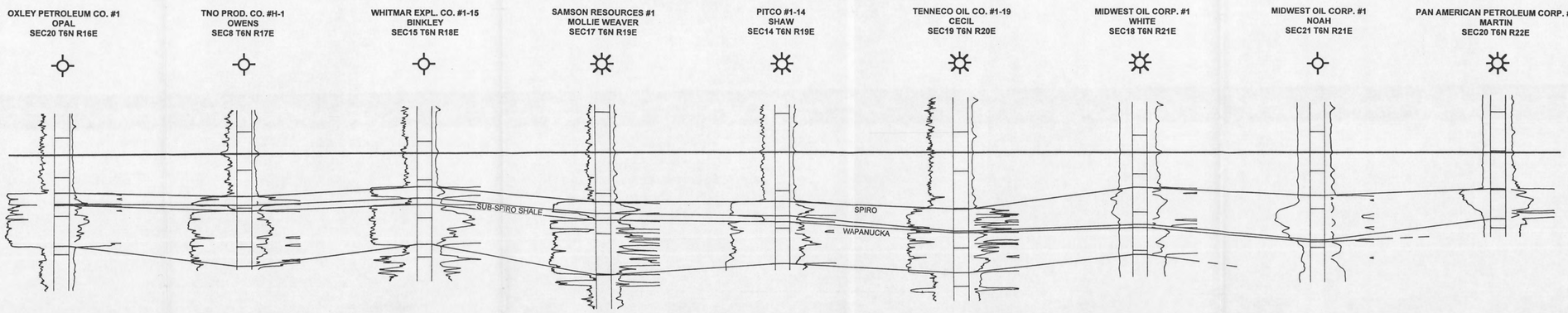


WEST

EAST

B

B'



WEST

EAST

C

C'

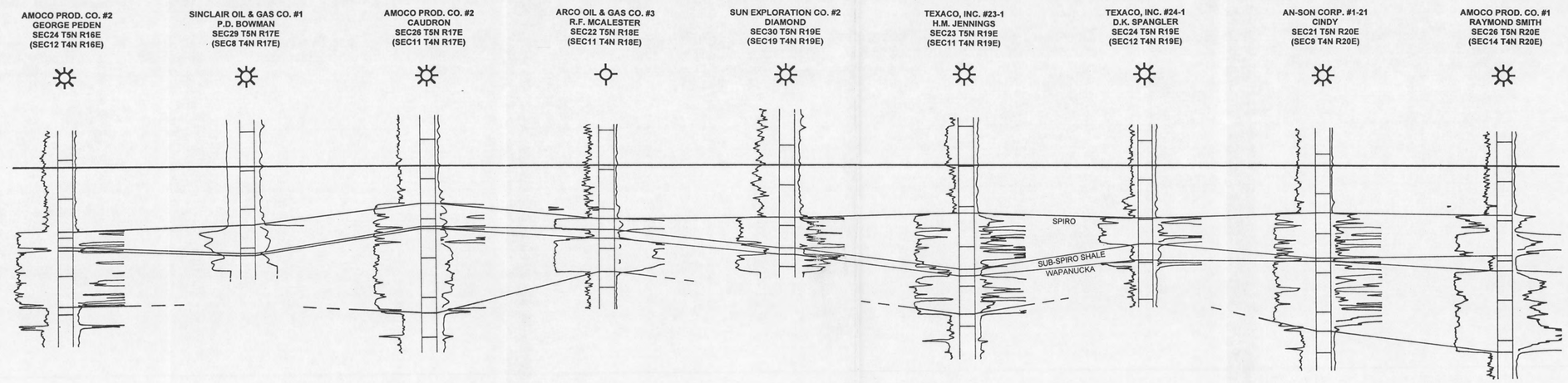


PLATE VI
STRATIGRAPHIC CROSS SECTIONS
A-A' THROUGH C-C'

200
FEET
100
0
VERTICAL SCALE

NO HORIZONTAL SCALE

LEGEND

SPIRO PRODUCTION

NON-SPIRO PRODUCTION

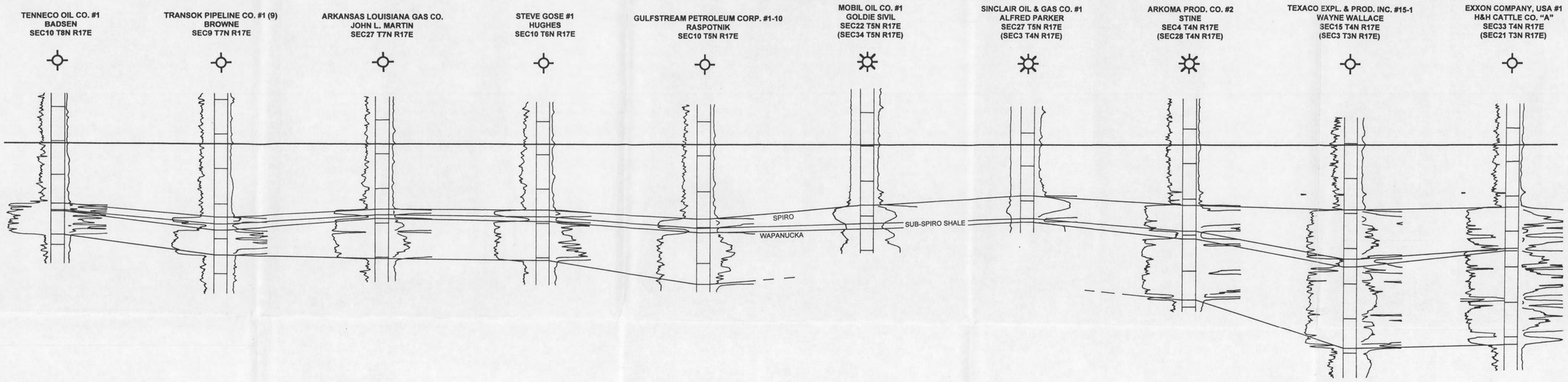
FORREST B. HESS	JULY 6, 1995

NORTH

SOUTH

D

D'

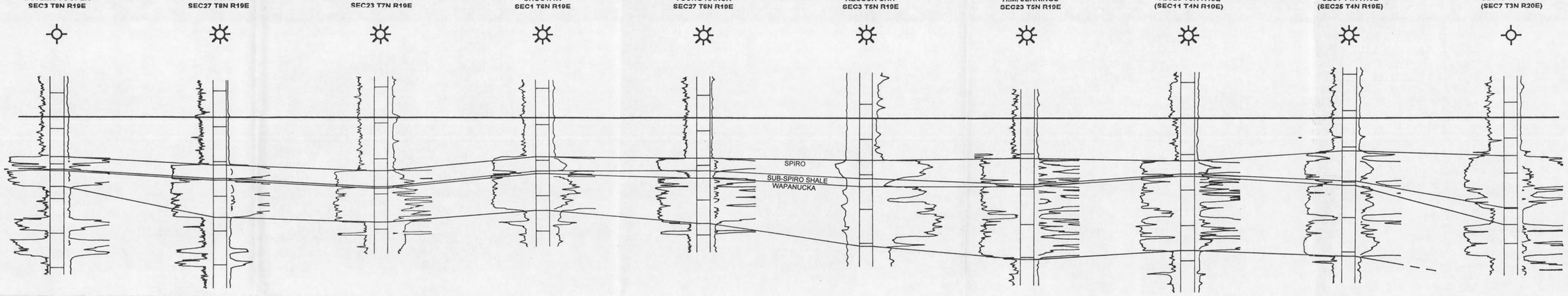


NORTH

SOUTH

E

E'



NORTH

SOUTH

F

F'

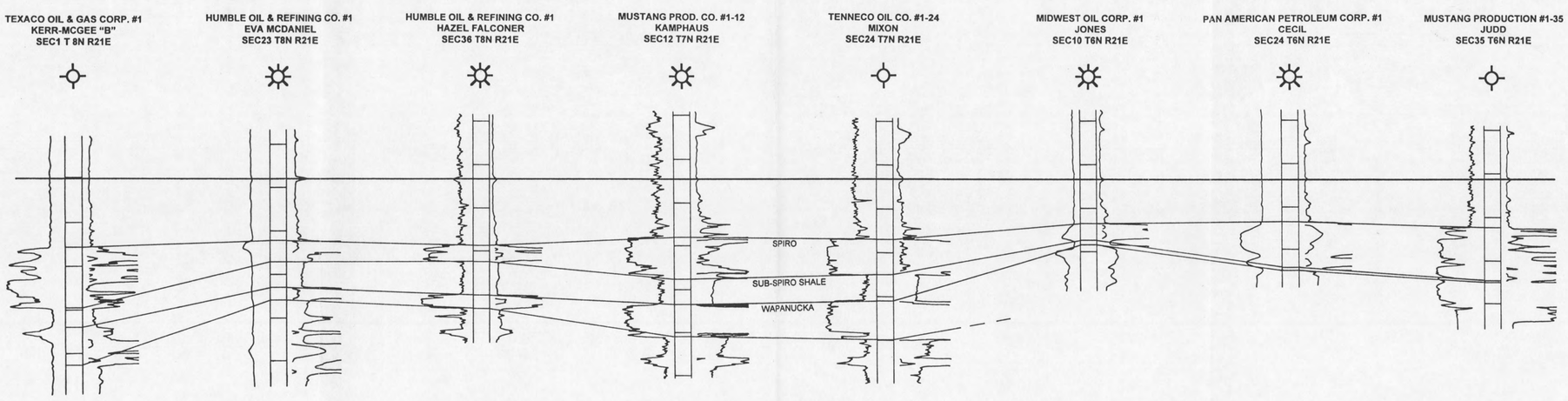


PLATE VII
STRATIGRAPHIC CROSS SECTIONS
D-D' THROUGH F-F'

200
FEET
100
0
VERTICAL SCALE

NO HORIZONTAL SCALE

LEGEND

SPIRO PRODUCTION

NON-SPIRO PRODUCTION

FORREST B. HESS | JULY 6, 1995