

STRATIGRAPHY AND URANIUM POTENTIAL OF VIRGILIAN
THROUGH Leonardian strata in parts of Comanche,
Cotton, and Tillman Counties, Oklahoma,
AND Wichita County, Texas

By

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AND WICHITA COUNTY, TEXAS

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PREFACE

This thesis concerns the distribution and physical characteristics of selected facies of Upper Pennsylvanian and Lower Permian rocks in parts of Comanche, Cotton, and Tillman Counties, Oklahoma, and Wichita County, Texas. Electric logs were used to prepare maps and several correlation cross sections. Analyses of cores, bit cuttings, and electric log correlations were used to make inferences about depositional environments.

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CHAPTER I

ABSTRACT

Depositional systems of Virgilian through Leonardian strata indicate an overall marine regression with several minor transgressions. Depositional environments ranged from shallow marine to alluvial piedmont. Structural geology was an important influence on sedimentation.

The Wichita Mountains Uplift to the north, the Red River Arch, and probably the Ouachita Folded Belt were primary sources of clastic sediments carried into the study area.

Deformation of strata during the Paleozoic was generally associated with two zones of weakness formed by Precambrian tectonism, the Red River Arch and the Amarillo-Wichita Uplift.

Evidence that conditions may have been favorable for uranium mineralization includes surface and subsurface radioactive anomalies, abundance of arkosic sandstones and conglomerates, moderate abundance of carbonaceous material in cores and bit cuttings, presence of faults and oil-productive structural traps, and proximity of a uranium-ion source, the Wichita Granite.

CHAPTER II

INTRODUCTION

Location of Study Area

The area of study, approximately 23 townships, includes parts of Comanche, Cotton, and Tillman Counties, Oklahoma, and Wichita County, Texas (Fig. 1). The strata concerned range from Virgilian to Leonardian (Plate 1). Major structural elements are the Muenster-Waurika Arch, the Red River Uplift, and the eastern most edge of the Hollis-Hardeman Basin (Plate 2).

Statement of the Problem

The primary objectives of this study were to determine (1) stratigraphic relationships of Virgilian through Leonardian strata, (2) the structural framework of the area, (3) the major depositional environments of strata, and (4) areas favorable for the accumulation of uranium minerals. Specific problems confronted are as follows:

1. If anomalous accumulations of uranium minerals exist, what is the areal distribution of the anomalies at the surface and in the subsurface?
2. What depositional environments are favorable for uranium mineralization and what is the areal distribution of these environments?
3. Where were the source area(s) of the sediments?
4. What is the general tectonic makeup of the area?

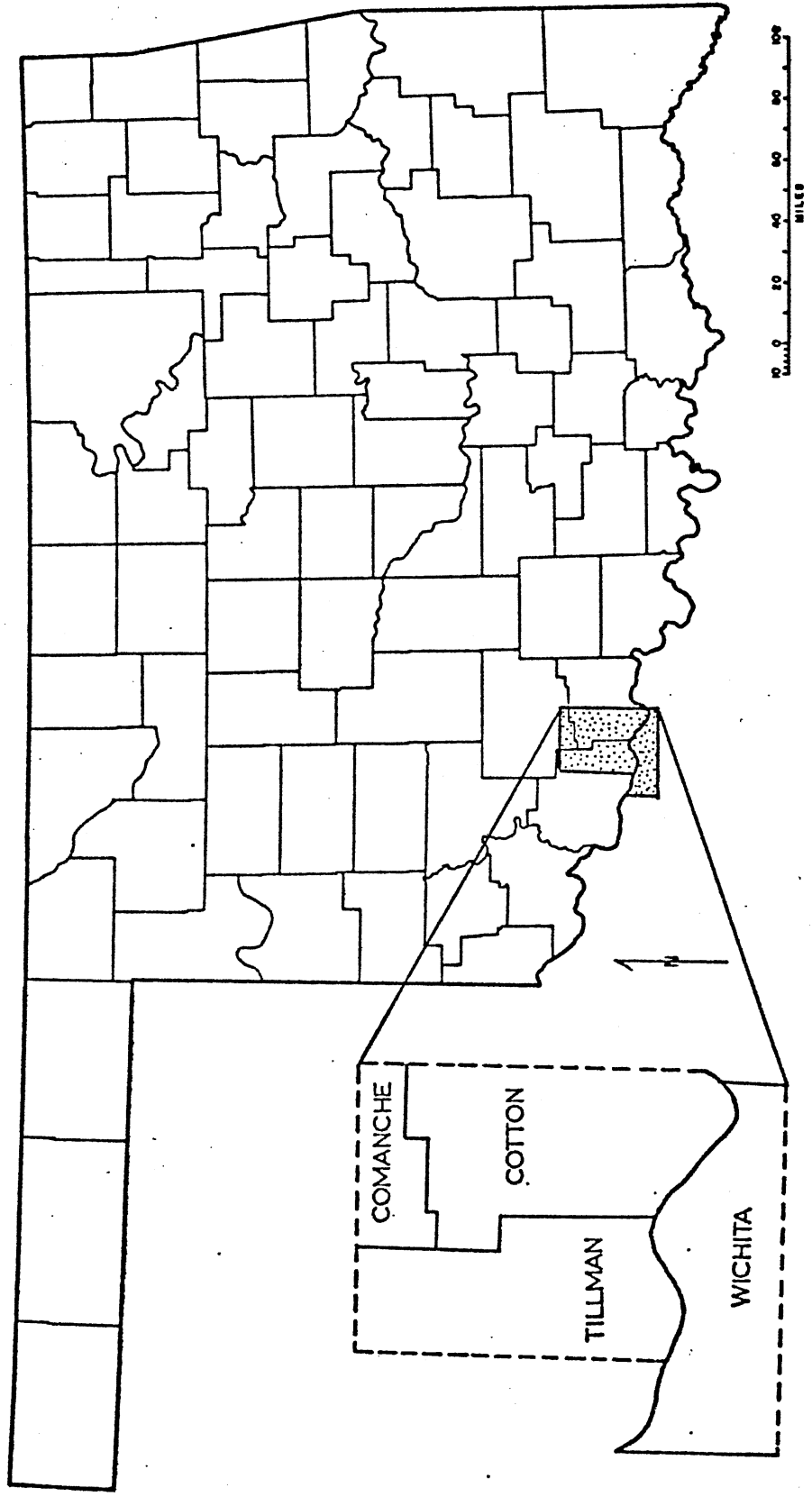


Fig. 1.--Location map of study area.

5. What is the relation of structural geology to uranium mineralization in the area?

Previous Investigations

The study area was included in Taff's report (1904) on the general geology of the Arbuckle and Wichita Mountains. The Permian strata of the area was divided into the Wichita Formation and the overlying Hennessey Shale by Adams and others (1939). The subsurface stratigraphy and structure of rocks in the Hollis Basin were studied by Sears (1951). Chase (1956) described the Paleozoic rocks around the Wichita Mountains and mapped the Post Oak Conglomerate. Stratigraphic columns for Paleozoic rocks in the Anadarko, Ardmore, Hollis, and McAlester Basins of southern Oklahoma were established by Hicks and others (1956) (Plate 1). The subsurface geology of the Southwest Randlett oil field was described by Cipriani (1956). Brown (1959) discussed the problems of stratigraphic nomenclature in Upper Pennsylvanian rocks of north-central Texas. The U. S. Geological Survey (McKee, Oriel and others, 1967; McKee, Crosby and others, 1975) classified Pennsylvanian strata of the study area as being within the Cisco Group and followed Adams' division of the Permian. Soderstrom (1969) discussed the stratigraphy and tectonic framework of the Palo Duro-Hardeman Basin area. The stratigraphy, sedimentology, and uranium potential of the Hollis-Hardeman Basin were described by Lee (1980).

Basement structures in the study area were mapped by Ham (1964). Geology of the ancient southern margin of North America and the related southern Oklahoma aulacogen were reviewed by King (1975), Walper (1977), and Wickham (1978).

Brown (1960, 1966, 1969), Wermund and Jenkins (1970), and Galloway and Brown (1972) have interpreted depositional environments in Upper Pennsylvanian and Permian rocks of the Texas portion of the study area, and Erxleben (1975) dealt with depositional systems in the Canyon Group (Missourian) of north-central Texas. Stanton (1977) discussed the surface and subsurface geology of north-central Texas and southwestern Oklahoma and located several radioactive anomalies.

The occurrence of radioactive material and anomalies in southern Oklahoma and northern Texas were described by Chase (1954) and McKay (1957). Al-Shaieb and others (1977, 1978) discussed the uranium potential of the igneous and sedimentary rocks in the Wichita Mountains region. Permian uranium-bearing sandstones on the Muenster-Waurkia Arch and in the Red River area were described by Morrison (1975).

Methods and Procedures

Approximately 350 electric-logs were correlated in the study area and, where well density was adequate, at least one electric-log per square mile was used. Four major cross sections and 23 looping cross sections were made. The remaining logs were correlated to these controlling cross-sections. The four major cross sections are shown herein as Plates 3 through 6.

Correlations were begun in the southwestern corner of the study area, and were based on previous correlations by the Texas Bureau of Economic Geology staff (Brown and others, 1972; Erxleben, 1975; Soleis, 1978) and by Lee (1980).

A tectonic-framework map (Plate 3) shows major faults, structural axes, uplifts, and basins. This map was modified from Al-Shaieb and others (1980).

A structural-contour map of the top of the Megargel Limestone Member of the Thrifty Formation (Plates 1 and 7) shows the structural geology of the study area. The Megargel of the Thrifty Formation, which is approximately equivalent to the Breckenridge Limestone Member of the Thrifty Formation (Lee, 1980), is the youngest marker bed that can be traced throughout the area. (During correlation of electric logs, the Megargel Limestone was determined to be slightly above the Breckenridge Limestone.) An isopach map of the Megargel was made to help in estimating the depositional processes involved in creation of the unit. Four net-sandstone percentage maps corresponding to four major stratigraphic intervals were prepared to determine depositional trends.

One core and bit cuttings from 18 wells were studied to aid in interpretation of depositional environments. The core and the bit cuttings were tested with a scintillometer for anomalous radioactivity. A survey was made of available gamma-ray well logs to check for zones of anomalously high radioactivity.

Field work included a carborne-scintillometer and gamma-ray spectrometer survey. Many of the outcrops in the study area were inspected. Rock, soil, and stream sediment were spot-sampled throughout the area.

CHAPTER III

STRATIGRAPHIC FRAMEWORK

Introduction

Stratigraphic nomenclature of the Pennsylvanian System used in this thesis (Plate 1) is based on the terminology used by Cipriani (1956), Brown (1959, 1960, 1966, 1969), Wermund and Jenkins (1970), and Lee (1980); Permian terminology is based on work by the Texas Bureau of Economic Geology (Stanton, 1977) and Lee (1980). Lee (1980) divided the section into the Cisco, Pontotoc, and Wichita-Albany Groups. Many of the Permian marker beds used by these workers do not extend into this study area.

Sears (1951) and Hicks and others (1956) divided the section into the Cisco, Wichita, Cleark Fork, and El Reno Groups (Plate 1), whereas the Oklahoma Geological Survey divided the section into Vamoosa, Lecompton, Ada, Vanoss, Oscar, Sumner, Hennessey, and El Reno Groups (Havens, 1977). Type electric-logs which demonstrate marked varieties of lithology and variations in interval thicknesses in the study area are shown in Plate 8.

An attempt has been made to show the boundary of the Pennsylvanian and Permian Systems as well as boundaries of the Virgilian-Wolfcampian and Wolfcampian-Leonardian Stages. Exact locations of these boundaries in the section is difficult to determine due to the gradational changes in depositional systems. However, the divisions shown in Plate 8 are commonly used.

Correlation Sections

Locations of correlation sections are shown in Plate 9. Four cross-sections (Plates 3, 4, 5, 6) show chiefly lateral and vertical facies changes. Two east-west cross-sections (Plates 3 and 4) are oriented parallel and subparallel to the major structural axes in the study area. Two north-south cross-sections (Plates 5 and 6) cross the trends of major structural axes.

The stratigraphic section was divided into four intervals. In ascending order, marker beds used to divide these intervals are the Home Creek Limestone Member of the Caddo Creek Formation, the Gonzales and Gunsight Limestone Members of the Graham Formation, and the Megargel Limestone Member of the Thrifty Formation (Plate 1). Problems of correlation above the Megargel Limestone Member made subdivision of the upper part of the section impractical. However, ad hoc markers were used in an attempt to correlate the section above the Megargel as well as possible, within the framework of the problem. Difficulty of correlation is due to the scarcity of extensive marker beds and to complications of the stratigraphy caused by growth faults (Morrison, 1977; Lee, 1980).

Sandstone-Percentage Maps

Sandstone-percentage maps were made to delineate depositional trends and to aid in the approximation of positions of source areas. Sandstone-percentage maps were chosen over net- or gross-sandstone thickness maps. Thickness of the mapped intervals vary markedly. Maps showing total-interval thickness, net sandstone, and sandstone percentages of each interval are in Appendix F.

Interval 1

Interval 1 is between the top of the Home Creek Limestone Member, Caddo Creek Formation, and the top of the Gonzales Limestone Member, Graham Formation (Plates 1 and 8). Thickness of the interval ranges from 52 to 442 feet and thickness of net sandstone ranges from 0 to 155 feet. Percentage of sandstone ranges from 0 to 63 (Plate 10).

Sandstone percentages of Interval 1 (Plate 10) show a wide range of trends, but the two dominant orientations are east-west and northwest-southeast. In the northern portion of the study area, sandstone is sparse except in two small areas (Plate 10), where sandstone is as thick as .. feet and makes up .. percent of the interval (Plate 10). The thickest accumulations of sandstone (up to .. feet) in Interval 1 are along the north of the Red River Uplift (Plate 2). Sandstone trends tend to be parallel or subparallel to structural axes (cf. Plates 7 and 10).

Interval 2

Interval 2 extends from the top of the Gonzales Limestone Member to the top of the Gunsight Limestone Member, Graham Formation (Plates 1 and 8). Thickness of the interval ranges from 19 to 54 feet and thickness of net sandstone ranges from 0 to 286 feet. Percentage of sandstone ranges from 0 to 71 (Plate 11).

Trends shown by the sandstone percentage map of Interval 2 (Plate 11) are less variable in direction than trends of Interval 1 (cf. Plates 10 and 11). In the northern half of the study area trends are southward. This indicates that the major source areas of sand was the Wichita Mountains. In the southerly portion of the study area, sandstone bodies tend to be oriented southeast-northwest. This trend crosses the Red River Uplift

(cf. Plates 7 and 11) suggesting that the uplift was not a major source area during the span of time recorded by Interval 2.

Interval 3

Interval 3 is between the top of the Gunsight Limestone Member, Graham Formation, and the top of the Megargel Limestone Member, Thrifty Formation (Plates 1 and 8). Thickness of the interval ranges from 57 to 542 feet. Thickness of the net sandstone ranges from 0 to 173 feet. Percentage of sandstone ranges from 0 to 61 (Plate 12).

Sandstone percentage trends of Interval 3 (Plate 12) are poorly defined, but comparison with the structural geologic map (Plate 7) suggest a close, positive association with structural elements. For example, sandstone is extremely thick (61 feet) in the central part of the study area (T. 3 S., R. 14 W.), which is structurally low (Plate 7). Another area of thick sandstone, which is oriented west-northwest to east-southeast, is located north of the Red River Uplift in the Texas portion of the study area (cf: Plates 12 and 17).

Interval 4

Interval 4 is defined as extending from the top of the Megargel Limestone Member to the surface (Plates 1 and 8). Thickness of the interval ranges from 250 to 2655 feet. Thickness of net sandstone ranges from 17 to 764 feet. Percentage of sandstone ranges from 4 to 46 (Plate 13).

Sandstone distribution in Interval 4 shows few distinctive trends (Plate 13). In most of the area, sandstone percentages range from 10 to 30 percent. Isolated areas in which sandstone makes up 30 to 40

percent of the interval are located along the Red River and in the remainder of the Texas portion of the study area. Comparison of Plates 7 and 13 indicates that structural geology probably was much less influential upon the deposition of the sediments contained in Interval 4 than upon older sediments included in this study.

CHAPTER IV

STRUCTURAL FRAMEWORK

General

The study area is located on the southern flank of the Amarillo-Wichita Uplift and between the Hollis-Hardeman and Marietta basins (Plate 2). The Muenster-Waurika Arch extends across the northern part of the study area and the Red River Uplift trends westward across the Texas portion of the study area (Plate 2).

The area of investigation is a part of a linear system of uplifts and basins hypothesized to be aulacogen (King, 1975; Powell and Phelps, 1977; Walper, 1977; Wickham, 1978). The "Southern Oklahoma Aulacogen" is believed to be a rift arm of an "RRR" triple junction that failed. The other two former grabens of the junction continued to spread, oceanic crust formed along their axes, and they eventually developed into a passive continental margin. This margin was the site of deposition of the Ouachita facies. Oceanic crust never developed in the failed rift, which ceased to spread at an earlier stage (Wickham, 1978). Other hypothesized aulacogens that trend at high angles to the Ouachita facies are the Delaware Aulacogen of West Texas, the Reelfoot Aulacogen in Mississippi and Arkansas, and the Mount Rogers Aulacogen of the Carolinas (Walper, 1977).

According to Wickham (1978), the Oklahoma Aulacogen has undergone three stages of development. During the rifting stage, intrusive and

extrusive rocks of Middle to Late Cambrian age were deposited as the basement was uplifted and fractured. The second stage was subsidence during which a thick sedimentary section of Late Cambrian to Early Mississippian rocks were deposited (Ham, 1963; Wickham, 1978). The third stage of the aulacogen was one of deformation. This deformation is hypothesized to have formed the Anadarko, Ardmore, Hollis-Hardeman, and Mareitta Basins as well as the Arbuckle, Criner, Muenster-Waurika, and Wichita Uplifts (Plate 2) (Wickham, 1978; Walper, 1977). Folding and reactivation of older faults occurred during this stage. This deformational phase is believed to have been caused by plate convergence and continental collision as the North American plate was subducted beneath the Afro-South American plate. This plate convergence presumably occurred from the Late Ordovician through the Pennsylvanian (Walper, 1977). Additional deformation in the study area took place during the Pennsylvanian and perhaps during the Early Permian.

Structure of the Megargel Limestone

Member, Thrifty Formation

Generalized shallow and intermediate structure of the area is shown by a structural contour map (Plate 7) of the top of the Megargel Limestone Member, Thrifty Formation (Plate 1). Folds generally trend northwesterly to westerly. Minor trends are northeasterly. One major fault has been mapped in the northern half of the study area. Two smaller faults join this major fault in T. 3 S., R. 12 W. This fault system is probably a shallow expression of the Muenster-Waurika basement fault (Ham, 1964). Displacement along most faults diminishes upward,

Several anticlines are in the southern part of the area, just north

of the Red River Uplift. The most prominent anticlinal feature is a dome in T. 4 S. and T. 5 S., R. 12 W.; it has at least 200 feet of closure. The Southwest Randlett oil field is located on this structure. Most of the Texas portion of the study area is occupied by the east-west trending Red River Uplift.

This interpretation of structural geology of the Megargel Limestone differs from that of Morrison (1977), in that Morrison did not interpret the Muenster-Waurika fault to be present at the Megargel level. Morrison also mapped a northeast-trending fault in the southwestern part of the study area. Because more data were used in the present investigation, the interpretation shown herein seems to be the more probable.

CHAPTER V

DEPOSITIONAL FRAMEWORK

Introduction

Interpretations of depositional environments and processes, set out in this chapter, are based on correlation cross sections, electric-log characteristics, sandstone-percentage maps, analyses of bit cuttings, and analyses of cores. These kinds of evidence were interpreted relative to standards set out by Shelton (1973). Cores are not abundant, and this circumstance has limited use of internal features of the rocks for interpretation of depositional environments.

Depositional Systems

Depositional systems in the study area indicate an overall marine regression broken by several minor transgressions. The Virgilian and Leonardian rocks range from shallow marine carbonates and clastics to conglomerates and coarse-grained sandstones deposited by braided streams.

Major sources of sediment are interpreted to have been the Wichita Mountains and occasionally the Red River Uplift (Plate 2). This interpretation is based on analyses of cores and of bit cuttings, on sandstone-percentage maps, and on work by Erxleben (1975), Stanton (1977), Morrison (1977), and Lee (1980).

The Ouachita Folded Belt (Plate 2) probably was also a source of sediments (Morrison, 1977), but there is no strong and direct evidence

from the subsurface of this study to support the hypothesis. Some chert is in bit cuttings from wells in the northern portion of the study area, but it is associated with limestones, and probably was derived from the Arbuckle Group. Morrison (1977) recorded some paleocurrent directions that would indicate transportation of sediments from the Ouachita belt.

During Early and Middle Virgilian the study area encompassed shallow marine and coastal and deltaic depositional environments. Regression proceeded during the Late Virgilian through Middle Leonardian, and most of the study area probably was covered by coastal to alluvial piedmont environments (Plates 1 and 8).

Most transgressions during this overall regression are shown by thin beds of limestone, useful in this study as marker beds. Above the Megargel Limestone Member of the Thrifty Formation these marker beds are very thin and are not extensive. However, three of the minor transgressions produced marker beds extensive enough for correlation and separation of the section into four major intervals (Plates 1 and 8).

Interval 1

Rocks of Interval 1 (top of the Home Creek Limestone Member, Caddo Creek Formation to the top of the Gonzales Limestone Member, Graham Formation) are Early Virgilian (Plates 1 and 8). Rocks of Interval 1 range from a white to tan sandstone into a black to greenish gray shale (Finis Shale Member). Above the Finis Shale is a white to brown limestone (Gonzales Limestone Member) (Appendices A, B; Plates 14 through 32).

The sandstone that lies directly above the Home Creek Limestone Member is as thick as 50 feet at some places. It is very fine to medium grained, shows fair sorting, and is made up of subangular to rounded

grains (Appendices A, B; Plates 14 through 32). The electric-log characteristics indicate that the sandstone fines upward, has a sharp lower contact, and a gradational upper contact (Plates 3 through 6, and 8).

The Finis Shale Member is fissile and fossiliferous. The most common fossils are fenestrate bryozoa and brachiopods. The shale is 100 to 200 feet thick (Appendices A, B; Plates 14 through 32).

The Gonzales Limestone Member generally is 5 to 15 feet thick. The matrix of the limestone is very fine to fine grained. Fossils in the limestone are mostly crinoid stems and brachiopods (Appendices A, B; Plates 14 through 32). (In the Magnolia No. 76 Honaker core, the Gonzales Limestone ranges from mudstone to packstone.)

Sandstones of Interval 1 (Plate 10) trend eastward and southeastward. Sandstone is absent from most parts of the northern portions of the study area.

Depositional Environments. The prevalent environment of Interval 1 is indicated to have been shallow marine by:

1. abundant, well-preserved marine fauna (i.e., fenestrate bryozoa and brachiopods);
2. sandstones that are subparallel to depositional strike and relatively distal to the Wichita Uplift; and
3. very fine-grained to medium-grained sandstones.

Interval 2

Rocks of Interval 2 (top of the Gonzales Limestone Member, Graham Formation to the top of the Gunsight Limestone Member, Graham Formation (Plates 1 and 8) are Early to Middle Virgilian. Rocks of Interval 2

mostly are brownish-black shales and whitish-brown sandstones (Necessity Shale and Gunsight Sandstone Members). Some thin limestones are in the southwestern part of the study area. Above the shales and sandstones is the white to gray Gunsight Limestone Member (Appendices A, B; Plates 14 through 32).

Individual sandstone units in Interval 2 range from 10 to 40 feet thick. Total thickness of the combined sandstone units may be as much as 100 feet. These sandstones are very fine grained to medium grained. Sorting is fair and grains are subangular to subrounded. Quartz is the dominant constituent of the sandstones (Appendices A, B; Plates 14 through 32). In general, electric-log characteristics indicate sharp lower contacts and gradational upper contacts (Plates 3 through 6, and 8).

Shales in Interval 2 are fissile and are interbedded with siltstones. No fossils were observed in these shales. The shales range from 10 to 50 feet thick (Appendices A, B; Plates 14 through 32).

The Gunsight Limestone Member generally is 2 to 10 feet thick. The limestone is microcrystalline to very fine grained. Fossils include Triticites, miliolid foraminifera, and ostracodes (Scholle, 1978). There is interbedding of fossils and mud matrix (Appendices A, B; Plates 14 through 32). (In the Magnolia No. 76 Honaker core, the Gunsight is grainstone.)

In Interval 2 (Plate 11) sandstones trend northward in the northern portion of the study area and northwestward in the southern part of the area.

Depositional Environments. Depositional environments of Interval 2 probably ranged from alluvial plain and coastal to shallow marine, as indicated by:

1. marine fauna;
2. thick sandstones that trend generally perpendicular to depositional strike and that are proximal to the Wichita Uplift (indicating alluvial plain or deltaic environments);
3. thick sandstones that are subparallel to depositional strike and relatively distal to the Wichita Uplift (indicating interdeltic environments);
4. sharp lower contacts of sandstones as indicated by electric-log characteristics; and
5. very fine-grained to medium-grained sandstones.

Interval 3

Rocks of Interval 3 (top of the Gunsight Limestone Member, Graham Formation to the top of the Megargel Limestone Member, Thrifty Formation) are Middle to Late Virgilian (Plates 1 and 8). Interval 3 comprises interbedded grayish-brown to green shales and white to brown siltstones and sandstones with some thin limestones. Above these strata is a white limestone (Megargel Limestone) (Appendices A, B; Plates 14 through 32).

The combined thickness of the sandstones and shales ranges from 40 to a few hundred feet. The sandstones are very fine to fine grained and are interbedded with siltstones. Sorting is poor and grains are subangular to subrounded. Shales in Interval 3 are blocky to fissile. In the Texas portion of the study area the shales contain bryozoa and crinoid stems. Some thin gray to brown limestones (Ivan, Blach Ranch, and Breckenridge Limestone Members) are present in the southwestern part of the study area. These beds include abundant Triticites (Appendices A, B; Plates 1 through 32).

The Megargel Limestone Member ranges from 3 to 28 feet thick in the study area. It is microcrystalline to fine grained. Fossils were not observed in bit cuttings and the unit was not cored in the Magnolia No. 76 Honaker. The Megargel is the thickest and most extensive limestone bed in the set of strata being studied (Appendices A, B; Plates 14 through 32). Unlike other limestones in the study area, the Megargel does not thicken basinward. Instead, thickening of the limestone is positively correlated with structural highs in the area (cf. Plates 33 and 7).

Accumulations of sandstone in Interval 3 (Plate 12) suggest a close relationship to structure. The thickest accumulation corresponds to a structural low, which is an arm of the Hollis Basin (Plates 2 and 7).

Depositional Environments. Depositional environments of Interval 3 are believed to have ranged from coastal to shallow marine, as indicated by:

1. marine fauna (namely Triticites);
2. absence of distinctive sandstone trends;
3. sandstones that trend subparallel to depositional strike;
4. gradational contacts between sandstones and shales;
5. very fine-grained to fine-grained sandstones; and
6. lack of sandstones that are proximal to the Wichita Uplift.

Interval 4

The rocks of Interval 4 (top of the Megargel Limestone Member, Thrifty Formation to the surface) are Late Virgilian to Middle Leonardian (Plates 1 and 8). Interval 4 is dominantly reddish-brown mudstones and siltstones and white to tan sandstones. Thin limestones and some coals have limited lateral extent. Arkosic sandstones and conglomerates were

observed in bit cuttings from the northern portion of the study area (Appendices A, B; Plates 14 through 32).

Sandstones in Interval 4 range from very fine grained to very coarse grained and show poor to fair sorting. Grains are angular to subrounded. Individual sandstone units are generally thinner than 30 feet. Coarse arkosic sandstones in the northern part of the study area contain feldspar grains. Most of these feldspar grains are potassium feldspar. Rock fragments and chert are constituents of the sandstones in Interval 4 at some localities. Calcite and silica cements are common (Appendices A, B; Plates 14 through 32).

Mudstones in the interval are blocky to massive and concretions and nodules are common. Some thin limestones or limy sandstones as well as coals are present in Interval 4. The limestones are white to gray (Appendices A, B; Plates 14 through 32). Spontaneous-potential curves of sandstone units in Interval 4 are highly serrated and irregular, indicating sharp bed boundaries. Correlation of electric-logs indicates that sandstones of Interval 4 are continuous laterally only for short distances (Plates 3 through 6, and 8).

Sandstone trends of Interval 4 (Plate 13) are quite variable and do not appear to be significantly influenced by underlying folds and faults. Unlike Intervals 1 through 3, Interval 4 shows some thick sandstone bodies in the northern portion of the study area. In the southern portion of the study area, sandstone trends generally are northwestward.

Depositional Environments. The depositional environments of Interval 4 are inferred to have ranged from distal alluvial piedmont to shallow marine, as indicated by the following:

1. absence of evidence of marine fauna;
2. thickness of sandstone units (i.e., generally 10 to 30 feet);
3. thick sandstones proximal to the Wichita Uplift;
4. sandstone trends subperpendicular to the mountain front
(indicating alluvial plain to deltaic environments);
5. sandstone trends parallel to depositional strike (indicating
interdeltaic environments);
6. conglomerates and coarse-grained to very coarse-grained sand-
stones that are arkosic;
7. presence of coals (probably indicating swamp or lagoonal
environments);
8. presence of thin limestones (indicating minor transgressions
and shallow marine conditions);
9. sharp vertical and lateral contacts; and
10. presence of angular and subangular sand grains.

CHAPTER VI

URANIUM POTENTIAL

Introduction

Evaluation of the uranium potential of the study area was attempted by the following surveys:

1. Soil and stream sediment samples were taken at random throughout the study area, and rock samples were taken at most of the significantly large outcrops.

2. Scintillometer and gamma-ray spectrometer readings were made at each sample location.

3. In the Oklahoma portion of the study area, bit cuttings from at least one well per township were checked with a scintillometer for anomalously high readings.

4. The Magnolia No. 76 Honaker core was checked with a scintillometer for unusual radioactivity.

5. Gamma-ray well logs conducted were inspected for the occurrence of anomalously high radioactivity.

Surface Sample Survey

A survey of rocks, soil, and stream sediments was made of the study area using a scintillometer and a gamma-ray spectrometer. Samples were

taken from each location for geochemical analysis.¹ Information gathered from this analysis is shown in Appendix C. Three surface anomalies were noted in the study area (Plate 34). The data taken by the Scintillometer (total gamma-ray counts per second) and the gamma-ray spectrometer (counts per minute) at each anomaly are shown in tabular form in Appendix C.

The anomalies are located in the southeastern part of the area (T. 4 and 5 S., R. 12 W.). These anomalies were mentioned in previous investigations (Morrison, 1977; Al-Shaieb, 1977a, b). They show little or no association with structural geology when their distribution is compared to the map of the Megargel Limestone (Plate 7).

Bit Cutting Survey

In Appendix D are listed wells from which bit cuttings were described and examined with a scintillometer. No anomalous radioactivity was recorded.

Core Survey

The core from the Magnolia No. 76 Homaker (the only core available), the analysis of which is shown in Appendix A, contained no anomalously radioactive zones in siltstones, sandstones, or conglomerates. Two of the shale units in the core showed high radioactivity.

¹Zuhair Al-Shaieb and Richard G. Thomas, "National Uranium Resource Evaluation, Lawton Quadrangle, Oklahoma and Texas," U. S. Department of Energy, Grand Junction, Colorado, open-file report (in press).

Gamma-Ray Survey

The following guidelines set out by Hansen (1977) and Lee (1980) were used to determine anomalous zones on gamma-ray logs. (1) The anomalous zone must be below the shallowest occurrence (top) of arkose. (2) The anomalous zone must be in conglomerate, sandstone, or siltstone (as determined by self-potential deflection on electric-log, where available). (3) The gamma-ray intensity must be significantly higher than the background (Hansen, 1977, p. 49). For the purposes of this research the term "significantly" was defined as a deflection of the gamma-ray curve that went off scale two or more times. All subsurface anomalies located were in three clusters in the Texas portion of the study area (Plate 35). Depths of the gamma-ray anomalies range from 250 to 1750 feet. An example of one of the gamma-ray anomalies is shown in Figure 2.

Subsurface gamma-ray anomalies seem to be positively associated with the Red River Uplift. However, this association may be due to the fact that more drilling was done on structural highs for potential hydrocarbon traps, and not because of a causal relationship between positive structure and the radioactivity anomalies.

These subsurface anomalies do not coincide in location with surface anomalies (Plate 34), which are exclusively in the Oklahoma portion of the study area. However, gamma-ray logs in the study area are rare. The total number of gamma-ray logs is less than five percent of the total number of borehole well logs used in this investigation.

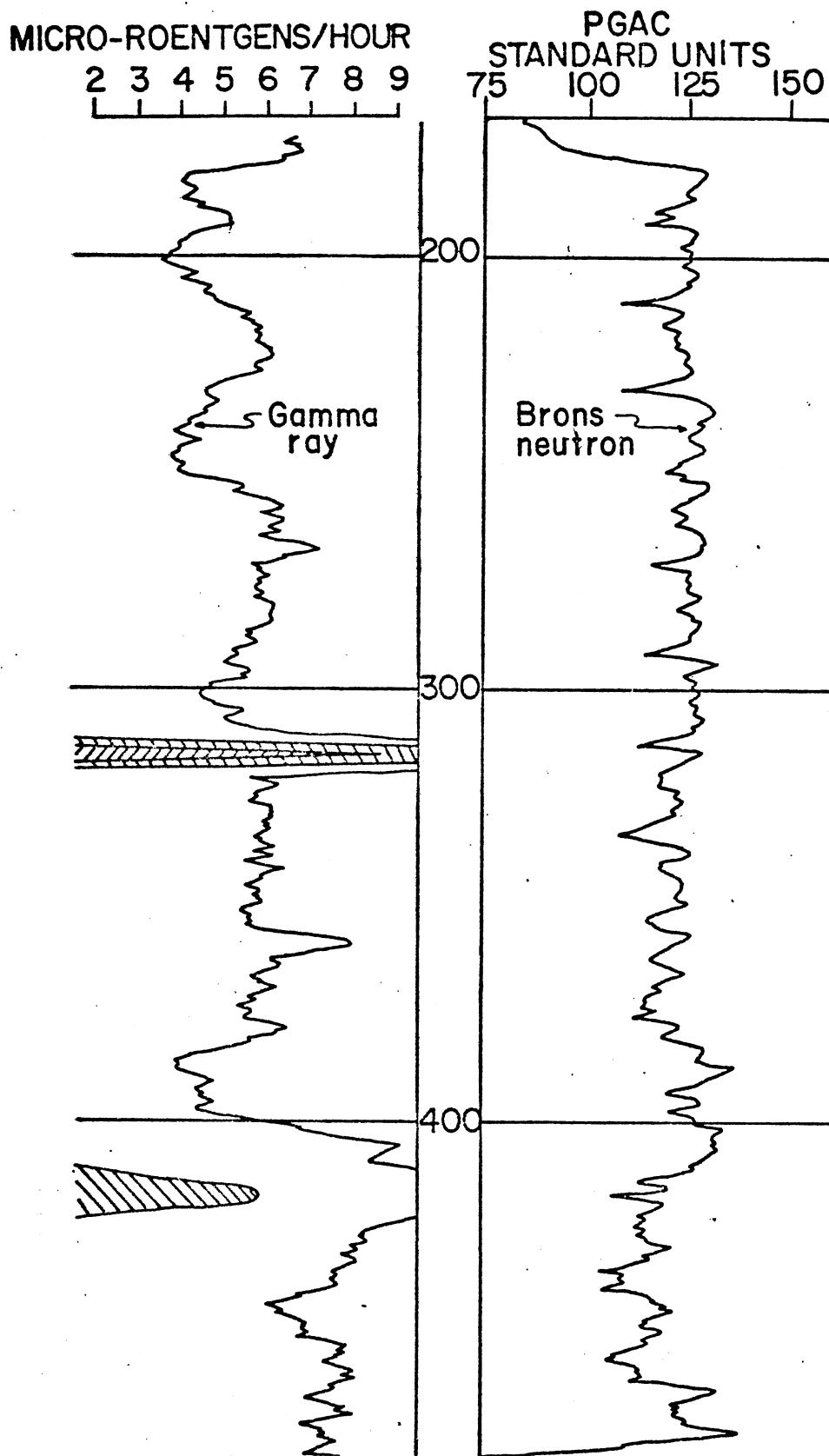


Fig. 2.--Gamma-ray log with anomalous radioactive zone.

Summary

Potential for mineralization in the study area may be somewhat favorable due to the following evidence:

1. A limited survey at the surface indicated at least three radioactive anomalies in the study area (Al-Shaieb and others, 1980).
2. A survey of the small number of gamma-ray logs resulted in detection of several subsurface radioactivite anomalies.
3. Study of bit cuttings from wells indicates an abundance of arkosic sandstones and conglomerates, which are believed to be rock types favorable for uranium mineralization (Al-Shaieb and others, 1977a, b).
4. Analyses of the Magnolia No. 76 Honaker core and bit cuttings from wells indicate moderately abundant organic material, which can serve as a reductant in uranium mineralization.
5. Al-Shaieb and others (1978) indicated that the Wichita Granite is a potential source rock of uranium ions. The granite has been eroded and deposited in the subsurface of the study area, and uranium ions liberated in ground water may have been re-deposited in the clastic sediments.
6. The dominant depositional environments of Interval 4 (p. 20) generally were favorable for uranium mineralization (Al-Shaieb and others, 1978).
7. Morrison (1977) and Al-Shaieb and others (1978) indicated that faults and oil-productive structural traps are positively correlated with uranium mineralization in some areas. Therefore, the mere existence of faults and oil fields in the study area can be regarded as favorable evidence (Lee, 1980).

CHAPTER VII

SUMMARY

Principal conclusions of this study are as follows:

1. Depositional systems of Virgilian through Leonardian strata indicate an overall marine regression with several minor transgressions.
2. Depositional environments probably ranged from shallow marine to alluvial piedmont.
3. Deformation during the Paleozoic was generally associated with two zones of weakness formed by Precambrian tectonism, the Red River Arch and the Amarillo-Wichita Uplift.
4. The Wichita Mountains Uplift to the north, the Red River Arch, and probably the Ouachita Folded Belt were the primary sources of clastic materials within the study area.
5. Indications that conditions may have been favorable for uranium mineralization are surface and subsurface radioactive anomalies, abundance of arkosic sandstones and conglomerates, moderate abundance of carbonaceous material in cores, faults and oil-productive structural traps, and proximity of a uranium-ion source, the Wichita Granite.

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APPENDIX A
ANALYSIS OF CORE

ANALYSIS OF CORE

Only one core was available for inspection in the study area. The location of this core and of the 18 wells from which bit cuttings were examined are shown in Plate 9. The sections of core available from the Magnolia No. 76 Honaker mostly are carbonate and shale units with large gaps between them. Therefore, interpretations about depositional environments necessarily are limited. Unfortunately an electric log was not made on this well. The closest electric log available is of the Magnolia No. 14 Brewer, located in section 250 of the Waggoner Colony Subdivision, Wichita County, Texas, approximately three-quarters of a mile away. This log was used as a guide for correlation of the cored intervals.

Geographic Location

The core (Plate 14) from the Magnolia No. 76 Honaker is located in block A-665 of the S.P.R.R. Survey, Electra Field, Wichita County, Texas (Plate 9).

Vertical Position

The core is from the various intervals from 589 to 2507 feet deep. This section of rock includes the entire Virgilian through Middle Leonardian section. However, most of the cored intervals are below the Megargel Limestone Member of the Thrifty Formation (Plates 1 and 8) and are Virgilian.

Internal Features

Sedimentary Structures

Most of the carbonate rocks in the core are massive to blocky. One grainstone shows lamination of mud and fossils (Fig. 3). Styolites are common in many of the limestones (Fig. 4). Shales are blocky to fissile. A coal at 1633 feet which is laminated and fissile (Fig. 5). The only sandstone in the core is finely laminated.

Texture

Carbonate rocks range from microcrystalline mudstones to coarse grainstones. The limestone at 2482 to 2483 feet appears to be recrystallized breccia. Some siltstones are included, and the sandstone at 1941 feet is very fine grained to fine grained. The sandstone is moderately sorted and grains generally are subangular to subrounded (Fig. 6). Many grains show evidence of dissolution (Fig. 7).

Constituents

As stated previously, the rocks in this core include shales, siltstones, carbonates, and one sandstone unit. The carbonate range from mudstones to grainstones. The allochems in the carbonates are mostly fossils and fossil fragments, but some oolites are included (Fig. 8). The most common fossils are Triticites, fenestrate bryozoa, crinoic stems, and brachiopods (Figs. 9 and 10) (Scholle, 1978). Some of the limestones are pyritic.

The sandstone unit at 1941 feet is made up almost exclusively of quartz grains. Many of these grains have been dissolved and corroded and

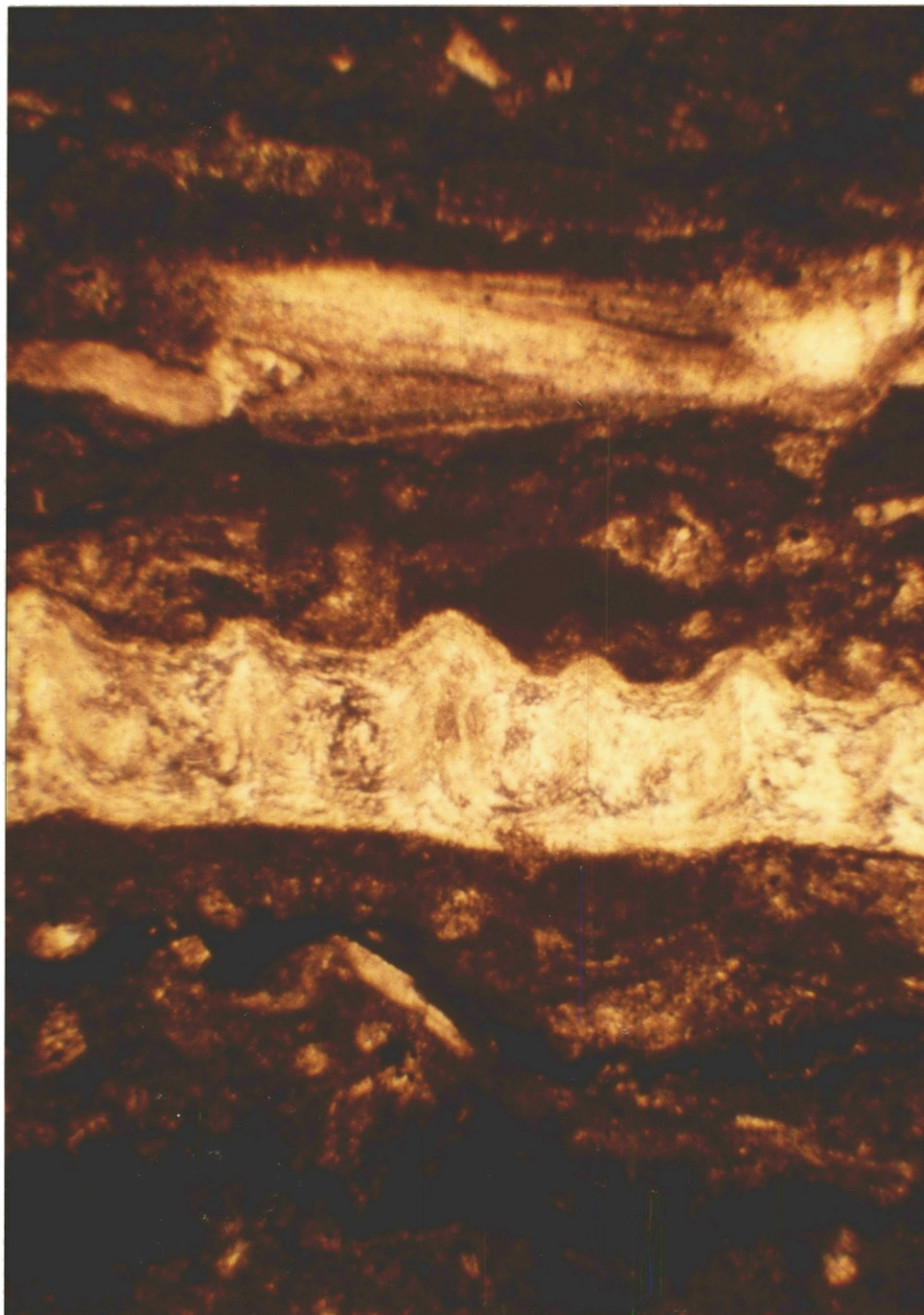


Fig. 3.--Lamination of mud and fossils in grainstones.
Samples from Magnolia No. 76 Honaker Core,
2439 feet deep. Magnification 25X, crossed
nicols.

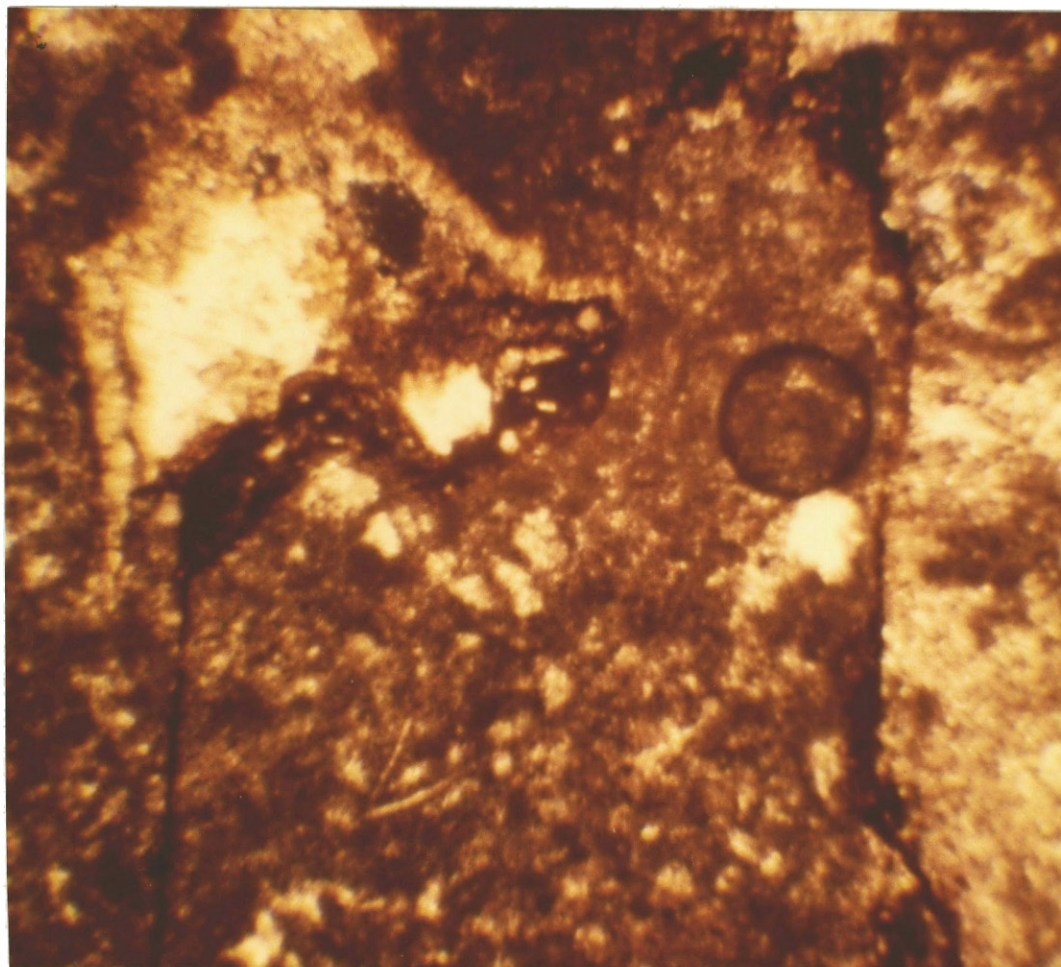


Fig. 4.--Stylolite (sty) within limestone. Sample is from Magnolia No. 76 Honaker core, 2491 feet deep. Magnification is 25X, crossed nicols.



Fig. 5.--Coal at 1633 feet deep from the Magnolia No. 76 Honaker core.

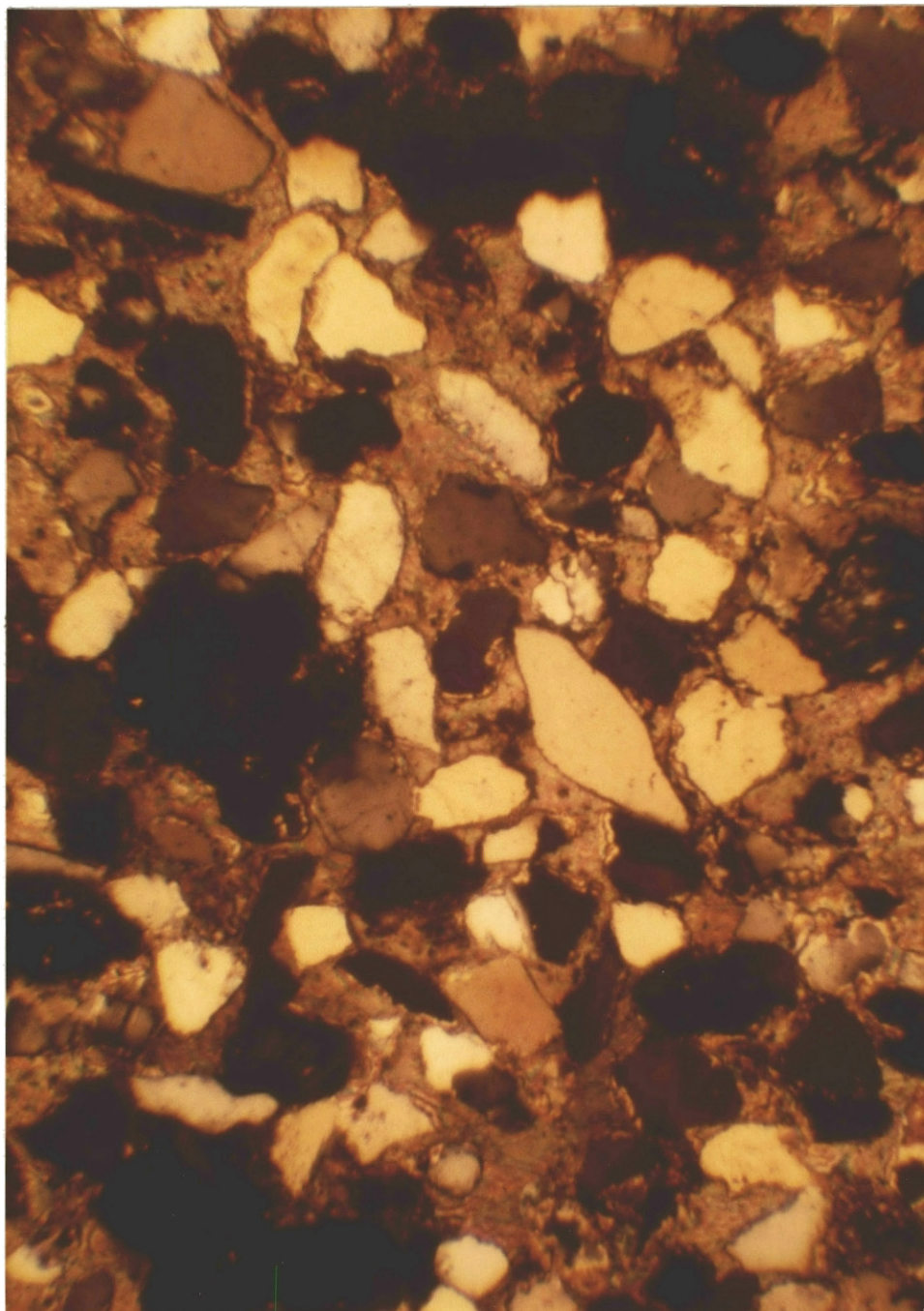


Fig. 6.--Very fine-grained to fine-grained sandstone. Sorting is moderate and grains are subangular to subrounded. Sample is from Magnolia No. 76 Honaker core, 1941 feet deep. Magnification is 25X, crossed nicols.

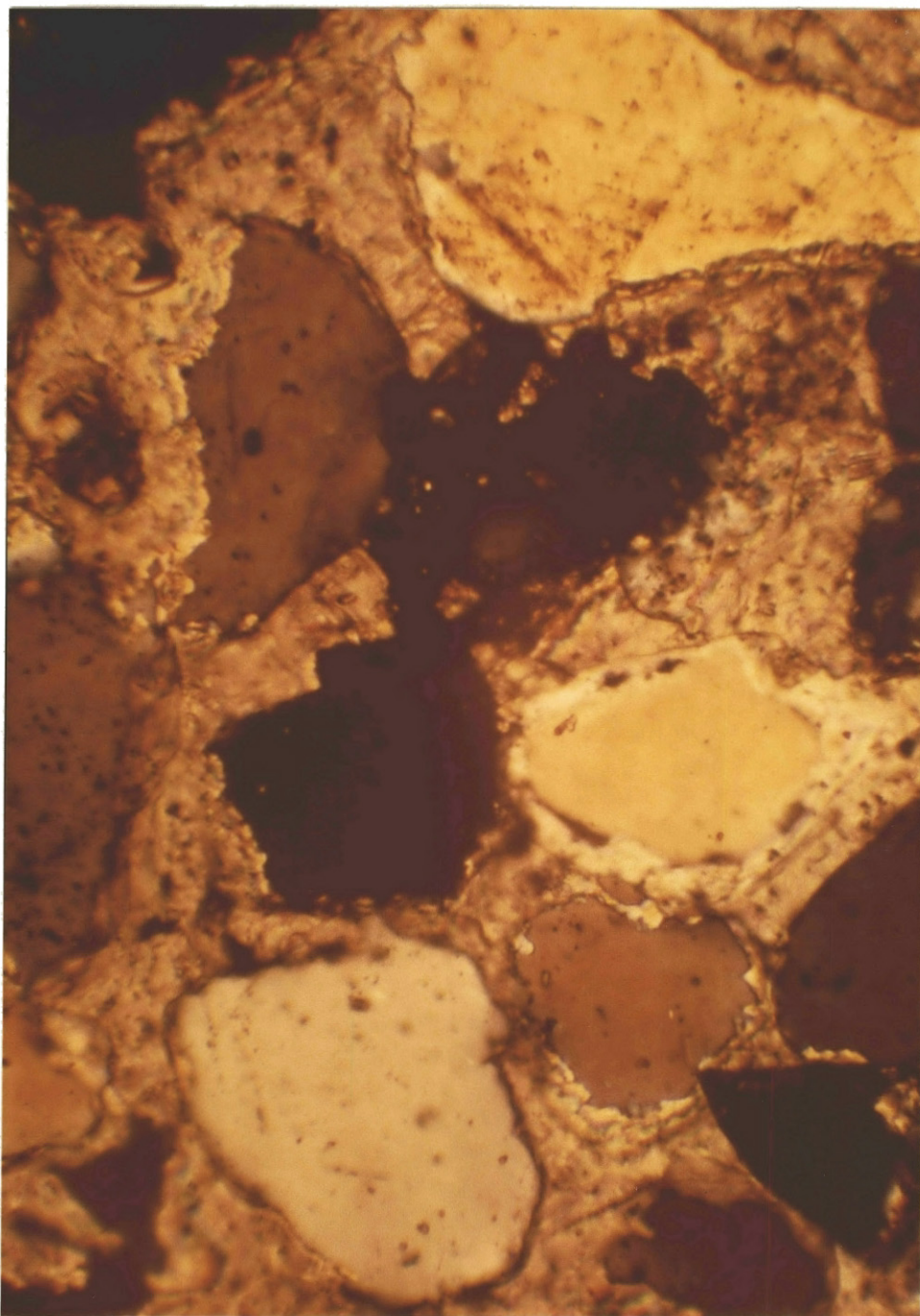


Fig. 7.--Very fine-grained to fine-grained sandstone. Quartz (qtz) grains show overgrowths and dissolution. Calcite cement (cal) is abundant and shows replacement of quartz grains. Sample is from Magnolia No. 76 Honaker core, 1941 feet deep. Magnification is 100X, crossed nicols.

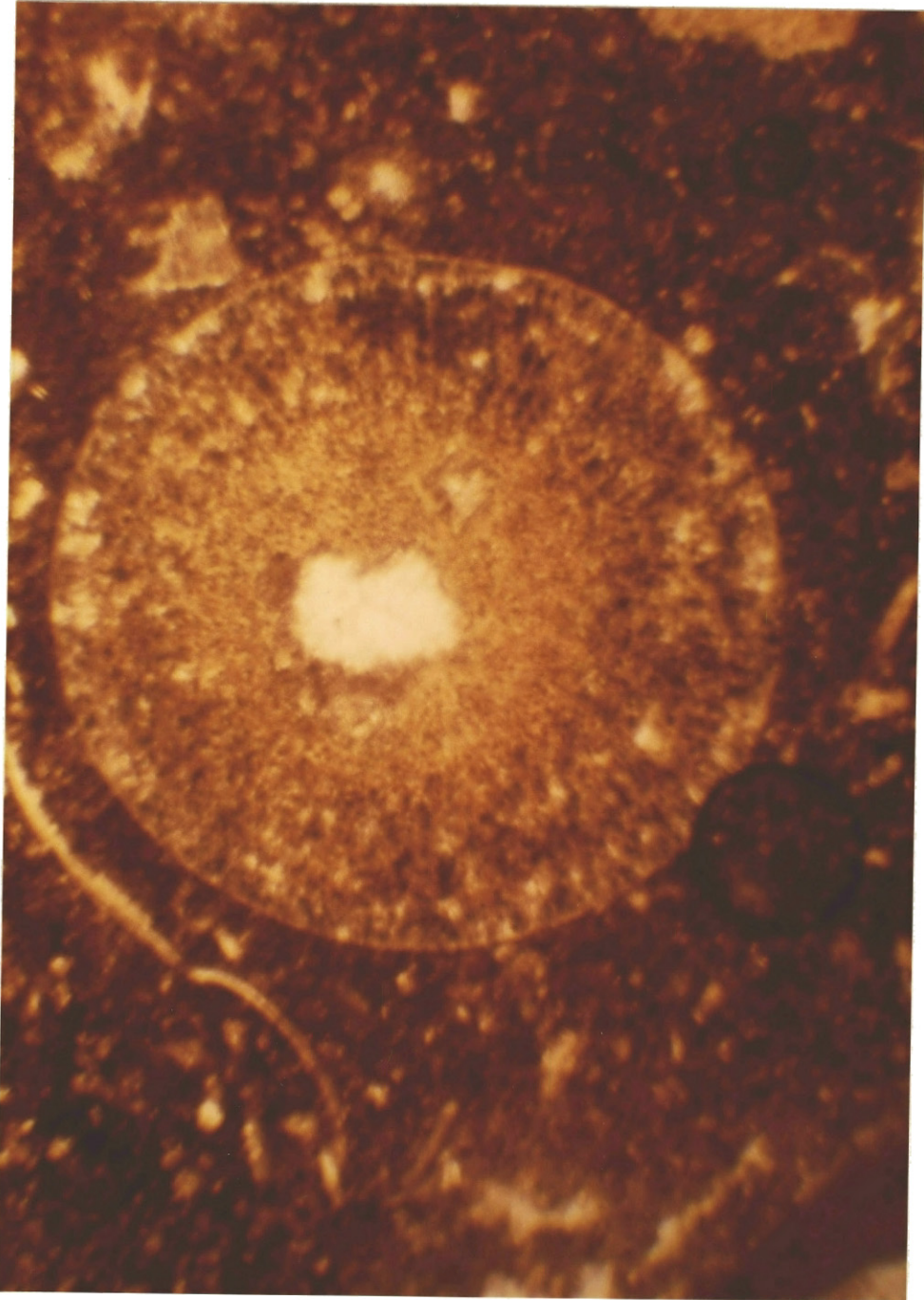


Fig. 8.—Oolite within limestone at 1819 feet deep. Sample is from Magnolia No. 76 Honaker core. Magnification is 25X, crossed nicols.

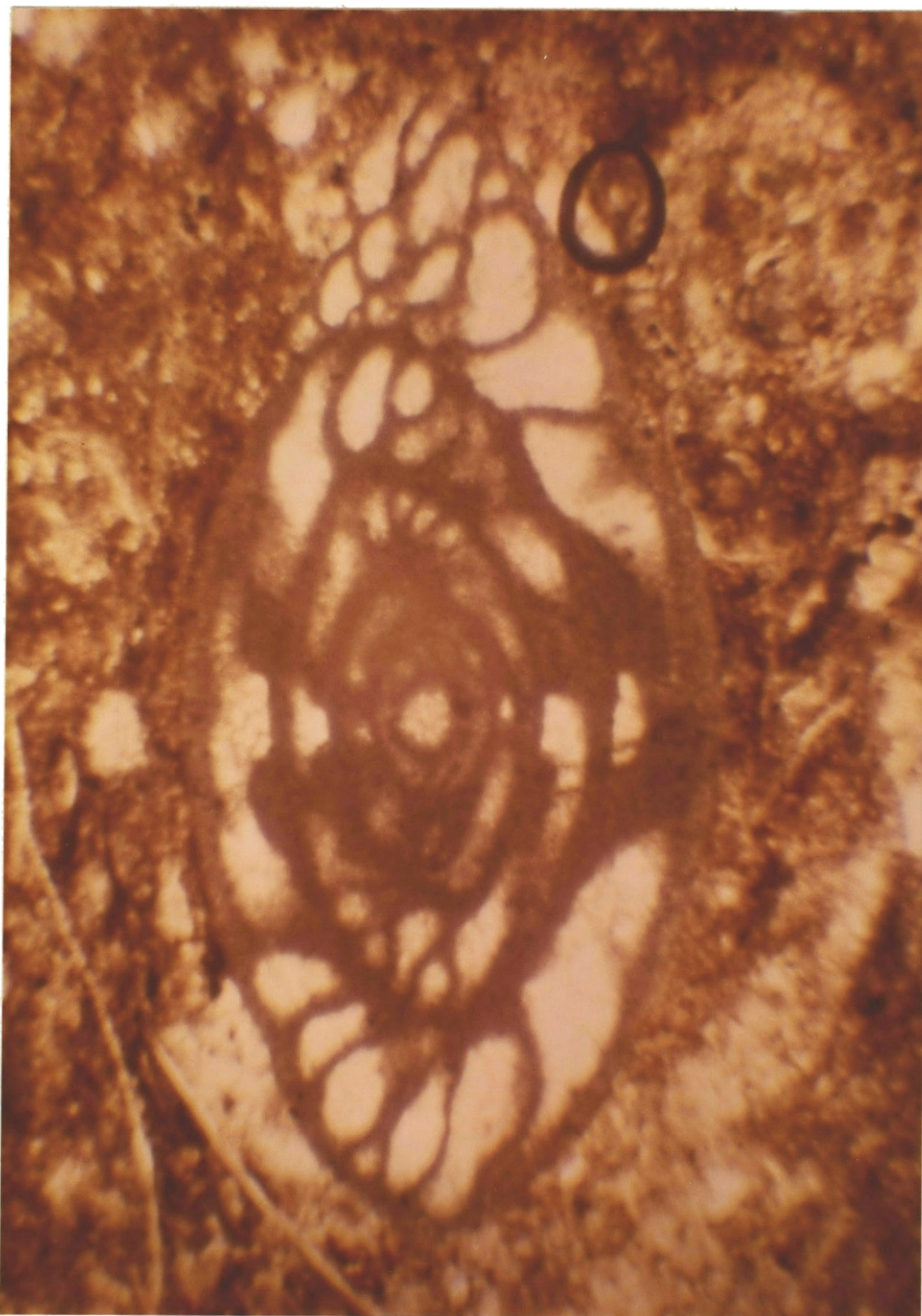


Fig. 9.--Triticites in grainstone at 2135 feet deep
from the Magnolia No. 76 Honaker core.
Magnification is 25X, crossed nicols.



Fig. 10.--Fenestrate bryozoa (bty) within black shale.
Sample is from Magnolia No. 76, Honaker
core, 1893 feet deep.

show excellent replacement by calcite cement (Fig. 7). There is abundance of carbonaceous material, as well as some hematite, the both of which give it a "salt-and-pepper" appearance.

Depositional Environment(s)

The rocks in this core, namely carbonates, coal, and black fissile shales, and the abundant, well-preserved marine fossils indicate an overall shallow marine to lagoonal environment. Undoubtedly other environments would have been indicated if more of the core had been available.

APPENDIX B

ANALYSIS OF BIT CUTTINGS

ANALYSIS OF BIT CUTTINGS

Introduction

Bit cuttings from 18 wells in the Oklahoma portion of the study area were described and logged (Plates 15 through 32). Samples from the Home Creek Limestone Member of the Caddo Creek Formation (or from total depth in wells that did not penetrate the Home Creek) upward to the surface were examined. An electric log (S.P. and Short Normal curves) from each well is shown on the logging forms. These electric logs were used in conjunction with the bit cuttings to pick boundaries of the different lithologies. Internal features described on each log include texture (grain size, sorting, and rounding), constituents, color, and lithology. Of course, sedimentary structures and unit boundaries cannot be determined from the bit cuttings. Marker beds (both formal and ad hoc names) used in correlation of all electric logs in the study area are labeled on the sample logs.

Interval 1

Interval 1 generally consists of the Gonzales Limestone, Finish Shale, and Creek Shale Members of the Graham Formation (Plates 1 and 8). The Gonzales Limestone is white to brown, very fine-grained to fine-grained limestone. Generally it contains fossil fragments, including crinoid stems and brachiopods. The Finish and Creek Shales are black to grayish-green and fissile. In some of the wells, a very fine-grained to medium-grained sandstone overlies the Home Creek Limestone Member (Canyon Group).

This sandstone generally is white to tan, shows fair sorting and is made up of subangular to subrounded grains.

Interval 2

In the area of study, Interval 2 generally consists of thick units of sandstone overlain by the Gunsight Limestone Member of the Graham Formation (Plates 1 and 8). The Gunsight Limestone is very thin, white to gray, and is fossiliferous at some localities. Sandstones in Interval 2 are white to brown, very fine grained to medium grained, and sorting is fair. Grains are subangular to subrounded. Quartz is the dominant constituent.

Interval 3

Interval 3 consists of interbedded limestones, shales, and some sandstones, overlain by the Megargel Limestone Member of the Thrifty Formation (Plates 1 and 8). The Megargel Limestone is generally white, microcrystalline to fine-grained limestone. No fossils were observed in bit cuttings from the Megargel. Shales in Interval 3, unlike those in Interval 4, generally are gray to green and are more fissile. Sandstone in Interval 3 are white to brown, very fine grained to fine grained, and are interbedded with siltstones. Sorting is poor and grains are subangular to subrounded. In the southwestern portion of the study area the Breckenridge Blach Ranch, and Ivan Limestone Members are present at some places. These limestones are white to gray and microcrystalline.

Interval 4

In general, rocks above the Megargel Limestone Member of the Thrifty

Formation (Plates 1 and 8) mostly are clastics. Reddish-brown shales and white to tan sandstones are most common. Wells in the extreme northern part of the area include some white to gray and pink arkosic sandstones. The feldspar grains mostly are potassium feldspar. Some of the sandstones contain chert and rock fragments. Grain sizes of rocks in Interval 4 range from shale to very coarse-grained sandstones. Sandstones are poorly to fairly well sorted, and are angular to subrounded. Thin white to gray limestones are at several levels within Interval 1.

APPENDIX C

RADIOMETRIC AND RELATED GEOCHEMICAL RESULTS
FOR URANIUM OCCURRENCES

RADIOMETRIC AND RELATED GEOCHEMICAL RESULTS
FOR URANIUM OCCURRENCES

<u>Occurrence Number</u>	11	12	13
<u>Sample Number</u>	MGY 271,272	MGY 377,338	MGY 273
<u>Total Gamma-ray Count (cps)*</u>	1,800	1,400	200
<u>Gamma-ray Spectrometer data (cps)**</u>			
Total	64,400 47,040	79,360 8,440	3,590
K	3,121 2,200	3,694 496	203
U	3,832 2,869	5,071 378	120
Th	177 153	201 73	34
Th/U Ratio	0.05 0.05	0.04 0.19	0.29
<u>UO (DNAA) (ppm)</u>	33.21 52.28	539.2 74.12	13.19
<u>V (ppm)</u>	48 65	35 65	40
<u>V/U Ratio</u>	1.45 1.24	0.06 0.88	3.03
<u>Significant Associated Elements (ppm)</u>	Cu(534) Cu(4,100)	Cu(4,100)	Cu(511)

*Counts per second

**Counts per minute

URANIUM OCCURRENCES

<u>Occurrence Number</u>	11	12	13
<u>Name</u>	Byar's farm	Benson's farm	Unnamed radio- active anomaly
<u>County</u>	Cotton	Cotton	Cotton
<u>¼ Section</u>	SW NW SE	SW NE NE	NE SW SE
<u>Section</u>	30	3	7
<u>Township</u>	5S	5S	4S
<u>Range</u>	12W	12W	12W
<u>Latitude (N)</u>	35 05 26	34 09 24	34 13 14
<u>Longitude (W)</u>	98 29 41	34 13 14	98 29 36
<u>Host Rock</u>	Garber Sand- stone Fm.	Wellington Fm.	Wellington Fm.
<u>Deposit Class or Subclass (No.)</u>	Channel-controlled peneconcordant (243)		
<u>Prod. #</u>	a	a	a
<u>Reference</u>	Chase, 1954 Beroni, 1956 PRR(M-1591)	Chase, 1954 Beroni, 1956 PRR(M-1591)	PRR(RG-23)

OKLAHOMA STATE UNIVERSITY
DEPT. OF GEOLOGY
PHYSICAL SCIENCE II - RM. 151
STILLWATER, OKL. 74074

LAB REPORT

LAB-ID _____ SUBCONTRACT NO. BFEC 78-131-E PII DATE 2/29/80
CALL NO. _____ CERTIFY SIGNATURE *[Signature]*

*Less than

BFEC SAMPLE NO.	MGY	228	229	230	231	232	233	234	235	236	237
LAB SAMPLE NO.		69/1	69/2	69/3	69/4/1	69/4/2	70/6	70/7	70/8	70/9	70/10
J ₃ O ₈ R (ppm)		2.31	3.70	3.60	3.91	3.04	2.69	2.93	2.16	3.23	1.44
J ₃ O ₈ W (ppb)											
J ₃ O ₈ S, SS (ppm)											
LOI S, SS (%)											
MEA (ppm)											
Ag		0	0	0	0	0	0	0	0	0	0
Al		73600	90000	24500	23300	63100	92200	38900	31000	48200	33700
As		*1	*2	*1	*1	*1	*1	*1	*1	*1	*1
B		*10	*10	*10	*10	*10	*10	*10	*10	*10	*10
Ba		80	60	1200	500	300	300	300	540	1760	1400
Be		*10	*10	*10	*10	*10	*10	*10	*10	*10	*10
Ca		80500	19100	190100	108400	103000	6200	108700	116500	108100	107400
Co		6	8	3	7	8	8	5	5	8	4
Cr		15	18	12	7	16	12	7	11	11	5
Cu		14	21	14	15	23	13	41	18	18	16
Fe		25800	42500	400	900	15200	30600	9200	5400	12400	nd
La		26	42	58	43	48	26	44	22	49	23
Li		34	63	14	22	39	54	27	17	24	16
Mn		5200	780	3140	6800	3960	390	5470	8410	4530	3850
Mo		*10	*10	*10	*10	*10	*10	*10	*10	*10	*10
Na		15600	8200	4000	4000	7400	6900	4100	4400	5000	4800
Nb		23	28	21	24	25	30	22	26	22	25
Ni		13	15	11	11	12	12	8	6	7	6
Pb		5	25	10	30	25	25	20	15	25	30
Sb		*3	*3	16	10	*5	*5	10	6	10	10
Sc		30	16	83	64	39	11	60	50	62	58
Sn		*7	*5	23	16	10	*5	15	12	15	16
Sr		780	30	715	450	365	0	410	195	580	375
Ti		4400	3700	900	1700	3400	5400	1700	1800	2100	1500
V		55	80	45	160	83	70	63	65	70	20
W		*10	*10	*10	*10	*10	*10	*10	*10	*10	10
Y		19	28	21	24	26	28	22	24	21	21
Zn		57	70	13	32	41	40	27	12	25	24
Zr		138	145	52	92	151	291	141	392	224	131

OKLAHOMA STATE UNIVERSITY
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LAB REPORT

LAB-ID STILLWATER, OKL. 74074 SUBCONTRACT NO. BFEC 78-131-E PII DATE 2/29/80


CALL NO. _____ CERTIFY SIGNATURE *[Signature]*

*Less than

BFEC SAMPLE NO. MGY	238	239	240	241	242	243	244	245	246	247
LAB SAMPLE NO.	70/11	70/12	70/13	70/14	70/15	70/16	70/17	70/18	77/1	77/4
U ₃ O ₈ R (ppm)	5.52	4.81	5.15	9.01	5.53	1.16	1.47	4.11	1.94	1.57
U ₃ O ₈ W (ppb)										
U ₃ O ₈ S, SS (ppm)										
LOI S, SS (%)										
MEA (ppm)										
Ag	0	0	0	0	0	0	0	0	0	0
Al	51100	18900	47800	70900	45000	42600	16700	45800	62100	56600
As	*1	*1	*1	*2	*1	*1	*1	*1	*1	*2
B	*10	*10	*10	*10	*10	*10	*10	*10	*10	*10
Ba	340	4080	180	700	1340	1160	60	900	220	280
Be	*10	*10	*10	*10	*10	*10	*10	*10	*10	*10
Ca	109700	109200	112200	2500	115600	119800	115800	113000	2000	5900
Co	6	5	6	4	4	5	5	8	6	5
Cr	11	9	10	9	10	10	6	12	8	8
Cu	18	12	17	16	17	11	9	15	11	8
Fe	19200	nd	29100	2500	3000	nd	nd	17100	1200	nd
La	55	65	47	12	25	15	43	42	8	3
Li	25	30	25	23	18	17	9	21	20	15
Mn	7460	7510	2920	320	8680	6950	4140	3140	710	160
Mo	*10	*10	*10	*10	*10	*10	*10	*10	*10	*10
Na	4200	3800	6900	6800	4800	5100	6900	3800	4200	5700
Nb	22	21	22	35	28	28	20	23	36	35
Ni	10	10	11	5	8	9	6	10	7	5
Pb	0	25	20	5	15	10	10	10	15	0
Sb	8	15	7	*3	*3	*3	18	10	*3	*3
Sc	56	82	55	*10	42	36	89	65	*10	*10
Sn	14	22	13	*5	8	8	25	16	*5	*5
Sr	400	600	460	100	270	245	740	630	70	105
Ti	2100	700	2100	3500	2100	2000	700	1900	3300	2500
V	40	40	115	90	45	18	20	45	27	25
W	*10	*10	*10	*10	*10	*10	*10	*10	*10	*10
Y	24	24	22	29	24	24	19	24	27	29
Zn	36	40	49	29	28	20	13	31	18	22
Zr	117	86	274	832	259	189	44	120	346	465

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*Less than

BFEC SAMPLE NO. MGY	248	249	250	251	252	253	254	255	256	257
LAB SAMPLE NO.	77/14	77/17/2	77/17/2	77/24	77/25	77/26/1	77/26/2	79/10	79/16/1	79/16/2
U ₃ O ₈ R (ppm)	1.84	4.17	4.03	2.73	2.49	4.46	1.71	3.45	8.82	9.01
U ₃ O ₈ W (ppb)										
U ₃ O ₈ S, SS (ppm)										
LOI S, SS (%)										
MEA (ppm)										
Ag	0	0	0	0	0	0	0	0	0	0
Al	31600	7100	40800	63800	41100	65000	65000	117600	32000	59400
As	*1	*2	*1	*2	*1	*1	*2	*2	*1	*2
B	*10	*10	*10	*10	10	*10	20	*10	*10	*10
Ba	160	180	80	600	220	640	140	440	1520	60
Be	*10	*10	*10	*10	*10	*10	*10	*10	*10	*10
Ca	118100	5100	115900	1300	113100	116900	24300	10100	85300	20700
Co	8	13	7	8	8	8	7	11	7	16
Cr	8	14	10	5	8	9	6	11	4	17
Cu	12	31	15	15	14	17	11	14	35	4100
Fe	1000	24600	6000	500	18600	23900	9100	11500	6300	18900
La	12	31	28	nd	37	85	6	27	23	27
Li	15	60	20	23	28	31	30	53	11	76
Mn	7160	580	5910	190	7460	4600	2170	520	11740	950
Mo	*10	*10	*10	*10	*10	*10	*10	*10	*10	*10
Na	6700	3800	111200	5100	8500	4500	5100	15400	5100	6300
Nb	27	33	25	35	21	23	32	36	27	32
Ni	5	13	9	7	10	9	9	14	6	15
Pb	10	10	20	15	30	15	10	10	10	15
Sb	*6	*3	*7	*3	10	*8	*3	*3	*3	*3
Sc	45	12	50	9	64	51	9	11	24	18
Sn	11	*5	12	*5	16	14	*5	*5	*6	*5
Sr	235	25	370	110	440	540	86	30	380	15
Ti	1500	5200	1900	3100	2000	2200	3400	4900	1900	5800
V	18	60	24	30	65	86	30	76	40	115
W	*10	*10	*10	*10	*10	*10	*10	*10	*10	*10
Y	22	30	23	30	21	24	28	33	25	30
Zn	25	59	25	28	42	42	29	49	19	79
Zr	220	327	316	625	97	120	412	350	245	329

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LAB REPORT

LAB-10 PHYSICAL SCIENCE II - RM. 151 SUBCONTRACT NO. BFEC 78-131-E PII DATE 2/29/80
STILLWATER, OKL. 74374


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*Less than

BFEC SAMPLE NO.	MGY	258	259	260	261	262	263	264	265	266	267
LAB SAMPLE NO.		79/17	79/29	79/31	79/33	79/34	79/35	79/36	79/37	79/38	79/39
U ₃ O ₈ R (ppm)		17.02	3.62	2.79	8.40	3.02	3.92	2.62	1.66	2.08	1.41
U ₃ O ₈ W (ppb)											
U ₃ O ₈ S, SS (ppm)											
LOI S, SS (%)											
MEA (ppm)											
Ag		0	0	0	0	0	0	0	0	0	0
Al		64400	49100	50400	47000	49800	48300	94600	61600	54200	46300
As		*2	*2	*1	*2	*1	*1	*1	*2	*1	*1
B		*10	*10	*10	10	*10	*10	20	*10	*10	*10
Ba		160	160	680	2000	280	800	380	120	1600	1520
Be		*10	*10	*10	*10	*10	*10	*10	*10	*10	*10
Ca		11200	44100	110400	107200	81300	112900	22000	34800	84200	110300
Co		12	10	7	11	8	8	11	7	7	7
Cr		13	8	7	9	9	11	11	6	9	7
Cu		342	24	73	30	11	30	13	14	11	11
Fe		14900	12100	3300	nd	5500	15200	14300	3300	7400	12900
La		46	12	18	26	26	46	41	nd	26	20
Li		68	23	20	21	23	34	48	22	21	26
Mn		160	2240	7780	11660	7300	9900	590	1730	4890	6920
Mo		*10	*10	*10	*10	*10	*10	*10	*10	*10	*10
Na		8800	5200	5500	4800	6900	6700	8700	6500	3300	6300
Nb		33	33	29	32	30	23	33	35	28	28
Ni		11	10	10	8	7	10	10	10	9	6
Pb		0	10	10	30	10	20	10	15	10	25
Sb		*3	*3	*3	*3	*3	*10	*3	*3	*3	*3
Sc		15	18	32	37	23	59	12	11	25	31
Sn		*5	*5	*8	*8	*5	15	*5	*5	*5	*8
Sr		10	105	375	260	140	680	30	120	190	340
Ti		6300	3300	2000	3000	3700	2000	4700	2600	2500	2000
V		85	50	45	73	30	60	60	25	30	20
W		*10	*10	*10	*10	*10	*10	*10	*10	*10	*10
Y		32	27	25	26	28	21	31	28	25	22
Zn		60	26	32	30	23	35	40	23	23	24
Zr		364	896	288	624	767	106	394	387	539	145

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*Less than

BFEC SAMPLE NO. MGY	268	269	270	271	272	273	274	275	276	277
LAB SAMPLE NO.	79/40	79/41	79/42	82/1/1	82/1/2	82/4	82/12	82/13	82/14	82/15
U ₃ O ₈ R (ppm)	3.70	1.49	1.89	33.21	52.28	13.19	1.62	2.47	1.85	1.91
U ₃ O ₈ W (ppb)										
U ₃ O ₈ S, SS (ppm)										
LOI S, SS (%)										
MEA (ppm)										
Ag	0	*10	0	0	0	0	0	0	0	0
Al	59400	35100	69100	48000	61400	26600	63200	63200	32900	37000
As	*2	*1	*1	*1	*1	*1	*2	*2	*1	*2
B	30	*10	*10	*10	*10	*10	*10	*10	*10	*10
Ba	50	340	260	160	120	220	20	20	1120	80
Be	*10	*10	*10	*10	*10	*10	*10	*10	*10	*10
Ca	83900	9132	6790	86800	33700	113800	1900	1900	118800	87600
Co	8	8	7	7	6	5	5	5	6	5
Cr	10	5	7	8	10	7	5	5	8	9
Cu	15	21	11	534	4100	511	21	21	21	12
Fe	7200	nd	7700	12900	53400	11600	3400	3400	nd	nd
La	19	140	134	17	39	49	5	5	23	5
Li	28	11	24	22	29	13	20	20	17	16
Mn	9250	8260	680	10660	7240	9290	480	4880	7030	8400
Mo	*10	*10	*10	*10	*10	*10	*10	*10	*10	*10
Na	6400	6270	3680	5100	5400	3500	4400	3700	4500	5300
Nb	30	30	38	28	23	22	35	35	28	30
Ni	12	8	10	12	8	4	8	5	8	6
Pb	10	30	10	5	15	10	10	20	25	10
Sb	*3	8	3	*3	*3	14	*3	*3	*5	*3
Sc	25	25	10	28	20	72	*10	15	38	29
Sn	*7	8	5	*6	*5	21	*5	*5	10	*5
Sr	150	150	65	150	105	385	60	110	235	155
Ti	3300	152	348	2300	3100	1100	1100	3000	1900	2700
V	190	20	15	48	65	40	20	25	20	10
W	*10	*10	*10	*10	*10	*10	*10	*10	*10	*10
Y	26	25	31	24	19	25	28	27	23	27
Zn	100	29	28	30	37	26	14	14	25	15
Zr	594	198	550	237	183	75	412	849	430	534

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LAB REPORT

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*Less than

BFEC SAMPLE NO. MGY	278	279	280	281	282	283	284	285	286	287
LAB SAMPLE NO.	82/16/1	82/16/2	82/17	82/18	82/19	AS #24	s77/3	s77/3	s77/5	s77/6
U ₃ O ₈ R (ppm)	6.63	6.64	9.90	9.12	2.67	31.15				
U ₃ O ₈ W (ppb)										
U ₃ O ₈ S, SS (ppm)							2.85	3.33	2.85	3.14
LOI S, SS (%)										
MEA (ppm)										
Ag	0	0	0	0	0	0	*10	*10	*10	*10
Al	76100	59400	64400	49100	50400	28600	70200	66400	76400	69900
As	*1	*2	*2	*2	*1	*2	*1	*2	*3	*2
B	*10	30	*10	*10	*10	*10	50	60	70	90
Ba	100	60	360	100	800	200	600	550	700	300
Be	*10	*10	*10	*10	*10	*10	*10	*10	*10	*10
Ca	121100	83200	4800	111900	37800	111900	15100	13500	12100	8000
Co	8	8	6	14	5	13	5	8	7	10
Cr	13	10	9	10	8	6	17	15	19	16
Cu	181	15	23	3116	20	1263	25	25	19	15
Fe	3500	7200	3200	10700	1400	3700	17200	15600	19200	18000
La	50	19	17	32	9	39	25	24	29	34
Li	35	28	24	25	18	9	29	27	35	29
Mn	6270	6270	5670	5480	4770	10110	220	240	300	170
Mo	*10	*10	*10	*10	*10	*10	*10	*10	*10	*10
Na	5300	5300	5400	4200	6400	8800	11100	6000	6600	6000
Nb	26	26	34	22	32	29	31	32	33	32
Ni	11	11	14	14	9	13	15	10	19	15
Pb	170	170	15	10	10	35	20	20	30	20
Sb	5	5	*3	11	*3	*9	*3	*3	*3	*3
Sc	44	44	*10	63	12	58	*10	*10	*10	*10
Sn	10	10	*5	17	*5	15	*5	*5	*5	*5
Sr	280	280	85	290	180	520	100	125	90	60
Ti	3600	3600	3700	1900	2700	1200	4200	4300	4500	4600
V	70	70	30	50	30	20	30	75	70	40
W	*10	*10	*10	*10	*10	*10	*10	*10	30	*10
Y	28	28	28	23	27	22	30	30	30	29
Zn	204	204	273	34	44	15	55	42	71	67
Zr	175	175	1040	62	852	151	512	722	503	630

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LAB REPORT

LAB-ID _____ SUBCONTRACT NO. BFEC 78-131-E PII DATE 2/29/80

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*Less than

BFEC SAMPLE NO.	298	299	300	301	302	303	304	305	306	307
LAB SAMPLE NO.	s77/19	s77/20	s77/21	s77/22	s77/23	ss79/1	s79/2	s79/3	ss79/4	ss79/5
U ₃ O ₈ R (ppm)										
U ₃ O ₈ W (ppb)										
U ₃ O ₈ S, SS (ppm)	2.08	2.79	3.48	2.57	2.65	3.09	3.48	3.03	6.66	2.69
LOI S, SS (%)										
MEA (ppm)										
Ag	*10	*10	*10	*10	*10	*10	*10	*10	*10	*10
Al	79600	57200	65500	60900	63700	57200	60000	52700	46200	51500
As	*2	*2	*1	*2	*2	*2	*2	*2	*2	*2
B	60	20	50	30	40	40	35	60	30	50
Ba	100	550	100	200	200	300	300	400	400	400
Be	*10	*10	*10	*10	*10	*10	*10	*10	*10	*10
Ca	13200	20200	43100	4600	500	10100	6100	4500	7800	7400
Co	8	7	9	8	6	6	4	9	5	6
Cr	20	14	18	12	14	14	11	10	7	9
Cu	26	17	26	15	17	18	17	20	9	11
Fe	23400	11400	18400	12200	13000	12600	11200	8100	5500	9500
La	40	17	35	19	25	18	22	14	14	8
Li	44	26	32	23	24	20	22	17	15	18
Mn	150	70	80	270	220	210	130	90	110	160
Mo	*10	*10	*10	*10	*10	*10	*10	*10	*10	*10
Na	5000	8900	16900	7100	6900	8000	6800	10700	8100	7000
Nb	32	33	30	35	34	33	33	33	34	33
Ni	10	12	15	13	12	16	19	7	17	9
Pb	15	10	10	10	35	20	30	20	10	10
Sb	*3	*3	*3	*3	*3	*3	*3	*3	*3	*3
Sc	11	*10	13	*10	*10	*10	*10	*10	*10	*10
Sn	*5	*5	*5	*5	*5	*5	*5	*5	*5	*5
Sr	70	150	120	90	60	200	140	160	215	150
Ti	5100	3700	4100	3800	4200	3900	4100	3800	3700	3300
V	65	60	65	70	25	15	50	60	60	40
W	*10	*10	*10	*10	*10	*10	30	*10	40	*10
Y	31	29	27	30	30	29	31	30	30	29
Zn	47	34	46	30	45	48	51	45	26	39
Zr	598	629	582	600	605	722	910	759	722	769

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LAB REPORT

LAB-ID _____ SUBCONTRACT NO. BFEC 78-131-E PII DATE 2/29/80

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*Less than

BFEC SAMPLE NO. MGY	288	289	290	291	292	293	294	295	296	297
LAB SAMPLE NO.	s77/7	s77/8	s77/9	s77/10	s77/11	s77/12	s77/13	s77/15	s77/16	s77/18
U ₃ O ₈ R (ppm)										
U ₃ O ₈ W (ppb)										
U ₃ O ₈ S, SS (ppm)	2.79	3.49	2.60	3.27	3.43	3.32	3.48	2.49	3.16	3.48
LOI S, SS (%)										
MEA (ppm)										
Ag	*10	*10	*10	*10	*10	*10	*10	*10	*10	*10
Al	53800	45400	82300	58300	52300	65500	48400	59500	70100	28500
As	*1	*2	*1	*2	*2	*2	*2	*2	*2	*1
B	40	85	70	60	50	50	55	50	40	50
Ba	300	700	300	400	400	550	500	100	400	500
Be	*10	*10	*10	*10	*10	*10	*10	*10	*10	*10
Ca	105300	10300	11600	3700	3800	8600	10200	13500	9800	6147
Co	7	5	10	8	6	9	10	4	5	6
Cr	21	11	20	15	9	17	12	14	18	18
Cu	25	12	16	10	9	14	21	12	12	25
Fe	17700	6600	26200	11200	6900	14900	8300	12900	20000	18100
La	36	14	31	18	6	30	14	21	32	147
Li	40	16	36	23	16	28	19	25	36	36
Mn	1010	180	260	210	140	220	190	220	320	410
Mo	*10	*10	*10	*10	*10	*10	*10	*10	*10	*10
Na	10400	13900	5400	9300	8100	7500	30100	7300	5100	5160
Nb	26	33	31	33	33	33	35	32	34	34
Ni	20	19	23	11	7	16	13	6	8	9
Pb	15	15	10	25	30	30	10	30	15	20
Sb	*4	*3	*3	*3	*3	*3	*3	*3	*3	6
Sc	32	*10	11	*10	*10	*10	*10	*10	*10	10
Sn	*5	*10	*5	*5	*5	*5	*5	*5	*5	5
Sr	1430	310	35	120	150	135	320	170	50	310
Ti	3300	3900	4500	4300	3800	4800	3800	3800	4800	3940
V	90	35	50	70	40	25	10	50	70	70
W	30	*10	*10	*10	*10	*10	*10	*10	*10	*10
Y	25	30	28	30	30	31	29	29	30	29
Zn	77	45	58	48	22	49	45	25	50	42
Zr	342	986	504	766	962	719	895	499	685	475

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PHYSICAL SCIENCE II - RM. 151
STILLWATER, OKL. 74074

LAB REPORT

LAB-ID _____ SUBCONTRACT NO. BFEC 78-131-E PII DATE 2/29/80

CALL NO. _____ CERTIFY SIGNATURE *[Signature]*

*Less than

BFEC SAMPLE NO. MGY	308	309	310	311	312	313	314	315	316	317
LAB SAMPLE NO.	s79/6	s79/7	s79/8	s79/9	s79/11	s79/12	ss79/13	ss79/14	s79/15	s79/18
U ₃ O ₈ R (ppm)										
U ₃ O ₈ W (ppb)										
U ₃ O ₈ S, SS (ppm)	4.98	3.65	3.16	3.43	3.36	3.13	3.14	2.68	2.41	2.61
LOI S, SS (%)										
MEA (ppm)										
Ag	*10	*10	*10	*10	*10	*10	*10	*10	*10	*10
Al	58700	69700	56100	51500	67600	53800	59800	49600	42200	61000
As	*2	*3	*2	*2	*2	*2	*2	*2	*2	*2
B	70	70	60	40	30	50	25	60	20	30
Ba	350	300	300	250	300	400	500	300	200	200
Be	*10	*10	*10	*10	*10	*10	*10	*10	*10	*10
Ca	9200	4500	7200	12100	8400	4700	10100	9900	2600	12400
Co	6	5	9	11	13	4	5	4	6	9
Cr	12	16	12	13	16	11	15	10	8	16
Cu	12	16	13	16	16	14	17	10	12	16
Fe	11900	15800	8600	9800	15800	8700	12200	8100	2300	14800
La	32	28	19	19	25	21	18	18	nd	28
Li	23	27	18	23	29	17	24	17	12	25
Mn	230	110	110	240	140	110	130	290	130	380
Mo	*10	*10	*10	*10	*10	*10	*10	*10	*10	*10
Na	6500	6300	6600	23700	5500	8500	12100	8200	8500	7200
Nb	34	34	33	34	33	33	34	34	36	33
Ni	5	15	12	5	15	13	19	13	7	16
Pb	20	20	20	*10	30	35	*10	*10	40	20
Sb	*3	*3	22	*3	*3	*3	*3	*3	*3	*3
Sc	*10	*10	*10	*10	*10	*10	*10	*10	*10	*10
Sn	*5	*5	*5	*5	*5	*5	*5	*5	*5	*5
Sr	130	65	75	50	90	55	120	165	160	80
Ti	4000	4500	4100	3900	4400	4000	4200	3400	2300	4000
V	40	15	30	70	35	30	80	70	90	30
W	*10	*10	20	*10	*10	*10	*10	*10	*10	*10
Y	30	30	32	30	29	29	29	29	32	27
Zn	80	47	33	42	79	62	54	51	27	47
Zr	642	781	799	761	734	848	697	722	648	581

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LAB REPORT

LAB-10 _____ SUBCONTRACT NO. BFEC 78-131-E PII DATE 2/29/80
CALL NO. _____ CERTIFY SIGNATURE *[Signature]*

*Less than

BFEC SAMPLE NO. MGY	318	319	320	321	322	323	324	325	326	327
LAB SAMPLE NO.	s79/19	s79/20	s79/21	s79/22	s79/23	s79/24	s79/25	s79/26	s79/27	s79/28
U ₃ O ₈ R (ppm)										
U ₃ O ₈ W (ppb)										
U ₃ O ₈ S, SS (ppm)	2.54	3.08	3.35	2.93	2.91	2.79	2.90	3.01	3.35	2.87
LOI S, SS (%)										
MEA (ppm)										
Ag	*10	*10	*10	*10	*10	*10	*10	*10	*10	*10
Al	57100	68500	75700	62900	56600	68300	57500	72100	53800	72800
As	*1	*2	*2	*2	*2	*2	*2	*2	*2	*2
B	45	80	30	60	40	30	65	60	60	70
Ba	600	200	400	400	300	200	300	300	300	100
Be	*10	*10	*10	*10	*10	*10	*10	*10	*10	*10
Ca	28600	4600	4400	14400	4500	10900	7300	8000	5900	7100
Co	12	10	11	5	3	8	6	8	5	10
Cr	13	13	17	14	12	16	12	14	14	17
Cu	35	46	22	19	19	15	17	22	14	17
Fe	15300	10200	18500	17100	9900	18600	12400	20600	11200	21800
La	27	29	38	29	22	31	14	39	12	34
Li	22	23	32	31	19	30	21	32	25	31
Mn	310	170	180	310	140	250	100	160	180	190
Mo	*10	*10	*10	*10	*10	*10	*10	*10	*10	*10
Na	5600	6200	4900	26200	8400	6900	6600	5600	46300	7100
Nb	33	36	34	33	35	34	33	34	34	33
Ni	10	15	19	18	14	6	15	17	18	17
Pb	20	15	25	30	30	10	30	*10	40	30
Sb	*3	*3	*3	*3	*3	*3	*3	*3	*3	*3
Sc	*10	*10	*10	*10	*10	*10	*10	*10	*10	*10
Sn	*5	*5	*5	*5	*5	*5	*5	*5	*5	*5
Sr	260	65	50	60	80	25	55	20	110	25
Ti	3800	4300	4700	4100	4100	4600	4100	4700	3800	4700
V	50	60	95	90	80	85	65	110	120	60
W	*10	*10	*10	20	30	30	*10	*10	30	*10
Y	26	29	29	28	28	28	29	30	32	29
Zn	48	39	47	46	28	41	23	41	37	85
Zr	723	642	795	576	720	567	638	599	718	605

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LAB REPORT

LAB-ID _____ SUBCONTRACT NO. BFEC 78-131-E PII DATE 2/29/80
 CALL NO. _____ CERTIFY SIGNATURE *[Signature]*

*Less than

BFEC SAMPLE NO. MGY	328	329	330	331	332	333	334			
LAB SAMPLE NO.	s79/30	s79/32	s82/5	s82/6	ss82/9	s82/10	s82/11			
U ₃ O ₈ R (ppm)										
U ₃ O ₈ W (ppb)										
U ₃ O ₈ S, SS (ppm)	2.88	3.21	2.97	2.91	2.99	2.91	3.13			
LOI S, SS (%)										
MEA (ppm)										
Ag	*10	*10	*10	*10	*10	*10	*10			
Al	57800	80100	56700	49100	50100	64400	50000			
As	*2	*2	*2	*2	*2	*2	*2			
B	50	50	45	30	40	50	30			
Ba	200	300	450	500	400	300	300			
Be	*10	*10	30	*10	*10	*10	*10			
Ca	3800	7500	4100	6400	8200	5500	3700			
Co	5	8	9	6	4	6	7			
Cr	12	19	12	10	10	12	8			
Cu	12	22	12	10	15	16	10			
Fe	10400	24000	9400	6500	8300	15600	7700			
La	11	36	14	9	10	22	13			
Li	19	34	17	16	25	29	20			
Mn	190	210	170	110	170	400	190			
Mo	*10	*10	*10	*10	*10	*10	*10			
Na	5500	4900	6800	9300	22600	7400	7000			
Nb	35	33	32	34	31	33	34			
Ni	5	12	9	10	13	15	10			
Pb	50	25	15	30	30	45	25			
Sb	*3	*3	*3	*3	*3	*3	*3			
Sc	*10	*10	*10	*10	*10	*10	*10			
Sn	*5	*5	*5	*5	*5	*5	*5			
Sr	85	30	65	130	140	90	130			
Ti	3700	4900	3700	3700	3700	4200	3900			
V	45	50	70	100	60	40	20			
W	*10	40	*10	*10	*10	*10	*10			
Y	29	30	29	29	29	30	30			
Zn	18	49	19	15	29	37	39			
Zr	585	602	910	892	693	601	869			

APPENDIX D

LOCATIONS OF WELLS USED IN BIT-CUTTING SURVEY

LOCATIONS OF WELLS USED IN BIT-CUTTING SURVEY

<u>Spot (Sec., Tp., Rge.)</u>	<u>Operator</u>	<u>Well</u>
SE SE NW 30-1S-15W	Johnson	Kinder No. 1
SW NW 7-1S-12W	Frankfort	Picken No. 1
SW SW SW 9-2S-15W	Staley-Donahue	Taylor No. 1
SW SW NW 18-2S-14W	Carter	Minton No. 1
SE SE SW 5-2S-13W	Bay	Anderson No. 1
NW NE 26-2S-13W	Wood	Harris No. 1
SW SW SW 17-2S-12W	Nixon	Nah-Voon-Ey No. 1
SW SW NW 3-3S-15W	Amerada	Hill No. 1
SE SE NE 10-3S-14W	Pure	Sims No. 1
NE NE NE 30-3S-13W	Stewart-Orm	Emery No. 1
NE NE SW 9-3S-12W	McCann	Shaw No. 1
SW SE SW 15-4S-15W	Tibbets	Coulter No. 1
SW SW NW 23-4S-14W	Johnson	Mount No. 1
SW SW SE 10-4S-13W	Johnson	Stephens No. 1
NW NW SW 2-4S-12W	Harper	Moyer No. 1
SE SE SE 1-5S-15W	Parker	Fuller No. 1
NW NW SE 8-5S-12W	Nixon	Miller No. 2
SW SW NW 11-5S-12W	Shelby	Abbot No. 1

APPENDIX E

LOCATIONS OF LOGS USED IN PREPARATION
OF CORRELATION SECTIONS

LOCATIONS OF LOGS USED IN PREPARATION
OF CORRELATION SECTIONS

West-East Correlation Section A-A'

1.	Johnson, Kinder No. 1	NW NW NW	7-2S-15W
2.	Staley-Donahue, Taylor No. 1	SW SW SW	9-2S-15W
3.	Andrew, McCary No. 1	SW SW NE	10-2S-15W
4.	Carter, Minton No. 1	SW SW NW	18-2S-14W
5.	Clark, Stuckey No. 1	SW SW NW	15-2S-14W
6.	Griffin, Gore No. 1	SW SW NE	25-2S-14W
7.	Johnson, Holmes No. 1	SW SW SW	20-2S-13W
8.	Gibson, Scherler No. 1	SE SE SW	15-2S-13W
9.	Wood, Harris No. 1	NW NE	26-2S-13W
10.	Morton, State No. 1	NE NE NW	25-2S-13W
11.	Akin-Dimock, Rodgers No. 1	SW SE NW	19-2S-12W
12.	Pinkston, Nah-Voon-Ey No. 1	SW SW SW	17-2S-12W
13.	Bridwell, O-Haw-Win-Me No. 1	SE SE NW	17-2S-12W
14.	Nixon, Urfer No. 1	NW SW SE	9-2S-12W
15.	Kingery, Wallace No. 1	NW SW SW	11-2S-12W
16.	Carter, Holly Parrish No. 1	SW SW	1-2S-12W

West-East Correlation Section B-B'

17.	Pyramid, Hunt No. 1	NW NW SW	18-4S-15W
18.	Danciger, Bear No. 1	NE NE SE	19-4S-15W
19.	Sunray, Chanate No. 1	NE NE SW	28-4S-15W
20.	Abbott-Sinex, Indian No. 1	SW NW NW	34-4S-15W
21.	Union, Zotigh No. 1	SE SE SE	27-4S-15W
22.	Texas Co., Asenap No. 1	NW NW SW	25-4S-15W
23.	Snoddy, Crossland No. 1	NW NW NE	6-5S-14W
24.	Helton, McDullough No. 1	SW NW NE	33-4S-14W
25.	Powers, Moss No. 1	SW NW NE	34-4S-14W
26.	Anderson, Spires No. 1	NE NE NW	31-4S-13W
27.	Ross, Way-Se-Pappy No. 1	SW SW NW	32-4S-13W
28.	Akin, Laniers No. 1	SW NE SE	32-4S-13W
29.	Ross, Inman No. 1	SW SE SW	34-4S-13W
30.	Ross, Clark No. 1	NE NW	34-4S-13W
31.	Ross, Pau-Kau-Brace No. 1	NW NW NE	2-5S-13W
32.	Harlin, Warren No. 1	NW NW SE	2-5S-13W
33.	Norwood, Warren No. 1	NE NE SE	2-5S-13W
34.	Winfrey, Dickson No. 1	SE SE NW	1-5S-13W
35.	Ross, Miller No. 1	SE SW NE	1-5S-13W

36.	Broday, Moore No. 1	SW NW SE	6-5S-12W
37.	Fortex, Standord No. 1	NW SW NE	5-5S-12W
38.	Conkling, Standford No. 1	SW SE NE	5-5S-12W
39.	Harvey, Williams No. 1	SW SW SE	4-5S-12W
40.	Ware, Menz No. 1	SE NE NE	10-5S-12W
41.	Shelby, Abbott No. 1	SW SW NW	11-5S-12W
42.	Huff, Abbott No. 1	NE NE SW	11-5S-12W
43.	Butcher, Boles No. 1	NE NE NW	13-5S-12W

North-South Correlation Section C-C'

44.	Kingery, Smith No. 1	SE NE NE	15-1S-15W
45.	Ross, Martin No. 1	SW SW SE	21-1S-15W
46.	Mack, Hellbusch No. 1	NW NW SW	25-2S-15W
47.	Amerada, Howard No. 1	SW SW NW	12-3S-15W
48.	Johnson, Ille No. 1	NW NW NE	25-3S-15W
49.	Ross, Burke No. 1	SW SW SW	12-4S-15W
50.	Sunray, Suites No. 1	SW SW NE	3-5S-15W
51.	Kiel Jr., Foster No. 1	Denison Sur.	A-64
52.	Wood, Foster No. 1	H.T.&B. Sur.	A-129
53.	Gorman, Goetze No. 7	S.H.&M.G.R.R. Sur.	A-477
54.	Perkins-Cullum, Goetze No. 1	Washington Sur.	Sec. 2
55.	Morrison, Krohn No. 1	H.&G.N. Sur.	A-144

North-South Correlation Section D-D'

56.	Nixon, Urfer No. 1	SE SE SE	19-1S-12W
57.	Honolulu, Quo-In-Oudle No. 1	SE SW	31-1S-12W
58.	Vickers, Patton No. 1	NE NE SW	32-2S-12W
59.	Hamilton, Powell No. 1	NW NW SW	32-2S-12W
60.	Meecker, Powell No. 1	SW NE SE	6-3S-12W
61.	Meecker, Kinder No. 1	NW NW NE	8-3S-12W
62.	McCann, Shaw No. 1	NE NE SW	9-3S-12W
63.	Snoddy, Allgood No. 1	NE NE SE	16-3S-12W
64.	Slemaker, Sultan No. 1	NE NE NW	22-3S-12W
65.	Slemaker-Deaner, Bryson No. 1	SE SW	22-3S-12W
66.	Standard of Kansas, Adams No. 1	SW NE SE	28-3S-12W
67.	Lowe, Griffin No. 1	SE SW SW	27-3S-12W
68.	Hutchingson, Larse No. 2	SW SW SW	33-3S-12W
69.	Johnson, Hilton No. A-1	SW SW NE	5-4S-12W
70.	Hutcheson, Whitehead No. 1	SE SW	8-4S-12W
71.	Harlin, Eastman No. 1	SW SW SE	18-4S-12W
72.	Ward, Unerwood No. 1	SE SE SE	30-4S-12W
73.	G.M.C., Elmore No. 1	NE SE	31-4S-12W
74.	Nixon, Miller No. 2	NW NW SE	8-5S-12W
75.	Spradling, Hale No. 1	NW SW NW	17-5S-12W
76.	Winfrey, Poolaw No. 1	NW NW NE	29-5S-12W
77.	Ross, Poolaw No. 1	SE SW NW	28-5S-12W
78.	Farris, Poolaw No. 1	NE NE NW	34-5S-12W
79.	Bolin, O'Neil No. 1	NE NE NW	34-5S-12W

80. Hammon, Johnson No. 10
81. Freeman, Emmert No. 1

Hastie Sur. A-92
West Brinkee Sur. A-516

APPENDIX F

INTERVAL THICKNESS, NET-SANDSTONE THICKNESS,
AND SANDSTONE-PERCENTAGE DATA

INTERVAL 1

County	Company/Well Location	Top of Megargel	Total Interval (feet)	Net Sand- Stone (feet)	Sand- Stone Percent
Tillman	Kingery, Smith #1 SE NE NE, 15, T1S, R15W				
"	Tankersly & George Howell #1 SE SE NW, 21, T1S, R15W		54	0	0
"	Ross, Martin #1 SW SW SE, 21, T1S, R15W		57	0	0
"	Equitable, McClellan #1 NE NE NW, 28, T1S, R15W	+745	52	0	0
"	Johnson, Kinder #1 SE SE NW, 30, T1S, R15W				
"	Acme, Strecker #1 SE SE NW, 21, T1S, R14W	+588			
Comanche	Kadane, Schumpert #1 C NW NE, 26, T1S, R14W	+540			
"	Frankfort, Pickens #1 C SW NW, 7, T1S, R12W				
"	Rodgers, Carmichael #1 SE SE NE, 15, T1S, R12W	-233	85	4	4.7
"	Nixon, Urfer #1 SE SE SE, 19, T1S, R12W	-151	62	5	8.1
"	Rocket, Turner #1 SW SW NW, 19, T1S, R12W				
Cotton	Honolulu Ouo-In-Ouodle #1 SE NE SE, 31, T1S, R12W	-690	68	0	0
Tillman	Harvey, Baswell #1 SE NE, 3, T2S, R15W	-85			
"	Johnson, Kinder #1 NW NW NW, 7, T2S, R15W	-144	81	5	6.2
"	Staley Donahue #1 Taylor SW SW SW, 9, T2S, R15W	-119	105	0	0

County	Company/Well Location	Top of Megargel	Total Interval (feet)	Net Sand- Stone (feet)	Sand- Stone Percent
Tillman	Andrew, McCary #1 SW SW NE, 10, T2S, R15W	-243	109	0	0
"	The Texas Co. Bruster #1 SE NW SE, 15, T2S, R15W	-546	130	0	0
"	Mack, Po-Ah-Wy #1 SE SE SW, 17, T2S, R15W	-962	132	0	0
"	Mack, Hellbusch #1 NW NW SW, 25, T2S, R15W	-1114	198	0	0
"	Anderson, Locke #1 NW NW NE, 28, T2S, R15W	-1070	170	0	0
"	McCaughey, Thompson #1 SE SE SE, 28, T2S, R15W	-1162	171	0	0
"	Harper & Knappenburger Walker #1 SW SW SW, 6, T2S, R14W	-108	98	0	0
Cotton	Clark, Stuckey #1 SW SW NW, 15, T2S, R14W	-474	62	5	8.1
Tillman	Carter, Minton #1 SW SW NW, 18, T2S, R14W	-614	145	0	0
Cotton	Griffin, Gore #1 SW SW NE, 23, T2S, R14W	-546	79	7	8.9
"	Johnson, McGee #1 SE SE NW, 25, T2S, R14W	-1146	187	52	27.8
"	Bay, Anderson #1 SE SE SW, 5, T2S, R13W	-196			
"	Bay, Crockett #1 SW NE, 9, T2S, R13W	-215			
"	Snoddy, Holmes #1 SE SE NW, 13, T2S, R13W	-618	105	13	12.4
"	Gibson, Scherler #1 SE SE SW, 15, T2S, R13W	-410	136	15	11.0

County	Company/Well Location	Top of Megargel	Total Interval (feet)	Net Sand- Stone (feet)	Sand- Stone Percent
Cotton	Griffin, Russel #1 NE NE SW, 16, T2S, R13W	-328	91	10	11.0
"	Johnson, Holmes #1 SW SW SW, 20, T2S, R13W	-574	100		
"	Morton, State #1 NE NE NW, 25, T2S, R13W	-614	129	19	14.7
"	Wood, Harris C NW NE, 26, T2S, R13W	-556	115	5	4.3
"	Miller (Hassell) Herman Sheler #1 NW SW NW, 26, T2S, R13W				
"	Lackey, Wright #1 NW NE NE, 28, T2S, R13W	-568			
"	Hassell, Rich #1 NW NE SW, 35, T2S, R13W				
"	Murta, Hertzler #1 SW SE NE, 35, T2S, R13W	-916	145	0	0
"	Carter, Holly Parrish #1 SW SW, 1, T2S, R12W	-1105	170	18	10.6
"	Fisher, Wallace #1 SW SW, 3, T2S, R12W	-955			
"	Nixon, Urfer #1 NW SW SE, 9, T2S, R12W	-864	108	0	0
"	Kingery, Wallace #1 NW SW SW, 11, T2S, R12W				
"	Barbre, Parrish #1 NE NW NE, 13, T2S, R12W	-994			
"	Weaver, Dickman #1 NE NE SW, 14, T2S, R12W	-971			
"	Clark, Wood-Ah-Se-Oo #1 SW SW SW, 15, T2S, R12W	-964			

County	Company/Well Location	Top of Megargel	Total Interval (feet)	Net Sand- Stone (feet)	Sand- Stone Percent
Cotton	Bridwell O-Haw-Win-Me #1 SE SE NW, 17, T2S, R12W	-705	125	0	0
"	Pinkston Nah-Voon-Ey #1 SW SW SW, 17, T2S, R12W	-761	118	0	0
"	Akin & Dimock, Rodgers #1 SW SE NW, 19, T2S, R12W	-734	128	19	14.8
"	Davis (Pinkston) Te-Haw-Ne #1 SE SE SW, 20, T2S, R12W	-766	123	0	0
"	Baldwin, Petty, #1 NE NE NW, 21, T2S, R12W	-828			
"	Harper, Indian #1 NW NE SW, 23, T2S, R12W	-903			
"	Barbre, Kurtz #1 NW SE, 25, T2S, R12W				
"	Norman, Holmes #1 SE SE SE, 27, T2S, R12W	-996			
"	Man, Handy #1 NE NE NE, 28, T2S, R12W	-814			
"	Akin, Fox #1 NW NW SE SW, 28, T2S, R12W				
"	Vickers, Patton #1 NE NE SW, 30, T2S, R12W	-762	196	0	0
"	Hamilton, Powell #1 NW NW SW, 32, T2S, R12W	-834			
"	Harvey, Pruitt #1 NW NW SE, 33, T2S, R12W	-930			
"	Harvey Tabby-To-Sav-It NW NW NE, 34, T2S, R12W	-946			

County	Company/Well Location	Top of Megargel	Total Interval (feet)	Net Sand- Stone (feet)	Sand- Stone Percent
Cotton	Russell, Gilliam #1 NW NW SW, 35, T2S, R12W	-1066			
"	Whately & Barbre Bates #1 SE SW NE, 36, T2S, R12W	-888			
"	Ross (Russell) Holmes #1 NW NW NW, 36, T2S, R12W	-926			
"	Griffin, Martin #1 SE SW SW, 36, T2S, R12W	-893			
Tillman	Amerada, Hill #1 SW SW NW, 3, T3S, R15W	-1299			
"	Amerada, Howard #1 SW SW NW, 12, T3S, R15W	-1359	198	0	0
"	Nutting, Martin #1 SW NE NE, 22, T3S, R15W				
"	Johnson, Ille #1 NW NW NE, 25, T3S, R15W	-1662	205	0	0
Tillman	Amerada, Row #1 SW SW SW, 1, T3S, R14W	-1450	217	0	0
"	Pinkston & Davis Dubenhoeffer #1 NW SE SE, 8, T3S, R14W	-1423	202	0	0
"	Pure, Sims #1 SE SE NE, 10, T3S, R14W	-1874			
"	Wirick, Randall #1 NW NW SE, 12, T3S, R14W	-1461	213	0	0
"	McElreath, Josefy #1 SW SE, 23, T3S, R14W	-1548	195	0	0
"	Cities Service, Sellars #1 NW SE SE, 24, T3S, R14W	-1479	200	0	0

County	Company/Well Location	Top of Megargel	Total Interval (feet)	Net Sand- Stone (feet)	Sand- Stone Percent
Tillman	K.L.B., Harvey #1 NE NE SW, 29, T3S, R14W				
"	Ross, Castleberry #1 NW NW SE, 30, T3S, R14W	-1695	237	0	0
"	EPH Griffin, Dudenhoeffer #1 SE SE NE, 32, T3S, R14W	-1526			
"	Johnson Huffington #1 C SW NE, 34, T3S, R14W	-1667	410	63	15
Cotton	Blair, Dodenhoeffer #1 NE NE SW, 3, T3S, R13W				
"	Riddle & McClelland White #1 C NW SW, 4, T3S, R13W	-1339			
"	Neeld & Hood Gregson #1 NW SW SE, 9, T3S, R13W				
"	Walker, Scherler #1 SE NW SE, 10, T3S, R13W				
"	Hutcheson, Dickson #1 SW SW NE, 12, T3S, R13W				
"	Zweig, Thornton #1 NE NE SW, 13, T3S, R13W	-1438			
"	Fleeger, Tisdale #1 C SE NW, 14, T3S, R13W				
"	Wolf & Brown, Perry #1 NE NW NW SE, 15, T3S, R13W	-1301			
"	Larson & Thomas Booher #1 SE SW SW, 25, T3S, R13W				
"	Clark & Cowden Corely #1 NE NE SE, 30, T3S, R13W	-1296			

County	Company/Well Location	Top of Megargel	Total Interval (feet)	Net Sand- Stone (feet)	Sand- Stone Percent
Cotton	Stewart & Orm Emery #1 NE NE NE, 30, T3S, R13W	-1468			
"	Umberhour, Miller #1 SW SW NW, 33, T3S, R13W	(-1397)	318	28	9
"	Wilder, Shamblin #1 NW NW SW, 1, T3S, R12W				
"	Hart, Tah-Que, Chi #1 NW NE SE, 1, T3S, R12W	-956			
"	Harvey Moo-Rah-Waddy #1 NW NE NE, 2, T3S, R12W	-1066			
"	McCashland, Hill #1 SE NE NE, 4, T3S, R12W	-980	92	0	0
"	McCashland No-Bah-Nuck #1 NE NE NE, 3, T3S, R12W	-1064	100	0	0
"	Meeker, Powell #1 SW NE SE, 6, T3S, R12W				
"	Meeker, Kinder #1 NW NW NE, 8, T3S, R12W				
"	McCann, Shaw #1 NE NE SW, 9, T3S, R12W	-1079			
"	Hall, Kinder #1 SE NW, 10, T3S, R12W				
"	Funk, Kerr, #1-11 NW SE NE, 11, T3S, R12W	-897	240	4	2
"	McCashland, Verniput #1 SE SE NE, 11, T3S, R12W	-898	115	0	0
"	Carr, Hooker #1 NW NW SW, 12, T3S, R12W				
"	Kelleher, Indian #1 C NW NE, 12, T3S, R12W				

County	Company/Well Location	Top of Megargel	Total Interval (feet)	Net Sand- Stone (feet)	Sand- Stone Percent
Cotton	Burton Ne-Wook-Ah-Ker #1 SE SE SE, 12, T3S, R12W				
"	Howell Ka-Hina-Watch-It #1 SW SW NE, 12 T3S, R12W				
"	Bridwell, Attouvick #1 NW SE NW, 13, T3S, R12W		-958		
"	Carr, Tankofper #6-B SW NW SE, 13, T3S, R12W				
"	Burton, Davis #1 13, T3S, R12W				
"	, Tah-Kof-Per #4 13, T3S, R12W				
"	Amerada, Flipping #1 SE SE SE, 14, T3S, R12W				
"	Harper & Turner Tappto #1 SE NE SW, 14, T3S, R12W				
"	Neeld, Kinder #1 S $\frac{1}{2}$ NW NE, 15, T3S, R12W		-900		
"	Snoody, Allgood #1 NE NE SE, 16, T3S, R12W		-987		
"	Gray, Wright #1 SE SW NW, 17, T3S, R12W		-1066		
"	Hutcheson, Zweiaker #1 SE NE NE, 20, T3S, R12W				
"	Slemaker, Sultan #1 NE NE NW, 22, T3S, R12W				
"	Slemaker-Deaner Bryson #1 C SE SW, 22, T3S, R12W				

County	Company/Well Location	Top of Megargel	Total Interval (feet)	Net Sand- Stone (feet)	Sand- Stone Percent
Cotton	Kingery, Pen #1 NE NE SE, 24, T3S, R12W				
"	Burton, Lulu Pahdi #1 NE NE NE, 24, T3S, R12W				
"	Kingery, Indian #1 NE NE SW, 24, T3S, R12W				
"	Stanolinid, Moyer #1 C NE NW, 25, T3S, R12W	-1189	233	24	10
"	Jones, Thurman #1 NE NE NW, 26, T3S, R12W	-1294			
"	Amerada Gina-Quoe-Tone #1 NE NE SW, 26, T3S, R12W				
"	Lowe, Griffin #1 SE SW SW, 27, T3S, R12W	-1335	320	50	16
"	Blackwell, Alexander #1 NE SW NE, 27, T3S, R12W				
"	Std. of Kansas, Adams #1 SW NE SE, 28, T3S, R12W				
"	McGee, Whitehead #1 SW SW, 28, T3S, R12W	-1363			
"	Hutcheson, Whitehead #1 SE SW SW, 28, T3S, R12W				
"	Griffin, Scruggs, #1 NW NW SE, 30, T3S, R12W				
"	Hutchison, Larse #2 SW SW SW, 33, T3S, R12W	-1383	327	80	24
"	Slemaker, Otis #1 SE SE NW, 36, T3S, R12W				
"	Kadane (Hoffman) Browning #1 SW SW NE, 6, T5S, R15W	-1453	238	10	4

County	Company/Well Location	Top of Megargel	Total Interval (feet)	Net Sand- Stone (feet)	Sand- Stone Percent
Cotton	Ross, Burke #1 SW SW SW, 12, T4S, R15W	-1288	260	54	21
"	Tibbets, Coulter #1 SW SE SW, 15, T4S, R15W	-988			
"	Keener, Arnt #1 SE NE NE, 16, T4S, R15W	-1082	215	31	14
"	Consolidated, Slack #1 NE NE SW, 17, T4S, R15W	-1230			
"	Midwest, Varner #1 C NE SE, 17, T4S, R15W	-1148	236	10	4
"	Pyramid, Hunt #1 NW NW SW, 18, T4S, R15W	-1295	255	35	14
"	Danciger, Bear #1 NE NE SE, 19, T4S, R15W	-1117			
"	Kadane, Carroll #1 NW NE SW, 23, T4S, R15W				
"	Texas Co., Asenap #1 NW NW SW, 25, T4S, R15W	-925	226	20	9
"	Stanolind, Watson #1 NE NE NW, 26, T4S, R15W	-877	230	65	28
"	Kadane, Tofpoie #1 C SE NW, 26, T4S, R15W				
"	Gulf, Owen #1 NE NE NE, 27, T4S, R15W	-824	209	39	19
"	Union, Zotigh #1 SE SE SE, 27, T4S, R15W	-1040	147	8	5
"	Sunray, Chanate #1 NE NE SW, 28, T4S, R15W	-1008	185	0	0
"	, Hamill #1 31, T4S, R15W	-1194	351	72	21
"	, Medlock #1 32, T4S, R15W	-1109	242	63	26

County	Company/Well Location	Top of Megargel	Total Interval (feet)	Net Sand- Stone (feet)	Sand- Stone Percent
Cotton	Abbott & Sinex, Indian #1 SW NW NW, 34, T4S, R15W	-946	118	0	0
"	Anderson, Davenport #1 NW NW SE, 35, T4S, R15W	-998			
"	Wilson, Williams #1 SW SW NE, 14, T4S, R14W				
"	Whattiker, Gittings #1 NW NW NW, 15, T4S, R14W				
"	Little, Morton #1 SW SW NE, 17, T4S, R15W	-1295			
"	Davidson, Mount #1 NW SE NE, 17, T4S, R14W	-1458	342	86	25
"	Johnson, Mount #1 SW SW NW, 23, T4S, R14W				
"	Helton, McCullough #1 SW NW NE, 33, T4S, R14W	-1109	275	0	0
"	Powers, Moss #1 SW SW NE, 34, T4S, R14W	-953	265	0	0
"	Parker Red River 100 #2 SE SW SW SW, 34, T4S, R14W	-385			
"	Ross, Crocker #1 NE NE NE, 9, T4S, R13W	-1386			
"	Johnson, Stephens #1 SW SW SE, 10, T4S, R13W	-1299	330	71	22
"	Ross, Kirkpatrick #1 NW NW SE, 11, T4S, R13W	-1331			
"	Bingham, Goode #1 NW SW NW, 13, T4S, R13W	-1292			
"	Little, Doty #1 SW SE, 14, T4S, R13W				

County	Company/Well Location	Top of Megargal	Total Interval (feet)	Net Sand- Stone (feet)	Sand- Stone Percent
Cotton	Johnson, McClough #1 NW SE NW, 17, T4S, R13W	-1436			
"	Frankfort, Montgomery #1 SE SE NW, 21, T4S, R13W	-1307	282	75	27
"	Nagle, Emory #1 SW SW NW, 26, T4S, R13W	-926			
"	Waggoner, Weaver #1 NE NE NE, 27, T4S, R13W	-1020	303	42	14
"	Ross, Wah-Ah-Kinney SW SW NW, 29, T4S, R13W	-1242			
"	Anderson, Spires #1 NE NE NW, 31, T4S, R13W	-1086	268	47	18
"	Ross (Moran) Way-Se-Pappy #1 SW SW NW, 32, T4S, R13W	-1008	257	31	12
"	Akin, Laniers #1 SW NE SE, 32, T4S, R13W	-1024			
"	Ross, Clark #1 NE NW, 34, T4S, R13W	-780			
"	Ross, Inman #1 SW SE SW, 34, T4S, R13W	-968	286	102	36
"	Haliburton Pendergraft #1 NW NW SW, 1, T4S, R12W	-1269			
"	Harper, Moyer #1 NW NW SW, 2, T4S, R12W	-1273			
"	Ohio, Chapman #1 SE SW NE, 3, T4S, R12W	-1298	269	44	16
"	Johnson, Hilton #A-1 5, T4S, R12W	-1373			
"	Hutcheson, Whitehead #1 SE SW, 8, T4S, R12W	-1282			

County	Company/Well Location	Top of Megargel	Total Interval (feet)	Net Sand- Stone (feet)	Sand- Stone Percent
Cotton	Shultz (Ace), Wolfe #1 SE NW, 11, T4S, R12W	-1327			
"	Wilcox, Ressel #1 SW SW SW, 11, T4S, R12W				
"	Moore & Ross Armstrong #1 NE NE NW, 12, T4S, R12W				
"	Moore, Neel #1 SE SE SE, 12, T4S, R12W				
"	Ross, Ressel #1 SE SE SE, 14, T4S, R12W	-1267			
"	Ratcliff, Johnson #1 SE SE SE SW, 15, T4S, R12W				
"	Griffin, Ballard #1 C NW NW, 15, T4S, R12W				
"	Harlin, Eastman #1 SW SW SE, 18, T4S, R12W				
"	Beard, Geimi-Saddle #1 C SW NE, 24, T4S, R12W	-1251			
"	Ross, Kirkpatrick #1 NW NW NW, 25, T4S, R12W	-1111			
"	Nixon, Kirkpatrick #1 NE NE SW, 25, T4S, R12W				
"	Stewart, Cassidy #1 NE NW NW, 26, T4S, R12W	-1145	398	51	13
"	Ward, Underwood #1 NE SE SE, 30, T4S, R12W	-860	300	24	8
"	Winfrey, Miller #1 W $\frac{1}{2}$ SE SE SW, 31, T4S, R12W	-713			
"	, McGowan #1 , 33, T4S, R12W	-912			

County	Company/Well Location	Top of Megargel	Total Interval (feet)	Net Sand- Stone (feet)	Sand- Stone Percent
Cotton	Ross, Baldwin #1 SW NW NE, 34, T4S, R12W				
"	Andrade, Menz #1 NE NE SE, 34, T4S, R12W	-946			
"	Little, Ressel #1 C SE SE, 35, T4S, R12W	-930	442	58	13
"	Miller, Ressel #1 SE SE NE, 35, T4S, R12W				
"	Nixon, Menz #1 SE SW, 35, T4S, R12W				
Tillman	Parker, Fuller #1 SE SE SE, 1, T5S, R15W	-673			
"	Fleet, John #1 SW SW NE, 2, T5S, R15W	-861	150	40	27
"	Kingery, Johnson #1 SW SE SW, 2, T5S, R15W	-932			
"	, Suiter #1 3, T5S, R15W	(-961)	135	4	3
"	Seneca, U.S. Govt. #1 N $\frac{1}{2}$ NW SW, 14, T5S, R15W				
"	Ross U.S. Govt. B.L.M. #1 SE SE NW NW, 15 T5S, R15W				
"	Anderson-Helton Goehler #7 NE NW, 4, T5S R14W	-616	145	0	0
"	Parker, U.S. Govt. #1 SW NW SE, 4, T5S, R14W	-450	100	0	0
"	Anderson-Helton Brisley #1 SW SW, 5, T5S, R14W	-569			

County	Company/Well Location	Top of Megargel	Total Interval (feet)	Net Sand- Stone (feet)	Sand- Stone Percent
Tillman	Helton, Mount #1 SW NW SE SE, 6, T5S, R14W				
"	Helton, Lizzie #1 S½ SW, 6, T5S, R14W				
"	, Fuller #1 6, T5S, R14W	(-964)			
"	Snoddy, Crossland #1 NW NW NE, 6, T5S, R14W	-993	239	0	0
"	Anderson, Owens #1-B NW NW NW, 7, T5S, R14W	-585			
"	Anderson, Owen #1 NW SE NE, 7, T5S, R14W	-396			
"	, Red R. #247 8, T4S, R14W	(-442)	130	72	48
Cotton	Winfrey, Dickson #1 SE SE NW, 1, T5S, R13W	-641			
"	Norwood Phillips-Dickson #1 NW SW NW, 1, T5S, R13W	-637			
"	Howell, Sankadota #1 NE SE SW, 1, T5S, R13W	-629			
"	Nixon, Warren #1 NE SE SE, 1, T5S, R13W	-550			
"	Norwood, Warren "A" #1 NE SW NE SE, 1, T5S, R13W	-584	167	0	0
"	Ross, Miller #1 SE SW NE, 1, T5S, R13W	-607			
"	Ross, Pau-Kau-Brace #1 NW NW NE, 2, T5S, R13W	-670			
"	Harlin, Warren #1 NW NW SE, 2, T5S, R13W	-616	288	36	13

County	Company/Well Location	Top of Megargel	Total Interval (feet)	Net Sand- Stone (feet)	Sand- Stone Percent
Cotton	Norwood, Warren #1 NE NE SE, 2, T5S, R13W	-616			
"	Slemaker-Deaner Bingham #1 SW SW NW, 3, T5S, R13W	-780			
"	Oldle-Pah-Quote #1 12, T5S, R13W				
"	Farris, Jordon #1 SW SW SE, 14, T5S, R13W	-898			
"	Harvey, Williams #1 SW SW SE, 4, T5S, R12W	-756			
"	Conkling, Stanford #1 SW SE NE, 5, T5S, R12W	-714			
"	Fortex, Stanford #1 NW SW NE, 5, T5S, R12W	-670	209	4	2
"	Ross, Auch-Ch-Chiah #5 NW SW SE, 5, T5S, R12W	-631			
"	Hamilton Oma Dugan #1-A NW SW SW, 5, T5S, R12W	-559	241	17	7
"	Duncan, Dugan A #1 NW SW SW, 5, T5S, R12W	-577			
"	Broday, Moore #1 SW NW SE, 6, T5S, R12W	-561	184	0	0
"	Akin & Dimock, Brown #2 SW SW SW, 6, T5S, R12W	-592	220	8	4
"	Murphy, Brown #15 NW NE NE SE, 6, T5S, R12W	-563			
"	Neeld, Brown #1 SW SW SE, 6, T5S, R12W				
"	Phillips, Brown #2 SW SE SE, 6, T5S, R12W				

County	Company/Well Location	Top of Megargel	Total Interval (feet)	Net Sand- Stone (feet)	Sand- Stone Percent
Cotton	Duncan, Postelwaite #1 NW NE SE, 7, T5S, R12W				
"	Nixon, Miller #1 SE SE SE, 8, T5S, R12W	-821			
"	Nixon, Miller #2 NW NW SE, 8, T5S, R12W	-712			
"	Norwood, Green #1 NE SW NW, 9, T5S, R12W				
"	Scott, Young #1 NE NE SE, 9, T5S, R12W	-827			
"	King & Sons, Young #2 SW SW SE, 9, T5S, R12W	-828			
"	Ware, Menz #1 SE NE NE, 10, T5S, R12W	-807	393	42	11
"	Van Loh, Mills #1 SW SW SW, 10, T5S, R12W				
"	Shelby, Abbott #1 SW SW NW, 11, T5S, R12W	-813	383	33	9
"	Huff, Abbott #1 NE NE SW, 11, T5S, R12W				
"	Butcher, Boles #1 NE NE NW, 13, T5S, R12W				
"	Bolin, Clampitt #2 NE NE SW, 13, T5S, R12W	-806			
"	Ross, Baldwin #1 NE NE SW 14, T5S, R12W	-837			
"	Nixon, Kemp #1 SE NW SW, 15 T5S, R12W	-821			
"	Ross, Hall "B" #10 NW SE SE NW, 16, T5S, R12W	-808	388	63	16

County	Company/Well Location	Top of Megargel	Total Interval (feet)	Net Sand- Stone (feet)	Sand- Stone Percent
Cotton	Ross, Hall "B" #1 SW NW, 16, T5S, R12W	-816	272	81	30
"	Nixon, Jones #1 NW NW SE, 16, T5S, R12W	-808	392	47	12
"	, Hale #1 17, T5S, R12W	(-821)			
"	Ross, Eastman "A" #2 NE NE NE, 17, T5S, R12W	-819			
"	Loggie, Samuels #1 SW SW SW NE, 21, T5S, R12W	-737			
"	Wood, Patterson #1 SW NE NE, 22, T5S, R12W	-792			
"	Francis & Perksley Kinniard #1 NW NE NE, 23, T5S, R12W	-817			
"	Bolin, Clampitt #1 NW NW NW, 24, T5S, R12W	-820			
"	Gray, Benthey #1 NW NW NE, 25, T5S, R12W	-754			
"	Bolin, Kinniard #1 SW SW NE, 26, T5S, R12W	-697	288	25	9
"	Ross, Poolaw #1 SE SW NW, 28, T5S, R12W	-641			
"	Farris, Poolaw #1 SW SE NE, 28, T5S, R12W	-666	285	7	2
"	Winfrey, Poolaw #1 NW NW NE, 29, T5S, R12W	-780			
"	Cities Service, Bear #1 SE NE NW, 33, T5S, R12W				
"	Bolin, O'Neil #1 NE NE NW, 34, T5S, R12W	-587	273	7	3

County	Company/Well Location	TX#	Top of Megargel	Total Interval (feet)	Net Sand- Stone (feet)	Sand- Stone Percent
Wichita	Paradise, Waggoner E-2 TCRR Sur. AB 632 Sec. 1	115	-530			
"	G.M. Shanor, Allingham A #18 HT&C RR Sur. Blk 5 Sec 32	171	-470	121	15	12
"	G.W. Cooper, Jennings #1 HT&B Sur. A-475	63	-504	273	46	17
"	W.A. Lofton Waggoner "ZZ" #1 HT&B Sur. A-503 Sec. 14	153	-563			
"	Medford, Waggoner "F" #1 GC&SF Sur. A-586	157	-540			
"	Magnolia, Brewer #14 Waggoner Colony Sec. 250	62	-588	254	58	23
"	Gulf, Miller #1 HT&C Sur. Blk. 5	53	-468	243	49	20
"	Underwood, Jacobi #1 Waggoner Col. Sub. 246	180	-817			
"	National Ass. Willie Proud #1 Waggoner Col. Sub. Sec. 189	36	-926	323	120	37
"	Magnolia, Perkins #1 NW Extension Blk 87	121	-535	171	0	0
"	Magnolia, Schmoker #43 Red River Valley Blk. 23	64	-675	148	40	27
"	American Liberty Tuttle #1 Waggoner Colony Blk. 174	59	-1442	410	155	38
"	Perkins & Cullum Goetze #1 Washington RR Sur Sec 2	56	-826	318	21	7
"	Magnolia, Ramming WSW #1 Dodson Sur.	47	-393	97	40	41

County	Company/Well Location	TX#	Top of Megargel	Total Interval (feet)	Net Sand- Stone (feet)	Sand- Stone Percent
Wichita	Wood, Foster #1 SA&MG Sur. A-272	181	-641			
"	Magnolia Honaker WSW #1	110	-497	233	87	37
"	Morrison Slaughter #D-1 H&GN Sur. A-483	76	-600	309	63	
"	Dillard, Barwise #1 Cole Sur. A-37	42	-880	118	5	4
"	Akin & Dimock Gibson #1-A Waggoner Colony Sub. 271	39	-631	243	82	34
"	Humble, Serrien #30 HT&B Sur. A-480	144	-391	115	12	10
"	Magnolia, Riley #179 Denison Sur.	150	-326	89	5	6
"	Fish, Ramming #1 HT&B A-476	184	-402			
"	Nixon, Hieserman #1 Armendaris Sur. A-10	112	-856	267	81	30
"	Woody, Slama #1 Red River Sub. Blk. 6	185	-550	190	0	0
"	Knight, Robinson #1 Waggoner Colony Sub. 310	191	-553	134	84	63
"	Wood, Roller "1" #1 W. Grady Sur. A-357	160	-500	172	65	38
"	Ada, Michina #1 Winters Sur. A-322	81	-530	258	48	19
"	Stanolind, Roller Est. CTRR Sur. A-438 Lot 121	43	-913	152	0	0
"	Burk Royalty, Malone #1-A Burkburnett Blk. 16	189	-642	190	0	0

County	Company/Well Location	TX#	Top of Megargel	Total Interval (feet)	Net Sand- Stone (feet)	Sand- Stone Percent
Wichita	Anthony, Riley #1 Redman Sur. A-249	190	-792	199	0	0
"	Wood, Heiserman #8 HT&B Sur. A-125	40	-409	180	6	3
"	Hood, McCullough George #1 Farrish Sur. A-383	151	-361	91	14	15
"	Love, Love Estate A #1 Collins Sur. A-411	168	-858	240	18	8
"	Wood, Foster #1 HT&B Sur. A-129	182	-530			
"	Fain & McGaha Powell & Van. #1 Waggoner Colony Blk. 239	60	-1182	461	153	33
"	Kadane, Robinson #1 Waggoner Colony Blk. 171	105	-1255	436	112	26
"	Freeman, Emmert #1 W. Brinker Sur. A-516	54	-1128	259	58	22
"	Dickinson Brushy Pasture	122	-666			
"	Kiel Jr., Ed Foster #1 Denison Sur. A-64	186	-660			
"	Morrison, Krohn, Inc. #1 H&GN Sur. A-144	119	-630	336	109	32
"	Gorman, Goetze #7 SH&MGRR Sur. A-477	143	-662	87	0	0
"	Frankel, Wright #1 Red R. Valley Lds. Blk 11	38	-348			
"	Hammon, N. Johnson #10 H. Hastie Sur. A-92	156	-305	120	0	0

INTERVAL 2

County	Company/Well Location	Total Interval (feet)	Net Sandstone (feet)	Sandstone Percent
Tillman	Kingery, Smith #1 SE NE NE, 15, T1S, R15W			
"	Tankersly & George Howell #1 SE SE NW, 21, T1S, R15W	52	0	0
"	Ross, Martin #1 SW SW SE, 21, T1S, R15W	37	5	14
"	Equitable, McClellan #1 NE NE NW, 28, T1S, R15W	69	0	0
"	Johnson, Kinder #1 SE SE NW, 30, T1S, R15W			
"	Acme, Strecker #1 SE SE NW, 21, T1S, R14W			
Comanche	Kadane, Schumpert #1 C NW NE, 26, T1S, R14W			
"	Frankfort, Pickens #1 C SW NW, 7, T1S, R12W			
"	Rodgers, Carmichael #1 SE SE NE, 15, T1S, R12W	89	0	0
"	Nixon, Urfer #1 SE SE SE, 19, T1S, R12W	69	8	12
"	Rocket, Turner #1 SW SW NW, 19, T1S, R12W			
Cotton	Honolulu, Ouo-In-Oudle #1 SE NE SE, 31, T1S, R12W	69	31	45.0
Tillman	Harvey, Buswell #1 SE NE, 3, T2S, R15W			
"	Johnson, Kinder #1 NW NW NW, 7, T2S, R15W	118	31	26.3
"	Staley, Donahue #1 Taylor SW SW SW, 9, T2S, R15W	119	2	10.5

County	Company/Well Location	Total Interval (feet)	Net Sandstone (feet)	Sandstone Percent
Tillman	Andrew, McCary #1 SW SW NE, 10, T2S, R15W	42	12	28.6
"	The Texas Co., Bruster #1 SE NW SE, 15, T2S, R15W	44	12	27.3
"	Mack, Po-Ah-Wy #1 SE SE SW, 17, T2S, R15W	55	39	71.0
"	Mack, Hellbusch #1 NW NW SW, 25, T2S, R15W	43	10	23.3
"	Anderson, Locke #1 NW NW NE, 28, T2S, R15W	50	20	40
"	McCaughey, Thompson #1 SE SE SE, 28, T2S, R15W	48	10	20.8
"	Harper & Knappenburger Walker #1 SW SW SW, 6, T2S, R14W	79	29	36.7
Cotton	Clark, Stuckey #1 SW SW NW, 15, T2S, R14W	73	30	41.1
Tillman	Carter, Minton #1 SW SW NW, 18, T2S R14W	52	16	30.8
Cotton	Griffin, Gore #1 SW SW NE, 23, T2S, R14W	55	31	56.4
"	Johnson, McGee #1 SE SE NW, 25, T2S, R14W	77	20	26.0
"	Bay, Anderson #1 SE SE SW, 5, T2S, R13W			
"	Bay, Crockett #1 SW NE, 9, T2S, R13W			
"	Snoddy, Holmes #1 SE SE NW, 13, T2S, R13W	59	5	8.5
"	Gibson, Scherler #1 SE SE SW, 15, T2S, R13W	28	0	0

County	Company/Well Location	Total Interval (feet)	Net Sandstone (feet)	Sandstone Percent)
Cotton	Griffin, Russell #1 NE NE SW, 16, T2S, R13W	58	25	43.1
"	Johnson, Holmes #1 SW SW SW, 20, T2S, R13W	46		
"	Morton, State #1 NE NE NW, 25, T2S, R13W	74	26	35.1
"	Wood, Harris C NW NE, 26, T2S, R13W	39	6	15.4
"	Miller (Hassell) Herman Sheler #1 NW SW NW, 26, T2S, R13W			
"	Lackey, Wright #1 NW NE NE, 28, T2S, R13W			
"	Hassell, Rich #1 NW NE SW, 35, T2S, R13W			
"	Murta, Hertzler #1 SW SE NE, 35, T2S, R13W	128	4	3.1
"	Carter, Holly Parrish #1 SW SW, 1, T2S, R12W	112	22	19.6
"	Fisher, Wallace #1 SW SW, 3, T2S, R12W			
"	Nixon, Urfer #1 NW SW SE, 9, T2S, R12W	110	5	4.5
"	Kingery, Wallace #1 NW SW SW, 11, T2S, R12W			
"	Barbre, Parrish #1 NE NW NE, 13, T2S, R12W			
"	Weaver, Dickman #1 NE NE SW, 14, T2S, R12W			
"	Clark, Wood-Ah-Se-Oo #1 SW SW SW, 15, T2S, R12W			

County	Company/Well Location	Total Interval (feet)	Net Sandstone (feet)	Sandstone Percent
Cotton	Bridwell, O-Haw-Win-Me #1 SE SE NW, 17, T2S, R12W	92	0	0
"	Pinkston, Nah-Voon-Ey #1 SW SW SW, 17, T2S, R12W	108	0	0
"	Akin & Dimock, Rodgers #1 SW SE NW, 19, T2S, R12W	102	5	4.9
"	Davis (Pinkston) Te-Haw-Ne #1 SE SE SW, 20, T2S, R12W	128	25	19.5
"	Baldwin, Petty #1 NE NE NW, 21, T2S, R12W			
"	Harper, Indian #1 NW NE SW, 23, T2S, R12W			
"	Barbre, Kurtz #1 NW SE, 25, T2S, R12W			
"	Norman, Holmes #1 SE SE SE, 27, T2S, R12W			
"	Man, Handy #1 NE NE NE, 28, T2S, R12W			
"	Akin, Fox #1 NW NW SE SW, 28, T2S, R12W			
"	Vickers, Patton #1 NE NE SW, 30, T2S, R12W	85	28	33.0
"	Hamilton, Powell #1 NW NW SW, 32, T2S, R12W			
"	Harvey, Pruitt #1 NW NW SE, 33, T2S, R12W			
"	Harvey, Tabby-To-Sav-It NW NW NE, 34, T2S, R12W			
"	Russell, Gilliam #1 NW NW SW, 35, T2S, R12W			

County	Company/Well Location	Total Interval (feet)	Net Sandstone (feet)	Sandstone Percent
Cotton	Whately & Barbre, Bates #1 SE SW NE, 36, T2S, R12W			
"	Ross (Russell), Holmes #1 NW NW NW, 36, T2S, R12W			
"	Griffin, Martin #1 SE SW SW, 36, T2S, R12W			
Tillman	Amerada, Hill #1 SW SW NW, 3, T3S, R15W			
"	Amerada, Howard #1 SW SW NW, 12, T3S, R15W	46	0	0
"	Nutting, Martin #1 SW NE NE, 22, T3S, R15W			
"	Johnson, Ille #1 NW NW NE, 25, T3S, R15W	167	57	34.1
"	Amerada, Rowe #1 SW SW SW, 1, T3S, R14W	77	21	27.3
"	Pinkston & Davis Dudenhoeffer #1 NW SE SE, 8, T3S, R14W	116	49	42.2
"	Pure, Sims #1 SE SE NE, 10, T3S, R14W			
"	Wirick, Randall #1 NW NW SE, 12, T3S, R14W	156	44	28
"	McElreath, Josefy #1 SW SE, 23, T3S, R14W	179	52	29
"	Cities Service, Sellars #1 NW SE SE, 24, T3S, R14W	164	44	27
"	K.L.B., Harvey #1 NE NE SW, 29, T3S, R14W			
"	Ross, Castleberry #1 NW NW SE, 30, T3S, R14W	149	22	15

County	Company/Well Location	Total Interval (feet)	Net Sandstone (feet)	Sandstone Percent
Tillman	EPH Griffin, Dudenhoeffer #1 SE SE NE, 32, T3S, R14W			
"	Johnson, Huffington #1 C SW NE, 34, T3S, R14W	229	90	39
Cotton	Blair, Dudenhoffer #1 NE NE SW, 3, T3S, R13W			
"	Riddle & McClelland White #1 C NW SW, 4, T3S, R13W			
"	Neeld & Hood, Gregson #1 NW SW SE, 9, T3S, R13W			
"	Walker, Scherler #1 SE NW SE, 10, T3S, R13W			
"	Hutcheson, Dickson #1 SW SW NE, 12, T3S, R13W			
"	Zweig, Thornton #1 NE NE SW, 13, T3S, R13W			
"	Fleeger, Tisdale #1 C SE NW, 14, T3S, R13W			
"	Wolf & Brown, Perry #1 NE NW NW SE, 15, T3S, R13W			
"	Larson & Thomas, Booher #1 SE SW SW, 25, T3S, R13W			
"	Clark & Cowden, Corely #1 NE NE SE, 30, T3S, R13W			
"	Stewart & Orm, Emery #1 NE NE NE, 30, T3S, R13W			
"	Umbenhour, Miller #1 SW SW NW, 33, T3S, R13W	139	77	55
"	Wilder, Shamblin #1 NW NW SW, 1, T3S, R12W			

County	Company/Well Location	Total Interval (feet)	Net Sandstone (feet)	Sandstone Percent
Cotton	Hart, Tah-Que-Chi #1 NW NE SE, 1, T3S, R12W			
"	Harvey Moo-Rah-Waddy #1 NW NE NE, 2, T3S, R12W			
"	McCashland, Hill #1 SE NE NE, 4, T3S, R12W	158	73	46
"	McCashland, No-Bah-Nuck #1 NE NE NE, 3, T3S, R12W	173	73	42
"	Meeker, Powell #1 SW NE SE, 6, T3S, R12W			
"	Meeker, Kinder #1 NW NW NE, 8, T3S, R12W			
"	McCann, Shaw #1 NE NE SW, 9, T3S, R12W	165	131	79
"	Hall, Kinder #1 SE NW, 10, T3S, R12W			
"	Funk, Kerr #1-11 NW SE NE, 11, T3S, R12W	193	84	44
"	McCashland, Verniput #1 SE SE NE, 11, T3S, R12W	220	60	27
"	Carr, Hooker #1 NW NW SW, 12, T3S, R12W			
"	Kelleher, Indian #1 C NW NE, 12, T3S, R12W			
"	Burton, Ne-Wook-Ah-Ker #1 SE SE SE, 12, T3S, R12W			
"	Howell Ka-Hina-Watch-It #1 SW SW NE, 12, T3S, R12W			
"	Bridwell, Attouvick #1 NW SE NW, 13, T3S, R12W			

County	Company/Well Location	Total Interval (feet)	Net Sandstone (feet)	Sandstone Percent
Cotton	Carr, Tankofper #6-B SW NW SE, 13, T3S, R12W			
"	Burton, Davis #1 13, T3S, R12W			
"	Tah-Kof-Per #4 13, T3S, R12W			
"	Amerada, Flipping #1 SE SE SE, 14, T3S, R12W			
"	Harper & Turner, Tappto #1 SE NE SW, 14, T3S, R12W			
"	Neeld, Kinder #1 S $\frac{1}{2}$ NW NE, 15, T3S, R12W			
"	Snoody, Allgood #1 NE NE SE, 16, T3S, R12W			
"	Gray, Wright #1 SE SW NW, 17, T3S, R12W			
"	Hutcheson, Zweiaker #1 SE NE NE, 20, T3S, R12W			
"	Slemaker, Sultan #1 NE NE NW, 22, T3S, R12W			
"	Slemaker-Deaner Bryson #1 C SE SW, 22, T3S, R12W			
"	Kingery, Pen #1 NE NE SE, 24, T3S, R12W			
"	Burton, Lulu Pahdi #1 NE NE NE, 24, T3S, R12W			
"	Kingery, Indian #1 NE NE SW, 24, T3S, R12W			
"	Stanolinid, Moyer #1 C NE NW, 25, T3S, R12W	288	172	60

County	Company/Well Location	Total Interval (feet)	Net Sandstone (feet)	Sandstone Percent
Cotton	Jones, Thurman #1 NE NE NW, 26, T3S, R12W			
"	Amerada Gina-Quoe-Tone #1 NE NE SW, 26, T3S, R12W			
"	Lowe, Griffin #1 SE SW SW, 27, T3S, R12W	225	144	64
"	Blackwell, Alexander #1 NE SW NE, 27, T3S, R12W			
"	Std. of Kansas, Adams #1 SW NE SE, 28, T3S, R12W			
"	McGee, Whitehead #1 SW SW, 28, T3S, R12W			
"	Hutcheson, Whitehead #1 SE SW SW, 28, T3S, R12W			
"	Griffin, Scruggs #1 NW NW SE, 30, T3S, R12W			
"	Hutchison, Larse #2 SW SW SW, 33, T3S, R12W	195	83	43
"	Slemaker, Otis #1 SE SE NW, 36, T3S, R12W			
"	Kadane (Hoffman) Browning #1 SW SW NE, 6, T4S, R15W	211	111	53
"	Ross, Burke #1 SW SW SW, 12, T4S, R15W	158	78	49
"	Tibbets, Coulter #1 SW SE SW, 15, T4S, R15W			
"	Keener, Arnt #1 SE NE NE, 16, T4S, R15W	188	71	38
"	Consolidated, Slack #1 NE NE SW, 17, T4S, R15W			

County	Company/Well Location	Total Interval (feet)	Net Sandstone (feet)	Sandstone Percent
Cotton	Midwest, Varner #1 C NE SE, 17, T4S, R15W	204	54	26
"	Pyramid, Hunt #1 NW NW SW, 18, T4S, R15W	175	67	38
"	Danciger, Bear #1 NE NE SE, 19, T4S, R15W			
"	Kadane, Carroll #1 NW NE SW, 23, T4S, R15W			
"	Texas Co. Asenap #1 NW NW SW, 25, T4S, R15W	112	70	63
"	Stanolind, Watson #1 NE NE NW, 26, T4S, R15W	167	85	51
"	Kadane, Tofpoie #1 C SE NW, 26, T4S, R15W			
"	Gulf, Owen #1 NE NE NE, 27, T4S, R15W	232	55	24
"	Union, Zotigh #1 SE SE SE, 27, T4S, R15W	229	95	41
"	Sunray, Chanate #1 NE NE SW, 28, T4S, R15W	257	59	23
"	Hamill #1 31, T4S, R15W	215	91	42
"	Medlock #1 32, T4S, R15W	239	116	49
"	Abbott & Sinex, Indian #1 SW NW NW, 34, T4S, R15W	288	183	64
"	Anderson, Davenport #1 NW NW SE, 35, T4S, R15W			
"	Wilson, Williams #1 SW SW NE, 14, T4S, R14W			
"	Whattiker, Gittings #1 NW NW NW, 15, T4S, R14W			

County	Company/Well Location	Total Interval (feet)	Net Sandstone (feet)	Sandstone Percent
Cotton	Little, Morton #1 SW SW NE, 17, T4S, R14W			
"	Davidson, Mount #1 NW SE NW, 23, T4S, R14W	170	117	69
"	Johnson, Mount #1 SW SW NW, 23, T4S, R14W			
"	Helton, McCullough #1 SW NW NE, 33, T4S, R14W	193	74	38
"	Powers, Moss #1 SW SW NE, 34, T4S, R14W	158	40	25
"	Parker, Red River 100 #2 SE SW SW SW, 34, T4S, R14W			
"	Ross, Crocker #1 NE NE NE, 9, T4S, R13W			
"	Johnson, Stephens #1 SW SW SE, 10, T4S, R13W	153	35	23
"	Ross, Kirkpatrick #1 NW NW SE, 11, T4S, R13W			
"	Bingham, Goode #1 NW SW NW, 13, T4S, R13W			
"	Little, Doty #1 SW SE, 14, T4S, R13W			
"	Johnson, McClough #1 NW SE NW, 17, T4S, R13W	173	68	39
"	Frankfort, Montgomery #1 SE SE NW, 21, T4S, R13W	239	109	46
"	Nagle, Emory #1 SW SW NW, 26, T4S, R13W	180	59	33
"	Waggoner, Weaver #1 NE NE NE, 27, T4S, R13W	167	29	17

County	Company/Well Location	Total Interval (feet)	Net Sandstone (feet)	Sandstone Percent
Cotton	Ross, Wah-Ah-Kinney SW SW NW, 29, T4S, R13W			
"	Anderson, Spires #1 NE NE NW, 31, T4S, R13W	201	90	17
"	Ross (Moran) Way-Se-Pappy #1 SW SW NW, 32, T4S, R13W	818	61	
"	Akin, Laniers #1 SW NE SE, 32, T4S, R13W			
"	Ross, Clark #1 NE NW, 34, T4S, R13W			
"	Ross, Inman #1 SW SE SW, 34, T4S, R13W	166	33	34
"	Halliburton Pendergraft #1 NW NW SW, 1, T4S, R12W			
"	Harper, Moyer #1 NW NW SW, 2, T4S, R12W			
"	Ohio, Chapman #1 SE SW NE, 3, T4S, R12W	270	182	67
"	Johnson, Hilton #A-1 5, T4S, R12W			
"	Hutcheson, Whitehead #1 SE SW, 8, T4S, R12W			
"	Shultz (Ace), Wolfe #1 SE NW, 11, T4S, R12W			
"	Wilcox, Ressel1 #1 SW SW SW, 11, T4S, R12W			
"	Moore & Ross, Armstrong #1 NE NE NW, 12, T4S, R12W			
"	Moore, Neel #1 SE SE SE, 12, T4S, R12W			

County	Company/Well Location	Total Interval (feet)	Net Sandstone (feet)	Sandstone Percent
Cotton	Ross, Ressel #1 SE SE SE, 14, T4S, R12W			
"	Ratcliff, Johnson #1 SE SE SE SW, 15, T4S, R12W			
"	Griffin, Ballard #1 C NW NW, 15, T4S, R12W			
"	Harlin, Eastman #1 SW SW SE, 18, T4S, R12W			
"	Beard, Geimi-Saddle #1 C SW NE, 24, T4S, R12W			
"	Ross, Kirkpatrick #1 NW NW NW, 25, T4S, R12W			
"	Nixon, Kirkpatrick #1 NE NE SW, 25, T4S, R12W			
"	Stewart, Cassidy #1 NE NW NW, 26, T4S, R12W	177	60	34
"	Ward, Underwood #1 BE SE SE, 30, T4S, R12W	218	110	50
"	Winfrey, Miller #1 W $\frac{1}{2}$ SE SE SW, 31, T4S, R12W	182	92	51
"	McGowan #1 33, T4S, R12W			
"	Ross, Baldwin #1 SW NW NE, 34, T4S, R12W			
"	Andrade, Menz #1 NE NE SE, 34, T4S, R12W			
"	Little, Ressel #1 C SE SE, 35, T4S, R12W	181	91	50
"	Miller, Ressel #1 SE SE NE, 35, T4S, R12W			
"	Nixon, Menz #1 SE SW, 35, T4S, R12W			

County	Company/Well Location	Total Interval (feet)	Net Sandstone (feet)	Sandstone Percent
Tillman	Parker, Fuller #1 SE SE SE, 1, T5S, R15W			
"	Fleet, John #1 SW SW NE, 2, T5S, R15W	272	95	35
"	Kingery, Johnson #1 SW SE SW, 2, T5S, R15W			
"	Suiter #1 3, T5S, R15W	271	46	17
"	Seneca, U.S. Govt. #1 N $\frac{1}{2}$ NW SW, 14, T5S, R15W			
"	Ross, U.S. Govt. B.L.M. #1 SE SE NW NW, 15, T5S, R15W			
"	Anderson-Helton, Goehler #7 NE NW, 4, T5S, R14W	114	20	18
"	Parker, U.S. Govt. #1 SW NW SE, 4, T5S, R14W	187	51	27
"	Anderson-Helton, Brisley #1 SW SW, 5, T5S, R14W			
"	Helton, Mount #1 SW NW SE SE, 6, T5S, R14W			
"	Helton, Lizzie #1 S $\frac{1}{2}$ SW, 6, T5S, R14W			
"	Fuller #1 6, T5S, R14W			
"	Snoddy, Crossland #1 NW NW NE, 6, T5S, R14W	170	101	59
"	Anderson, Owens #1-B NW NW NW, 7, T5S, R14W			
"	Anderson, Owen #1 NW SE NE, 7, T5S, R14W			

County	Company/Well Location	Total Interval (feet)	Net Sandstone (feet)	Sandstone Percent
Tillman	Red R. #247 8, T5S, R14W	131	20	15
Cotton	Winfrey, Dickson #1 SE SE NW, 1, T5S, R13W			
"	Norwood, Phillips-Dickson #1 NW SW NW, 1, T5S, R13W			
"	Howell, Sankadota #1 NE SE SW, 1, T5S, R13W			
"	Nixon, Warren #1 NE SE SE, 1, T5S, R13W			
"	Norwood, Warren "A" #1 NE SW NE SE, 1, T5S, R13W	164	52	32
"	Ross, Miller #1 SE SW NE, 1, T5S, R13W	173	98	
"	Ross, Pau-Kau-Brace #1 NW NW NE, 2, T5S, R13W			
"	Harlin, Warren #1 NW NW SE, 2, T5S, R13W	129	65	57
"	Norwood, Warren #1 NE NE SE, 2, T5S, R13W	135	68	50
"	Slemaker-Deaner, Bingham #1 SW SW NW, 3, T5S, R13W			
"	Oldle-Pan-Quote #1 12, T5S, R13W			
"	Farris, Jordon #1 SW SW SE, 14, T5S, R13W			
"	Harvey, Williams #1 SW SW SE, 4, T5S, R12W			
"	Conkling, Stanford #1 SW SE NE, 5, T5S, R12W			

County	Company/Well Location	Total Interval (feet)	Net Sandstone (feet)	Sandstone Percent
Cotton	Fortex, Stanford #1 NW SW NE, 5, T5S, R12W	227	119	52
"	Ross, Auch-Ch-Chiah #5 NW SW SE, 5, T5S, R12W			
"	Hamilton, Oma Dugan #1-A NW SW SW, 5, T5S, R12W	149	81	54
"	Duncan, Dugan A #13 NW SW SW, 5, T5S, R12W			
"	Broday, Moore #1 SW NW SE, 6, T5S, R12W	154	71	46
"	Akin & Dimock, Brown #2 SW SW SW, 6, T5S, R12W	170	108	64
"	Murphy, Brown #15 NW NE NE SE, 6, T5S, R12W			
"	Neeld, Brown #1 SW SW SE, 6, T5S, R12W			
"	Phillips, Brown #2 SW SE SE, 6, T5S, R12W			
"	Duncan, Postelwaite #1 NW NE SE, 7, T5S, R12W			
"	Nixon, Miller #1 SE SE SE, 8, T5S, R12W			
"	Nixon, Miller #2 NW NW SE, 8, T5S, R12W			
"	Norwood, Green #1 NE SW NW, 9, T5S, R12W			
"	Scott, Young #1 NE NE SE, 9, T5S, R12W			
"	King & Sons, Young #2 SW SW SE, 9, T5S, R12W			
"	Ware, Menz #1 SE NE NE, 10, T5S, R12W	168	50	30

County	Company/Well Location	Total Interval (feet)	Net Sandstone (feet)	Sandstone Percent
Cotton	Van Loh, Mills #1 SW SW SW, 10, T5S, R12W			
"	Shelby, Abbott #1 SW SW NW, 11, T5S, R12W	169	59	35
"	Huff, Abbott #1 NE NE SW, 11, T5S, R12W			
"	Butcher, Boles #1 NE NE NW, 13, T5S, R12W			
"	Bolin, Clampitt #2 NE NE SW, 13, T5S, R12W			
"	Ross, Baldwin #1 NE NE SW, 14, T5S, R12W			
"	Nixon, Kemp #1 SE NW SW, 15, T5S, R12W	176	83	47
"	Ross, Hall "B" #10 NW SE SE NW, 16, T5S, R12W	167	23	14
"	Ross, Hall "B" #1 SW NW, 16, T5S, R12W	216	79	37
"	Nixon, Jones #1 NW NW SE, 16, T5S, R12W	165	18	11
"	Hale, #1 17, T5S, R12W			
"	Ross, Eastman "A" #2 NE NE NE, 17, T5S, R12W			
"	Loggie, Samuels #1 SW SW SW NE, 21, T5S, R12W			
"	Wood, Patterson #1 SW NE NE, 22, T5S, R12W			
"	Francis & Perksley Kinniard #1 NW NE NE, 23, T5S, R12W			

County	Company/Well Location	Total Interval (feet)	Net Sandstone (feet)	Sandstone Percent
Cotton	Bolin, Clampitt #1 NW NW NW, 24, T5S, R12W			
"	Gray, Benthey #1 NW NW NE, 25, T5S, R12W			
"	Bolin, Kinniard #1 SW SW NE, 26, T5S, R12W	170	41	24
"	Ross, Poolaw #1 SE SW NW, 28, T5S, R12W			
"	Farris, Poolaw #1 SW SE NE, 28, T5S, R12W	187	98	52
"	Winfrey, Poolaw #1 NW NW NE, 29, T5S, R12W			
"	Cities Service, Bear #1 SE NE NW, 33, T5S, R12W			
"	Bolin, O'Neil #1 NE NE NW, 34, T5S, R12W	170	81	48

County	Company/Well Location	TX#	Total Interval (feet)	Net Sand- Stone (feet)	Sand- Stone Percent
Wichita	Paradise, Waggoner E-2 TCRR Sur. AB 632 Sec. 1	115			
"	G.M. Shanor, Allingham A #18 HT&C RR Sur. Blk. 5 Sec. 32	171	102	69	68
"	G.W. Cooper, Jennings #1 HT&B Sur. A-475	63	126	81	64
"	W.A. Lofton Waggoner "ZZ" #1 HT&B Sur. A-503 Sec. 14	153			
"	Medford, Waggoner "F" #1 GC&SF Sur. A-586	157	118	69	58
"	Magnolia, Brewer #14 Waggoner Colony Sec. 250	62	227	20	9
"	Gulf, Miller #1 HT&C Sur. Blk. 5	53	120	15	13
"	Underwood, Jacobi #1 Waggoner Col. Sub. 246	180	122	30	25
"	National Ass. Willie Proud #1 Waggoner Col. Sub. Sec. 189	36	118	20	17
"	Magnolia, Perkins #1 NW Extension Blk. 87	121	95	18	19
"	Magnolia, Schmoker #43 Red River Valley Blk. 23	64	138	45	33
"	American Liberty, Tuttle #1 Waggoner Colony Blk. 174	59	138	41	30
"	Perkins & Cullum, Goetze #1 Washington RR Sur. Sec. 2	56	441	89	20
"	Magnolia, Ramming WSW #1 Dodson Sur.	47	140	63	45

County	Company/Well Location	TX#	Total Interval (feet)	Net Sand- Stone (feet)	Sand- Stone Percent
Wichita	Wood, Foster #1 SA&MG Sur. A-272	181			
"	Magnolia, Honaker WSW #1	110	218	56	26
"	Morrison, Slaughter #D-1 H&GN Sur. A-483	76	258	64	25
"	Dillard, Barwise #1 Cole Sur. A-37	42	142	72	51
"	Akin & Dimock, Gibson #1-A Waggoner Colony Sub. 271	39	100	18	18
"	Humble, Serrien #30 HT&B Sur. A-480	144	140	28	20
"	Magnolia, Riley #179 Denison Sur.	150	130	5	4
"	Fish, Ramming #1 HT&B A-476	184	145	41	28
"	Nixon, Hieserman #1 Armendaris Sur. A-10	112	422	286	68
"	Woody, Slama #1 Red River Sub. Blk. 6	185	133	50	38
"	Knight, Robinson #1 Waggoner Colony Sub. 310	191	179	95	53
"	Wood, Roller "1" #1 W. Grady Sur. A-357	160	179	95	53
"	Ada, Michina #1 Winters Sur. A-322	81	514	102	19
"	Stanolind, Roller Est. CTRR Sur. A-438 Lot 121	43	343	155	45
"	Burk Royalty, Malone #1-A Burkburnett Blk. 16	189	132	32	24
"	Anthony, Riley #1 Redman Sur. A-249	190	170	85	50

County	Company/Well Location	TX#	Total Interval (feet)	Net Sand- Stone (feet)	Sand- Stone Percent
Wichita	Wood, Heiserman #8 HT&B Sur. A-125	40	157	74	47
"	Hood McCullough George #1 Farrish Sur. A-383	151	245	88	36
"	Love, Love Estate A #1 Collins Sur. A-411	168	441	260	59
"	Wood, Foster #1 HT&B Sur. A-129	182	121	49	40
"	Fain & McGaha Powell & Van... #1 Waggoner Colony Blk. 239	60	158	27	17
"	Kadane, Robinson #1 Waggoner Colony Blk. 171	105	170	14	8
"	Freeman, Emmert #1 W. Brinker Sur. A-516	54	248	136	55
"	Dickinson, Brushy Pasture	122			
"	Kiel Jr., Ed Foster #1 Denison Sur. A-64	186			
"	Morrison, Krohn, Inc. #1 H&GN Sur. A-144	119	281	92	33
"	Gorman, Goetze #7 SH&MGRR Sur. A-477	143	220	138	63
"	Frankel, Wright #1 Red R. Valley Lds. Blk. 11	38			
"	Hammon, N. Johnson #10 H. Hastie Sur. A-92	156	198	139	70

INTERVAL 3

County	Company/Well Location	Total Interval (feet)	Net Sandstone (feet)	Sandstone Percent
Tillman	Kingery, Smith #1 SE NE NE, 15, T1S, R15W			
"	Tankersly & George Howell #1 SE SE NW, 21, T1S, R15W	87	17	20
"	Ross, Martin #1 SW SW SE, 21, T1S, R15W	91	7	8
"	Equitable, McClellan #1 NE NE NW, 28, T1S, R15W	108	13	12
"	Johnson, Kinder #1 SE SE NW, 30, T1S, R15W			
"	Acme, Strecker #1 SE SE NW, 21, T1S, R14W			
Comanche	Kadane, Schumpert #1 C NW NE, 26, T1S, R14W			
"	Frankfort, Pickens #1 C SW NW, 7, T1S, R12W			
"	Rodgers, Carmichael #1 SE SE NE, 15, T1S, R12W	57	0	0
"	Nixon, Urfer #1 SE SE SE, 19, T1S, R12W	86		
"	Rocket, Turner #1 SW SW NW, 19, T1S, R12W			
Cotton	Honolulu Ouo-In-Ouodle #1 SE NE SE, 31, T1S, R12W	70	5	7
Tillman	Harvey, Buswell #1 SE NE, 3, T2S, R15W			
"	Johnson, Kinder #1 NW NW NW, 7, T2S, R15W	119	8	7
"	Staley, Donahue #1 Taylor SW SW SW, 9, T2S, R15W	75	0	0

County	Company/Well Location	Total Interval (feet)	Net Sandstone (feet)	Sandstone Percent
Tillman	Andrew, McCary #1 SW SW NE, 10, T2S, R15W	85	7	8
"	The Texas Co., Bruster #1 SE NW SE, 15, T2S, R15W	105	7	7
"	Mack, Po-Ah-Sy #1 SE SE SW, 17, T2S, R15W	88	0	0
"	Mack, Hellbusch #1 NW NW SW, 25, T2S, R15W	189	8	7
"	Anderson, Locke #1 NW NW NE, 28, T2S, R15W	175	6	3
"	McCaughey, Thompson #1 SE SE SE, 28, T2S, R15W	164	41	25
"	Harper & Knappenburger Walker #1 SW SW SW, 6, T2S, R14W	128	7	5
Cotton	Clark, Stuckey #1 SW SW NW, 15, T2S, R14W	110	12	11
Tillman	Carter, Minton #1 SW SW NW, 18, T2S, R14W	111	0	0
Cotton	Griffin, Gore #1 SW SW NE, 23, T2S, R14W	112	5	4
"	Johnson, McGee #1 SE SE NW, 25, T2S, R14W	184	19	10
"	Bay, Anderson #1 SE SE SW, 5, T2S, R13W			
"	Bay, Crockett #1 SW NE, 9, T2S, R13W	60	0	0
"	Snoddy, Holmes #1 SE SE NW, 13, T2S, R13W	100	10	10
"	Gibson, Scherler #1 SE SE SW, 15, T2S, R13W	82	15	18

County	Company/Well Location	Total Interval (feet)	Net Sandstone (feet)	Sandstone Percent
Cotton	Griffin, Russell #1 NE NE SW, 16, T2S, R13W	122	20	16
"	Johnson, Holmes #1 SW SW SW, 20, T2S, R13W	72		
"	Morton, State #1 NE NE NW, 25, T2S, R13W	96	10	10
"	Wood, Harris C NW NE, 26, T2S, R13W	108	29	27
"	Miller (Hassell) Herman Sheler #1 NW SW NW, 26, T2S, R13W			
"	Lackey, Wright #1 NW NE NE, 28, T2S, R13W			
"	Hassell, Rich #1 NW NE SW, 35, T2S, R13W			
"	Murta, Hertzler #1 SW SE NE, 35, T2S, R13W	75	10	13
"	Carter, Holly Parrish #1 SW SW, 1, T2S, R12W	112	23	21
"	Fisher, Wallace #1 SW SW, 3, T2S, R12W			
"	Nixon, Urfer #1 NW SW SE, 9, T2S, R12W	97	10	10
"	Kingery, Wallace #1 NW SW SW, 11, T2S, R12W			
"	Barbre, Parrish #1 NE NW NE, 13, T2S, R12W			
"	Weaver, Dickman #1 NE NE SW, 14, T2S, R12W			
"	Clark Wood-Ah-Se-Oo #1 SW SW SW, 15, T2S, R12W			

County	Company/Well Location	Total Interval (feet)	Net Sandstone (feet)	Sandstone Percent
Cotton	Bridwell O-Haw-Win-Me #1 SE SE NW, 17, T2S, R12W	110	28	25
"	Pinkston, Nah-Voon-Eye #1 SW SW SW, 17, T2S, R12W	97	18	19
"	Akin & Dimock, Rodgers #1 SW SE NW/ 19, T2S, R12W	101	23	23
"	Davis (Pinkston) Te-Haw-Ne #1 SE SE SW, 20, T2S, R12W	79	21	27
"	Baldwin, Petty #1 NE NE NW, 21, T2S, R12W			
"	Harper, Indian #1 NW NE SW, 23, T2S, R12W			
"	Barbre, Kurtz #1 NW SE, 25, T2S, R12W			
"	Norman, Holmes #1 SE SE SE, 27, T2S, R12W			
"	Man, Handy #1 NE NE NE, 28, T2S, R12W			
"	Akin, Fox #1 NW NW SE SW, 28, T2S, R12W			
"	Vickers, Patton #1 NE NE SW, 30, T2S, R12W	116	11	9
"	Hamilton, Powell #1 NW NW SW, 32, T2S, R12W			
"	Harvey, Pruitt #1 NW NW SE, 33, T2S, R12W			
"	Harvey Tabby-To-Sav-It NW NW NE, 34, T2S, R12W			
"	Russell, Gilliam #1 NW NW SW/ 35, T2S, R12W			

County	Company/Well Location	Total Interval (feet)	Net Sandstone (feet)	Sandstone Percent
Cotton	Whately & Barbre Bates #1 SE SW NE, 36, T2S, R12W			
"	Ross (Russell), Holmes #1 NW NW NW, 36, T2S, R12W			
"	Griffin, Martin #1 SE SW SW, 36, T2S, R12W			
Tillman	Amerada, Hill #1 SW SW NW, 3, T3S, R15W			
"	Amerada, Howard #1 SW SW NW, 12, T3S, R15W	139	39	28
"	Nutting, Martin #1 SW NE NE, 22, T3S, R15W			
"	Johnson, Ille #1 NW NW NE, 25, T3S, R15W	91	31	34
"	Amerada, Rowe #1 SW SW SW, 1, T3S, R14W	160	40	25
"	Pinkston & Davis Dudenhoeffer #1 NW SE SE, 8, T3S, R14W	107	45	42
"	Pure, Sims #1 SE SE NE, 10, T3S, R14W			
"	Wirick, Randall #1 NW NW SE, 12, T3S, R14W	103	63	61
"	McElreath, Josefy #1 SW SE, 23, T3S, R14W	90	18	20
"	Cities Service, Sellars #1 NW SE SE, 24, T3S, R14W	102	22	22
"	K.L.B., Harvey #1 NE NE SW, 29, T3S, R14W			
"	Ross, Castleberry #1 NW NW SE, 30, T3S, R14W	104	8	8

County	Company/Well Location	Total Interval (feet)	Net Sandstone (feet)	Sandstone Percent
Tillman	EPH Griffin, Dudenhoeffer #1 SE SE NE, 32, T3S, R14W			
"	Johnson, Huffington #1 C SW NE, 34, T3S, R14W	112	37	33
Cotton	Blair, Dudenhoffer #1 NE NE SW, 3, T3S, R13W			
"	Riddle & McClelland White #1 C NW SW, 4, T3S, R13W			
"	Neeld & Hood, Gregson #1 NW SW SE, 9, T3S, R13W			
"	Walker, Scherler #1 SE NW SE, 10, T3S, R13W			
"	Hutcheson, Dickson #1 SW SW NE, 12, T3S, R13W			
"	Zweig, Thornton #1 NE NE SW, 13, T3S, R13W			
"	Fleeger, Tisdale #1 C SE NW, 14, T3S, R13W			
"	Wolf & Brown, Perry #1 NE NW NW SE, 15, T3S, R13W			
"	Larson & Thomas, Booher #1 SE SW SW, 25, T3S, R13W			
"	Clark & Cowden, Corely #1 NE NE SE, 30, T3S, R13W			
"	Stewart & Orm, Emery #1 NE NE NE, 30, T3S, R13W			
"	Umbenhour, Miller #1 SW SW NW, 33, T3S, R13W	221	32	14
"	Wilder, Shamblin #1 NW NW SW, 1, T3S, R12W			

County	Company/Well Location	Total Interval (feet)	Net Sandstone (feet)	Sandstone Percent
Cotton	Hart, Tah-Que-Chi #1 NW NE SE, 1, T3S, R12W			
"	Harvey Moo-Rah-Waddy #1 NW NE NE, 2, T3S, R12W			
"	McCashland, Hill #1 SE NE NE, 4, T3S, R12W	178	39	22
"	McCashland No-Bah-Nuck #1 NE NE NE, 3, T3S, R12W	168	10	6
"	Meeker, Powell #1 SW NE SE, 6, T3S, R12W			
"	Meeker, Kinder #1 NW NW NE, 8, T3S, R12W			
"	McCann, Shaw #1 NE NE SW, 9, T3S, R12W	163	48	29
"	Hall, Kinder #1 SE NW, 10, T3S, R12W			
"	Funk, Kerr #1-11 NW SE NE, 11, T3S, R12W	218	10	5
"	McCashland, Verniput #1 SE SE NE, 11, T3S, R12W	171	59	35
"	Carr, Hooker #1 NW NW SW, 12, T3S, R12W			
"	Kelleher, Indian #1 C NW NE, 12, T3S, R12W			
"	Burton Ne-Wook-Ah-Ker #1 SE SE SE, 12, T3S, R12W			
"	Howell Ka-Hina-Watch-It #1 SW SW NE, 12, T3S, R12W			

County	Company/Well Location	Total Interval (feet)	Net Sandstone (feet)	Sandstone Percent
Cotton	Bridwell, Attouwick #1 NW SE NW, 13, T3S, R12W			
"	Carr, Tankofer #6-B SW NW SE, 13, T3S, R12W			
"	Burton, Davis #1 13, T3S, R12W			
"	Tah-Kof-Per #4 13, T3S, R12W			
"	Amerada, Flipping #1 SE SE SE, 14, T3S, R12W			
"	Harper & Turner, Tappto #1 SE NE SW, 14, T3S, R12W			
"	Neeld, Kinder #1 S $\frac{1}{2}$ NW NE, 15, T3S, R12W			
"	Snoody, Allgood #1 NE NE SE, 16, T3S, R12W			
"	Gray, Wright #1 SE SW NW, 17, T3S, R12W			
"	Hutcheson, Zweiaker #1 SE NE NE, 20, T3S, R12W			
"	Slemaker, Sultan #1 NE NE NW, 22, T3S, R12W			
"	Slemaker-Deaner Bryson #1 C SE SW, 22, T3S, R12W			
"	Kingery, Pen #1 NE NE SE, 24, T3S, R12W			
"	Burton, Lulu Pahdi #1 NE NE NE, 24, T3S, R12W			
"	Kingery, Indian #1 NE NE SW, 24, T3S, R12W			

County	Company/Well Location	Total Interval (feet)	Net Sandstone (feet)	Sandstone Percent
Cotton	Stanolinid, Moyer #1 C NE NW, 25, T3S, R12W			
"	Jones, Thurman #1 NE NE NW, 26, T3S, R12W			
"	Amerada Gina-Quoe-Tone #1 NE NE SW, 26, T3S, R12W			
"	Lowe, Griffin #1 SE SW SW, 27, T3S, R12W	190	11	6
"	Blackwell, Alexander #1 NE SW NE, 27, T3S, R12W			
"	Std. of Kansas, Adams #1 SW NE SE, 28, T3S, R12W			
"	McGee, Whitehead #1 SW SW, 28, T3S, R12W			
"	Hutcheson, Whitehead #1 SE SW SW, 28, T3S, R12W			
"	Griffin, Scruggs #1 NW NW SE, 30, T3S, R12W			
"	Hutchison, Larse #2 SW SW SW, 33, T3S, R12W	222	58	26
"	Slemaker, Otis #1 SE SE NW, 36, T3S, R12W			
"	Kadane (Hoffman), Browning #1 SW SW NE, 6, T4S, R15W	437	94	22
"	Ross, Burke #1 SW SW SW, 12, T4S, R15W	429	58	14
"	Tibbets, Coulter #1 SW SE SW, 15, T4S, R15W			
"	Keener, Arnt #1 SE NE NE, 16, T4S, R15W	413	102	25

County	Company/Well Location	Total Interval (feet)	Net Sandstone (feet)	Sandstone Percent
Cotton	Consolidated, Slack #1 NE NE SW, 17, T4S, R15W			
"	Midwest, Varner #1 C NE SE, 17, T4S, R15W	405	102	25
"	Pyramid, Hunt #1 NW NW SW, 18, T4S, R15W	418	91	22
"	Danciger, Bear #1 NE NE SE, 19, T4S, R15W			
"	Kadane, Carroll #1 NW NE SW, 23, T4S, R15W			
"	Texas Co., Asenap #1 NW NW SW, 25, T4S, R15W	422	68	16
"	Stanolind, Watson #1 NE NE NW, 26, T4S, R15W	372	50	13
"	Kadane, Tofpoie #1 C SE NW, 26, T4S, R15W			
"	Gulf, Owen #1 NE NE NE, 27, T4S, R15W	330	70	21
"	Union, Zotigh #1 SE SE SE, 27, T4S, R15W	439	55	12
"	Sunray, Chanate #1 NE NE SW, 28, T4S, R15W	437	41	9
"	Hamill #1 31, T4S, R15W	458	82	18
"	Medlock #1 32, T4S, R15W	422	76	18
"	Abbott & Sinex, Indian #1 SW NW NW, 34, T4S, R15W	399	86	22
"	Anderson, Davenport #1 NW NW SE, 35, T4S, R15W			
"	Wilson, Williams #1 SW SW NE, 14, T4S, R14W			

County	Company/Well Location	Total Interval (feet)	Net Sandstone (feet)	Sandstone Percent
Cotton	Whattiker, Gittings #1 NW NW NW, 15, T4S, R14W			
"	Little, Morton #1 SW SW NE, 17, T4S, R14W			
"	Davidson, Mount #1 NW SE NW, 23, T4S, R14W	197	21	11
"	Johnson, Mount #1 SW SW NW, 23, T4S, R14W			
"	Helton, McCullough #1 SW NW NE, 33, T4S, R14W	230	48	21
"	Powers, Moss #1 SW SW NE, 34, T4S, R14W	233	93	40
"	Parker, Red River 100 #2 SE SW SW SW, 34, T4S, R14W			
"	Ross, Crocker #1 NE NE NE, 9, T4S, R13W			
"	Johnson, Stephens #1 SW SW SE, 10, T4S, R13W	210	40	19
"	Ross, Kirkpatrick #1 NW NW SE, 11, T4S, R13W			
"	Bingham, Goode #1 NW SW NW, 13, T4S, R13W	195	18	9
"	Little, Doty #1 SW SE, 14, T4S, R13W			
"	Johnson, McClough #1 NW SE NW, 17, T4S, R13W	401	31	8
"	Frankfort, Montgomery #1 SE SE NW, 21, T4S, R13W	184	96	52
"	Nagle, Emory #1 SW SW NW, 26, T4S, R13W	170	16	9
"	Waggoner, Weaver #1 NE NE NE, 27, T4S, R13W	205	7	3

County	Company/Well Location	Total Interval (feet)	Net Sandstone (feet)	Sandstone Percent
Cotton	Ross, Wah-Ah-Kinney SW SW NW, 29, T4S, R13W	183	27	15
"	Anderson, Spires #1 NE NE NW, 31, T4S, R13W	171	21	12
"	Ross (Moran) Way-Se-Pappy #1 SW SW NW, 32, T4S, R13W	177	29	16
"	Akin, Laniers #1 SW NE SE, 32, T4S, R13W			
"	Ross, Clark #1 NE NW, 34, T4S, R13W			
"	Ross, Inman #1 SW SE SW, 34, T4S, R13W	164	58	35
"	Halliburton, Pendergraft #1 NW NW SW, 1, T4S, R12W	180	7	
"	Harper, Moyer #1 NW NW SW, 2, T4S, R13W			
"	Ohio, Chapman #1 SE SW NE, 3, T4S, R12W	175	19	4
"	Johnson, Hilton #A-1 5, T4S, R12W	200	43	22
"	Hutcheson, Whitehead #1 SE SW, 8, T4S, R12W	191	20	10
"	Shultz (Ace), Wolfe #1 SE NW, 11, T4S, R12W	188	10	5
"	Wilcox, Ressel #1 SW SW SW, 11, T4S, R12W			
"	Moore & Ross, Armstrong #1 NE NE NW, 12, T4S, R12W			
"	Moore, Neel #1 SE SE SE, 12, T4S, R12W			
"	Ross, Ressel #1 SE SE SE, 14, T4S, R12W			

County	Company/Well Location	Total Interval (feet)	Net Sandstone (feet)	Sandstone Percent
Cotton	Ratcliff, Johnson #1 SE SE SE SW, 15, T4S, R12W			
"	Griffin, Ballard #1 C.NW NW, 15, T4S, R12W			
"	Harlin, Eastman #1 SW SW SE, 18, T4S, R12W			
"	Beard, Geimi-Saddle #1 C SW NE, 24, T4S, R12W	195	68	35
"	Ross, Kirkpatrick #1 NW NW NW, 25, T4S, R12W			
"	Nixon, Kirkpatrick #1 NE NE SW, 25, T4S, R12W			
"	Stewart, Cassidy #1 NE NW NW, 26, T4S, R12W	181	14	8
"	Ward, Underwood #1 BE SE SE, 30, T4S, R12W	178	4	2
"	Winfrey, Miller #1 W $\frac{1}{2}$ SE SE SW, 31, T4S, R12W	180	4	2
"	McGowen #1 33, T4S, R12W			
"	Ross, Baldwin #1 SW NW NE, 34, T4S, R12W			
"	Andrade, Menz #1 NE NE SE, 34, T4S, R12W			
"	Little, Ressel #1 C SE SE, 35, T4S, R12W	172	12	7
"	Miller, Ressel #1 SE SE NE, 35, T4S, R12W			
"	Nixon, Menz #1 SE SW, 35, T4S, R12W			
Tillman	Parker, Fuller #1 SE SE SE, 1, T5S, R15W			

County	Company/Well Location	Total Interval (feet)	Net Sandstone (feet)	Sandstone Percent
Tillman	Fleet, John #1 SW SW NE, 2, T5S, R15W	390	65	17
"	Kingery, Johnson #1 SW SE SW, 2, T5S, R15W	385	58	15
"	Suiter #1 3, T5S, R15W	373	45	
"	Seneca, U.S. Govt. #1 N $\frac{1}{2}$ NW SW, 14, T5S, R15W			
"	Ross, U.S. Govt. B.L.M. #1 SE SE NW NW, 15, T5S, R15W			
"	Anderson-Helton, Goehler #7 NE NW, 4, T5S, R14W	175	18	12
"	Parker, U.S. Govt. #1 SW NW SE, 4, T5S, R14W	233	49	21
"	Anderson-Helton Brisley #1 SW SW, 5, T5S, R14W			
"	Helton, Mount #1 SW NW SE SE, 6, T5S, R14W			
"	Helton, Lizzie #1 S $\frac{1}{2}$ SW, 6, T5S, R14W			
"	Fuller #1 6, T5S, R14W			
"	Snoddy, Crossland #1 NW NW NE, 6, T5S, R14W	428	52	12
"	Anderson, Owens #1-B NW NW NW, 7, T5S, R14W			
"	Anderson, Owen #1 NW SE NE, 7, T5S, R14W	178	45	25
"	Red R. #247 8, T5S, R14W	215	77	36

County	Company/Well Location	Total Interval (feet)	Net Sandstone (feet)	Sandstone Percent
Cotton	Winfrey, Dickson #1 SE SE NW, 1, T5S, R13W			
"	Norwood Phillips-Dickson #1 NW SW NW, 1, T5S, R13W	205	45	22
"	Howell, Sankadota #1 NE SE SW/ 1, T5S, R13W			
"	Nixon, Warren #1 NE SE SE, 1, T5S, R13W			
"	Norwood, Warren "A" #1 NE SW NE SE, 1, T5S, R13W	172	0	0
"	Ross, Miller #1 SE SW NE, 1, T5S, R13W	162	0	0
"	Ross, Pau-Kau-Brace #1 NW NW NE, 2, T5S, R13W			
"	Harlin, Warren #1 NW NW SE, 2, T5S, R13W	183	59	32
"	Norwood, Warren, #1 NE NE SE, 2, T5S, R13W	171	59	35
"	Slemaker-Deaner Bingham #1 SW SW NW, 3, T5S, R13W			
"	Oldle-Pah-Quote #1 12, T5S, R13W			
"	Farris, Jordan #1 SW SW SE, 14, T5S, R13W			
"	Harvey, Williams #1 SW SW SE, 4, T5S, R12W			
"	Conkling, Stanford #1 SW SE NE, 5, T5S, R12W			
"	Fortex, Stanford #1 NW SW NE, 5, T5S, R12W	162	3	2

County	Company/Well Location	Total Interval (feet)	Net Sandstone (feet)	Sandstone Percent
Cotton	Ross, Auch-Ch-Chiah #5 NW SW SE, 5, T5S, R12W			
"	Hamilton, Oma Dugan #1-A NW SW SW, 5, T5S, R12W	148	10	7
"	Duncan, Dugan A #13 NW SW SW, 5, T5S, R12W			
"	Broday, Moore #1 SW NW SE, 6, T5S, R12W	155	0	0
"	Akin & Dimock, Brown #2 SW SW SW, 6, T5S, R12W	150	0	0
"	Murphy, Brown #15 NW NE NE SE, 6, T5S, R12W			
"	Neeld, Brown #1 SW SW SE, 6, T5S, R12W			
"	Phillips, Brown #2 SW SE SE, 6, T5S, R12W			
"	Duncan, Postelwaite #1 NW NE SE, 7, T5S, R12W			
"	Nixon, Miller #1 SE SE SE, 8, T5S, R12W			
"	Nixon, Miller #2 NW NW SE, 8, T5S, R12W	162	11	7
"	Norwood, Green #1 NE SW NW, 9, T5S, R12W			
"	Scott, Young #1 NE NE SE, 9, T5S, R12W			
"	King & Sons, Young #2 SW SW SE, 9, T5S, R12W			
"	Ware, Menz El SE NE NE, 10, T5S, R12W	168	7	4
"	Van Loh, Mills #1 SW SW SW, 10, T5S, R12W			

County	Company/Well Location	Total Interval (feet)	Net Sandstone (feet)	Sandstone Percent
Cotton	Shelby, Abbott #1 SW SW NW, 11, T5S, R12W	158	13	8
"	Huff, Abbott #1 NE NE SW, 11, T5S, R12W			
"	Butcher, Boles #1 NE NE NW, 13, T5S, R12W			
"	Bolin, Clampitt #2 NE NE SW, 13, T5S, R12W			
"	Ross, Baldwin #1 NE NE SW, 14, T5S, R12W			
"	Nixon, Kemp #1 SE NW SW, 15, T5S, R12W	169	33	20
"	Ross, Hall "B" #10 NW SE SE NW, 16, T5S, R12W	163	4	2
"	Ross, Hall "B" #1 SW NW, 16, T5S, R12W	171	18	11
"	Nixon, Jones #1 NW NW SE, 16, T5S, R12W	165	5	3
"	Hale #1 17, T5S, R12W			
"	Ross, Eastman "A" #2 NE NE NE, 17, T5S, R12W			
"	Loggie, Samuels #1 SW SW SW NE, 21, T5S, R12W	173	73	42
"	Wood, Patterson #1 SW NE NE, 22, T5S, R12W	175	42	24
"	Francis & Perksley Kinniard #1 NW NE NE, 23, T5S, R12W	175	39	22
"	Bolin, Clampitt #1 NW NW NW, 24, T5S, R12W	170	28	16

County	Company/Well Location	Total Interval (feet)	Net Sandstone (feet)	Sandstone Percent
Cotton	Gray, Benthey #1 NW NW NE, 25, T5S, R12W	180	21	12
"	Bolin, Kinniard #1 SW SW NEF 26, T5S, R12W	177	20	11
"	Ross, Poolaw #1 SE SW NW, 28, T5S, R12W	178	20	11
"	Farris, Poolaw #1 SW SE NE, 28, T5S, R12W	181	30	17
"	Winfrey, Poolaw #1 NW NW NE, 29, T5S, R12W			
"	Cities Service, Bear #1 SE NE NW, 33, T5S, R12W			
"	Bolin, O'Neil #1 NE NE NW, 34, T5S, R12W	180	5	3

County	Company/Well Location	TX#	Total Interval (feet)	Net Sand- Stone (feet)	Sand- Stone Percent
Wichita	Paradise, Waggoner E-2 TCRR Sur. AB 632 Sec. 1	115	319	52	16
"	G.M. Shanor, Allingham A #18 HT&C RR Sur. Blk. 5, Sec. 32	171	491	108	22
"	G.W. Cooper, Jennings #1 HT&B Sur. A-475	63	542	75	14
"	W.A. Lofton, Waggoner "ZZ" #1 HT&B Sur. A-503 Sec. 14	153	371	82	22
"	Medford, Waggoner "F" #1 GC&SF Sur. A-586	157	345	10	3
"	Magnolia, Brewer #14 Waggoner Colony Sec. 250	62	248	10	4
"	Gulf, Miller #1 HT&C Sur. Blk. 5	53	360	54	15
"	Underwood, Jacobi #1 Waggoner Col. Sub. 246	180	394	81	21
"	National Ass. Willie Proud #1 Waggoner Col. Sub. Sec. 189	36	378	45	12
"	Magnolia, Perkins #1 NW Extension Blk. 87	121	171	30	18
"	Magnolia, Schmoker #43 Red River Valley Blk. 23	64	135	5	4
"	American Liberty, Tuttle #1 Waggoner Colony Blk. 174	59	500	105	21
"	Perkins & Cullum, Goetze #1 Washington RR Sur. Sec. 2	56	235	27	11
"	Magnolia, Ramming WSW #1 Dodson Sur.	47	284	105	37
"	Wood, Foster #1 SA&MG Sur. A-272	181	260	28	11

County	Company/Well Location	TX#	Total Interval (feet)	Net Sand- Stone (feet)	Sand- Stone Percent
Wichita	Magnolia, Honaker WSW #1	110	263	32	12
"	Morrison, Slaughter #D-1 H&GN Sur. A-483	76	309	20	6
"	Dillard, Barwise #1 Cole Sur. A-37	42	480	173	36
"	Akin & Dimock, Gibson #1-A Waggoner Colony Sub. 271	39	402	118	29
"	Humble, Serrien #30 HT&B Sur. A-480	144	170	20	12
"	Magnolia, Riley #179 Denison Sur.	150	241	10	4
"	Fish, Ramming #1 HT&B A-476	184	284	25	9
"	Nixon, Hieserman #1 Armendaris Sur. A-10	112	256	16	6
"	Woody, Slama #1 Red River Sub. Blk. 6	185	167	9	5
"	Knight, Robinson #1 Waggoner Colony Sub. 310	191	388	32	8
"	Wood, Roller "1" #1 W. Grady Sur. A-357	160	157	0	0
"	Ada, Michina #1 Winters Sur. A-322	81	267	10	4
"	Stanolind, Roller Est. CTRR Sur. A-438, Lot 121	43	265	21	8
"	Burk Royalty, Malone #1-A Burkburnett Blk. 16	189	128	0	0
"	Anthony, Riley #1 Redman Sur. A-249	190	175	10	6

County	Company/Well Location	TX#	Total Interval (feet)	Net Sand- Stone (feet)	Sand- Stone Percent
Wichita	Wood, Heiserman #8 HT&B Sur. A-125	40	243	36	15
"	Hood McCullough George #1 Farrish Sur. A-383	151	274	28	10
"	Love, Love Estate A #1 Collins Sur. A-411	168	261	86	33
"	Wood, Foster #1 HT&B Sur. A-129	182	298	10	3
"	Fain & McGaha, Powell & Van...#1 Waggoner Colony Blk. 239	60	472	90	19
"	Kadane, Robinson #1 Waggoner Colony Blk. 171	105	445	68	15
"	Freeman, Emmert #1 W. Brinker Sur. A-516	54	321	25	8
"	Dickinson, Brushy Pasture	102			
"	Kiel Jr., Ed Foster #1 Denison Sur. A-64	186	331	68	21
"	Morrison, Krohn, Inc. #1 H&GN Sur. A-144	119	337	53	16
"	Gorman, Goetze #7 SH&MGRR Sur. A-477	143	185	36	19
"	Frankel, Wright #1 Red River Valley Lds. Blk.11	38			
"	Hammon, N. Johnson #10 H. Hastie Sur. A-92	156	150	4	3

INTERVAL 4

County	Company/Well Location	Total Interval (feet)	Net Sandstone (feet)	Sandstone Percent
Tillman	Kingery, Smith #1 SE NE NE, 15, T1S, R15W			
"	Tankersly & George Howell #1 SE SE NW, 21, T1S, R15W	230	17	7
"	Ross, Martin #1 SW SW SE, 21, T1S, R15W			
"	Equitable, McClellan #1 NE NE NW, 28, T1S, R15W	320	33	10
"	Johnson, Kinder #1 SE SE NW, 30, T1S, R15W			
"	Acme, Strecker #1 SE SE NW, 21, T1S, R14W	523	23	4
Comanche	Kadane, Schumpert #1 C NW NE, 26, T1S, R14W	530	67	13
"	Frankfort, Pickens #1 C SW NW, 7, T1S, R12W			
"	Rodgers, Carmichael #1 SE SE NE, 15, T1S, R12W	1120	172	15
"	Nixon, Urfer #1 SE SE SE, 19, T1S, R12W	1117	209	19
"	Rocket, Turner #1 SW SW NW, 19, T1S, R12W			
Cotton	Honolulu Ouo-In-Ouodle #1 SE NE SE, 31, T1S, R12W	1695	382	23
Tillman	Harvey, Buswell #1 SE NE, 3, T2S, R15W			
"	Johnson, Kinder #1 NW NW NW, 7, T2S, R15W	1161	222	19
"	Staley Donahue #1 Taylor SW SW SW, 9, T2S, R15W	1230	132	11

County	Company/Well Location	Total Interval (feet)	Net Sandstone (feet)	Sandstone Percent
Tillman	Andrew, McCary #1 SW SW NE, 10, T2S, R15W	1285	182	14
"	The Texas Co., Bruster #1 SE NW SE, 15, T2S, R15W	1408	160	11
"	Mack, Po-Ah-Wy #1 SE SE SW, 17, T2S, R15W	1904	420	22
"	Mack, Hellbusch #1 NW NW SW, 25, T2S, R15W	1960	438	22
"	Anderson, Locke #1 NW NW NE, 28, T2S, R15W	2044	353	17
"	McCaughey, Thompson #1 SE SE SE, 28, T2S, R15W	2150	579	27
"	Harper & Knappenburger Walker #1 SW SW SW, 6, T2S, R14W	1113	89	8
Cotton	Clark, Stuckey #1 SW SW NW, 15, T2S, R14W	1490	310	21
Tillman	Carter, Minton #1 SW SW NW, 18, T2S, R14W	1512	196	13
Cotton	Griffin, Gore #1 SW SW NE, 23, T2S, R14W	1520	182	12
"	Johnson, McGee #1 SE SE NW, 25, T2S, R14W	2187	300	14
"	Bay, Anderson #1 SE SE SW, 5, T2S, R13W			
"	Bay, Crockett #1 SW NE, 9, T2S, R13W	1230	188	15
"	Snoddy, Holmes #1 SE SE NW, 13, T2S, R13W	1607	248	15
"	Gibson, Scherler #1 SE SE SW, 15, T2S, R13W	1391	150	11

County	Company/Well Location	Total Interval (feet)	Net Sandstone (feet)	Sandstone Percent
Cotton	Griffin, Russell #1 NE NE SW, 16, T2S, R13W	1329	272	20
"	Johnson, Holmes #1 SW SW SW, 20, T2S, R13W	1570	162	10
"	Morton, State #1 NE NE NW, 25, T2S, R13W	1622	114	7
"	Wood, Harris C NW NE, 26, T2S, R13W	1522	259	17
"	Miller (Hassell) Herman Sheler #1 NW SW NW, 26, T2S, R13W			
"	Lackey, Wright #1 NW NE NE, 28, T2S, R13W			
"	Hassell, Rich #1 NW NE SW, 35, T2S, R13W			
"	Murta, Hertzler #1 SW SE NE, 35, T2S, R13W	1930	118	6
"	Carter, Holly Parrish #1 SW SW, 1, T2S, R13W	2069	280	14
"	Fisher, Wallace #1 SW SW, 3, T2S, R12W	1895	423	22
"	Nixon, Urfer #1 NW SW SE, 9, T2S, R12W	1823	186	10
"	Kingery, Wallace #1 NW SW SW, 11, T2S, R12W			
"	Barbre, Parrish #1 NE NW NE, 13, T2S, R12W	1961	264	13
"	Weaver, Dickman #1 NE NE SW, 14, T2S, R12W	1831	295	16
"	Clark Wood-Ah-Se-Oo #1 SW SW SW, 15, T2S, R12W	1875	160	9

County	Company/Well Location	Total Interval (feet)	Net Sandstone (feet)	Sandstone Percent
Cotton	Bridwell O-Haw-Win-Me #1 SE SE NW, 17, T2S, R12W	1660	208	13
"	Pinkston, Nah-Voon-Ey #1 SW SW SW, 17, T2S, R12W	1740	110	6
"	Akin & Dimock, Rodgers #1 SW SE NW, 19, T2S, R12W	1688	281	17
"	Davis (Pinkston) Te-Haw-Ne #1 SE SE SW, 20, T2S, R12W	1676	113	7
"	Baldwin, Petty #1 NE NE NW, 21, T2S, R12W	1766	287	16
"	Harper, Indian #1 NW NE NW, 23, T2S, R12W	1840	131	7
"	Barbre, Kurtz #1 NW SE, 25, T2S, R12W			
"	Norman, Holmes #1 SE SE SE, 27, T2S, R12W	1928	242	13
"	Man, Handy #1 NE NE NE, 28, T2S, R12W	1792	222	12
"	Akin, Fox #1 NW NW SE SW, 28, T2S, R12W			
"	Vickers, Patton #1 NE NE SW, 30, T2S, R12W	1735	192	11
"	Hamilton, Powell #1 NW NW SW, 32, T2S, R12W	1846	304	16
"	Harvey, Pruitt #1 NW NW SE, 33, T2S, R12W	1790	255	14
"	Harvey Tabby-To-Sav-It NW NW NE, 34, T2S, R12W	1790	274	15
"	Russell, Gilliam #1 NW NW SW, 35, T2S, R12W	1977	173	9

County	Company/Well Location	Total Interval (feet)	Net Sandstone (feet)	Sandstone Percent
Cotton	Whately & Barbre Bates #1 SE SW NE, 36, T2S, R12W	1757	344	20
"	Ross (Russell) Holmes #1 NW NW NW, 36, T2S, R12W	1896	455	24
"	Griffin, Martin #1 SE SW SW, 36, T2S, R12W	1835	300	16
Tillman	Amerada, Hill #1 SW SW NW, 3, T3S, R15W	2135	472	22
"	Amerada, Howard #1 SW SW NW, 12, T3S, R15W	2192	432	20
"	Nutting, Martin #1 SW NE NE, 22, T3S, R15W			
"	Johnson, Ille #1 NW NW NE, 25, T3S, R15W	2597	461	18
"	Amerada, Rowe #1 SW SW SW, 1, T3S, R14W	2282	361	16
"	Pinkston & Davis Dudenhoeffer #1 NW SE SE, 8, T3S, R14W	2367	563	24
"	Pure, Sims #1 SE SE NE, 10, T3S, R14W	2105	287	14
"	Wirick, Randall #1 NW NW SE, 12, T3S, R14W	2452	463	19
"	McElreath, Josefy #1 SW SE, 23, T3S, R14W	2524	610	24
"	Cities Service, Sellars #1 NW SE SE, 24, T3S, R14W	2303	427	19
"	K.L.B., Harvey #1 NE NE SW, 29, T3S, R14W			
"	Ross, Castleberry #1 NW NW SE, 30, T3S, R14W	2655	351	13

County	Company/Well Location	Total Interval (feet)	Net Sandstone (feet)	Sandstone Percent
Tillman	EPH Griffin Dudenhoeffer #1 SE SE NE, 32, T3S, R14W	2500	770	31
"	Johnson, Huffington #1 C SW NE, 34, T3S, R14W	2652	663	25
Cotton	Blair, Dudenhoffer #1 NE NE SW, 3, T3S, R13W			
"	Riddle & McClelland White #1 C NW SW, 4, T3S, R13W	2334	442	19
"	Neeld & Hood, Gregson #1 NW SW SE, 9, T3S, R13W			
"	Walker, Scherler #1 SE NW SE, 10, T3S, R13W			
"	Hutcheson, Dickson #1 SW SW NE, 12, T3S, R13W			
"	Zweig, Thornton #1 NE NE SW, 13, T3S, R13W	2365	193	8
"	Fleeger, Tisdale #1 C SE NW, 14, T3S, R13W			
"	Wolf & Brown, Perry #1 NE NW NW SE, 15, T3S, R13W	2252	330	15
"	Larson & Thomas, Booher #1 SE SW SW, 25, T3S, R13W			
"	Clark & Cowden, Corely #1 NE NE SE, 30, T3S, R13W	2285	187	8
"	Stewart & Orm, Emery #1 NE NE NE, 30, T3S, R13W	2412	313	13
"	Umbenhour, Miller #1 SW SW NW, 33, T3S, R13W	(2392)	(367)	(15)
"	Wilder, Shamblin #1 NW NW SW, 1, T3S, R12W			

County	Company/Well Location	Total Interval (feet)	Net Sandstone (feet)	Sandstone Percent
Cotton	Hart, Tah-Que-Chi-#1 NW NE SE, 1, T3S, R12W	1818	265	15
"	Harvey Moo-Rah-Waddy #1 NW NE NE, 2, T3S, R12W	1951	285	15
"	McCashland, Hill #1 SE NE NE, 4, T3S, R12W	1985	150	9
"	McCashland No-Bah-Nuck #1 NE NE NE, 3, T3S, R12W	1913	116	6
"	Meeker, Powell #1 SW NE SE, 6, T3S, R12W			
"	Meeker, Kinder #1 NW NW NE, 8, T3S, R12W			
"	McCann, Shaw #1 NE NE SW, 9, T3S, R12W	1980	249	13
"	Hall, Kinder #1 SE NW, 10, T3S, R12W			
"	Funk, Kerr #1-11 NW SE NE, 11, T3S, R12W	1736	296	17
"	McCashland, Verniput #1 SE SE NE, 11, T3S, R12W	1713	274	16
"	Carr, Hooker #1 NW NW SW, 12, T3S, R12W			
"	Kelleher, Indian #1 C NW NE, 12, T3S, R12W			
"	Burton Ne-Wook-Ah-Ker #1 SE SE SE, 12, T3S, R12W			
"	Howell Ka-Hina-Watch-It #1 SW SW NE, 12, T3S, R12W			

County	Company/Well Location	Total Interval (feet)	Net Sandstone (feet)	Sandstone Percent
Cotton	Bridwell, Attouwick #1 NW SE NW, 13, T3S, R12W	1859	233	13
"	Carr, Tankofer #6-B SW NW SE, 13, T3S, R12W			
"	Burton, Davis #1 13, T3S, R12W			
	Tah-Kof-Per #4 13, T3S, R12W			
"	Amerada, Flipping #1 SE SE SE, 14, T3S, R12W			
"	Harper & Turner Tappto #1 SE NE SW, 14, T3S, R12W			
"	Neeld, Kinder #1 S $\frac{1}{2}$ NW NEF 15, T3S, R12W	1867	259	14
"	Snoody, Allgood #1 NE NE SE, 16, T3S, R12W	1978	290	15
"	Gray, Wright #1 SE SW NW, 17, T3S, R12W	2019	310	15
"	Hutcheson, Zweiaker #1 SE NE NE, 20, T3S, R12W			
"	Slemaker, Sultan #1 NE NE NW, 22, T3S, R12W			
"	Slemaker-Deaner, Bryson #1 C SE SW, 22, T3S, R12W			
"	Kingery, Pen #1 NE NE SE, 24, T3S, R12W			
"	Burton, Lulu Pahdi #1 NE NE NE, 24, T3S, R12W			
"	Kingery, Indian #1 NE NE SW, 24, T3S, R12W			

County	Company/Well Location	Total Interval (feet)	Net Sandstone (feet)	Sandstone Percent
Cotton	Stanolinid, Moyer #1 C NE NWy 25, T3S, R12W	1852	348	19
"	Jones, Thurman #1 NE NE NW, 26, T3S, R12W	2270	357	16
"	Amerada Gina-Quoe-Tone #1 NE NE SW, 26, T3S, R12W			
"	Lowe, Griffin #1 SE SW SW, 27, T3S, R12W	2245	455	20
"	Blackwell, Alexander #1 NE SW NE, 27, T3S, R12W			
"	Std. of Kansas, Adams #1 SW NE SE, 28, T3S, R12W			
"	McGee, Whitehead #1 SW SW, 28, T3S, R12W	2223	465	21
"	Hutcheson, Whitehead #1 SE SW SW, 28, T3S, R12W			
"	Griffin, Scruggs #1 NW NW SE, 30, T3S, R12W			
"	Hutchison, Larse #2 SW SW SW, 33, T3S, R12W	2243	620	28
"	Slemaker, Otis #1 SE SE NW, 36, T3S, R12W			
"	Kadane (Hoffman) Browning #1 SW SW NE, 6, T4S, R15W	2478	764	31
"	Ross, Burke #1 SW SW SW, 12, T4S, R15W	2320	487	21
"	Tibbets, Coulter #1 SW SE SW, 15, T4S, R15W	1900	500	26
"	Keener, Arnt #1 SE NE NE, 16, T4S, R15W	2104	556	26

County	Company/Well Location	Total Interval (feet)	Net Sandstone (feet)	Sandstone Percent
Cotton	Consolidated, Slack #1 NE NE SW, 17, T4S, R15W	2264	387	17
"	Midwest, Varner #1 C NE SE, 17, T4S, R15W	1756	384	22
"	Pyramid, Hunt #1 NW NW SW, 18, T4S, R15W	2265	753	33
"	Danciger, Bear #1 NE NE SE, 19, T4S, R15W	2127	362	17
"	Kadane, Carroll #1 NW NE SW, 23, T4S, R15W			
"	Texas Co., Asenap #1 NW NW SW, 25, T4S, R15W	1740	364	21
"	Stanolind, Watson #1 NE NE NW, 26, T4S, R15W	1614	400	25
"	Kadane, Tofpoie #1 C SE NW, 26, T4S, R15W			
"	Gulf, Owen #1 NE NE NE, 27, T4S, R15W	1355	407	30
"	Union, Zotigh #1 SE SE SE, 27, T4S, R15W	2015	559	28
"	Sunray, Chanate #1 NE NE SW, 28, T4S, R15W	1961	373	19
"	Hamill #1 31, T4S, R15W	2182	345	16
"	Medlock #1 32, T4S, R15W	2100	575	27
"	Abbott & Sinex, Indian #1 SW NW NW, 34, T4S, R15W	1958	409	21
"	Anderson, Davenport #1 NW NW SE, 35, T4S, R15W	2026	683	34
"	Wilson, Williams #1 SW SW NE, 14, T4S, R14W			

County	Company/Well Location	Total Interval (feet)	Net Sandstone (feet)	Sandstone Percent
Cotton	Whattiker, Gittings #1 NW NW NW, 15, T4S, R14W			
"	Little, Morton #1 SW SW NE, 17, T4S, R14W	2343	270	12
"	Davidson, Mount #1 NW SE NW, 23, T4S, R14W	2220	448	20
"	Johnson, Mount #1 SW SW NW, 23, T4S, R14W			
"	Helton, McCullough #1 SW NW NE, 33, T4S, R14W	2067	597	29
"	Powers, Moss #1 SW SW NE, 34, T4S, R14W	1880	637	34
"	Parker, Red River 100 #2 SE SW SW SW, 34, T4S, R14W	1300	435	33
"	Ross, Crocker #1 NE NE NE, 9, T4S, R13W	2368	575	24
"	Johnson, Stephens #1 SW SW SE, 10, T4S, R13W	2262	411	18
"	Ross, Kirkpatrick #1 NW NW SE, 11, T4S, R13W	2318	345	15
"	Bingham, Goode #1 NW SW NW, 13, T4S, R13W	2202	467	21
"	Little, Doty #1 SW SE, 14, T4S, R13W			
"	Johnson, McClough #1 NW SE NW, 17, T4S, R13W	2390	582	24
"	Frankfort, Montgomery #1 SE SE NW, 21, T4S, R13W	2046	447	22
"	Nagle, Emory #1 SW SW NW, 26, T4S, R13W	1910	478	25
"	Waggoner, Weaver #1 NE NE NE, 27, T4S, R13W	2304	255	11

County	Company/Well Location	Total Interval (feet)	Net Sandstone (feet)	Sandstone Percent
Cotton	Ross, Wah-Ah-Kinney SW SW NW, 29, T4S, R13W	2219	354	16
"	Anderson, Spires #1 NE NE NW, 31, T4S, R13W	2083	549	26
"	Ross (Moran) Way-Se-Pappy #1 SW SW NW, 32, T4S, R13W	1972	413	21
"	Akin, Laniers #1 SW NE SE, 32, T4S, R13W	2020	535	26
"	Ross, Clark #1 NE NW, 34, T4S, R13W	1740	313	18
"	Ross, Inman #1 SW SE SW, 34, T4S, R13W	1927	252	13
"	Halliburton, Pendergraft #1 NW NW SW, 1, T4S, R12W	2124	352	17
"	Harper, Moyer #1 NW NW SW 2, T4S, R12W	2140	369	17
"	Ohio, Chapman #1 SE SW NE, 3, T4S, R12W	1973	485	25
"	Johnson, Hilton #A-1 5, T4S, R12W	2274	553	24
"	Hutcheson, Whitehead #1 SE SW, 8, T4S, R12W	2100	391	19
"	Shultz (Ace), Wolfe #1 SE NW, 11, T4S, R12W	2193	351	16
"	Wilcox, Ressel #1 SW SW SW, 11, T4S, R12W			
"	Moore & Ross, Armstrong #1 NE NE NW, 12, T4S, R12W			
"	Moore, Neel #1 SE SE SE, 12, T4S, R12W			

County	Company/Well Location	Total Interval (feet)	Net Sandstone (feet)	Sandstone Percent
Cotton	Ross, Ressel #1 SE SE SE, 14, T4S, R12W	2122	463	22
"	Ratcliff, Johnson #1 SE SE SE SW, 15, T4S, R12W			
"	Griffin, Ballard #1 C NW NW, 15, T4S, R12W			
"	Harlin, Eastman #1 SW SW SE, 18, T4S, R12W			
"	Beard, Geimi-Saddle #1 C SW NE, 24, T4S, R12W	1900	515	27
"	Ross, Kirkpatrick #1 NW NW NW, 25, T4S, R12W	2017	438	22
"	Nixon, Kirkpatrick #1 NE NE SW, 25, T4S, R12W			
"	Stewart, Cassidy #1 NE NW NW, 26, T4S, R12W	2079	510	25
"	Ward, Underwood #1 BE SE SE, 30, T4S, R12W	1860	464	25
"	Winfrey, Miller #1 S $\frac{1}{2}$ SE SE SW, 31, T4S, R12W	1654	449	27
"	McGowen #1 33, T4S, R12W	1835	487	27
"	Ross, Baldwin #1 SW NW NE, 34, T4S, R12W			
"	Andrade, Menz #1 NE NE SE, 34, T4S, R12W	1860	412	22
"	Little, Ressel #1 C SE SE, 35, T4S, R12W	1660	282	17
"	Miller, Ressel #1 SE SE NE, 35, T4S, R12W			
"	Nixon, Menz #1 SE SW, 35, T4S, R12W			

County	Company/Well Location	Total Interval (feet)	Net Sandstone (feet)	Sandstone Percent
Tillman	Parker, Fuller #1 SE SE SE, 1, T5S, R15W	1611	364	23
"	Fleet, John #1 SW SW NE, 2, T4S, R15W	1876	423	24
"	Kingery, Johnson #1 SW SE SW, 2, T4S, R15W	1944	378	19
"	Suiter #1 3, T4S, R15W	(1895)	(692)	(37)
"	Seneca, U.S. Govt. #1 N $\frac{1}{2}$ NW SW, 14, T5S, R15W			
"	Ross U.S. Govt. B.L.M. #1 SE SE NW NW, 15, T5S, R15W			
"	Anderson-Helton Goehler #7 NE NW, 4, T5S, R14W	1553	595	38
"	Parker, U.S. Govt. #1 SW NW SE, 4, T5S, R14W	1355	346	26
"	Anderson-Helton Brisley #1 SW SW, 5, T5S, R14W	1479	645	44
"	Helton, Mount #1 SW NW SE SE, 6, T5S, R14W			
"	Helton, Lizzie #1 S $\frac{1}{2}$ SW, 6, T5S, R14W			
"	Fuller #1 6, T5S, R14W	(1914)	(491)	(26)
"	Snoddy, Crossland #1 NW NW NE, 6, T5S, R14W	1879	651	35
"	Anderson, Owens #1-B NW NW NW, 7, T5S, R14W	1503	367	24
"	Anderson, Owen #1 NW SE NE, 7, T5S, R14W	1200	228	17

County	Company/Well Location	Total Interval (feet)	Net Sandstone (feet)	Sandstone Percent
Tillman	Red R. #247 8, T5S, R14W	(1403)	(436)	(31)
Cotton	Winfrey, Dickson #1 SE SE NW, 1, T5S, R13W	1593	339	21
"	Norwood Phillips-Dickson #1 NW SW NW, 1, T5S, R13W	1578	294	19
"	Howell, Sankadota #1 NE SE SW, 1, T5S, R13W	1625	436	27
"	Nixon, Warren #1 NE SE SE, 1, T5S, R13W	1491	400	27
"	Norwood, Warren "A" #1 NE SW NE SE, 1, T5S, R13W	1520	412	27
"	Ross, Miller #1 SE SW NE, 1, T5S, R13W	1560	293	19
"	Ross, Pau-Kau-Brace #1 NW NW NE, 2, T5S, R13W	1630	321	20
"	Harlin, Warren #1 NW NW SE, 2, T5S, R13W	1620	470	29
"	Norwood, Warren #1 NE NE SE, 2, T5S, R13W	1620	386	24
"	Slemaker-Deaner Bingham #1 SW SW NW, 3, T5S, R13W	1795	411	23
"	Oldle-Pah-Quote #1 12, T5S, R13W			
"	Farris, Jordon #1 SW SW SE, 14, T5S, R13W	1772	477	27
"	Harvey, Williams #1 SW SW SE, 4, T5S, R12W	1703	487	29
"	Conkling, Stanford #1 SW SE NE, 5, T5S, R12W	1580	400	25

County	Company/Well Location	Total Interval (feet)	Net Sandstone (feet)	Sandstone Percent
Cotton	Fortex, Stanford #1 NW SW NE, 5, T5S, R12W	1400	643	46
"	Ross, Auch-Ch-Chiah #5 NW SW SE, 5, T5S, R12W	1557	675	43
"	Hamilton, Oma Dugan #1-A NW SW SW, 5, T5S, R12W	1452	542	37
"	Duncan, Dugan A #13 NW SW SW, 5, T5S, R12W	1498	602	40
"	Broday, Moore #1 SW NW SE, 6, T5S, R12W	1510	358	24
"	Akin & Dimock, Brown #2 SW SW SW, 6, T5S, R12W	1537	343	22
"	Murphy, Brown #15 NW NE NE SE, 6, T5S, R12W	1495	590	39
"	Neeld, Brown #1 SW SW SE, 6, T5S, R12W			
"	Phillips, Brown #2 SW SE SE, 6, T5S, R12W			
"	Duncan, Postelwaite #1 NW NE SE, 7, T5S, R12W			
"	Nixon, Miller #1 SE SE SE, 8, T5S, R12W	1730	393	23
"	Nixon, Miller #2 NW NW SE, 8, T5S, R12W	1630	397	24
"	Norwood, Green #1 NE SW NW, 9, T5S, R12W			
"	Scott, Young #1 NE NE SE, 9, T5S, R12W	1702	253	15
"	King & Sons, Young #2 SW SW SE, 9, T5S, R12W	1740	467	27
"	Ware, Menz #1 SE NE NE, 10, T5S, R12W	1706	247	14

County	Company/Well Location	Total Interval (feet)	Net Sandstone (feet)	Sandstone Percent
Cotton	Van Loh, Mills #1 SW SW SW, 10, T5S, R12W			
"	Shelby, Abbott #1 SW SW NW, 11, T5S, R14W	1670	475	28
"	Huff, Abbott #1 NE NE SW, 11, T5S, R12W			
"	Butcher, Boles #1 NE NE NW, 13, T5S, R12W			
"	Bolin, Clampitt #2 NE NE SW, 13, T5S, R12W	1642	233	14
"	Ross, Baldwin #1 NE NE SW, 14, T5S, R12W	1752	383	22
"	Nixon, Kemp #1 SE NW SW, 15, T5S, R12W	1681	279	17
"	Ross, Hall "B" #10 NW SE SE NW, 16, T5S, R12W	1678	446	27
"	Ross, Hall "B" #1 SW NW, 16, T5S, R12W	1738	362	21
"	Nixon, Jones #1 NW NW SE, 16, T5S, R12W	1620	274	17
"	Hale #1 17, T5S, R12W	(1731)	(381)	(22)
"	Ross, Eastman "A" #2 NE NE NE, 17, T5S, R12W	1716	569	33
"	Loggie, Samuels #1 SW SW SW NE, 21, T5S, R12W	1662	318	19
"	Wood, Patterson #1 SW NE NE, 22, T5S, R12W	1655	512	31
"	Francis & Perksley Kinniard #1 NW NE NE, 23, T5S, R12W	1627	441	27

County	Company/Well Location	Total Interval (feet)	Net Sandstone (feet)	Sandstone Percent
Cotton	Bolin, Clampitt #1 NW NW NW, 24, T5S, R12W	1663	318	19
"	Gray, Benthey #1 NW NW NE, 25, T5S, R12W	1587	327	21
"	Bolin, Kinniard #1 SW SW NE, 26, T5S, R12W	1535	316	21
"	Ross, Poolaw #1 SE SW NW, 28, T5S, R12W	1591	271	17
"	Farris, Poolaw #1 SW SE NE, 28, T5S, R12W	1608	359	22
"	Winfrey, Poolaw #1 NW NW NE, 29, T5S, R12W	1710	495	29
"	Cities Service, Bear #1 SE NE NW, 33, T5S, R12W			
"	Bolin, O'Neil #1 NE NE NW, 34, T5S, R12W	1450	337	23

County	Company/Well Location	TX#	Total Interval (feet)	Net Sand- Stone (feet)	Sand- Stone Percent
Wichita	Paradise, Waggoner E-2 TCRR Sur. AB 632 Sec. 1	115	1680	255	15
"	G.M. Shanor, Allingham A #18 HT&C RR Sur. Blk. 5 Sec. 32	171	1540	272	18
"	G.W. Cooper, Jennings #1 HT&B Sur. A-475	63	1546	328	21
"	W.A. Lofton, Waggoner "ZZ" #1 HT&B Sur. A-503 Sec. 14	153	1643	364	22
"	Medford, Waggoner "F" #1 GC&SF Sur. A-586	157	1610	320	20
"	Magnolia, Brewer #14 Waggoner Colony Sec. 250	62	1712	393	23
"	Gulf, Miller #1 HT&C Sur. Blk. 5	53	1560	505	32
"	Underwood, Jacobi #1 Waggoner Col. Sub. 246	180	1890	511	27
"	National Ass. Willie Proud #1 Waggoner Col. Sub. Sec. 189	36	1920	580	30
"	Magnolia, Perkins #1 NW Extension Blk. 87	121	1435	500	35
"	Magnolia, Schmoker #43 Red River Valley Blk. 23	64	1367	358	26
"	American Liberty, Tuttle #1 Waggoner Colony Blk. 174	59	2438	472	19
"	Perkins & Cullum, Goetze #1 Washington RR Sur. Sec. 2	56	1806	392	22
"	Magnolia, Ramming WSW #1 Dodson Sur.	47	1438	348	24
"	Wood, Foster #1 SA&MG Sur. A-272	181	1637	432	26

County	Company/Well Location	TX#	Total Interval (feet)	Net Sand- Stone (feet)	Sand- Stone Percent
Wichita	Magnolia, Honaker WSW #1	110	1588	291	18
"	Morrison, Slaughter #D-1 H&GN Sur. A-483	76	1615	263	16
"	Dillard, Barwise #1 Cole Sur. A-37	42	1981	508	26
"	Akin & Dimock, Gibson #1-A Waggoner Colony Sub. 271	39	1682	660	39
"	Humble, Serrien #30 HT&B Sur. A-480	144	1367	446	33
"	Magnolia, Riley #179 Denison Sur.	150	1348	350	26
"	Fish, Ramming #1 HT&B A-476	184	1432	538	38
"	Nixon, Hieserman #1 Armendaris Sur. A-10	112	1830	580	32
"	Woody, Slama #1 Red River Sub. Blk. 6	185	1450	263	18
"	Knight, Robinson #1 Waggoner Colony Sub. 310	191	1633	341	21
"	Wood, Roller "1" #1 W. Grady Sur. A-357	160	1443	257	18
"	Ada, Michina #1 Winters Sur. A-322	81	1380	366	26
"	Stanolind, Roller Est. CTRR Sur. A-438 Lot 121	43	1426	478	34
"	Burk Royalty, Malone #1-A Burkburnett Blk. 16	189	1602	351	22
"	Anthony, Riley #1 Redman Sur. A-249	190	1705	472	28

County	Company/Well Location	TX#	Total Interval (feet)	Net Sand- Stone (feet)	Sand- Stone Percent
Wichita	Wood, Heiserman #8 HT&B Sur. A-125	40	1440	389	27
"	Hood McCullough George #1 Farrish Sur. A-383	151	1300	264	20
"	Love, Love Estate A-#1 Collins Sur. A-411	168	1834	419	23
"	Wood, Foster #1 HT&B Sur. A-129	182	1510	346	23
"	Fain & McGaha Powell & Van...#1 Waggoner Colony Blk. 239	60	2190	770	35
"	Kadane, Robinson #1 Waggoner Colony Blk. 171	105	2281	542	24
"	Freeman, Emmert #1 W. Brinker Sur. A-516	54	1970	575	29
"	Dickinson Brushy Pasture	102	1675	508	30
"	Kiel Jr., Ed Foster #1 Denison Sur. A-64	186	1655	535	32
"	Morrison, Krohn, Inc. #1 H&GN Sur. A-144	119	1650	469	28
"	Gorman, Goetze #7 SH&MGRR Sur. A-477	143	1665	173	10
"	Frankel, Wright #1 Red River Valley Lds. Blk.11	38	1267	377	30
"	Hammon, N. Johnson #10 H Hastie Sur. A-92	156	1228	331	27

VITA

Thomas Allen Robberson

Candidate for the Degree of

Master of Science

Thesis: STRATIGRAPHY AND URANIUM POTENTIAL OF VIRGILIAN THROUGH LEONARD-
IAN STRATA IN PARTS OF COMANCHE, COTTON, AND TILLMAN COUNTIES,
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