T-2142

THE USE OF PARAMETERS DERIVED FROM WELL LOGS FOR CORRELATION, HUNTON GROUP, WESTERN OKLAHOMA

by

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T-2142

A Thesis submitted to the Faculty and Board of Trustees of the Colorado School of Mines in partial fulfillment of the requirements for the degree of Master of Science, Geophysical Engineering.

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ABSTRACT

The subsurface Hunton group is studied in wells from parts of Dewey and Woodward counties of western Oklahoma. The study starts with the initial visual correlation of five intervals within the Hunton group. Eighteen wells are correlated by the traditional methods of matching log sections for similarity and following characteristic log markers. Attempts are made to use two separate empirical methods to establish the correlation that has been done.

One approach aims to establish the correlated interval markers by means of the differences between "log statistical parameters" of the correlated interavls. The "log statistical parameters" are the average values and standard deviation values of some chosen log parameters. Well log parameters used for this study are the gamma ray, formation resistivity and matrix (grain) density. The matrix density is obtained through a special equation combining the fractional Neutron and Density porosities. This first approach is successful in establishing empirically three "time" markers, namely, the top of the Chimneyhill subgroup and two markers within the "Kirkidium biofacies" subgroup. The second approach aims to establish individual correlated units by similarity of histogram profiles

of the chosen well log parameters. This approach is not successful, but leads to a secondary objective of this study--the discussion of some aspects of sedimentary facies.

No cores have been used in this study. Some information has, however, been drawn from lithological log descriptions in a few of the wells studied and the conclusions which have been deduced from this study will best be confirmed through additional detailed core analysis.

TABLE OF CONTENTS

Table of Contents continued Page

LIST OF ILLUSTRATIONS

FIGURES

TABLES

List of Tables continued Page

PLATES
(All Plates in Pocket)

LIST OF APPENDICES

Page

ACKNOWLEDGMENTS

I wish to express my heartiest thanks and appreciation to Dr. G.R. Pickett, my thesis advisor, for his interest, suggestions, and guidance through this entire study. Very sincere thanks are also extended to the other members of my thesis committee, Dr. R.J. Weimer and Dr. W.M. Major, for their various contributions to make this study possible. The same thanks are extended to Professor William R. Astle for his suggestions in statistics.

I also wish to express my appreciation to Ashland Exploration, Incorporated for their financial assistance throughout the entire study period, and to Mrs. Peggy Ballard who typed the manuscript.

INTRODUCTION

Thesis Objective

The immediate objective of this study is to develop additional correlation methods different from the usual visual methods using borehole logs. At this point in this paper, no single type of correlation (rock-, bio , or time-stratigraphic correlation) may be implied. Of particular interest are methods amenable to computer application with digitized logs and the possible combination of empirical parameters to establish correlation markers. A subsidiary objective which has arisen during the course of this study is the discussion of those aspects of the study which suggest sedimentary facies change.

Meaning of Correlation

The word correlation ordinarily means mutual interdependence or interrelation. When applied to stratigraphy correlation is directed toward establishing the relationships between sequences of events in separate areas.

Three main types of stratigraphic correlation are therefore identified. In rock-stratigraphic correlation, rock units are correlated in terms of lithologic continuity using lithologic

criteria. In biostratigraphic correlation rock units are correlated in terms of biological continuity using biologic criteria. The biological criteria may not be the chronological sequence of fauna. In time-stratigraphic correlation rock units are correlated in terms of geologic time scale. For most geologists and subsurface stratigraphers time-stratigraphic correlation has the greatest significance, the time surfaces bounding the units being determined by organic (fossil evolution) and inorganic correlation methods.

In localized areas of study, inorganic methods using well logs and core descriptions and applying the process of "correlation by stratal continuity" (Lowman, 1949), yield a high degree of precision in time-stratigraphic correlation. In the process of "correlation by stratal continuity" beds are traced among closely spaced wells and stratal continuity is established for strata that show distinctive log characteristics. Thin beds of bentonite, limestone, siltstone, calcareous silty sandstone, shale units and coal are most commonly traced. Each traced layer in a vertical stratigraphic sequence is supposed to record a geologic event which may or may not be synchronous within a large area. For a localized area, however, such traced layers are reliable "time markers." The greatest advantage of time-stratigraphic units is the ability to study facies changes within them.

Study Area

The study area is in Dewey and Woodward counties of Oklahoma (Fig. 1). Geologically, the area is on the northern flank of the Anadarko Basin, an asymmetrical sedimentary basin (Slate, 1964) striking approximately NW-SE. The basin occupies most of the western half of Oklahoma and extends into the Texas panhandle. The syncline was believed to have been created by the Wichita orogeny in Late Mississippian or Early Pennsylvanian time.

Wells studied were chosen from an area within R.16W. to R.19W. and T.16N. to T.20N. (Fig. 2). The wells penetrated the Hunton carbonates and the work done in this study is within the Hunton group.

The Hunton is the name given to the Silurian to Early Devonian carbonate strata that outcrop in the Arbuckle Mountain-Criner Hills of South Central Oklahoma (Amsden, 1975). The strata overlie the Sylvan Shale (Late Ordovician) and underlie the Woodford Shale (Late Devonian-Early Mississippian). In the subsurface the term is applied to carbonate strata of possible Silurian and/or Devonian age exhibiting the same shale contacts at the top and bottom. It is thus easy to identify the top and bottom of the Hunton from radioactivity logs. Crystalline dolomite is the dominant lithology. Limestone is also present and chert inclusions have been reported in core analysis and in lithologic logs.

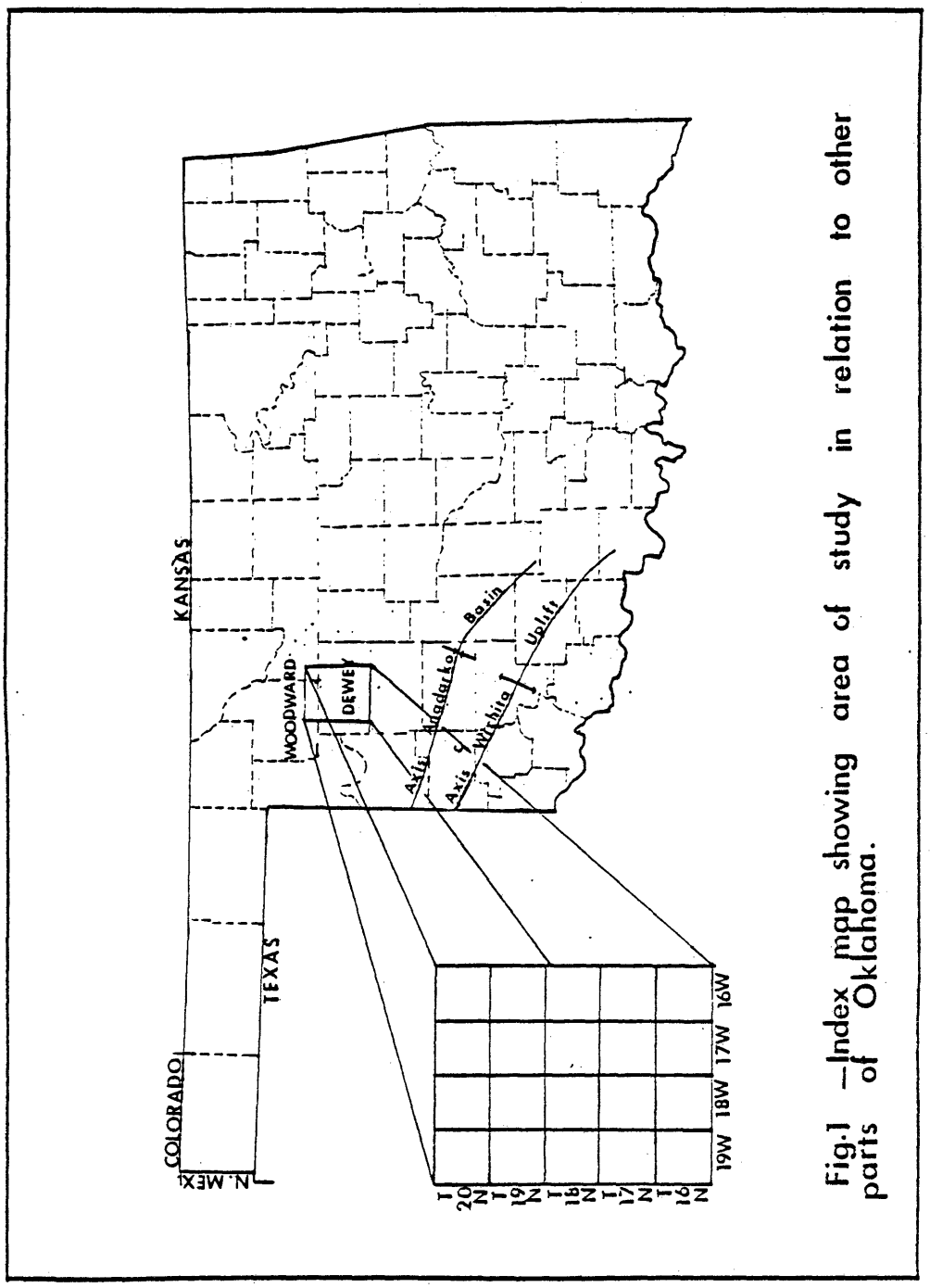

Fig.1 —Index map showing area of study in relation to other parts of Oklahoma.

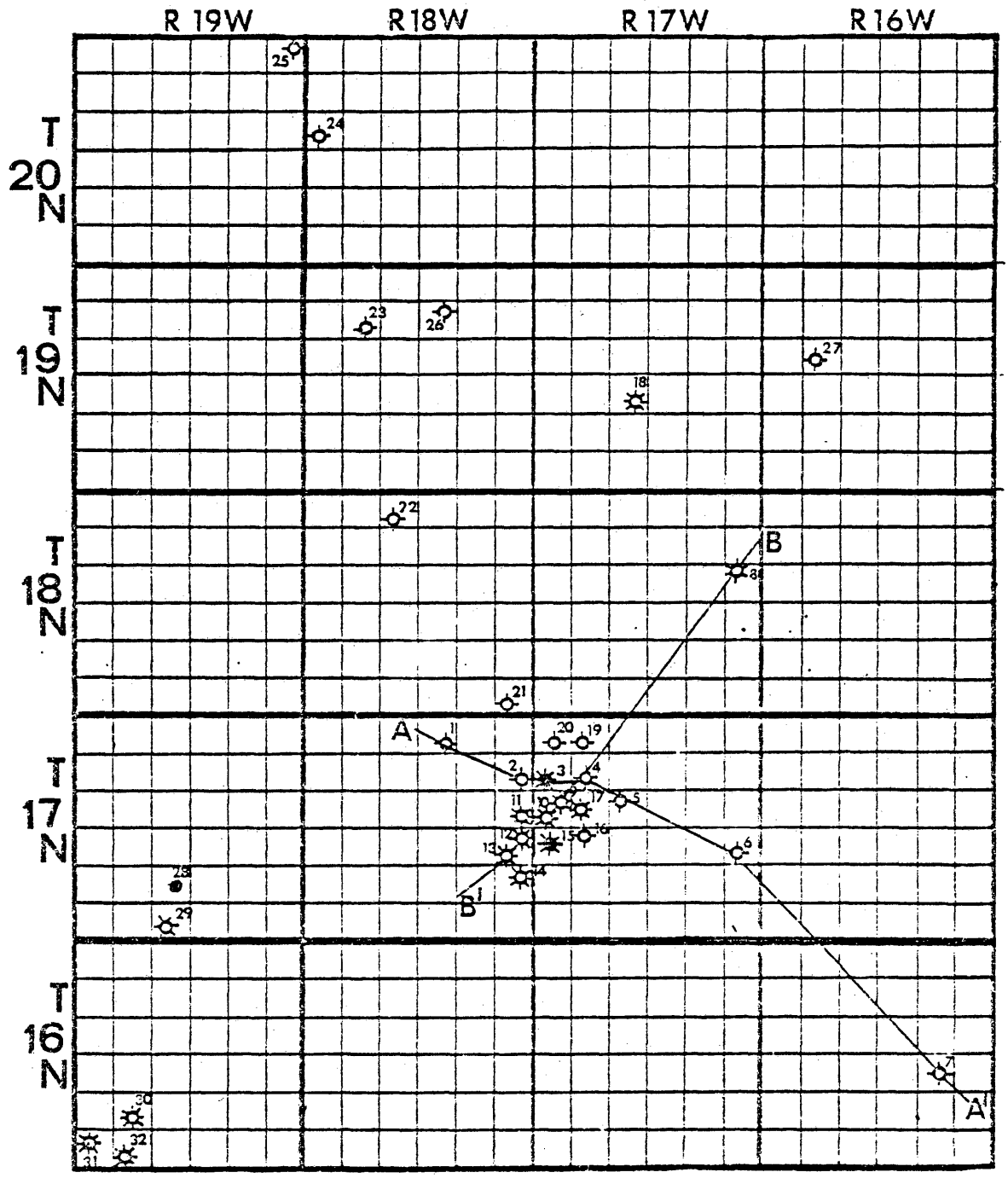

Fig. 2 — Area of study showing well locations and the lines AA' and BB' respectively semi-parallel and semi-perpendicular to the Anadarko Basin.

In the study area, the Devonian beds have been eroded away during a mid-Devonian erosion so that the Woodford shale unconformably overlies Silurian beds (Amsden, 1975). Two major formations or subgroups are present--a lower Chimney-hill subgroup and the overlying "Kirkidinm biofacies" (Amsden, 1975) named from the dominant brachiopods, "Kirkidium pingue pingue" and "Kirkidium pingue latum". A stratigraphic chart showing the different relationships of the Hunton group is shown in Fig. 3.

Criteria for Correlation of Wells Used in This Study

The correlation of equivalent strata from one well to the next has traditionally been done by selecting intervals of logs from different wells and matching them for similarity or for characteristic log responses to lithological units. These two approaches have been followed in selecting and correlating five intervals that can be recognized on logs within the Hunton group. The Induction (Resistivity), Gamma Ray, and Neutron and Density logs have been used for the correlation. It is not possible to give the correlated units predise lithological identities because of the absence of core descriptions and insufficient lithologic log descriptions. The absence of cores also makes it difficult to validate any "correlation by stratal continuity."

The wells studied have been numbered as follows: Wells 1, 2, 3, 4, 5, 6, 7, fall on the AA' line while correlated

Fig. 3. Stratigraphic Chart Showing Relationships of the Hunton Group

Generalized (After Amsden, 1975)			Area of Study (NW Oklahoma)		
Group and Formation		Age	Group and Formation		Age
Woodford Shale		Early Mississippian-Late Devonian	Woodford Shale		Early Mississippian-Late Devonian
Hunton Group	Frisco Formation Haragon-Bois d'Arc Formation	Early Devonian	Hunton Group		
	Kirkidium biofacies (subsurface only) Henryhouse Formation (outcrop)	Late Silurian		Kirkidium biofacies (subsurface only) Henryhouse Formation (outcrop)	Late Silurian
	Chimneyhill Subgroup (outcrop & subsurface)	Late Silurian-Late Ordovician		Chimneyhill Subgroup (outcrop & subsurface)	Late Silurian-Late Ordovician
Sylvan Shale		Late Ordovician	Sylvan Shale		Late Ordovician

wells 8, 4, 9, 10, 11, 12, 13, fall on the BB' line. Wells 14, 15, 16, 17, 18 complete the eighteen correlated wells. The rest of the wells in the study area which have not been correlated are randomly numbered from 19 to 32 (Fig. 2).

Fig. 4 shows the logs from Well 3 on which are based the criteria for the stratigraphic correlation of the wells used in this study. The Hunton group is easily identified between the top Woodford Shale and the basal Sylvan Shale.

The top of the Hunton or the base of the Woodford Shale is designated marker A, defined by a sharp change in gamma ray deflection. The base of the Hunton or the top of the Sylvan Shale is designated Marker I which again is defined by a sharp change in gamma ray deflection. Markers A and I are thus defined by characteristic log patterns above and below them.

Marker H is the top of the Chimneyhill(?) subgroup so that interval HI is the Chimneyhill(?). On the Gamma Ray log H marks the end of the uniform low gamma ray deflection that characterizes interval HI. H also marks the location of a thin bed that has a consistent and sharp deflection of the gamma ray. So marker H is established by two criteria. First, it marks a position where there is a recognizable change in the pattern of gamma ray deflection. Second, it marks the position of a characteristic Gamma Ray log response.

Well 3. A.K. Cox Unit No. 2 C SW/4 7-17N-17W

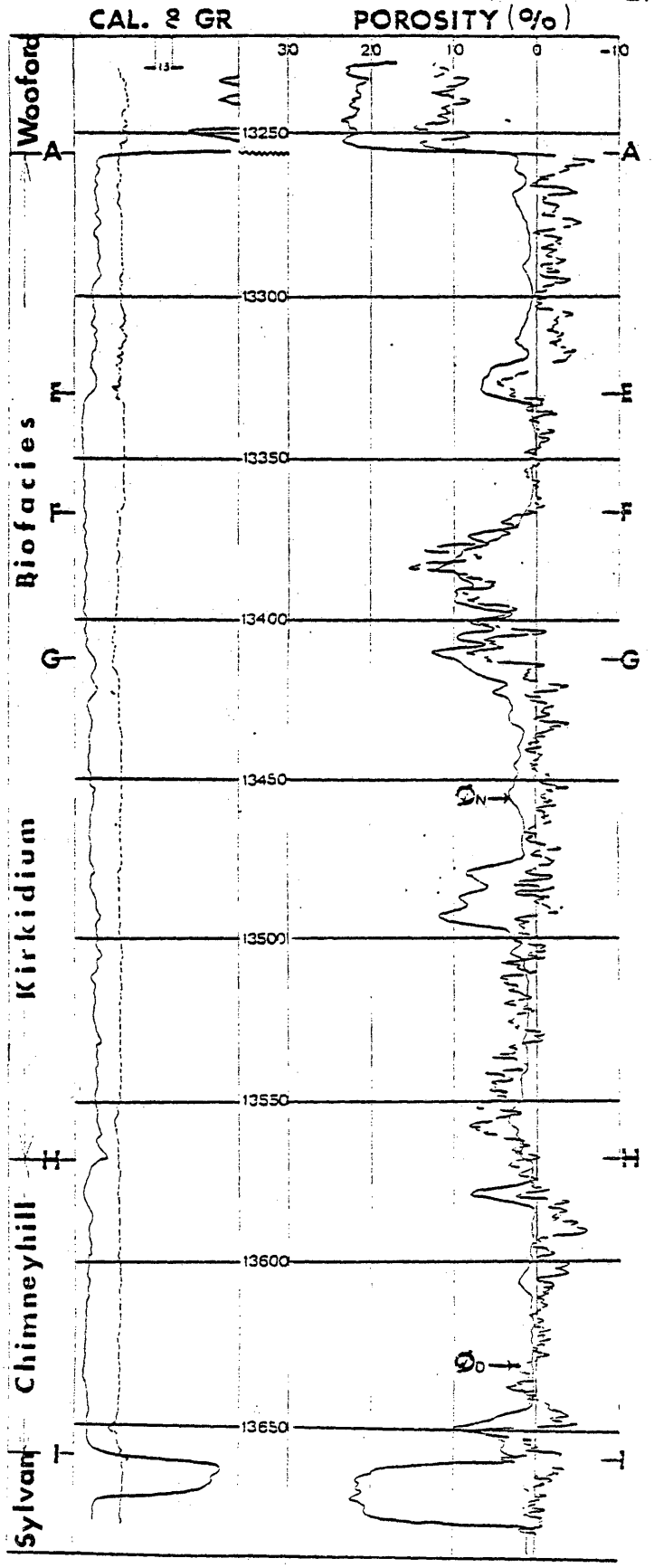

Fig. 4. Caliper (CaL), Gamma Ray (GR), Density Porosity (ϕ_D) and Neutron porosity (ϕ_N) logs of Well 3 showing correlated intervals studied.

The "Kirkidium biofacies" subgroup is divided into four intervals: AE, EF, FG, and GH. The interval FG sometimes, but not always, shows good porosity development and the correlation of FG is mainly a porosity correlation. Marker F marks the top of porosity development in interval FG. Interval FG is also a major reservoir in the Hunton. Correlation of FG is aided by the clean nature (low gamma ray deflection) of FG. The marker G is located where the gamma ray deflection starts increasing again and not necessarily where the porosity ends. G also marks the top of a characteristic response of the Gamma Ray log, an expanded or flattened "M" shape. So marker G is established by a termination of a generally low gamma ray deflection of interval FG, by porosity development and by a characteristic log response ("M" shape) of the gamma ray.

Interval GH is correlated on the criteria already described for markers G and H. Additionally, interval GH has a consistent and characteristic Density porosity gradient. There is a general increase of Density porosity with depth. Density porosity which starts at G with low values (negative values in places) less than the corresponding Neutron porosities, gradually increases downward and may surpass Neutron porosities toward the base, H. Very close to marker H Density porosity starts decreasing again. So H again is located near this characteristic change in the Density porosity-depth profile.

Interval EF is correlated on the basis of its near-zero Density and Neutron porosities and by low gamma ray response.

The marker E is chosen where porosity development starts while on the Gamma Ray log, E marks the beginning of higher gamma ray deflection, or a "hump" on the Gamma Ray log.

In correlating the eighteen wells used in this study, the markers have been followed with varying degrees of certainty or confidence. Markers A and I were located with most confidence except in a few wells where it was difficult to locate I because the Sylvan shale was not sufficiently penetrated. The other markers in order of lesser reliability are H, G, F, and E. As a matter of fact, the log characteristics of interval EF in the type well are almost non-existent in the other wells so that marker E in the other wells is almost a guess. Plates 1 and 2 are the correlated wells in two directions AA' and BB' respectively semi-parallel and semi-perpendicular to the strike of the Anadarko basin (Fig. 2).

What is the Correlation Type?

Having described the criteria for the correlation of the wells and selection of intervals, the question that arises is what type of correlation has been established. It would not be called a biostratigraphic correlation for the mere fact that biologic criteria have not been used. Lithologic criteria have been used since the log responses indicate some aspects of rock properties. Rock-stratigraphic correlation is therefore implied. However, except for markers A and I where

the Woodford Shale and the Sylvan Shale are positively identified, the other markers have not been totally established by specific lithologies of the correlated intervals. The correlation established would be a time-stratigraphic correlation if there was a way to prove that each of the correlated units was deposited during an interval of time.

One fact is that the correlated wells have been chosen from a local area. Following the reasoning of Lowman (1949) and Weimer (1966), inorganic methods through well logs in such a small area of study provide high probability of stratal continuity for at least some of the intervals.

Carbonate sediments are basically intrabasinal and are deposited in warm, generally shallow, clear marine water. The few hundred feet thickness of the Hunton are indicative of platform shelf deposits. A carbonate platform is a large carbonate body built up with a more or less horizontal top and abrupt shelf margin (Wilson, 1975). So carbonates deposited on shelves of epeiric seas must have been deposited on essentially flat surfaces. Also drawing analogy from the present shelf depths whose Holocene sediments (e.g. Bahamas) much resemble ancient limestones, it can be safely assumed that in the geologic past, shelves and platforms, hundreds of miles wide were covered with water only tens of meters deep.

Evidence exists that by mid-Silurian time practically the whole American continent was flooded by shallow seas

which produced marine carbonates. Since the Hunton carbonates in the study area are of Silurian period, it can be inferred that any carbonate deposits such as those that describe markers, H, G, and E, and which are recognizable on the Gamma Ray log would have been deposited on flat surfaces and would therefore indicate "time markers."

Progradation with slow subsidence over a very flat surface influenced by minor transgressions and regressions which usually accompany carbonate sedimentation often produce a cyclic or hemicyclic pattern of carbonate sequences. A hemicyclic pattern (AB-AB) on a large scale is shown by the Gamma Ray log within the Hunton group. Here lower and higher gamma ray sequences alternate. Krumbein and Sloss (1963) have argued that the boundaries between such sedimentary rhythms may closely approximate "time markers." They term the procedure "correlation by position in the bathymetric cycle." Markers H, G, and E conform to this process of correlation.

An attempt has been made in the preceding paragraphs to define the type of correlation done in this study. Based on the small area of study, on the assumed flat surface on which the sediments were deposited and on the hemicyclicity exhibited by the Hunton sequences, markers H, G, and E may be appropriately termed "approximate time markers." F is not considered a "time marker" but has been chosen for exploration purposes because of the porous interval FG.

PROBLEM AND PROCEDURE

The main problem in this study is to develop an empirical correlation method which will be amenable to computer applications using digitized logs. An attempt is to be made to combine empirical parameters to establish correlation markers. If such markers are "time markers" they would possess immense benefits in geological applications.

Previous Work

Although the processes and statistical techniques employed in this study are different, there have been attempts made by a few authors to do stratigraphic correlation by some empirical methods.

Lowman (1949) has described a quasi-empirical method for stratigraphic correlation in a local test area based on assemblages of foraminifera. The foraminiferal assemblages have been evaluated by counting the individuals of each genus in a representative fraction of each sample (3 foot cores). By means of bar graphs the generic percentage for each sample has been shown and these have been compiled on maps and profiles showing the distribution of genera relative to certain gross features of the environment.

Shaw (1964) has also detailed a graphic-statistical technique for time-stratigraphic correlation. His work dealt with the practical and theoretical aspects of the use of fossil ranges in establishing an absolute geochronological scale. Shaw was able through the graphic expression of correlation between two sections to formulate equations of the general straight-line forms,

$$Y = C_1 + m_1X, \text{ or}$$

$$X = C_2 + m_2Y.$$

Shaw called these mathematical expressions "Equations of Correlation" with which he described the position of the line representing the time correlations of the sections graphed. With the equation he was able to estimate the relative rates of rock accumulation and the relative time of flooding.

Selection of Log Parameters

The selection of log data has been determined by the well logs available for the study. The eighteen wells correlated all have Gamma Ray, Induction (Resistivity), and Porosity (Combined Density and Neutron) logs. The Density porosity (ϕ_D) and Neutron porosity (ϕ_N) are combined in an equation derived below to obtain a calculated matrix (grain density),

ρ_{mc}. Ideally, ρ_{mc} should be a lithologic-dependent rock-typing parameter.

Derivation of Calculated Matrix (Grain) Density, ρ_{mc}

For a clean formation of known matrix density, ρ_m, having a true porosity, ϕ, and which contains a fluid of density, ρ_f, the formation bulk density, ρ_b, will be

$$\rho_b = \phi\rho_f + (1-\phi)\rho_m \qquad (1)$$

The density porosity, ϕ_D, read from the Density log is given by,

$$\phi_D = \frac{\rho_{ma} - \rho_b}{\rho_{ma} - \rho_{fa}}, \qquad (2)$$

where ρ_{ma} is the apparent matrix density assumed in the logging process by the operator, ρ_b is the bulk density as read from the log and ρ_{fa} is the apparent fluid density assumed in the logging process.

Substituting the ρ_b from equation (1) into equation (2) and rearranging gives the equation below.

$$\rho_m = \frac{\rho_{ma} - (\rho_{ma} - \rho_{fa})\phi_D - \rho_f \phi}{1-\phi}$$

The ρ_m derived from the above equation will be known as the calculated matrix density and designated ρ_{mc}.

The logs used in this study were run using ρ_{ma} = 2.71 gm/cc and ρ_{fa} = 1.00 gm/cc. Because of a lack of a better true porosity, the Neutron porosity, ϕ_N, will be taken as the true porosity and ρ_f will be taken as 1.00 gm/cc.

Substituting these values in the equation above, ρ_{mc} is given as,

$$\rho_{mc} = \frac{2.71 - 1.71\ \phi_D - \phi_N}{1-\phi_N}.$$

Density and Neutron porosities, ϕ_D and ϕ_N respectively are easily read out from the combined Density and Neutron logs and, in the above equation, are expressed as fractional porosity.

Procedure

After the wells were visually correlated, each correlated interval was zoned into small depth intervals using the Gamma Ray log depth or the Porosity log depth. Corresponding gamma ray (GR), porosity (ϕ_D and ϕ_N), resistivity (Rt) and thickness values were obtained for each zone. Calculated matrix density, ρ_{mc} and log Rt were also calculated for each zone. For the study the logarithm of Rt (log Rt) is more convenient than Rt. The values listed above are the quantities which will be referred to as log parameters. Appendix A is a tabulation of the Log Parameters according to well and correlated interval.

For each correlated interval, quantities which will be called "Log Statistical Parameters" were also obtained. The "Log Statistical Parameters" are the averages and standard deviations of the GR, log Rt and ρ_{mc} for each interval and the interval thicknesses. The interval averages and standard

deviations were calculated from the zone values in each interval using a hand calculator (HP 25). Appendix B is a tabulation of the "Log Statistical Parameters" according to wells and correlated intervals. The total thickness of the Hunton (AI) for each well is also included in Appendix B. Comparison of the "Log Statistical Parameters" is used to detect the lateral variations of rock properties in the intervals.

Histograms of GR, Log Rt, and ρ_{mc} were also made for each correlated interval in thirteen of the wells correlated. A class width of 2.00 API units (7-9, 9-11, etc.) was chosen for the GR while log Rt and ρ_{mc} had class widths of 0.10 (0.1-0.2, 0.2-0.3, etc.) and 0.2 gm/cc (2.50-2.62, 2.62-2.64, etc.), respectively.

Frequency of the class width is the total thickness of all the zones which fall within the class width expressed as a percentage of the total thickness of the correlated interval. The histograms are used primarily in an attempt to establish the intervals by similarity of histogram patterns or profiles. They are also used in the discussion of sedimentary facies.

ESTABLISHMENT OF CORRELATION BY STATISTICAL TECHNIQUES

The statistical techniques adopted to study the correlated intervals follow the approaches traditionally used to correlate wells. The first approach aims to establish the markers through the differences between "Log Statistical Parameters." This is essentially a comparison in a vertical profile of the various log properties. The second approach aims to establish the intervals themselves by matching them for similarity.

Establishment of Correlated Interval Markers

It is necessary and important that the markers which are selected in any correlation be tested for their correctness, and if any error exists, to know the level of error. A marker can be validated only after the test.

A formal procedure for the statistical testing of theories in scientific research exists.

a. An experiment is planned so that if the results obtained cannot be explained by the chance variation involved in drawing a sample, the theory is confirmed.

b. It is initially assumed that the results collected from the experiment are due to chance alone. This assumption is called the null hypothesis.

c. A theoretical sampling distribution based on the null hypothesis is then used to determine the probability of collecting similar sample data by chance alone.

d. If the probability is less than some predetermined small percentage (usually 5% or 1%), the results are taken as significant. The null hypothesis is rejected and the theory confirmed.

This approach is adopted first to test the validity of the correlated interval markers and then to select the best criteria or parameters by which each marker can be best established.

The experiment set up starts in the tabulated "Log Statistical Parameters" in Appendix B. The parameters are compared in a vertical direction among the correlated intervals AE, EF, FG, GH, and HI. Since markers A and I are relatively easy to identify from the logs and are true "time markers" they will not be subjected to the test applied to the other markers.

The results from the experiment are obtained by subtracting the value of the parameter in the underlying interval from the value of the parameter in the overlying interval. So far each parameter, say the "average GR," and for marker E, the value in interval EF is subtracted from the value in interval AE (AE-EF), the value in interval FG is subtracted from the value in interval EF (EF-FG) for marker F, the

value in interval GH is subtracted from the value in FG (FG-GH) for marker G and the value in interval HI is subtracted from the value in interval GH (GH-HI) for marker I. The differences are designated P (Plus) if positive or zero and M (Minus) if negative. A representation of these differences for all the eighteen wells is shown in Tables 1 and 2.

The experiment has been planned to simulate the visual process of selecting and correlating markers from well logs. A marker becomes conspicuous if the log signature or pattern above and below the marker are differentiable. So what the eye does in effect is to identify a marker by differentiating what overlies and underlies the marker without necessarily quantifying the difference. The P's and M's are the result of the experiment and they are to be used to define the markers. For each parameter and each marker, the total P's and total M's are determined.

What is then the significance of the total P's and M's? The null hypothesis assumes that they are mere chance results unless they can be proved otherwise. A summary of the markers and total P's and M's for each parameter are shown on Table 3.

The experiment is set up such that there are two possible outcomes for each difference, a P or an M. In this experiment neither P nor M signifies a "failure" or a "success."

Well		AVERAGE GR				AVERAGE LOG R_t				AVERAGE ρ_{mc}			
		AE-EF	EF-FG	FG-GH	GH-HI	AE-EF	EF-FG	FG-GH	GH-HI	AE-EF	EF-FG	FG-GH	GH-HI
18		P	P	M	P	M	P	P	P	P	P	M	M
15		P	P	M	P	M	M	M	P	M	P	P	M
17		P	P	M	P	M	P	M	P	P	P	P	M
16		P	P	M	P	P	M	M	P	M	P	M	M
14		P	P	M	P	M	P	M	P	P	M	P	M
12		P	P	M	P	M	P	M	P	P	M	P	M
13		M	P	M	P	P	M	M	P	M	P	P	M
4		P	P	M	P	M	P	M	P	P	M	P	M
2		P	P	M	P	P	P	M	P	P	M	P	M
5		P	P	M	P	M	P	M	P	P	P	P	M
8		P	P	M	P	M	P	M	P	P	M	P	M
6		P	P	M	P	P	P	M	P	P	M	P	M
7		P	M	M	P	M	P	M	P	P	M	P	M
1		P	P	M	P	P	P	M	P	P	M	P	M
3		P	M	M	P	M	P	P	M	P	M	P	M
9		M	P	M	P	P	M	M	P	P	P	P	M
10		P	P	M	P	M	P	M	P	P	M	P	M
11		P	P	M	P	M	P	M	P	P	M	P	M
Total	P	16	16	0	18	6	14	2	17	15	7	16	0
	M	2	2	18	0	14	4	16	1	3	11	2	18

Table 1: Representations of the differences between interval log statistical parameters (averages) according to two attributes, plus (P) and minus (M), where P indicates positive or zero and M indicates negative difference.

		STANDARD DEVIATION GR				STANDARD DEVIATION LOG Rt				STANDARD DEVIATION ρ_{mc}			
Well		AE-EF	EF-FG	FG-GH	GH-HI	AE-EF	EF-FG	FG-GH	GH-HI	AE-EF	EF-FG	FG-GH	GH-HI
18		M	P	M	P	P	M	M	P	P	M	P	M
15		P	M	M	P	P	M	M	M	P	P	P	M
17		P	M	M	P	P	M	M	M	P	M	M	M
16		P	P	M	P	P	M	M	M	P	M	P	M
14		P	M	M	P	P	M	P	M	P	M	P	M
12		P	P	M	M	M	M	P	M	P	M	P	M
13		P	P	P	P	P	M	P	M	P	P	M	P
4		P	P	M	P	P	P	M	M	P	P	M	P
2		P	M	M	P	P	M	M	P	P	P	P	M
5		P	P	M	M	P	P	M	M	P	P	M	M
8		P	P	M	P	P	M	P	M	P	P	M	P
6		P	P	M	P	P	M	P	M	M	P	P	M
7		P	M	M	P	P	M	P	M	P	P	M	M
1		P	M	M	M	P	M	P	M	P	M	P	M
3		P	M	M	P	M	P	M	M	P	M	M	P
9		P	P	M	M	P	M	P	M	P	M	P	M
10		P	M	M	P	P	P	M	M	P	P	M	P
11		P	P	M	P	P	M	M	M	P	M	P	M
Total	P	17	10	1	14	16	4	8	2	17	9	10	5
	M	1	8	17	4	2	14	10	16	1	9	8	13

Table 2: Representations of the differences between interval Log Statistical Parameters (standard deviations) according to two attributes, Plus (P) and Minus (M), where P indicates positive or zero and M indicates negative difference.

Table 3

Summary of Markers and Total P's and M's for each Parameter

Marker Identified by Difference	Parameter	Total (Σ=18) P	M
AE-EF (Marker E)	Average GR	16	2
	Average Log Rt	6	12
	Average ρ_{mc}	15	3
	Standard deviation GR	17	1
	Standard deviation Log Rt	16	2
	Standard deviation ρ_{mc}	17	1
EF-FG (Marker F)	Average GR	16	2
	Average Log Rt	14	4
	Average ρ_{mc}	7	11
	Standard deviation GR	10	8
	Standard deviation Log Rt	4	14
	Standard deviation ρ_{mc}	9	9
FG-GH (Marker G)	Average GR	-	18
	Average Log Rt	2	16
	Average ρ_{mc}	16	2
	Standard deviation GR	1	17
	Standard deviation Log Rt	8	10
	Standard deviation ρ_{mc}	10	8
GH-HI (Marker H)	Average GR	18	-
	Average Log Rt	17	1
	Average ρ_{mc}	-	18
	Standard deviation GR	14	4
	Standard deviation Log Rt	2	16
	Standard deviation ρ_{mc}	5	13

Since the aim is to produce criteria for establishing the markers a "success" will apply to those P's or those M's that will cause the null hypothesis to be rejected.

The probability of getting a P or M for each subtraction is constant. In this case it is 0.5 since there is no expressed preference for either P or M. This probability will be denoted by the letter, p. There are also 18 trials (number of wells) in which P or M can occur for each parameter and since the wells are different, the trials are independent of one another.

Generally, under the conditions stated above, the probability of x successes in n trials is given by

$$b(x;\ n,\ p) = \frac{n!}{x!(n-x)!}\ p^{x}\ (1-p)^{n-x}$$

for $x = 0,\ 1,\ldots,\ n$.

The probability distribution defined by this equation is called the binomial distribution. It will be used to find the minimum number of P's or M's that will cause the null hypothesis to be rejected and make the results significant within 5 percent and 1 percent error margin. That means that acceptable results will be those for which only 5 percent or 1 percent of them are due to chance alone. These are the preconditions set up for this study.

Having stated the conditions for acceptable experimental results, the next step would be to find the results that are not likely to have occurred by chance alone.

Referring to the binomial probability table, Table 4, a result will be significant for 5 percent error margin if at least 13 successes (P's or M's) are registered. Thirteen or more successes will be obtained by chance alone 0.0481 or 4.81 percent of the time (add frequencies for 13, 14, 15, 16, 17, 18). For still a better error margin of 1 percent, at least 15 successes (P's and M's) must be registered. So 15 or more successes will be obtained by chance alone only 0.0038 0.38 percent of the time (add frequencies for 15, 16, 17, 18).

Looking back on the total P's and M's recorded for the markers (Table 3), two inferences can be derived. The first is the degree of reliability of the markers and the second is the choice of parameters that will best define a marker.

A parameter which scores at least 13P's or 13M's (for 5 percent error) or at least 15P's or 15M's (for 1 percent error) is an acceptable parameter for correlation. The best parameter is that which scores the possible maximum of 18P's or 18M's. Since six parameters are considered for each marker the best correlated marker would score a possible maximum of 108P's or 108M's (18x6). The degree of correctness

Table 4

Binomial Probability Table

n (trials)	x(successes)	b(x;n, p) (for p=0.5, n=18)
18	0	0.0000
	1	0.0001
	2	0.0006
	3	0.0031
	4	0.0116
	5	0.0327
	6	0.0708
	7	0.1214
	8	0.1670
	9	0.1854
	10	0.1670
	11	0.1214
	12	0.0708
	13	0.0327
	14	0.0116
	15	0.0031
	16	0.0006
	17	0.0001
	18	0.0000

in correlation might be judged on how much the total score for each marker differs from 108. An index, "Correlation Index," which will be used below in analyzing the markers will here be defined as,

$$\frac{\text{Total Acceptable Score by a Marker}}{108 \text{ (i.e. total possible score)}}$$

The statistical properties of this index are not yet investigated and therefore do not possess any statistical evidence (personal communication, Astle).

Analysis of the Markers

Marker H

Based on the 5 percent significant level, H is the most reliable marker. It is well defined by all the parameters with a "Correlation Index" of 96/108, i.e., (18+17+18+14+16+13)/108. At the 1 percent significant level it scores a "Correlation Index" of 69/108, i.e. (18+17+18+16)/108 coming second to marker E. At the 1 percent significance level the standard deviations of the GR and ρ_{mc} drop out as reliable correlation parameters for level H. The best correlation parameters are the averages of the GR, log RT and ρ_{mc} (Table 3).

Marker E

At the 1% significance level E is the most reliable marker with a "Correlation Index" of 81/108 i.e.

(16+15+17+16+17)/108. It comes second to H at the 5% significance level dropping out only "average log Rt" as a reliable correlation parameter in both significance levels. E also retains the same "Correlation Index" of 81/108 at the 5% significance level. The best correlation parameter is "average GR" and for a bigger allowance of 5% error, Log Rt (average and standard deviation) may be considered (Table 3).

Marker G

G scores a "Correlation Index" of 67/108 i.e. (18+16+16+17)/108 at both the 5% and 1% signifificance levels and so takes the third best marker. The best correlation parameters for marker G are "average GR' and standard deviation of GR. "Average log Rt' and "average ρ_{mc}" are also good correlation parameters. Standard deviation of log Rt and ρ_{mc} are not reliable at all as correlation parameters for marker G (Table 3).

Marker F

At the 5% significance level marker F has a low "Correlation Index" of 44/108 i.e. (16+14+14)/108. At the 1% significance level F has a still lower "Correlation Index" of 16/108 with only "average GR" qualifying as a reliable correlation parameter. At the 5% signifiance level "average log Rt" and standard deviation of log Rt just qualify to join "average GR" as good correlation parameters for marker F (Table 3).

After the analysis of the markers and their correlation parameters a few remarks may be made.

1. There is a possible relationship between markers H, G, and E by virtue of their high "Correlation Index." As was suggested before, they are all most probably "time markers." F on the other hand does not show the relationship and so may not, as also suggested before, be a possible "time marker." If these remarks hold intervals AE, GH, and HI are then possible time-stratigraphic units. The scepticism expressed earlier on over the location of Marker E does not after all hold because of the high "Correlation Index."

2. These markers are not equally identified by the same parameters.

Establishment of Intervals by Their Similarity

"Log Statistical Parameters" and histograms are used to study the similarity of an interval from well to well. The thirteen wells which fall on the AA' and BB' lines (Fig. 2) are used to study any similarity in histogram pattern. The histograms are those of GR, log Rt and ρ_{mc}. The AA' wells are compared differently from the BB' wells. The histograms are shown in Plates 3, 4, 5, 6, and 7. The absolute value of each "Log Statistical Parameter" (Appendix B) for each correlated interval is compared from well to well for

equality or for some other relationship. All the 18 wells correlated are used in this study.

Log Statistical Parameters (see Appendix B for numerical values)

Interval HI. Interval HI is characterized by low "average gamma ray" values, ranging from 9.7 to 16.3 API units. Log Rt ranges from 1.20 to 3.14 while ρ_{mc} ranges from 2.73 to 2.82 gm/cc. In each of the parameters there is neither a uniformity in values nor a recognizable, progressive trend in values along sections AA' and BB'. The thickness of internal HI ranges from 60 feet (?) on well 1 to 127 feet on well 14. However, considering all eighteen wells the thickness of interval HI is close within 92±15 feet (average and standard deviation).

Interval GH. The "average GR" values are much higher than for interval HI. The values are similar within 20.6±2.1 API units. On the basis of average GR values, intervals HI and GH are distinguishable. "Average Log Rt" values are not consistent and range from 1.41 to 3.15. "Average ρ_{mc}" values range from 2.68 to 2.75 gm/cc. The standard deviation for GR, log Rt, and ρ_{mc} in the different wells do not show any relationships indicating there is no similarity in the homogeneity of the interval. The interval ranges in thickness from 37 feet (well 8) to 229 feet (well 13). There is no progressive trend of thickness along sections AA' and BB'. However, interval GH is comparatively thin in wells 27 (50 feet), 8 (37 feet), and 6 (87 feet) which occupy a narrow, north-south strip in the mid-eastern section of the study area (Fig. 2).

Interval FG. "Average GR" values range from 10.6 to 21.1 API units, "average log Rt" 1.05 to 2.69 and "average ρ_{mc}" from 2.66 to 2.88 gm/cc. The great width of these ranges only implies that the properties of interval FG change unpredictably from well to well. There is no recognizable, progressive trend of the parameters along sections AA' and BB'. Interval FG ranges in thickness from 38 feet in wells 10 and 18 to 84 feet in well 12. No recognizable trend of thickness change exists along sections AA' and BB'.

Interval EF. The thickness of interval EF ranges from 6 feet to 60 feet and there is no recognizable trend of thickness change on section AA' or section BB'. "Average GR' values range from 9.5 to 30.0 API units, "average ρ_{mc}" from 2.71 to 2.82 gm/cc and "average log Rt" from 1.24 to 3.18. These values are neither characteristics of the interval nor follow a trend along sections AA' and BB'. The standard deviation values of GR, log Rt, and ρ_{mc} are different from well to well and also do not express any trend on sections AA' and BB'.

Interval AE. The thickness of internal AE ranges from 35 feet to 111 feet and there is no progressive trend in thickness variation along AA' and BB'. The "average GR" values are relatively high compared with the values in the underlying inverval EF. The values range from 13.9 to 35.0 API units. No value of "average ρ_{mc}" (range 2.74 to 2.83 gm/cc) or value of

"average log Rt" (range 1.3 to 2.99) is representative of the interval. The standard deviation values also vary from well to well indicating that the degree of heterogeneity of the interval changes from well to well.

The analysis of the "log statistical parameters" shows that it is only the "average GR' of those parameters considered that can be used in a vertical profile to differentiate the correlated intervals. Intervals EF, FG, and HI are characterized by lower "average GR" values while intervals AE and GH have higher "average GR" values. The lower and higher "average GR" values alternate in a hemicyclic (AB-AB) fashion. It may, however, be difficult to differentiate between intervals EF and FG since they are adjacent to each other and both have low "average GR" values. The absolute values of the other statistical parameters cannot be used similarly to "average GR" for correlation because their values are random. On a well to well comparison none of the "log statistical parameters" shows any recognizable, progressive trend along either section AA' or section BB'.

A study of the total Hunton thickness in the study area shows that the Hunton thickness changes randomly. It has been suggested (Amsden, 1975) that this may be partly due to the pre-Woodford erosion. On a more regional scale, however, the Hunton group increases in thickness southward toward the Anadarko basin.

There are some other thickness relationships within the Hunton group. The F marker on the top of the porous zone seems to have a consistent thickness from marker A or top of the Hunton group. Excluding wells 14 (67 feet), 16 (79 feet), 10 (75 feet), and 15 (93 feet), the other fourteen correlated wells give AF (AE + EF) = 112 $\pm$ 7 feet (average and standard deviation) or if the eighteen wells are considered, AF (AE + EF) = 104 $\pm$ 16 feet (average and standard deviation). So it is possible on the basis of thickness alone to approximate the position of marker F.

Comparison of Histograms (see Plates 3-7)

Several properties are used here to describe the histograms. Some of the properties are abbreviated and explained as follows:

RSK - skewed to the right
LSK - skewed to the left
APN - approximately normal distribution
ISK - Irregularly skewed
MD1 - Unimodal (one mode)
MD2 - Bimodal (two modes)
MMD - multimodal (greater than two modes)

Because the histograms show a lot of irregularities and gaps the assignment of these properties to different histograms depends very much on the personal judgement and discretion of the writer. A tabulated description of the histograms is shown in Tables 5 and 6. The numbers shown against the properties are those wells which exhibit the properties. The tables also show the log parameters and intervals for

Table 5

Description of Histograms, Section AA'

Log Parameter	Interval	Illustration	PROPERTIES RSK	LSK	APN	ISK	MD1	MD2	MMD
GR	HI	Plate 3	6,4		2	1,3,5,7	1,2,4,6,7	3,5	
ρ_{mc}	HI	Plate 3	1,5,7	4	3	6,2	5,7,3	1,4	2,6
log Rt	HI	Plate 3		3,5,6		1,2,4,5	1,3,6,7	2,5	4
GR	GH	Plate 4	1,2,3,4		5,6	7	1,3,5,6,7	2,4	
ρ_{mc}	GH	Plate 4	1		2,4,6,7	3,5	1,2,4,6,7	3,5	
log Rt	GH	Plate 4		1,2,4, 6,7		3,5	1,4,6,7	2	3,5
GR	FG	Plate 5	2,3,4	5	1	6,7	1,2,3,4,5	6,7	
ρ_{mc}	FG	Plate 5	5		7	1,2,3,4,6	4,5,7	1,2,3	6
log Rt	FG	Plate 5		4		1,2,3,5, 6,7	3,4	5	1,2,6,7
GR	EF	Plate 6			1,2,3, 5,7	4,6	1,2,3,5, 7	4,6	
ρ_{mc}	EF	Plate 6	6		1,3,4,5	2,7	1,3,4,5, 6,7	2	
log Rt	EF	Plate 6	4	1,3	2,7	5,6	2,3,4,7	1,5	6
GR	AE	Plate 7		3	1,2,6	4,5,7	1,2,3,6	4,7	5
ρ_{mc}	AE	Plate 7			4	1,2,3,5 6,7		1,2,3,4 5,6,7	
log Rt	AE	Plate 7		7	2	1,3,4,5 6	2,3,5,7	4	1,6

Table 6

Description of Histograms, Section BB'

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Log Parameter	Interval	Illustration	PROPERTIES						
			RSK	LSK	APN	ISK	MD1	MD2	MMD
GR	HI	Plate 3	8,4,9,12		10,13, 14	8,4,9,10, 11,12,13			
ρ_{mc}	HI	Plate 3	8	4	10,12,13	9,11	8,13	4,9,10,12	11
log Rt	HI	Plate 3				8,4,9,10 11,12,13		12	8,4,9,10, 13
GR	GH	Plate 4	4,9,13		10	8,11,12	9,10,12	8,4,11,13	
ρ_{mc}	GH	Plate 4	12,13	11	4,9,10	8	4,9,10, 11,12	8,13	
log Rt	GH	Plate 4		4,10,11 12,13	9	8	8,4,9,10 11,12,13		
GR	FG	Plate 5	4,9,12,13	10,11	8		8,4,9,10 11,12	13	
ρ_{mc}	FG	Plate 5		8	9,13	4,10,11, 12	8,4,13	9,10	11,12
log Rt	FG	Plate 5		4,9,10		8,11,12, 13	4,11	9	8,10,12,1
GR	EF	Plate 6	9	12	8,10	4,11,13	8,9,10	4,11,12,13	
ρ_{mc}	EF	Plate 6	8	9,10	4,13	11,12	8,4,9,13	10,11,12	
log Rt	EF	Plate 6	4	8	11	9,10,12, 13	4,11	8,9,10,12, 13	
GR	AE	Plate 7			11	8,4,9,10, 12,13	11	8,4,12,13	9,10
ρ_{mc}	AE	Plate 7			8,4,9, 10,11,12 13	9,10,13	8,4,11,12		
log Rt	AE	Plate 7	9,12	8		4,10,11, 13	8,11,12, 13	4,9	10

which histograms are described and where in the illustrations to find the histograms.

It is simple to find from Tables 5 and 6 the total number of wells, out of the 13 wells used in this histogram study, that exhibit a particular property for any log parameter in each interval. The gamma ray (GR) histogram in interval HI, for instance, shows that 12 wells have the MD1 property. The histogram of log Rt in this same interval shows that 11 wells have the ISK property. The histograms of ρ_{mc} and log Rt in interval GH show that 10 wells and 11 wells respectively have the MD1 property. Similarly, in the other intervals, some properties are common in such large numbers of wells.

On the face value, a property which shows in a large number of wells, would for a particular interval, quality as a recognizable histogram property to correlate the interval. However, personal communication with Professor William Astle shows that the 13 wells used in this histogram study do not constitute an adequate sample to give the results a statistical significance.

The inconsistencies of the histogram properties and those of the absolute values of "log statistical parameters" suggest that the sedimentary properties of each correlated interval are not constant but change from well to well. Another objective therefore arises to discuss how some results of this thesis may be tied to sedimentary properties of the rocks in the study area.

SOME ASPECTS OF SEDIMENTARY PROPERTIES OF ROCKS IN THE STUDY AREA

The foremost sedimentary information that can be defined from the thesis data are the different rock types within the Hunton carbonates. Lithologic identification can be made from the calculated matrix (grain) densities, ρ_{mc}, in appendix A. From general past experience, characteristic matrix densities are as follows for selected different rock types.

Sandstone (consolidated)	2.65-2.70 gm/cc
Sand (unconsolidated)	2.65-2.70 gm/cc
Limestone	2.70-2.80 gm/cc
Dolomite	2.80-2.90 gm/cc
Anhydrite	2.90-3.00 gm/cc
Gypsum	2.35 gm/cc
Salt	2.00-2.20 gm/cc

The higher values for limestone may correspond to dolomitic limestone or calcitic dolomite. Although the calculated matrix densities may not be the same as the physically real values because of the assumptions made in calculating them, the calculated values do indicate different lithologic rock types.

A matrix density range 2.60-2.70 gm/cc has been calculated mostly in the basal part of interval GH. This range could indicate quartz (or sand). The rock type could therefore be chert which has been widely reported in lithologic logs and

by Amsden (1975). Matrix densities of range 2.70-2.80 gm/cc have also been obtained and could correspond to rocks of calcite composition or limestone. Ranges of matrix density 280-2.90 gm/cc are also common and could indicate dolomite. Therefore, within the Hunton group three rock types are possibly identifiable from the calculated matrix densities--these are dolomite, limestone, and a rock type of quartz composition, probably chert (?).

Vertical lithologic changes have also been observed mostly in intervals GH and AE. In interval GH there is a vertical gradation upward from a basal rock type of matrix density 2.60-2.70 gm/cc into a rock type of matrix density 2.70-2.80 gm/cc (possibly limestone and dolomitic limestone) and finally into a rock type of matrix density 2.80-2.90 gm/cc (possibly dolomite). In Interval AE, the vertical gradation, where it occurs, its from a rock type of matrix density 2.70-2.80 gm/cc to a rock type of matrix density 2.80-2.90 gm/cc. If the rock type of matrix density 2.60-2.70 gm/cc is interpreted as marine sand or chert, then the vertical rock type change may indicate bathymmetry at time of deposition of the different rock types. The sequence indicates shallowing of water depth.

It is also possible to derive lateral changes in rock types and a lateral change in the log parameters. The average values of log parameters in Appendix B show that the rock

properties change from well to well. In places where the depositional trend is known it may be possible to follow the lateral change. Such lateral changes are most evident in the histograms. The dominant rock types or log values in each correlated interval can be obtained from the histograms. These dominant values are called the modes of histograms. The way the modes change for a particular log parameter and for a particular correlated interval may be a good sedimentary facies indicator.

Because this study has been done in a carbonate sequence post-depositional change or diagenesis, becomes an important aspect. Quantity of dolomite in each interval can be obtained making use of the ρ_{mc} data in Appendix A. Quantity of dolomite in each correlated interval is obtained by first adding up the total thickness occupied by dolomite ($\rho_{mc} \geq 2.80$ gm/cc) in that interval. This total thickness expressed as a percentage of the total interval thickness is the percentage quantity of dolomite. Percentage quantity of dolomite derived as explained above are shown in Table 7 for the different wells and correlated intervals. The quantities calculated are subject to the uncertainties in the calculation of matrix densities.

A comparative study of the intervals, for example, shows that intervals AE and HI are invariably dolomitized. FG has both low and high degrees of dolomitization. On a well to

well comparison, well 18 and well 9 are very poorly dolomitized, while wells 6, 2, 12, and 16 are highly dolomitized. The degree and trend of dolomitization for any particular interval can also be studied.

Table 7

Percentage Quantity of Dolomite in the Correlated Intervals

	Correlated Intervals and Quantity of Dolomite(%)				
Well	AE	EF	FG	GH	HI
1	34	0	0	5	30
2	69	50	82	5	47
3	41	0	22	17	18
4	31	0	0	1	27
5	35	0	0	0	19
6	78	33	93	0	44
7	49	0	76	8	20
8	19	8	89	11	15
9	0	0	9	0	6
10	66	0	76	5	7
11	36	24	21	4	50
12	55	56	52	14	54
13	34	39	20	3	24
14	41	0	24	8	11
15	27	31	18	7	47
16	56	100	5	13	56
17	34	0	0	11	24
18	0	0	0	0	24

Recommendations

This study has brought forward some positive and negative results which require further verification. The negative results may have been affected by log values and equations which may not be generally true. The successful correlation process reported in the study is basically a depth-derivative process using "manually digitized" logs.

Problems yet to be solved include the verification and "purification" of the equation for calculated matrix density so that it can have a general applicability for water- and hydrocarbon-bearing zones. This implies that errors due to logging, the problems in gas-bearing zones and their effects on log parameters must be recognized. In this study it was assumed that the true porosity is the Neutron porosity. This too needs verification. All these verifications need core data.

An ultimate aim would be to attempt a depth-derivative correlation process of the type reported successful in this study, using digitized well logs and the computer. Another aim would be to formulate an "Equation of Correlation" using any combination of the parameters derived in this study. An acceptable combination of parameters for correlation would have to take into account the interrelationships among the parameters. Such interrelationships are necessary to give the combination a statistical significance. The derivation of the interrelationship is, however, beyond the scope of this study.

A more regional approach to the study is recommended, especially, where a depositional strike or pateogeography is accurately known.

CONCLUSIONS

This study has been carried out in a local area which has been designated Silurian dolomitic facies in the Oklahoma Geological Survey Map GM-14 compiled by Thomas Amsden and T.L. Rowland in 1967. Because of the localized area of study, it has been possible to reliably correlate five intervals within the Hunton group partly by the similarity of log patterns and partly by characteristic log responses to some markers. Three of the correlated intervals are thought to be time-stratigraphic units.

The interval averages and standard deviations of the gamma ray (GR), logarithm of the formation resistivity (log Rt) and calculated matrix density (ρ_{mc}) are termed "Log statistical parameters." Correlation in the study area by similarity of "log statistical parameters" or similarity of histogram pattern is not successful. Only the "average GR" values among the "log statistical parameters" can be used in a vertical comparison to differentiate the different intervals. This is mainly because the values alternate in a hemicyclic pattern; low alternating with high values. Out of seven properties used to analyze the similarity of histograms for different intervals, only one, the unimodal property, is the most common

in all the intervals. On the overall, however, it is not possible to do a realistic analysis of the histogram properties because of the small number of wells (13 wells) used in the study.

"Log statistical parameters" are reliable parameters to establish interval markers and possibly identify time-stratigraphic units. The main tool in the establishment of markers is the vertical profile of each "log statistical parameters." The change of each "log statistical parameter" from one interval to the next interval below it establishes the interval markers.

Based on this process and at the 1% and 5% significance levels of statistical tests, two markers E and G within the "Kirkidium biofacies" subgroup are distinguished reliably as possible "time" markers. These markers have high values of "Correlation Index." The top of the Chimneyhill subgroup, marker H, is also distinguished reliably as a possible "time" marker. Intervals AE and GH within the "Kirkidium biofacies" subgroup and the Chimneyhill subgroup are therefore distinguished reliably as possible time-stratigraphic units. The top of the porous interval, marker F, within the "Kirkidium biofacies" subgroup, is not reliably distinguished and it has a low "Correlation Index."

It is also possible to combine "log statistical parameters" for correlation in the study area. The statistical significance

of the combination is yet to be determined. Marker E for instance is established by "average GR," "average ρ_{mc}" and standard deviations of GR, log Rt and ρ_{mc}. Marker G is best established by "average GR," "average log Rt," "average ρ_{mc}," and standard deviation of GR. Marker H, top of Chimneyhill subgroup, is best established by "average GR," "average log Rt," "average ρ_{mc}," and standard deviation of log Rt. The fact that the markers are not all identified by the same parameters suggests different genesis for the intervals.

APPENDIX A

Well by well tabulation of well log parameters - Density porosity (ϕ_D), Neutron porosity (ϕ_N), gamma ray (GR), formation resistivity (Rt), log Rt, calculated matrix density (ρ_{mc}), zone thickness and markers for the entire Hunton group.

Well 1
VANDERWORK NO. 1
C SE/4 3-17N-18N

Zone	Depth Interval (GR)	ϕ_D(%)	ϕ_N(%)	GR (API Units)	RT (ohm-m)	log Rt	ρ_{mc} (gm/cc)	Thickness (ft)	Marker
1	13418-21	-4.8	1.5	25.0	150	2.18	2.82	3	A
2	13421-24	-3.0	2.0	33.0	100	2.00	2.80	3	
3	13424-26	-3.7	1.5	33.0	185	2.27	2.80	2	
4	13426-29	-4.0	1.0	36.5	250	2.40	2.80	3	
5	13429-31	-3.0	0.8	24.0	200	2.30	2.78	2	
6	13431-35	-2.5	0.6	21.0	140	2.15	2.76	4	
7	13435-38	0.3	0.5	20.0	210	2.32	2.71	3	
8	13468-43	-1.2	0.5	21.0	170	2.23	2.74	5	
9	13443-46	1.5	0.5	22.5	700	2.85	2.69	3	
10	13446-50	-2.5	0.1	21.0	1300	3.11	2.75	4	
11	13450-53	2.0	0.1	20.0	550	2.74	2.69	3	
12	13453-57	-2.0	0.6	23.0	1500	3.18	2.75	4	
13	13457-60	0.0	0.5	25.5	700	2.85	2.72	3	
14	13460-62	-4.3	0.7	25.5	620	2.79	2.80	2	
15	13462-64	-2.0	0.5	24.5	550	2.74	2.75	2	
16	13464-66	-5.3	0.5	28.0	850	2.93	2.81	2	
17	13466-68	-4.5	0.6	27.5	700	2.85	2.80	2	
18	13468-72	-2.5	0.4	22.0	1400	3.15	2.76	4	
19	13472-75	-4.7	0.7	24.0	210	2.32	2.80	3	
20	13475-78	-1.0	0.2	20.0	900	2.95	2.73	3	
21	13478-82	1.5	0.1	19.0	1500	3.18	2.69	4	
22	13482-87	-4.0	0.4	21.0	1200	3.08	2.79	5	
23	13487-91	-0.3	0.1	18.0	1500	3.18	2.72	4	
24	13491-92	-1.0	0.4	20.0	950	2.98	2.73	2	
25	13492-97	-3.4	1.2	23.0	370	2.57	2.79	4	
26	13497-13500	-4.8	1.0	23.0	500	2.70	2.81	3	
27	13500-03	-8.8	1.0	22.5	160	2.20	2.88	3	
28	13503-09	-1.0	4.0	22.5	50	1.70	2.80	6	D?
29	13509-12	-1.5	2.0	17.0	110	2.04	2.77	3	
30	13512-19	0.6	0.4	14.5	330	2.52	2.71	7	E?
31	13519-22	2.0	1.0	15.0	150	2.18	2.69	3	
32	13522-28	5.0	5.0	15.5	80	1.90	2.71	6	F
33	13528-30	3.0	0.8	15.0	220	2.34	2.67	2	

Well 1 continued

Zone	Depth Interval (GR)	ϕ_D(%)	ϕ_N(%)	GR (API Units)	RT (ohm-m)	log Rt	ρ_{mc} (gm/cc)	Thickness (ft)	Marker
34	13530-32	2.0	0.6	13.0	220	2.34	2.69	2	
35	13532-37	1.1	1.1	15.0	160	2.20	2.71	5	
36	13537-40	2.5	1.2	14.5	90	1.95	2.69	3	
37	13540-43	-0.2	2.0	15.0	65	1.81	2.75	3	
38	13543-46	2.2	2.0	15.0	58	1.76	2.71	3	
39	13546-49	0.5	0.7	13.0	82	1.90	2.71	3	
40	13549-51	1.5	0.6	12.5	70	1.85	2.69	2	
41	13551-56	-1.0	1.2	13.5	50	1.70	2.75	5	
42	13556-60	2.0	5.0	14.5	15.0	1.18	2.76	4	
43	13560-65	5.0	8.2	15.0	7.1	0.85	2.77	5	
44	13565-68	3.5	6.0	12.0	14.0	1.15	2.76	3	
45	13568-73	1.2	2.8	14.0	25.0	1.40	2.74	5	
46	13573-78	7.0	11.0	15.0	8.5	0.93	2.79	5	
47	13578-80	0.3	1.5	15.0	35	1.54	2.73	2	G
48	13580-82	-2.0	1.7	18.5	90	1.95	2.77	2	
49	13582-85	-7.5	1.2	28.0	150	2.18	2.86	3	
50	13585-88	-4.2	1.2	30.0	175	2.24	2.80	3	
51	13588-90	-5.7	0.6	23.0	250	2.40	2.82	2	
52	13590-93	-3.0	0.3	21.5	350	2.54	2.77	3	
53	13593-97	-1.4	0.2	20.5	640	2.81	2.74	4	
54	13597-13602	-2.2	0.1	17.5	1000	3.00	2.75	5	
55	13602-07	0.8	0.1	22.5	1500	3.18	2.70	5	
56	13607-10	2.0	0.1	20.0	1500	3.18	2.68	3	
57	13610-13	4.2	0.1	20.0	1500	3.18	2.64	3	
58	13613-16	0.5	0.1	22.0	1500	3.18	2.70	3	
59	13616-19	1.0	0.1	26.0	1500	3.18	2.69	3	
60	13619-22	1.0	0.1	22.5	1500	3.18	2.69	3	
61	13622-24	-0.5	0.1	21.0	1500	3.18	2.72	2	
62	13624-26	1.0	0.1	21.0	1500	3.18	2.69	2	
63	13626-28	1.6	0.1	23.5	1500	3.18	2.68	2	
64	13628-30	3.1	0.1	27.5	1500	3.18	2.66	2	
65	13630-34	1.8	0.1	23.5	1500	3.18	2.68	4	
66	13634-36	3.5	0.1	19.5	1500	3.18	2.65	2	
67	13636-38	0.7	0.1	21.0	1500	3.18	2.70	2	
68	13638-41	2.0	0.0	22.5	1500	3.18	2.68	3	

Well 1 continued

Zone	Depth Interval (GR)	ϕ_D(%)	ϕ_N(%)	GR (API Units)	RT (ohm-m)	log Rt	ρ_{mc} (gm/cc)	Thickness (ft)	Marker
69	13641-43	1.70	0.0	20.0	1500	3.18	2.68	2	
70	13643-45	0.0	0.0	19.5	1500	3.18	2.71	2	
71	13645-50	2.8	0.0	19.0	1500	3.18	2.66	5	
72	13650-54	1.0	0.1	20.5	1500	3.18	2.69	4	
73	13654-57	0.0	0.0	20.5	1500	3.18	2.71	3	
74	13657-60	0.8	0.0	20.0	1500	3.18	2.70	3	
75	13660-63	3.3	0.0	22.0	1500	3.18	2.65	3	
76	13663-66	0.3	0.0	19.5	1500	3.18	2.70	3	
77	13666-70	1.6	0.0	20.5	1500	3.18	2.68	4	
78	13670-74	-0.7	0.0	19.5	1500	3.18	2.72	4	
79	13674-76	1.3	0.0	20.0	1500	3.18	2.69	2	
80	13676-82	2.5	0.0	20.0	1500	3.18	2.69	6	
81	13682-85	2.0	0.0	20.0	1500	3.18	2.68	3	
82	13685-90	1.2	0.1	18.5	1500	3.18	2.69	5	
83	13690-93	0.2	0.2	22.0	1500	3.18	2.71	3	
84	13693-95	-1.3	0.3	23.5	1500	3.18	2.74	4	
85	13695-13701	1.0	0.1	18.0	1500	3.18	2.69	6	
86	13701-05	2.0	0.1	21.5	1500	3.18	2.68	4	
87	13705-09	-1.5	0.4	30.0	1500	3.18	2.74	4	
88	13709-11	2.5	0.2	25.0	1500	3.18	2.67	2	
89	13711-13	0.1	0.1	23.5	1500	3.18	2.71	2	
90	13713-16	4.2	0.1	26.0	1500	3.18	2.64	3	
91	13716-19	3.0	0.1	22.5	1500	3.18	2.66	3	
92	13719-22	4.1	0.2	27.0	1500	3.18	2.64	3	
93	13722-25	3.0	0.1	23.5	1500	3.18	2.66	2	
94	13725-27	0.3	0.3	22.5	1500	3.18	2.71	2	
95	13727-31	3.5	0.4	25.0	800	2.90	2.66	4	
96	13731-33	2.0	0.5	25.0	300	2.48	2.68	2	
97	13733-35	5.0	0.7	25.0	170	2.23	2.64	2	
98	13735-38	0.8	0.8	23.5	370	2.57	2.71	3	
99	13738-41	3.2	0.5	22.0	600	2.78	2.66	3	
100	13741-43	1.0	0.1	30.0	900	2.95	2.69	2	H
101	13743-45	1.0	0.0	20.5	850	2.93	2.69	3	
102	13745-49	-0.5	0.1	8.0	450	2.65	2.72	4	
103	13749-52	1	0.0	15.5	380	2.58	2.69	3	

Well 1 continued

Zone	Depth Interval (GR)	ϕ_D(%)	ϕ_N(%)	GR (API Units)	RT (ohm-m)	log Rt	ρ_{mc} (gm/cc)	Thickness (ft)	Marker
104	13752-58	-0.5	0.2	17.0	320	2.51	2.72	6	
105	13758-60	2.0	4.0	16.0	15	1.18	2.75	2	
106	13760-62	6.7	11.0	11.0	6.8	0.83	2.79	2	
107	13762-64	1.0	8.0	14.0	7	0.85	2.84	2	
108	13764-67	2.3	9.4	15.0	11	1.04	2.84	3	
109	13767-71	-4.0	1.0	22.5	65	1.81	2.80	4	
110	13771-73	-2.0	0.3	17.5	250	2.40	2.75	2	
111	13773-80	-1.0	0.4	17.5	370	2.57	2.73	7	
112	13780-85	-3.2	2.5	20.0	90	1.95	2.81	5	
113	13785-87	0.0	0.3	16.5	200	2.30	2.72	2	
114	13787-88	-2.0	0.2	14.0	200	2.30	2.75	1	
115	13788-91	0.1	0.2	15.0	1100	3.04	2.71	3	
116	13791-94	-1.0	2.0	19.5	70	1.85	2.76	3	
117	13794-96	2.0	7.0	15.0	30	1.48	2.80	2	
118	13796-98	-4.6	6.0	15.0	32	1.51	2.90	2	
119	13798-13801	-1.0	2.0	14.0	60	1.78	2.76	3	
120	13801-03	-2.0	0.6	15.0	200	2.30	2.75	2	

Well 2
CALKINS NO. 1
C-SE 12-17N-18W

Zone	Depth Interval (GR)	ϕ_D(%)	ϕ_N(%)	GR (API Units)	RT (ohm-m)	log Rt	ρ_{mc} (gm/cc)	Thickness (ft)	Marker
1	13556-60	-6.5	5.0	22.5	51	1.71	2.92	4	A
2	13560-62	-1.0	6.0	19.0	120	2.08	2.84	2	
3	13562-66	0.0	7.0	18.0	52	1.72	2.84	4	
4	13566-68	-7.5	4.0	19.0	60	1.78	2.91	2	
5	13568-71	-4.5	2.5	25.0	95	1.98	2.83	3	
6	31571-75	-9.0	2.5	24.0	170	2.23	2.91	4	
7	13575-78	-5.5	3.0	21.0	140	2.15	2.86	3	
8	13578-80	-5.0	4.0	21.0	150	2.18	2.87	2	
9	13580-82	-6.5	4.8	25.0	170	2.23	2.91	2	
10	13582-88	-3.0	6.0	15.0	53	1.72	2.87	6	
11	13588-90	-3.3	3.5	15.0	67	1.83	2.83	2	
12	13590-92	-5.2	4.5	14.5	70	1.85	2.88	2	
13	13593-94	-6.0	3.5	14.0	48	1.68	2.88	1	
14	13594-97	-3.0	2.2	16.5	40	1.60	2.80	3	
15	13597-13601	-5.0	1.5	20.0	49	1.69	2.82	4	
16	13601-03	-2.8	1.5	17.0	75	1.88	2.78	2	
17	13603-04	-4.0	1.8	21.0	79	1.90	2.81	1	
18	13604-07	-6.0	1.5	20.0	75	1.88	2.84	3	
19	13607-10	-3.2	0.8	13.0	250	2.40	2.78	3	
20	13610-12	0.2	0.5	12.0	900	2.95	2.72	2	
21	13612-14	-5.0	0.6	12.0	1200	3.08	2.73	2	
22	13614-16	-1.1	0.8	16.5	1500	3.18	2.74	2	
23	13616-19	-6.3	1.6	22.0	100	2.0	2.85	3	
24	13619-21	-1.0	0.9	16.0	100	2.0	2.74	2	
25	13621-23	-3.0	1.3	21.0	190	2.28	2.78	2	
26	13623-27	-5.5	2.8	17.0	80	1.90	2.86	4	
27	13627-29	-5.6	1.9	19.0	110	2.04	2.84	2	
28	13629-33	-2.0	1.0	18.0	140	2.15	2.76	4	
29	13633-36	-0.6	0.9	20.0	500	2.70	2.74	3	
30	13636-39	-3.3	0.9	18.5	700	2.85	2.78	3	
31	13639-41	-1.8	0.9	17.0	900	2.95	2.76	2	
32	13641-45	-5.7	1.7	20.0	330	2.52	2.84	4	
33	13645-48	-3.0	1.1	21.0	160	2.20	2.78	3	

Well 2 continued

Zone	Depth Interval (GR)	ϕ_D(%)	ϕ_N(%)	GR (API Units)	RT (ohm-m)	log Rt	ρ_{mc} (gm/cc)	Thickness (ft)	Marker
34	13648-51	-2.0	1.5	27.0	250	2.40	2.77	3	D?
35	13651-54	-5.3	3.0	30.0	110	2.04	2.86	3	
36	13654-56	0.8	7.0	29.0	40	1.60	2.82	2	
37	13656-58	-1.6	6.9	26.5	26	1.41	2.87	2	
38	13658-59	-2.0	6.6	29.0	22	1.34	2.87	1	
39	13659-61	-5.7	8.9	27.0	21	1.32	2.98	2	
40	13661-63	0.0	8.0	25.0	17	1.23	2.86	2	
41	13663-65	-5.0	10.0	22.0	11	1.04	3.00	2	
42	31665-67	-2.2	7.5	17.0	10.5	1.02	2.89	2	
43	13667-69	-4.5	3.5	12.0	13	1.11	2.85	2	E
44	13669-72	0.5	2.1	10.0	20	1.30	2.74	3	
45	13672-73	-2.8	2.2	11.0	32	1.51	2.80	1	F
46	13673-75	-0.3	4.1	11.0	31	1.49	2.79	2	
47	13675-77	-4.2	5.3	13.5	22	1.34	2.88	2	
48	13677-80	0.0	5.0	11.0	17	1.23	2.80	3	
49	13680-83	0.5	7.4	14.0	13	1.11	2.84	3	
50	13683-87	-2.0	4.0	11.0	8.4	0.92	2.82	4	
51	13687-91	-1.0	7.0	10.0	9.5	0.98	2.86	4	
52	13691-94	-3.8	2.3	7.5	12	1.08	2.82	3	
53	13694-96	0.0	2.8	7.5	19.5	1.29	2.76	2	
54	13696-13700	-3.0	2.1	8.0	37	1.57	2.80	4	
55	13700-03	0.5	3.0	9.0	43	1.63	2.75	3	
56	13703-05	-1.0	5.5	11.0	21	1.32	2.83	2	
57	13705-11	1.5	13.0	14.5	6	0.78	2.94	6	G
58	13711-14	-3.5	6.0	18.5	9	0.95	2.88	3	
59	13714-18	-3.0	6.5	22.0	12	1.08	2.87	4	
60	13718-24	-2.3	2.0	20.0	20	1.30	2.79	6	
61	13724-26	-1.1	1.2	27.0	120	2.08	2.75	2	
62	13726-28	-2.5	0.9	20.0	200	2.30	2.77	2	
63	13728-30	-1.0	0.6	17.0	300	2.48	2.74	2	
64	13730-37	-3.0	0.8	15.0	480	2.68	2.78	7	
65	13737-43	-0.4	0.8	19.5	1200	3.08	2.73	6	
66	13743-47	-0.4	0.7	15.0	1100	3.04	2.73	4	
67	13747-50	-1.5	0.8	19.0	430	2.63	2.75	3	
68	13750-54	-2.0	0.6	19.5	760	2.88	2.75	4	

Well 2 continued

Zone	Depth Interval (GR)	ϕ_D(%)	ϕ_N(%)	GR (API Units)	RT (ohm-m)	log Rt	ρ_{mc} (gm/cc)	Thickness (ft)	Marker
69	13754-57	-0.5	0.7	15.0	600	2.78	2.73	3	
70	13757-59	-1.5	0.8	22.0	800	2.90	2.75	2	
71	13759-62	0.7	0.7	15.5	700	2.85	2.71	3	
72	13762-67	-2.0	0.8	16.0	870	2.94	2.76	5	
73	13767-71	0.0	0.5	13.5	760	2.88	2.72	4	
74	13771-73	-1.5	0.5	18.0	700	2.85	2.74	2	
75	13773-75	-3.0	0.6	19.0	520	2.72	2.77	2	
76	13775-79	-0.3	0.5	19.0	740	2.87	2.72	4	
77	13779-81	-0.5	0.7	20.0	710	2.85	2.73	2	
78	13781-85	0.0	0.5	18.0	650	2.81	2.73	4	
79	13785-89	-3.0	0.6	19.0	550	2.74	2.77	4	
80	13789-95	0.0	0.5	16.0	400	2.60	2.72	6	
81	13795-99	-1.0	0.4	16.0	620	2.79	2.73	4	
82	13799-13803	2.0	0.5	20.0	450	2.65	2.68	4	
83	13803-05	-0.5	0.8	22.0	350	2.54	2.73	2	
84	13805-08	-0.3	0.6	19.0	330	2.52	2.73	3	
85	13808-10	1.0	1.0	25.0	340	2.53	2.71	2	
86	13810-12	-0.8	0.5	15.0	200	2.30	2.73	2	
87	13812-15	2.0	0.4	15.5	360	2.56	2.68	3	
88	13815-17	-1.0	0.5	15.0	1400	3.15	2.74	2	
89	13817-22	0.0	0.8	24.0	600	2.78	2.72	5	
90	13822-24	3.0	0.8	21.0	640	2.81	2.67	2	
91	13824-29	-1.0	1.2	28.0	350	2.54	2.75	5	
92	13829-32	2.5	1.0	22.0	320	2.51	2.68	3	
93	13832-34	2.4	0.8	22.5	420	2.62	2.68	2	
94	13834-36	2.0	0.7	20.0	450	2.65	2.69	2	
95	13836-38	4.0	1.0	23.0	710	2.85	2.66	2	
96	13838-40	0.3	1.0	23.0	500	2.70	2.72	2	
97	13840-44	1.9	0.8	24.0	700	2.85	2.69	4	
98	13844-47	-1.0	1.0	27.0	380	2.58	2.74	3	
99	13847-49	2.0	1.0	26.0	300	2.48	2.69	2	
100	13849-52	-0.9	2.0	25.5	320	2.51	2.76	3	
101	13852-55	1.0	1.0	28.0	500	2.70	2.71	3	
102	13855-57	0.7	0.7	19.0	407	2.62	2.71	2	H
103	13857-59	-2.5	0.7	15.0	370	2.57	2.77	2	

Well 2 continued

Zone	Depth Interval (GR)	ϕ_D(%)	ϕ_N(%)	GR (API Units)	RT (ohm-m)	log Rt	ρ_{mc} (gm/cc)	Thickness (ft)	Marker
104	13859-62	2.0	0.8	15.0	580	2.76	2.69	3	
105	13862-64	-3.0	0.9	16.5	400	2.60	2.78	2	
106	13864-67	-1.0	1.0	14.5	90	1.95	2.74	3	
107	13867-71	-3.0	5.0	8.0	49	1.69	2.85	3	
108	13871-75	-6.0	1.0	11.0	90	1.95	2.83	4	
109	13875-79	-1.0	0.7	11.5	110	1.04	2.74	4	
110	13879-82	-6.0	1.0	13.0	140	2.15	2.83	3	
111	13882-87	-3.0	2.0	12.0	90	1.95	2.80	5	
112	13887-90	-5.0	3.5	13.5	85	1.93	2.86	3	
113	13890-92	-3.0	4.0	15.0	80	1.90	2.83	2	
114	13892-97	-4.0	1.2	15.0	210	2.32	2.80	5	
115	13897-99	-6.6	1.5	22.0	180	2.26	2.85	2	
116	13899-13902	0.0	1.0	18.0	160	2.20	2.73	3	
117	13902-08	-3.0	4.0	13.0	30	1.48	2.83	6	
118	13908-13	-1.0	1.0	15.0	90	1.95	2.74	5	
119	13913-19	1.0	5.0	14.0	12	1.08	2.78	6	
120	13919-24	-2.0	1.2	15.0	80	1.90	2.77	5	
121	13924-28	3.0	4.6	15.0	25	1.40	2.74	4	
122	13928-32	-8.0	2.7	13.5	30	1.48	2.90	4	

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Well 3
A.K. COX UNIT NO. 2
C SW/4 7-17N-17W

Zone	Depth Interval (GR)	ϕ_D(%)	ϕ_N(%)	GR (API Units)	RT (ohm-m)	log Rt	ρ_{mc} (gm/cc)	Thickness (ft)	Marker
1	13256-60	-6.5	2.0	22.5	110	2.04	2.86	4	A
2	13260-62	-4.0	2.5	23.0	115	2.06	2.82	2	
3	13262-67	0.0	1.5	20.0	200	2.30	2.74	5	
4	13267-69	-4.5	3.0	18.0	150	2.18	2.84	2	
5	13269-71	-1.0	2.5	19.0	100	2.00	2.77	2	
6	13271-74	-2.5	2.5	21.0	80	1.90	2.80	3	
7	13274-79	-5.0	1.5	23.0	130	2.11	2.82	4	
8	13279-82	0.0	1.0	18.0	200	2.30	2.73	3	
9	13282-89	-2.0	1.0	22.5	300	2.48	2.76	7	
10	13289-92	-0.5	1.8	22.0	180	2.26	2.75	3	
11	13292-94	-0.5	1.0	24.0	170	2.23	2.74	2	
12	13294-97	-4.0	1.0	20.0	190	2.28	2.80	3	
13	13297-13303	0.0	0.5	15.0	780	2.89	2.72	6	
14	13303-06	-4.0	1.0	18.0	210	2.32	2.80	3	
15	13306-10	-2.0	1.5	16.0	150	2.18	2.77	4	
16	13310-14	-3.0	2.5	19.0	110	2.04	2.81	4	E
17	13314-20	-4.0	1.0	17.0	180	2.26	2.80	5	E
18	13320-30	4.5	6.5	21.5	42	1.62	2.75	8	
19	13330-33	-1.0	0.5	11.0	150	2.18	2.74	2	
20	13333-35	1.0	0.5	10.0	250	2.40	2.70	2	
21	13335-37	-2.0	0.5	9.0	450	2.65	2.75	2	
22	13337-46	-1.0	0.0	8.0	1000	3.00	2.73	9	
23	13346-52	0.5	0.3	9.0	1200	3.08	2.71	6	
24	13352-56	1.0	0.5	10.0	850	2.93	2.70	4	
25	13356-63	0.0	0.5	9.0	1400	3.15	2.72	7	
26	13363-67	-0.5	0.8	10.0	1300	3.11	2.73	4	
27	13367-71	4.0	1.0	11.0	1400	3.15	2.66	4	F
28	13371-75	3.0	8.0	11.0	380	2.58	2.80	4	
29	13375-78	13.0	6.0	11.0	600	2.78	2.58	3	
30	13378-82	7.0	9.0	12.0	470	2.67	2.75	4	
31	13382-85	15.0	12.0	10.0	400	2.60	2.65	3	
32	13385-90	5.0	7.5	10.0	380	2.58	2.76	5	
33	13390-95	8.0	9.5	11.0	230	2.36	2.74	5	

Well 3 continued

Zone	Depth Interval (GR)	ϕ_D(%)	ϕ_N(%)	GR (API Units)	RT (ohm-m)	log Rt	ρ_{mc} (gm/cc)	Thickness (ft)	Marker
34	13395-99	2.5	2.5	9.0	490	2.69	2.71	4	
35	13399-13401	7.5	7.5	12.0	400	2.60	2.71	2	
36	13401-04	-1.0	5.0	11.0	290	2.46	2.81	3	
37	13404-06	6.0	9.0	11.0	170	2.23	2.77	2	
38	13406-09	5.0	6.0	11.0	170	2.23	2.73	3	
39	13409-12	8.0	12.5	15.0	60	1.78	2.80	3	G
40	13412-18	1.0	6.5	19.0	16	1.20	2.81	6	
41	13418-21	-3.5	3.5	18.0	25	1.40	2.83	3	
42	13421-25	0.5	4.5	19.0	44	1.64	2.79	4	
43	13425-29	-1.0	2.5	11.0	68	1.83	2.77	4	
44	13429-32	0.0	3.0	15.0	45	1.65	2.76	3	
45	13432-35	-2.5	2.0	16.0	40	1.60	2.79	3	
46	13435-48	0.0	1.0	15.0	28	1.45	2.73	13	
47	13448-60	-1.0	3.0	18.0	38	1.58	2.78	12	
48	13460-64	-1.0	1.5	15.0	50	1.70	2.75	4	
49	13464-70	1.0	1.8	15.0	42	1.62	2.72	6	
50	13470-72	-3.0	1.8	15.0	38	1.58	2.79	2	
51	13472-75	0.8	1.2	15.0	35	1.54	2.72	3	
52	13475-82	-1.0	9.0	18.0	12	1.08	2.90	7	
53	13482-84	2.3	6.0	15.0	14	1.15	2.78	2	
54	13484-88	2.2	9.2	18.0	13	1.11	2.84	4	
55	13488-92	-1.0	8.5	20.0	8	0.90	2.89	4	
56	13492-94	2.0	12.0	25.0	5.2	0.72	2.90	2	
57	13494-13500	1.0	3.5	20.0	15	1.18	2.75	6	
58	13500-02	2.5	2.5	20.0	30	1.48	2.71	2	
59	13502-06	-0.5	3.2	26.0	31	1.49	2.78	4	
60	13506-09	4.0	1.5	21.0	45	1.65	2.67	3	
61	13509-11	0.0	1.0	18.0	80	1.90	2.72	2	
62	13511-14	4.0	1.0	15.0	100	2.00	2.66	3	
63	13514-16	2.0	1.0	19.0	180	2.26	2.69	2	
64	13516-19	1.0	1.0	18.0	200	2.30	2.71	3	
65	13519-21	4.0	1.0	19.0	170	2.23	2.66	2	
66	13521-24	0.0	1.0	18.0	180	2.26	2.73	3	
67	13524-28	2.5	1.0	18.0	210	2.32	2.68	4	
68	13528-32	-0.5	1.5	25.0	90	1.95	2.74	4	

Well 3 continued

Zone	Depth Interval (GR)	ϕ_D(%)	ϕ_N(%)	GR (API Units)	RT (ohm-m)	log Rt	ρ_{mc} (gm/cc)	Thickness (ft)	Marker
69	13532-35	3.0	1.2	21.0	110	2.04	2.68	3	
70	13535-37	5.5	1.2	21.0	180	2.26	2.64	2	
71	13537-40	1.0	1.0	20.0	250	2.40	2.71	3	
72	13540-42	6.0	1.5	19.0	330	2.52	2.63	2	
73	13542-44	3.0	1.0	20.0	220	2.34	2.68	2	
74	13544-47	5.0	1.7	21.0	190	2.28	2.65	3	
75	13547-49	4.0	1.8	19.0	270	2.43	2.67	2	
76	13549-52	7.0	2.5	20.0	300	2.48	2.63	3	
77	13552-55	1.8	3.0	21.0	240	2.38	2.73	3	
78	13555-59	7.5	3.0	21.0	200	2.30	2.63	4	
79	13559-62	6.0	2.5	24.0	190	2.28	2.65	3	
80	13562-66	2.5	1.7	24.0	90	1.95	2.70	4	H
81	13566-68	0.0	2.0	30.0	75	1.88	2.74	2	
82	13568-70	3.0	0.5	20.0	130	2.11	2.67	2	
83	13570-74	1.0	0.6	13.5	300	2.48	2.70	4	
84	13574-76	0.5	0.9	11.0	55	1.74	2.72	2	
85	13576-78	-1.2	4.0	7.5	25	1.40	2.80	2	
86	13578-81	2.0	8.0	7.0	12	1.08	2.82	3	
87	13581-85	-3.0	1.0	11.0	85	1.93	2.78	4	
88	13585-88	-2.0	0.3	15.0	290	2.46	2.75	3	
89	13588-92	-6.0	0.6	12.0	400	2.60	2.82	4	
90	13592-96	0.6	0.6	15.0	450	2.65	2.71	4	
91	13596-98	-2.0	1.0	14.5	420	2.62	2.76	2	
92	13598-13600	0.0	0.5	11.0	450	2.65	2.72	2	
93	13600-04	-3.0	1.0	13.0	350	2.54	2.78	4	
94	13604-06	0.0	2.0	10.0	220	2.34	2.74	2	
95	13606-10	-3.0	1.5	13.0	150	2.18	2.79	4	
96	13610-15	-0.8	0.7	9.5	600	2.78	2.74	5	
97	13615-18	0.7	0.7	8.5	700	2.85	2.71	3	
98	13618-29	-0.7	0.6	8.0	580	2.76	2.73	11	
99	13629-32	2.4	0.5	7.5	450	2.65	2.68	3	
100	13632-35	0.5	0.5	7.5	310	2.49	2.71	3	
101	13635-38	3.5	0.1	8.0	240	2.38	2.65	3	
102	13638-41	0.5	0.2	11.0	130	2.11	2.70	3	
103	13641-44	-1.5	0.8	11.5	40	1.60	2.75	3	

Well 3. continued

Zone	Depth Interval (GR)	ϕ_D(%)	ϕ_N(%)	GR (API Units)	RT (ohm-m)	log Rt	ρ_{mc} (gm/cc)	Thickness (ft)	Marker
104	13644-48	-3.0	4.5	12.0	15	1.18	2.84	4	
105	13648-52	7.5	10.0	12.0	10	1.00	2.76	4	
106	13652-56	1.0	4.0	12.0	34	1.53	2.76	4	
107	13656-59	-3.0	2.7	20.0	60	1.78	2.81	3	I

Well 4
GOSDA UNIT NO. 1
SW-NE-SW 8-17N-17W

Zone	Depth Interval (GR)	ϕ_D(%)	ϕ_N(%)	GR (API Units)	RT (ohm-m)	log Rt	ρ_{cm} (gm/cc)	Thickness (ft)	Marker
1	13242-46	1.0	4.0	23.0	47	1.67	2.76		A
2	13246-54	-2.3	1.3	24.0	100	2.00	2.77		
3	13254-56	-7.0	1.5	26.0	130	2.11	2.86		
4	13256-58	0.0	1.0	22.0	115	2.06	2.73		
5	13258-62	-2.7	1.8	20.0	130	2.11	2.79		
6	13262-65	0.6	3.3	19.5	240	2.38	2.76		
7	13265-69	-1.3	0.9	12.0	100	2.00	2.75		
8	13269-72	1.0	4.5	15.5	100	2.00	2.77		
9	13272-80	2.0	8.0	14 5	40	1.60	2.82		
10	13280-85	-1.0	4.0	14.5	120	2.08	2.80		
11	13285-89	1.5	6.5	14.5	150	2.18	2.80		
12	13289-91	-2.1	1.0	13.5	110	2.04	2.76		
13	13291-93	1.0	1.0	15.0	80	1.90	2.71		
14	13293-94	-4.3	0.8	15.0	60	1.78	2.80		
15	13294-96	-2.0	0.5	13.0	52	1.72	2.75		
16	13296-13300	-2.0	0.3	15.0	70	1.85	2.75		
17	13300-02	-4.1	0.2	15.0	100	2.00	2.78		
18	13302-04	-0.7	0.2	17.0	150	2.18	2.73		
19	13304-08	-6.0	0.5	21.5	210	2.32	2.82		
20	13308-12	0.5	0.5	24.0	120	2.08	2.71		D?
21	13312-14	-3.1	0.2	25.0	100	2.00	2.77		
22	13314-19	-1.6	0.1	20.0	110	2.04	2.74		
23	13319-23	-3.5	0.1	21.0	500	2.70	2.77		E?
24	13323-30	0.5	0.0	18.5	270	2.43	2.70		
25	13330-33	-0.5	0.0	18.0	380	2.58	2.72		
26	13333-35	-2.5	0.0	18.0	550	2.74	2.75		
27	13335-39	-1.0	0.1	17.5	700	2.85	2.73		
28	13339-42	-1.5	0.1	15.0	250	2.40	2.74		
29	13342-44	-4.0	0.0	15.0	300	2.48	2.78		
30	13344-47	-1.0	0.0	13.0	390	2.59	2.73		
31	13347-50	-1.5	0.0	14.5	260	2.41	2.74		
32	13350-54	0.0	0.3	11.5	380	2.58	2.72		
33	13354-57	-2.6	0.7	11.0	300	2.48	2.77		F

Well 4 continued

Zone	Depth Interval (GR)	ϕ_D(%)	ϕ_N(%)	GR (API Units)	RT (ohm-m)	log Rt	ρ_{mc} (gm/cc)	Thickness (ft)	Marker
34	13357-62	0.0	2.5	14.5	75	1.88	2.75	5	
35	13362-68	8.0	11.5	11.0	150	2.18	2.78	6	
36	13368-72	4.0	8.5	10.0	140	2.15	2.79	4	
37	13372-80	9.0	12.0	10.5	155	2.19	2.77	8	
38	13380-85	11.0	13.0	10.0	125	2.10	2.75	5	
39	13385-89	10.0	12.9	11.0	102	2.01	2.77	4	
40	13389-94	11.0	13.0	12.0	95	1.98	2.75	5	
41	13394-97	8.5	12.0	10.5	100	2.00	2.78	3	
42	13397-13402	6.0	8.0	10.0	120	2.08	2.75	5	
43	13402-05	5.0	5.0	11.0	110	2.04	2.71	3	
44	13405-12	0.0	0.8	12.5	90	1.95	2.72	7	G
45	13412-14	1.2	0.3	14.0	60	1.78	2.69	2	
46	13414-21	0.0	0.1	20.0	150	2.18	2.71	7	
47	13421-25	1.0	0.1	17.0	500	2.70	2.69	4	
48	13425-30	-2.5	0.0	18.5	1500	3.18	2.75	5	
49	13430-33	0.0	0.0	15.0	1500	3.18	2.71	3	
50	13433-38	2.0	0.0	15.0	230	2.36	2.68	5	
51	13438-44	0.0	0.0	15.5	1500	3.18	2.71	6	
52	13444-48	2.0	0.0	16.5	1500	3.18	2.68	4	
53	13448-50	-2.0	0.0	15.0	1500	3.18	2.74	2	
54	13450-55	1.5	0.0	15.5	1500	3.18	2.68	5	
55	13455-59	-0.2	0.0	16.5	1500	3.18	2.71	4	
56	13459-63	4.0	0.0	15.0	1500	3.18	2.64	4	
57	13463-66	2.0	0.1	13.5	1500	3.18	2.68	3	
58	13466-68	-1.0	0.0	15.0	1500	3.18	2.73	2	
59	13468-70	2.0	0.0	14.5	1500	3.18	2.68	2	
60	13470-78	1.0	0.0	15.0	1500	3.18	2.69	8	
61	13478-80	2.3	0.0	15.0	800	2.90	2.67	2	
62	13480-83	-0.7	0.0	15.5	1500	3.18	2.72	3	
63	13483-85	2.0	0.0	15.0	1500	3.18	2.68	2	
64	13485-88	3.0	0.0	16.5	1500	3.18	2.65	3	
65	13488-90	0.0	0.0	15.0	1500	3.18	2.71	2	
66	13490-94	1.0	0.2	20.0	600	2.78	2.70	4	
67	13494-13500	3.5	0.1	16.0	320	2.51	2.65	6	
68	13500-06	0.8	0.2	21.5	1000	3.00	2.70	6	

Well 4 continued

Zone	Depth Interval (GR)	ϕ_D(%)	ϕ_N(%)	GR (API Units)	RT (ohm-m)	log Rt	ρ_{mc} (gm/cc)	Thickness (ft)	Marker
69	13506-08	-1.0	0.5	25.0	400	2.60	2.74	2	
70	13508-12	5.3	0.7	20.0	200	2.30	2.63	4	
71	13512-16	2.0	0.6	19.5	150	2.18	2.69	4	
72	13516-20	4.5	1.4	21.5	380	2.58	2.66	4	
73	13520-24	3.0	0.6	23.0	300	2.48	2.67	4	
74	13524-30	4.7	1.0	23.0	130	2.11	2.65	6	
75	13530-35	4.0	3.0	25.0	200	2.30	2.69	5	
76	13535-38	1.8	6.0	24.0	150	2.18	2.79	3	
77	13538-40	-1.5	4.5	23.5	60	1.78	2.82	2	H
78	13542-45	0.0	0.0	11.5	110	2.04	2.71	3	
79	13545-48	2.0	2.4	11.0	36	1.56	2.72	3	
80	13548-50	-3.0	1.0	11.0	80	1.90	2.78	2	
81	13550-53	1.7	0.2	14.0	160	2.20	2.68	3	
82	13553-56	-1.0	0.1	13.0	210	2.32	2.73	3	
83	13556-58	-2.0	0.1	15.0	200	2.30	2.75	2	
84	13558-61	-6.0	0.1	13.0	300	2.48	2.81	3	
85	13561-64	-1.0	0.0	12.5	450	2.65	2.73	3	
86	13564-68	0.0	0.0	12.0	240	2.38	2.71	4	
87	13568-73	-2.0	0.1	14.5	140	2.15	2.75	5	
88	13573-77	-2.6	0.1	10.0	140	2.15	2.76	4	
89	13577-81	-1.0	0.1	12.0	95	1.98	2.73	4	
90	13581-84	-3.0	0.1	9.0	70	1.85	2.76	3	
91	13584-86	-6.2	0.2	8.5	45	1.65	2.82	2	
92	13586-90	-3.0	0.8	8.5	34	1.53	2.78	4	
93	13590-94	-2.0	1.5	10.5	20	1.30	2.77	4	
94	13594-13600	7.0	11.0	11.0	5	0.70	2.79	6	
95	13600-05	3.0	9.0	14.5	6	0.78	2.82	5	
96	13605-08	9.0	14.0	13.0	3	0.48	2.81	3	
97	13608-11	6.5	10.0	14.0	35	0.54	2.78	3	
98	13611-14	9.5	13.5	14.5	3	0.48	2.79	3	
99	13614-18	6.0	11.0	15.0	4	0.60	2.81	4	
100	13618-20	3.0	8.5	15.0	8	0.90	2.81	2	
101	13620-24	-3.0	6.0	23.0	20	1.30	2.87	4	I

Well 5
STATE NO. 16-2
C - NW 16-17N-17W

Zone	Depth Interval (GR)	ϕ_D(%)	ϕ_N(%)	GR (API Units)	RT (ohm-m)	log Rt	ρ_{mc} (gm/cc)	Thickness (ft)	Marker
									A
1	13327-32	-4.0	2.5	35.5	115	2.06	2.82	5	
2	13332-38	7.0	4.0	52.5	32	1.51	2.66	6	
3	13338-40	1.0	2.0	38.0	40	1.60	2.73	2	
4	13340-44	-2.0	2.5	30.0	32	1.51	2.79	4	
5	13344-47	-4.0	4.0	37.5	30	1.48	2.85	3	
6	13347-50	-4.5	2.5	30.0	30	1.48	2.83	3	
7	13350-53	-1.2	1.5	30.0	40	1.60	2.76	3	
8	13353-58	-3.5	0.8	26.0	53	1.72	2.78	5	
9	13358-62	-1.8	0.8	34.0	60	1.78	2.75	4	
10	13362-65	0.2	8.0	73.0	22	1.34	2.85	3	
11	13365-67	-6.2	4.0	47.5	23	1.36	2.89	2	
21	13367-70	-1.0	5.1	34.5	20	1.30	2.82	3	
31	13370-72	-0.6	3.0	35.0	21	1.32	2.77	2	
41	13372-74	-3.2	2.0	30.0	21	1.32	2.80	2	
51	13374-77	-0.5	3.0	35.0	19	1.28	2.77	3	
61	13377-81	2.0	1.8	32.0	25	1.40	2.71	4	
71	13381-87	-0.8	1.5	26.5	30	1.48	2.75	6	
81	13387-92	1.5	3.5	28.0	12	1.08	2.75	5	D?
19	13392-94	3.8	5.9	30.0	6.5	0.81	2.75	2	
20	13394-97	4.0	8.5	30.5	2.9	0.46	2.79	3	
21	13397-99	1.5	7.7	30.0	3	0.48	2.82	2	
22	13399-13403	5.8	11.1	34.0	4	0.60	2.81	4	
23	13403-06	1.4	6.0	25.0	7	0.85	2.79	3	E?
24	13406-12	-2.2	0.2	15.0	55	1.74	2.75	6	
25	13412-16	0.0	2.0	19.0	60	1.78	2.74	4	
26	13416-22	-2.3	0.0	15.0	350	2.54	2.75	6	
27	13422-26	-3.5	0.0	12.0	210	2.32	2.77	4	
28	13426-30	0.0	0.0	14.0	130	2.11	2.71	4	
29	13430-34	-1.3	0.3	13.5	80	1.90	2.74	4	F
30	13434-38	-1.0	0.6	13.5	40	1.60	2.74	4	
31	13438-44	0.0	0.5	10.5	50	1.70	2.72	6	
32	13444-48	-1.5	0.7	12.0	39	1.59	2.75	4	
33	13448-51	1.0	1.0	14.5	25	1.40	2.71	3	

Well 5 continued

Zone	Depth Interval (GR)	ϕ_D(%)	ϕ_N(%)	GR (API Units)	RT (ohm-m)	log Rt	ρ_{mc} (gm/cc)	Thickness (ft)	Marker
34	13451-56	0.0	1.1	14.5	22	1.34	2.73	5	
35	13456-60	1.1	1.3	15.0	26	1.41	2.71	4	
36	13460-65	-1.5	1.7	15.5	18	1.26	2.77	5	
37	13465-70	1.5	2.0	15.0	16	1.20	2.72	5	G
38	13470-73	-2.5	1.2	20.0	70	1.85	2.77	3	
39	13473-80	-1.0	1.0	25.0	110	2.04	2.74	7	
40	13480-84	-3.0	0.6	18.0	850	2.93	2.77	4	
41	13484-87	-1.2	0.6	24.0	320	2.51	2.74	3	
42	13487-89	0.7	0.7	24.0	360	2.56	2.71	2	
43	13489-92	-2.5	0.6	24.5	850	2.93	2.76	3	
44	13492-94	1.1	0.9	24.0	550	2.74	2.71	2	
45	13494-97	-1.5	0.6	25.5	1500	3.18	2.75	3	
46	13497-13500	0.0	0.7	21.5	700	2.85	2.72	3	
47	13500-03	-2.0	0.6	18.5	1500	3.18	2.75	3	
48	13503-05	0.6	0.6	21.0	1500	3.18	2.71	2	
49	13505-07	-1.4	0.7	22.0	1500	3.18	2.75	2	
50	13507-09	0.9	0.6	20.0	1500	3.18	2.70	2	
51	13509-11	-1.5	0.6	20.0	1500	3.18	2.75	2	
52	13511-13	0.8	0.6	20.0	800	2.90	2.71	2	
53	13513-18	-2.0	0.6	21.0	1200	3.08	2.75	5	
54	13518-25	0.8	0.8	23.0	180	2.26	2.71	7	
55	13525-28	3.1	0.8	21.5	270	2.43	2.67	3	
56	13528-30	2.0	1.3	25.0	205	2.31	2.70	2	
57	13530-34	0.0	1.0	25.0	480	2.68	2.73	4	
58	13534-37	1.5	1.3	22.5	300	2.48	2.71	3	
59	13537-42	-2.3	2.0	28.0	750	2.88	2.79	5	
60	13542-47	4.0	1.5	26.0	100	2.00	2.67	5	
61	13547-56	3.5	1.0	24.0	300	2.48	2.67	9	
62	13556-58	2.0	2.6	26.0	100	2.00	2.72	2	
63	13558-61	5.0	2.0	24.0	100	2.00	2.66	3	
64	13561-67	3.0	2.0	26.0	110	2.04	2.69	6	
65	13567-75	3.0	4.5	29.0	17	1.23	2.74	8	H
66	13575-77	3.0	1.0	20.0	600	2.78	2.68	2	
67	13577-80	-1.5	0.5	16.0	1500	3.18	2.74	3	
68	13580-84	0.6	0.6	19.5	60	1.78	2.71	4	

Well 5 continued

Zone	Depth Interval (GR)	ϕ_D(%)	ϕ_N(%)	GR (API Units)	RT (ohm-m)	log Rt	ρ_{mc} (gm/cc)	Thickness (ft)	Marker
69	13584-88	4.0	4.7	11.0	28	1.45	2.72	4	
70	13588-92	-2.5	0.5	15.0	150	2.18	2.76	4	
71	13592-94	0.6	0.5	16.5	550	2.74	2.71	2	
72	13594-97	-1.0	0.6	20.0	500	2.70	2.74	2	
73	13596-98	-4.0	0.7	18.0	800	2.90	2.79	2	
74	13598-13600	-2.5	0 6	21.5	1500	3.18	2.76	2	
75	13600-04	-1.0	0.7	22.5	100	2.00	2.74	4	
76	13604-07	-3.6	3.8	19.5	50	1.70	2.84	3	
77	13607-09	-1.2	1.5	15.0	150	2.18	2.76	2	
78	13609-12	-3.0	0.9	19.0	250	2.40	2.78	3	
79	13612-14	-4.6	0.9	17.0	150	2.18	2.80	2	
80	13614-16	-2.0	1.0	15.0	120	2.08	2.76	2	
81	14616-18	-5.0	1.2	16.5	125	2.10	2.82	2	
82	13618-20	-1.2	1.1	19.5	130	2.11	2.75	2	
83	13620-22	-0.1	1.3	20.5	130	2.11	2.73	2	
84	13622-24	-1.0	1.0	20.0	140	2.15	2.74	5	
85	13624-27	-1.0	1.0	11.0	160	2.20	2.74	3	
86	13627-32	1.0	0.7	11.0	250	2.40	2.70	5	
87	13632-34	-0.6	0.6	11.0	700	2.85	2.73	2	
88	13634-36	1.1	0.8	14.0	1400	3.15	2.70	2	
89	13636-38	0.0	0.8	11.0	1500	3.18	2.72	2	
90	13638-40	1.5	0.6	11.0	1500	3.18	2.69	2	
91	13640-42	0.5	0.6	10.5	1500	3.18	2.71	2	
92	13642-44	2.6	0.6	10.5	1500	3.18	2.68	2	
93	13644-47	-0.7	0.4	10.5	1500	3.18	2.73	3	
94	13647-49	-2.5	0.4	11.0	1200	3.08	2.76	2	
95	13649-51	-1.2	0.4	12.0	700	2.85	2.74	2	
96	13651-53	-2.6	0.6	10.0	300	2.48	2.77	2	
97	13653-55	0.0	0.7	11.5	150	2.18	2.72	2	
98	13655-58	1.0	1.2	14.0	50	1.70	2.71	3	
99	13658-61	-2.5	4.5	17.0	39	1.59	2.84	3	
100	13661-63	0.6	3.8	19.0	35	1.54	2.77	2	
101	13663-65	-2.1	3.5	20.0	31	1.49	2.81	2	
102	13665-67	1.0	4.0	18.0	38	1.58	2.76	2	
103	13667-69	-1.0	4.6	23.0	42	1.62	2.81	2	
104	13669-72	-3.0	6.0	22.5	60	1.78	2.87	3	
105	13672-74	-4.0	5.0	35.0	70	1.85	2.87	2	

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Well 6

LAWHON NO. 1

NE-SW/4 24-17N-17W

Zone	Depth Interval (GR)	ϕ_D(%)	ϕ_N(%)	GR (API Units)	RT (ohm-m)	log Rt	ρ_{mc} (gm/cc)	Thickness (ft)	Marker
1	13492-96	-7.0	2.6	25.0	265	2.42	2.88	4	
2	13496-99	-4.0	2.0	23.0	230	2.36	2.81	3	
3	13499-13502	-5.2	2.5	22.0	700	2.85	2.85	3	
4	13502-06	-3.2	4.2	24.0	230	2.36	2.84	4	
5	13506-09	-5.2	1.6	22.0	1500	3.18	2.83	3	
6	13509-12	-3.0	2.5	27.0	520	2.72	2.81	3	
7	13512-14	-0.5	3.0	30.0	500	2.70	2.77	2	
8	13514-16	-4.0	3.8	32.0	550	2.74	2.85	2	
9	13516-21	-4.7	2.9	25.5	550	2.74	2.84	5	
10	13521-24	-3.5	2.0	29.0	1500	3.18	2.81	3	
11	13524-26	-2.0	2.0	23.0	1400	3.15	2.78	2	
12	13526-28	-3.8	1.8	23.5	1300	3.11	2.81	2	
13	13528-30	-2.0	1.5	22.5	1500	3.18	2.77	2	
14	13530-34	-3.2	1.1	19.0	1500	3.18	2.78	4	
15	13534-36	-1.1	1.3	18.0	1500	3.18	2.75	2	
16	13536-38	-0.2	1.3	19.5	1500	3.18	2.74	2	
17	13538-41	-1.6	1.3	19.5	1500	3.18	2.76	3	
18	13541-44	-4.0	1.2	21.0	1500	3.18	2.80	3	
19	13544-47	-6.0	2.0	21.5	800	2.90	2.85	3	
20	13547-50	-4.5	1.8	24.0	690	2.84	2.82	3	
21	13550-52	-8.0	2.0	26.0	1000	3.00	2.88	2	
22	13552-55	-10.0	3.0	30.0	250	2.40	2.94	3	
23	13555-58	-4.0	4.0	33.0	120	2.08	2.85	3	D?
24	13558-61	-3.0	6.6	26.0	52	1.72	2.89	3	
25	13561-65	-1.1	9.0	22.5	60	1.78	2.90	4	
26	13565-68	-2.0	8.0	23.0	90	1.95	2.90	3	
27	13568-70	-3.2	6.0	23.0	135	2.13	2.88	2	
28	13570-74	-5.5	5.2	22.5	115	2.06	2.90	4	E?
29	13574-76	-3.0	3.7	20.0	240	2.38	2.83	2	
30	13576-81	-1.0	1.8	18.0	500	2.70	2.76	5	
31	13581-83	-4.0	2.3	19.0	300	2.48	2.82	2	
32	13583-85	0.2	1.2	18.5	200	2.30	2.73	2	
33	13585-87	-2.2	1.5	18.0	120	2.08	2.77	2	

Well 6 continued

Zone	Depth Interval (GR)	ϕ_D(%)	ϕ_N(%)	GR (API Units)	RT (ohm-m)	log Rt	ρ_{mc} (gm/cc)	Thickness (ft)	Marker
34	13587-92	-0.7	1.1	13.5	70	1.85	2.74	5	
35	13592-94	0.5	2.2	15.0	30	1.48	2.74	2	F
36	13594-98	-1.2	9.8	20.0	15	1.18	2.92	4	
37	13598-13601	2.0	13.0	15.0	5.2	0.72	2.93	3	
38	13601-05	6.6	15.2	15.0	4.3	0.63	2.88	4	
39	13605-07	2.1	14.0	13.0	6	0.78	2.95	2	
40	13607-10	8.0	15.0	14.0	7.5	0.88	2.85	3	
41	13610-13	-4.5	8.0	17.0	13	1.11	2.94	3	
42	13613-16	-1.0	7.0	18.5	23	1.36	2.86	3	
43	13616-19	-4.0	6.0	19.5	40	1.60	2.89	3	
44	13619-21	-7.2	5.0	17.0	53	1.72	2.93	2	
45	13621-25	-5.3	2.9	15.5	200	2.30	2.85	4	
46	13625-27	-7.3	5.2	17.5	60	1.78	2.94	2	
47	13627-31	-2.2	4.0	20.0	45	1.65	2.82	4	
48	13631-35	-0.3	4.8	21.5	37	1.57	2.80	4	
49	13635-38	-1.2	2.1	19.5	100	2.00	2.77	3	G
50	13638-41	-0.5	1.8	22.5	1500	3.18	2.75	3	
51	13641-49	-1.0	1.3	22.0	1500	3.18	2.75	8	
52	13649-53	0.0	1.0	19.0	1500	3.18	2.73	4	
53	13653-56	-0.7	1.0	16.0	1500	3.18	2.74	3	
54	13656-59	-3.0	0.9	19.0	1500	3.18	2.78	3	
55	13659-61	0.2	0.8	19.0	1500	3.18	2.72	2	
56	13661-63	-0.5	1.0	22.5	1500	3.18	2.74	2	
57	13663-65	1.0	1.2	22.5	1500	3.18	2.71	2	
58	13665-67	-0.3	1.3	22.0	1500	3.18	2.74	2	
59	13667-69	1.2	1.3	21.5	1500	3.18	2.71	2	
60	13669-72	-0.2	1.5	23.0	1500	3.18	2.74	3	
61	13672-75	-2.6	2.0	25.5	600	2.78	2.79	3	
62	13675-79	1.5	1.0	22.5	1400	3.15	2.70	4	
63	13679-81	-0.2	1.0	21.0	1500	3.18	2.73	2	
64	31681-83	3.1	1.1	20.5	1500	3.18	2.68	2	
65	13683-86	0.5	1.2	23.0	1500	3.18	2.72	3	
66	13686-88	2.6	1.2	22.5	1500	3.18	2.69	2	
67	13688-90	-1.0	1.2	22.5	1500	3.18	2.75	2	
68	13690-94	0.0	1.0	21.0	1500	3.18	2.73	4	

Well 6 continued

Zone	Depth Interval (GR)	ϕ_D(%)	ϕ_N(%)	GR (API Units)	RT (ohm-m)	log Rt	ρ_{mc} (gm/cc)	Thickness (ft)	Marker
69	13694-96	-0.5	2.0	30.0	700	2.85	2.75	2	
70	13696-98	-2.7	1.5	26.0	410	2.61	2.78	2	
71	13698-99	2.0	1.5	25.5	700	2.85	2.70	1	
72	13699-13701	0.8	1.5	25.0	1000	3.00	2.72	2	
73	13701-03	2.8	1.4	26.0	1500	3.18	2.69	2	
74	13703-06	0.0	1.9	26.0	1500	3.18	2.74	3	
75	13706-09	2.6	2.0	25.0	1500	3.18	2.70	3	
76	13709-11	0.0	2.4	27.5	1500	3.18	2.75	2	
77	13711-14	4.0	2.0	24.0	1500	3.18	2.68	3	
78	13714-17	1.0	2.0	25.0	1500	3.18	2.73	3	
79	13717-20	3.1	2.0	30.0	1500	3.18	2.69	3	
80	13720-23	-0.5	2.4	31.0	500	2.70	2.76	3	
81	13723-25	1.2	2.0	33.0	650	2.81	2.72	2	
82	13725-28	-4.5	1.0	21.0	1500	3.18	2.81	3	H
83	13728-30	1.0	1.0	17.5	1500	3.18	2.71	4	
84	13730-32	2.5	1.1	15.0	1500	3.18	2.69	2	
85	13732-35	-2.0	1.0	12.5	1500	3.18	2.76	3	
86	13735-37	2.0	1.2	12.5	1500	3.18	2.70	2	
87	13737-42	-3.5	1.2	14.0	1500	3.18	2.79	5	
88	13742-43	-5.0	1.2	14.0	1200	3.08	2.82	1	
89	13743-46	-2.5	1.7	15.0	550	2.74	2.78	3	
90	13746-49	-5.5	3.2	12.5	450	2.65	2.86	3	
91	13749-54	-4.0	1.7	16.5	1500	3.18	2.81	5	
92	13754-57	0.8	0.8	12.0	1500	3.18	2.71	3	
93	13757-59	-4.0	0.8	12.5	1500	3.1	2.79	2	
94	13759-61	-0.7	0.7	13.0	1300	3.11	2.73	2	
95	13761-63	0.5	0.8	13.0	600	2.78	2.72	2	
96	13763-67	-5.0	3.2	15.0	260	2.41	2.85	4	
97	13767-72	-3.5	1.5	13.5	700	2.85	2.80	5	F?
98	13772-74	-1.5	2.0	15.0	50	1.70	2.77	2	
99	13774-76	-3.5	4.0	15.0	25	1.40	2.84	2	
100	13776-78	-1.3	10.0	15.0	18	1.26	2.92	2	
101	13778-81	1.3	9.0	15.0	20	1.30	2.85	3	
102	31781-86	-3.0	2.3	14.5	110	2.04	2.80	5	
103	13786-88	0.7	2.4	15.0	200	2.30	2.74	2	G?

Well 6 continued

Zone	Depth Interval (GR)	ϕ_D(%)	ϕ_N(%)	GR (API Units)	RT (ohm-m)	log Rt	ρ_{mc} (gm/cc)	Thickness (ft)	Marker
104	13788-89	-4.0	2.0	15.5	230	2.36	2.81	1	
105	13789-91	-1.8	1.8	16.5	320	2.51	2.77	2	
106	13791-92	-3.3	1.5	19.5	520	2.72	2.79	1	
107	13792-94	1.8	1.2	20.0	600	2.78	2.70	2	
108	13794-97	-1.0	2.0	20.0	80	1.90	2.76	3	
109	13797-99	0.0	2.7	15.5	60	1.78	2.76	2	
110	13799-13802	2.0	2.0	18.0	90	1.95	2.71	3	
111	13802-05	-2.0	1.1	21.0	450	2.65	2.76	3	
112	13805-07	1.2	1.5	21.0	300	2.48	2.71	2	
113	13807-09	-5.5	2.5	20.0	260	2.41	2.85	2	
114	13809-11	-3.0	2.6	25.0	190	2.28	2.81	2	I

Well 7
CHRISTENSON "C" NO. 1
C 23-16N-16W

Zone	Depth Interval (GR)	ϕ_D(%)	ϕ_N(%)	GR (API Units)	RT (ohm-m)	log Rt	ρ_{mc} (gm/cc)	Thickness (ft)	Marker
1	14011-15	-1.8	2.0	45.0	210	2.32	2.78	4	A
2	14015-17	-3.0	4.0	40.0	120	2.08	2.83	2	
3	14017-19	0.5	3.0	35.0	140	2.15	2.75	2	
4	14019-21	-3.0	1.2	31.0	300	2.48	2.78	2	
5	14021-23	-6.0	3.0	25.5	700	2.85	2.87	2	
6	14023-27	-2.0	2.7	22.5	700	2.85	2.79	4	
7	14027-30	-4.3	1.5	25.0	1400	3.15	2.81	3	
8	14030-33	-6.5	2.0	45.0	1500	3.18	2.86	3	
9	14033-37	-2.5	1.0	31.5	1500	3.18	2.77	4	
10	14037-41	-8.0	2.0	28.5	1500	3.18	2.88	4	
11	14041-44	-5.5	1.2	31.0	1500	3.18	2.83	3	
12	14044-46	0.0	1.0	25.5	1500	3.18	2.73	2	
13	14046-48	-6.8	0.6	27.0	1500	3.18	2.84	2	
14	14048-50	0.0	0.0	21.0	1500	3.18	2.71	2	E?
15	14050-59	1.0	0.0	10.5	1500	3.18	2.69	9	
16	14059-65	-2.0	0.0	9.0	1500	3.18	2.74	6	
17	14065-69	4.0	0.0	9.5	1500	3.18	2.64	4	
18	14069-71	-0.2	0.0	10.0	1500	3.18	2.71	2	
19	14071-75	1.0	0.0	9.0	1500	3.18	2.69	4	
20	14075-79	-1.5	0.0	8.5	1500	3.18	2.74	4	
21	14079-84	1.0	0.0	9.0	1500	3.18	2.69	5	
22	14084-89	-1.0	0.0	11.0	1500	3.18	2.73	5	
23	14089-92	-3.0	0.0	9.5	1500	3.18	2.76	3	
24	14092-98	1.0	0.0	10.0	1500	3.18	2.69	6	
25	14098-14100	-2.0	0.0	8.0	1500	3.18	2.74	2	
26	14100-04	0.0	0.0	8.0	1500	3.18	2.71	4	
27	14104-10	1.0	0.2	12.0	1500	3.18	2.70	6	F?
28	14110-13	-5.0	3.0	27.0	400	2.60	2.85	3	
29	14113-16	-7.5	2.0	20.0	140	2.15	2.88	3	
30	14116-21	11.0	1.5	20.0	100	2.00	2.55	5	
31	14121-24	-10.0	0.9	20.0	1500	3.18	2.90	3	
32	14124-27	-8.0	1.0	16.0	1200	3.08	2.87	3	
33	14127-31	-7.0	0.7	15.0	1300	3.11	2.84	4	G?

Well 7 continued

Zone	Depth Interval (GR)	ϕ_D(%)	ϕ_N(%)	GR (API Units)	RT (ohm-m)	log Rt	ρ_{mc} (gm/cc)	Thickness (ft)	Marker
34	14131-37	-3.0	0.6	19.0	1500	3.18	2.77	6	
35	14137-39	-6.0	0.5	15.5	1500	3.18	2.82	2	
36	14139-43	-4.0	0.4	17.0	1500	3.18	2.79	4	
37	14143-50	-4.0	0.3	16.5	1500	3.18	2.78	7	
38	14150-52	0.3	0.3	17.0	1500	3.18	2.71	2	
39	14152-57	-1.5	0.5	20.0	1500	3.18	2.74	5	
40	14157-60	-3.0	0.6	21.0	1500	3.18	2.77	3	
41	14160-64	-6.0	0.7	22.5	1500	3.18	2.83	4	
42	14164-67	-1.2	0.5	22.0	1500	3.18	2.74	3	
43	14167-70	-0.6	0.7	25.0	1500	3.18	2.73	3	
44	14170-75	-3.0	0.7	22.5	1500	3.18	2.77	5	
45	14175-80	-1.0	0.5	14.0	1500	3.18	2.74	5	
46	14180-87	-3.2	0.6	25.0	1500	3.18	2.78	7	
47	14187-96	-1.0	0.6	21.5	1500	3.18	2.74	9	
48	14197-98	-6.0	0.6	20.0	1500	3.18	2.82	2	
49	14198-14200	1.0	0.5	20.5	1500	3.18	2.70	2	
50	14200-08	-3.0	0.4	19.0	1500	3.18	2.77	8	
51	14208-12	-1.4	0.3	17.0	1500	3.18	2.74	4	
52	12412-16	-4.5	0.2	17.0	1500	3.18	2.79	4	
53	14216-18	-0.5	0.2	16.0	1500	3.18	2.72	2	
54	14218-20	-5.0	0.1	15.5	1500	3.18	2.80	2	
55	14220-24	-2.5	0.1	15.5	1500	3.18	2.75	4	
56	14224-27	-0.6	0.1	15.0	1500	3.18	2.72	3	
57	14227-29	1.0	0.1	15.0	1500	3.18	2.69	2	
58	14229-31	-4.2	0.1	15.0	1500	3.18	2.78	2	
59	14231-37	1.0	0.1	12.5	1500	3.18	2.69	6	
60	14237-42	-1.0	0.1	13.0	1500	3.18	2.73	5	
61	14242-44	-4.0	0.1	12.0	1500	3.18	2.78	2	
62	14244-46	-0.5	0.1	12.0	1500	3.18	2.72	2	
63	14246-48	-4.0	0.1	13.0	1500	3.18	2.78	2	
64	14248-50	1.5	0.1	14.5	1500	3.18	2.69	2	
65	14250-52	-2.3	0.2	14.5	1500	3.18	2.75	2	
66	14252-54	2.0	0.2	14.5	1500	3.18	2.68	2	
67	14254-58	-4.0	0.2	13.0	1500	3.18	2.78	4	
68	14258-65	-1.0	0.3	13.5	1500	3.18	2.73	7	

Well 7 continued

Zone	Depth Interval (GR)	ϕ_D(%)	ϕ_N(%)	GR (API Units)	RT (ohm-m)	log Rt	ρ_{mc} (gm/cc)	Thickness (ft)	Marker
69	14265-67	-3.0	0.5	16.5	1500	3.18	2.77	2	
70	14267-74	-1.0	0.6	22.0	1500	3.18	2.74	7	
71	14274-82	-2.7	0.6	21.0	1500	3.18	2.77	8	
72	14282-86	-1.2	0.7	19.0	1500	3.18	2.74	4	
73	14286-93	-1.0	0.7	22.0	1500	3.18	2.74	7	
74	14293-96	2.0	0.7	21.0	1500	3.18	2.69	3	
75	14296-98	-2.0	0.7	21.0	1500	3.18	2.76	2	
76	14298-14300	-0.5	0.6	20.5	1500	3.18	2.73	2	
77	14300-02	0.8	0.7	20.5	1500	3.18	2.71	2	
78	14302-04	-2.0	0.7	20.0	1500	3.18	2.76	2	
79	14304-06	1.2	0.8	19.0	1500	3.18	2.70	2	
80	14306-08	-1.5	1.0	20.0	1500	3.18	2.75	2	
81	14308-10	1.0	1.0	22.0	1500	3.18	2.71	2	
82	14310-14	-1.0	1.2	23.0	1500	3.18	2.75	4	
83	14314-17	-3.0	1.2	24.0	1500	3.18	2.78	3	
84	14317-22	-1.0	1.5	26.0	1500	3.18	2.75	5	
85	14322-24	2.0	3.0	36.0	500	2.70	2.73	2	
86	14324-26	-1.0	1.0	24.0	750	2.8	2.74	2	
87	14326-28	1.1	1.1	26.0	1500	3.18	2.71	2	
88	14328-30	-0.3	1.1	24.0	1500	3.18	2.73	2	
89	14330-37	2.0	2.0	25.5	1500	3.18	2.71	7	
90	14337-42	-2.0	3.0	36.0	450	2.65	2.80	5	
91	14342-46	1.0	2.0	32.0	500	2.70	2.73	4	
92	14346-48	0.0	1.5	36.0	1300	3.11	2.74	2	
93	14348-52	1.5	2.2	45.0	310	2.49	2.72	4	
94	14352-55	-5.2	1.5	36.0	800	2.90	2.83	3	
95	14355-59	-2.0	1.2	34.0	1500	3.18	2.77	4	
96	14359-62	-5.5	0.7	15.0	1500	3.18	2.82	3	H
97	14362-65	-1.5	0.2	17.5	1500	3.18	2.74	3	
98	14365-67	1.5	0.1	15.0	1500	3.18	2.69	2	
99	14367-69	-7.0	0.1	15.0	1500	3.18	2.83	2	
100	14369-71	-3.0	0.0	15.0	1500	3.18	2.76	2	
101	14371-72	-5.2	0.0	15.0	1500	3.18	2.80	1	
102	14372-76	2.0	0.0	10.5	1500	3.18	2.68	4	
103	14376-79	-1.0	0.0	12.0	1500	3.18	2.73	3	

Well 7 continued

Zone	Depth Interval (GR)	ϕ_D(%)	ϕ_N(%)	GR (API Units)	RT (ohm-m)	log Rt	ρ_{mc} (gm/cc)	Thickness (ft)	Marker
104	14379-82	2.8	0.0	11.0	1500	3.18	2.66	3	
105	14382-84	0.3	0.0	10.0	1500	3.18	2.70	2	
106	14384-87	-2.5	0.0	11.5	1500	3.18	2.75	3	
107	14387-90	2.0	0.0	10.0	1500	3.18	2.68	3	
108	14390-92	-3.4	0.0	10.0	1500	3.18	2.77	2	
109	14392-98	-1.0	0.0	10.5	1500	3.18	2.73	6	
110	14398-14401	-2.7	0.0	12.0	1500	3.18	2.76	3	
111	14401-04	0.0	0.1	12.5	1500	3.18	2.71	3	
112	14404-07	-4.0	0.4	14.0	1500	3.18	2.79	3	
113	14407-09	-2.0	0.4	13.0	1500	3.18	2.75	2	
114	14409-11	-4.0	0.4	15.0	1500	3.18	2.79	2	
115	14411-13	-2.5	0.5	15.0	1500	3.18	2.76	2	
116	14413-16	-7.0	0.6	15.0	1500	3.18	2.84	3	
117	14416-18	1.5	0.7	16.5	1500	3.18	2.70	2	
118	14418-21	-2.7	0.7	18.0	1500	3.18	2.77	3	
119	14421-23	0.8	0.8	16.5	1500	3.18	2.71	2	
120	14423-25	-3.6	0.9	16.0	1500	3.18	2.79	2	
121	14425-27	-0.6	0.8	16.0	1500	3.18	2.73	2	
122	14427-28	-3.0	0.7	16.0	1500	3.18	2.77	1	
123	14428-30	-0.7	0.7	18.0	1500	3.18	2.73	2	
124	14430-34	-2.5	0.8	16.5	1500	3.18	2.77	4	
125	14434-39	-1.0	0.7	18.0	1500	3.18	2.74	5	
126	14439-44	-7.0	2.0	19.0	300	2.48	2.87	5	
127	14444-47	1.2	0.6	13.0	1500	3.18	2.70	3	
128	14447-51	-10.0	2.6	26.0	500	2.70	2.93	4	I

Well 8

TALOGA TOWNSITE NO. 1-13

NW-NE-NW 13-18N-17W

Zone	Depth Interval (GR)	ϕ_D(%)	ϕ_N(%)	GR (API Units)	RT (ohm-m)	log Rt	ρ_{mc} (gm/cc)	Thickness (ft)	Marker
1	12112-14	-6.0	1.5	21.0	100	2.00	2.84	2	A
2	12114-17	-3.0	1.0	15.0	200	2.30	2.78	3	
3	12117-21	-4.5	0.9	11.0	130	2.11	2.80	4	
4	12121-25	0.0	0.7	13.0	190	2.28	2.72	4	
5	12125-27	-4.0	1.1	14.0	130	2.11	2.80	2	
6	12127-29	-0.6	1.3	14.5	80	1.90	2.74	2	
7	12129-34	-3.0	2.0	15.0	60	1.78	2.80	5	
8	12134-37	-1.0	0.7	15.0	200	2.30	2.74	3	
9	12137-42	0.7	0.7	15.0	210	2.32	2.71	5	
10	12142-45	2.0	0.7	17.5	330	2.52	2.69	3	
11	12145-48	-1.9	1.2	18.5	150	2.18	2.76	3	
12	12148-52	0.0	1.2	20.5	180	2.26	2.73	4	
13	12152-56	1.0	1.0	20.0	240	2.38	2.71	4	
14	12156-59	-1.0	1.2	23.0	260	2.41	2.75	3	
15	12159-62	-2.6	1.2	21.0	215	2.33	2.78	3	
16	12162-67	-0.6	0.9	22.0	240	2.38	2.74	5	
17	12167-69	-2.7	0.6	15.0	380	2.58	2.77	2	
18	12169-72	0.2	0.7	17.5	480	2.68	2.72	3	
19	12172-74	-1.0	0.9	15.5	360	2.56	2.74	2	D?
20	12174-76	-1.5	1.3	20.0	230	2.36	2.76	2	
21	12176-80	-2.5	1.3	19.0	175	2.24	2.78	4	
22	12180-88	0.0	0.6	16.0	415	2.62	2.72	8	E?
23	12188-90	0.6	0.6	15.0	400	2.60	2.71	2	
24	12190-93	0.5	0.7	14.0	300	2.48	2.71	3	
25	12193-95	-2.0	0.8	13.0	260	2.41	2.76	2	
26	12195-98	0.6	0.7	13.0	250	2.40	2.71	3	
27	12198-12200	-2.2	0.7	14.5	300	2.48	2.76	2	
28	12200-03	0.7	0.7	14.0	310	2.49	2.71	3	
29	12203-06	-2.0	0.6	14.5	300	2.48	2.75	3	
30	12206-08	0.0	0.7	12.0	240	2.38	2.72	2	
31	12208-10	-0.7	0.8	13.0	320	2.51	2.74	2	
32	12210-13	0.0	0.7	11.0	300	2.48	2.72	3	
33	12213-17	-4.3	0.8	11.0	270	2.43	2.80	2	

Well 8 continued

Zone	Depth Interval (GR)	ϕ_D(%)	ϕ_N(%)	GR (API Units)	RT (ohm-m)	log Rt	ρ_{mc} (gm/cc)	Thickness (ft)	Marker
34	12217-21	-1.0	0.9	11.0	210	2.32	2.74	4	
35	12221-23	0.0	0.8	11.5	170	2.23	2.72	2	
36	12223-27	-2.4	0.9	11.0	140	2.15	2.77	4	
37	12227-30	-1.0	0.8	11.0	105	2.02	2.74	3	
38	12230-34	-3.8	1.5	11.0	60	1.78	2.80	4	F
39	12234-38	-3.7	2.0	12.5	30	1.48	2.81	4	
40	12238-40	0.0	4.0	9.0	10	1.00	2.78	2	
41	12240-42	4.0	9.0	10.0	6	0.78	2.80	2	
42	12242-44	6.0	12.0	11.0	4.2	0.62	2.83	2	
43	12244-48	8.0	16.0	10.5	2.8	0.45	2.87	4	
44	12248-53	10.5	17.0	10.5	2.1	0.32	2.84	5	
45	12253-55	7.2	14.1	10.0	2.8	0.45	2.85	2	
46	12255-58	5.7	12.0	10.5	3.5	0.54	2.83	3	
47	12258-62	1.5	10.0	14.0	4	0.60	2.87	4	
48	12262-66	5.0	12.0	10.0	6	0.78	2.85	4	
49	12266-68	-2.0	5.4	10.0	15	1.18	2.84	2	
50	12268-71	-4.1	4.2	10.0	30	1.48	2.86	3	
51	12271-73	-2.0	3.8	9.0	40	1.60	2.81	2	
52	12273-75	-1.0	3.0	10.0	60	1.78	2.78	2	
53	12275-76	-2.4	1.8	13.0	80	1.90	2.78	1	G
54	12276-79	-1.0	1.8	20.0	120	2.08	2.76	3	
55	12279-81	4.0	1.0	15.5	170	2.23	2.66	2	
56	12281-86	1.0	0.8	15.0	220	2.34	2.70	5	
57	12286-89	-2.0	0.6	19.0	300	2.48	2.75	3	
58	12289-91	2.3	0.5	17.0	500	2.70	2.68	2	
59	12281-93	1.5	0.7	15.5	400	2.60	2.70	2	
60	12293-98	-2.0	1.3	26.0	230	2.36	2.77	5	
61	12298-12301	3.7	1.4	22.5	300	2.48	2.67	3	
62	12301-04	-2.1	1.9	29.0	320	2.51	2.78	3	
63	12304-06	2.5	1.9	29.5	310	2.49	2.70	2	
64	12306-09	3.0	2.1	27.5	150	2.18	2.69	3	
65	12309-13	-1.8	3.3	30.0	38	1.58	2.80	4	H
66	12313-15	3.0	0.2	13.0	100	2.00	2.66	2	
67	12315-18	0.5	0.5	8.0	750	2.88	2.71	3	
68	12318-20	2.0	0.2	8.5	600	2.78	2.68	2	

Well 8 continued

Zone	Depth Interval (GR)	ϕ_D(%)	ϕ_N(%)	GR (API Units)	RT (ohm-m)	log Rt	ρ_{mc} (gm/cc)	Thickness (ft)	Marker
69	12320-22	-1.0	0.2	9.0	800	2.90	2.73	2	
70	12322-25	2.0	0.2	8.0	500	2.70	2.68	3	
71	12325-32	0.2	0.2	8.0	450	2.65	2.71	7	
72	12332-38	-1.0	1.0	10.0	200	2.30	2.74	6	
73	12338-41	1.0	1.0	13.5	110	2.04	2.71	3	
74	12341-43	-3.0	4.0	15.0	65	1.81	2.83	2	
75	12343-45	3.5	3.0	15.0	60	1.78	2.70	2	
76	12345-48	-2.0	1.3	17.0	110	2.04	2.77	3	
77	12348-50	0.0	0.6	17.5	200	2.30	2.72	2	
78	12350-56	-0.5	0.8	11.0	170	2.23	2.73	6	
79	12356-60	1.0	1.0	9.0	110	2.04	2.71	4	
80	12360-63	-2.5	1.2	8.5	30	1.48	2.77	3	
81	12363-68	1.0	7.5	10.5	9	0.95	2.83	5	
82	12368-71	5.0	7.0	11.0	9	0.95	2.75	3	
83	12371-74	1.5	7.4	10.5	8.5	0.93	2.82	3	
84	12374-77	3.0	7.0	10.5	9.5	0.98	2.78	3	
85	12377-80	-0.3	5.2	11.0	15	1.18	2.81	3	
86	12380-83	2.0	3.0	12.0	30	1.48	2.73	3	
87	12383-87	-3.0	1.0	10.0	80	1.90	2.78	4	
88	12387-92	-0.6	2.0	14.5	70	1.85	2.76	5	
89	12392-96	2.5	2.5	13.5	70	1.85	2.71	4	
90	12397-98	4.0	2.0	12.5	95	1.98	2.68	2	
91	12398-12402	3.0	1.5	13.0	80	1.90	2.68	4	
92	12402-04	0.0	1.5	12.0	90	1.95	2.74	2	
93	12404-10	2.0	1.2	14.0	110	2.04	2.70	6	
94	12410-12	4.2	2.8	15.0	30	1.48	2.69	2	
95	12412-14	-2.0	3.0	20.0	32	1.51	2.80	2	I

Well 9
KOUNS UNIT NO. 1
C - NE 18-17N-17W

Zone	Depth Interval (GR)	ϕ_D(%)	ϕ_N(%)	GR (API Units)	RT (ohm-m)	log Rt	ρ_{mc} (gm/cc)	Thickness (ft)	Marker
1	13270-72	5.0	5.0	15.0	90	1.95	2.71	2	A
2	13272-74	0.0	3.0	15.5	140	2.15	2.76	2	
3	13274-77	2.3	3.0	15.0	110	2.04	2.72	3	
4	13277-82	-3.5	0.7	19.0	80	1.90	2.78	5	
5	13282-84	0.0	0.5	14.0	120	2.08	2.72	2	
6	13284-89	-2.0	0.5	15.0	200	2.30	2.75	5	
7	13289-92	-0.7	1.0	14.5	170	2.23	2.74	3	
8	13292-96	-2.2	0.5	12.0	120	2.08	2.76	4	
9	13296-13303	-3.5	0.0	12.0	420	2.62	2.77	7	
10	13303-07	-2.0	0.0	9.0	260	2.41	2.74	4	
11	13307-09	-1.0	0.0	11.0	300	2.48	2.73	2	
12	13309-12	-1.5	0.2	10.0	200	2.30	2.74	3	
13	13312-14	0.0	0.2	11.0	120	2.08	2.71	2	
14	13314-19	-2.5	0.0	7.5	64	1.81	2.75	5	
15	13319-22	-2.0	0.0	7.0	75	1.88	2.74	3	
16	13322-26	1.0	0.0	7.5	80	1.90	2.69	4	
17	13326-30	-1.0	0.0	10.0	90	1.95	2.73	4	
18	13330-34	-2.0	0.0	8.0	60	1.78	2.74	4	
19	13334-38	-2.0	0.0	14.0	47	1.67	2.74	4	
20	13338-40	-0.2	0.1	15.0	60	1.78	2.72	2	
21	13340-43	-2.5	0.5	20.0	100	2.00	2.76	3	
22	13343-48	-1.0	0.4	22.0	60	1.78	2.73	5	
23	13348-53	0.5	0.5	23.0	70	1.85	2.71	5	
24	13353-57	-0.5	0.7	16.0	70	1.85	2.73	4	
25	13357-62	-1.0	1.5	23.5	28	1.45	2.75	5	D?
26	13362-66	-0.5	0.3	20.0	40	1.60	2.72	4	E?
27	13366-70	-2.2	0.1	15.0	65	1.81	2.75	4	
28	13370-80	-2.0	0.5	11.0	100	2.00	2.75	10	
29	13380-85	-1.5	1.0	11.5	45	1.65	2.75	5	
30	13385-88	0.0	1.3	10.0	40	1.60	2.73	3	F?
31	13388-92	3.0	4.5	10.0	50	1.70	2.74	4	
32	13392-97	4.0	8.0	9.0	75	1.88	2.78	5	
33	13397-13401	6.0	6.0	11.0	105	2.02	2.71	4	

Well 9 continued

Zone	Depth Interval (GR)	ϕ_D(%)	ϕ_N(%)	GR (API Units)	RT (ohm-m)	log Rt	ρ_{mc} (gm/cc)	Thickness (ft)	Marker
34	13401-05	14.0	15.0	10.0	100	2.00	2.73	4	
35	13405-08	14.0	10.5	11.0	170	2.23	2.64	3	
36	13408-12	14.5	12.7	11.0	105	2.02	2.67	4	
37	13412-16	11.0	10.0	10.5	175	2.24	2.69	4	
38	13416-19	9.5	8.5	10.0	180	2.26	2.69	3	
39	13419-22	3.5	7.0	10.0	190	2.28	2.77	3	
40	13422-25	6.0	8.5	10.5	160	2.20	2.76	3	
41	13425-28	2.0	3.0	11.0	140	2.15	2.73	3	
42	13428-32	-3.5	2.0	14.5	70	1.85	2.81	4	
43	13432-42	0.0	0.0	15.0	150	2.18	2.71	10	G
44	13442-50	3.0	0.1	21.0	270	2.43	2.66	8	
45	13450-58	0.0	0.0	15.0	300	2.48	2.71	8	
46	13458-63	2.0	0.0	15.0	440	2.64	2.68	5	
47	13463-66	1.0	0.0	20.0	230	2.36	2.69	3	
48	13466-69	-2.0	0.0	15.0	290	2.46	2.74	3	
49	13469-75	0.5	0.0	14.0	380	2.58	2.70	6	
50	13475-78	-2.0	0.0	15.0	270	2.43	2.74	3	
51	13478-84	3.2	0.0	15.0	240	2.38	2.66	6	
52	13484-87	0.0	0.0	15.0	300	2.48	2.71	3	
53	13487-93	2.0	0.0	15.5	270	2.43	2.68	6	
54	13493-97	0.5	0.0	15.0	220	2.34	2.70	4	
55	13497-99	-1.7	0.0	15.5	300	2.48	2.74	2	
56	13499-13505	2.0	0.0	14.5	240	2.38	2.68	6	
57	13505-11	3.0	0.0	15.0	230	2.36	2.66	6	
58	13511-18	1.0	0.0	15.0	300	2.48	2.69	7	
59	13518-24	1.0	0.0	19.0	210	2.32	2.69	6	
60	13524-26	4.0	0.0	15.0	130	2.11	2.64	2	
61	13526-28	1.0	0.0	13.0	180	2.26	2.69	2	
62	13528-30	3.0	0.0	14.5	200	2.30	2.66	2	
63	13530-32	-1.5	0.0	15.0	420	2.62	2.74	2	
64	13532-34	2.5	0.0	15.5	330	2.52	2.67	2	
65	13534-38	3.0	0.0	18.0	230	2.36	2.66	4	
66	13538-43	1.0	0.0	22.5	230	2.36	2.69	5	
67	13543-45	6.0	0.2	17.0	190	2.28	2.61	2	
68	13545-47	2.5	0.5	24.0	140	2.15	2.68	2	

Well 9 continued

Zone	Depth Interval (GR)	ϕ_D(%)	ϕ_N(%)	GR (API Units)	RT (ohm-m)	log Rt	ρ_{mc} (gm/cc)	Thickness (ft)	Marker
69	13547-48	6.0	0.3	21.0	200	2.30	2.61	1	
70	13548-52	4.0	0.0	15.5	190	2.28	2.64	4	
71	13552-57	2.5	0.0	15.0	300	2.48	2.67	4	
72	13556-61	5.5	0.5	20.0	170	2.23	2.62	5	
73	13561-65	3.5	0.8	19.0	200	2.30	2.66	4	
74	13565-69	2.0	0.7	20.0	200	2.30	2.69	4	
75	13569-73	4.0	0.5	20.0	230	2.36	2.65	4	
76	13573-76	1.5	0.6	26.0	190	2.28	2.69	3	
77	13576-78	3.5	0.8	24.0	110	2.04	2.66	2	H
78	13579-82	0.0	0.0	15.0	100	2.00	2.71	3	
79	13582-87	4.0	0.0	20.0	420	2.62	2.64	5	
80	13587-93	0.0	0.0	13.0	280	2.45	2.71	6	
81	13593-95	-1.8	4.0	8.0	50	1.70	2.81	2	
82	13595-13601	4.0	8.0	7.5	11	1.04	2.78	6	
83	13601-05	-1.0	0.0	13.0	60	1.78	2.73	4	
84	13605-08	-4.0	0.3	8.5	200	2.30	2.78	3	
85	13608-12	-2.0	0.1	12.0	150	2.18	2.75	4	
86	13612-16	0.0	0.0	7.5	700	2.85	2.71	4	
87	13616-18	-1.1	0.9	15.0	200	2.30	2.74	2	
88	13618-22	-4.0	0.3	11.0	90	1.95	2.78	4	
89	13622-24	0.2	0.2	10.5	120	2.08	2.71	2	
90	13624-27	1.2	0.1	13.0	200	2.30	2.69	3	
91	13627-32	-0.4	0.7	7.5	80	1.90	2.73	5	
92	13632-35	2.2	0.2	7.0	55	1.74	2.68	3	
93	13635-38	-1.2	0.3	8.0	140	2.15	2.74	3	
94	13638-40	2.0	0.8	8.5	110	2.04	2.69	2	
95	13640-44	-1.0	1.0	7.5	68	1.83	2.74	4	
96	13644-48	1.7	1.0	7.5	75	1.88	2.70	4	
97	13648-53	6.0	9.0	8.5	10.5	1.02	2.77	5	
98	13653-56	-2.0	4.0	9.0	14	1.15	2.82	3	
99	13656-60	8.0	7.5	8.0	12	1.08	2.70	4	
100	13660-62	0.0	2.6	10.0	20	1.30	2.76	2	
101	13662-64	3.0	3.0	9.0	23	1.36	2.71	2	
102	13664-66	1.5	2.8	12.0	25	1.40	2.73	2	
103	13666-68	5.2	2.0	20.0	30	1.48	2.65	2	I

Well 10
J.W. Briggs Unit No. 1
C SW/4 18-17N-17W

Zone	Depth Interval (GR)	ϕ_D(%)	ϕ_N(%)	GR (API Units)	RT (ohm-m)	log Rt	ρ_{mc} (gm/cc)	Thickness (ft)	Marker
									A
1	13306-10	-3.0	1.1	30.0	180	2.26	2.78	4	
2	13310-14	-3.0	2.8	20.0	90	1.95	2.81	4	
3	13314-19	1.0	7.0	25.0	60	1.78	2.82	5	
4	13319-23	7.0	12.0	15.0	140	2.15	2.81	4	
5	13323-27	0.0	5.5	20.0	90	1.95	2.81	4	
6	13327-29	-2.6	5.0	21.0	44	1.64	2.85	2	
7	13329-31	3.0	5.5	25.0	50	1.70	2.76	2	
8	13331-35	-3.0	2.5	25.0	100	2.00	2.81	4	D? E?
9	13335-40	12.5	4.0	30.0	180	2.26	2.56	5	
10	13340-43	-2.0	2.0	22.0	100	2.00	2.79	3	
11	13343-46	1.0	4.0	22.5	80	1.90	2.76	3	
12	13346-51	-2.5	1.6	22.5	400	2.60	2.78	5	
13	13351-53	2.0	1.6	23.0	200	2.30	2.70	2	
14	13353-56	0.0	1.5	22.5	190	2.28	2.74	3	
15	13356-69	-4.0	0.8	22.0	280	2.45	2.79	3	
16	13359-61	-0.5	1.0	24.0	220	2.34	2.74	2	
17	13361-67	-4.0	0.8	22.5	200	2.30	2.79	6	
18	13367-71	-1.0	0.6	22.0	340	2.53	2.74	4	
19	13371-76	-3.0	1.5	24.0	190	2.28	2.79	5	
20	13376-80	-2.0	1.0	22.0	360	2.56	2.76	4	
21	13380-83	-4.0	2.5	20.0	110	2.04	2.82	3	
22	13383-86	-5.0	3.5	20.0	120	2.08	2.86	3	
23	13386-89	-3.0	4.0	26.0	100	2.00	2.83	3	
24	13389-93	0.0	4.0	22.0	75	1.88	2.78	4	
25	13393-95	-4.0	5.0	22.0	70	1.85	2.87	2	
26	13395-98	2.0	7.0	19.0	140	2.15	2.80	3	
27	13398-13402	0.0	5.0	15.5	130	2.11	2.80	4	
28	13402-06	-1.0	4.4	18.0	150	2.18	2.81	4	F
29	13406-09	-2.0	3.0	21.0	145	2.16	2.80	3	
30	13409-13	-6.0	2.5	22.0	70	1.85	2.86	4	
31	13413-18	1.0	5.0	26.0	26	1.41	2.78	5	G
32	13418-21	0.0	6.7	23.0	32	1.51	2.83	3	
33	13421-24	-2.5	3.0	30.0	60	1.78	2.81	3	

Well 10 continued

Zone	Depth Interval (GR)	ϕ_D(%)	ϕ_N(%)	GR (API Units)	RT (ohm-m)	log Rt	ρ_{mc} (gm/cc)	Thickness (ft)	Marker
34	13424-27	1.2	1.2	21.0	70	1.85	2.71	3	
35	13427-31	-3.0	2.0	23.0	60	1.78	2.80	4	
36	13431-34	1.0	1.2	21.0	65	1.81	2.71	3	
37	13434-36	-2.3	1.3	21.0	64	1.81	2.77	2	
38	13436-38	-0.5	1.0	20.0	70	1.85	2.74	2	
39	13438-41	1.8	1.0	21.0	82	1.91	2.70	3	
40	13441-44	-0.5	1.3	20.0	80	1.90	2.74	3	
41	13444-48	1.5	2.0	23.0	75	1.88	2.72	4	
42	13448-51	-2.2	1.0	19.0	120	2.08	2.77	3	
43	13451-55	2.0	0.7	22.0	160	2.20	2.69	4	
44	13455-58	2.0	1.0	25.0	200	2.30	2.69	3	
45	13458-62	-1.0	0.6	21.0	300	2.48	2.74	4	
46	13462-66	-1.5	0.6	23.0	295	2.47	2.75	4	
47	13466-68	-1.0	0.8	22.5	290	2.46	2.74	2	
48	13468-74	0.5	1.0	21.0	300	2.48	2.72	6	
49	13474-77	2.0	1.4	20.0	330	2.52	2.70	3	
50	13477-80	0.5	1.2	22.5	280	2.45	2.72	3	
51	13480-84	2.0	0.7	18.0	420	2.62	2.69	4	
52	13484-87	-2.0	0.5	19.0	420	2.62	2.75	3	
53	13487-91	1.0	0.4	20.0	550	2.74	2.70	4	
54	13491-98	1.0	0.5	22.0	300	2.48	2.70	7	
55	13498-13501	1.0	0.4	19.0	600	2.78	2.70	3	
56	13501-05	0.0	0.7	25.0	370	2.57	2.72	4	
57	13505-10	3.5	0.4	18.0	600	2.78	2.72	5	
58	13510-14	1.0	0.3	20.0	530	2.72	2.70	4	
59	13514-17	2.0	0.5	19.0	1500	3.18	2.68	3	
60	13517-21	0.0	0.6	21.5	1500	3.18	2.72	4	
61	13521-24	2.0	0.6	22.5	400	2.60	2.69	3	
62	13524-28	-0.5	0.8	30.0	700	2.85	2.73	4	
63	13528-31	3.5	0.2	20.0	1500	3.18	2.65	3	
64	13531-34	-0.5	0.7	25.0	800	2.90	2.73	3	
65	13534-42	0.5	0.5	20.0	1500	3.18	2.73	6	
66	13542-47	-0.5	0.8	29.0	850	2.93	2.73	5	
67	13547-50	-2.0	0.4	23.0	1500	3.18	2.75	3	
68	13550-53	4.6	0.1	21.0	1500	3.18	2.63	3	

Well 10 continued

Zone	Depth Interval (GR)	ϕ_D(%)	ϕ_N(%)	GR (API Units)	RT (ohm-m)	log Rt	ρ_{mc} (gm/cc)	Thickness (ft)	Marker
69	13553-57	1.0	0.1	15.0	1500	3.18	2.69	4	
70	13559-62	3.0	0.3	22.5	1500	3.18	2.66	5	
71	13562-65	-0.6	0.1	22.0	1500	3.18	2.72	3	
72	13565-69	0.5	0.5	24.0	1500	3.18	2.71	4	
73	13569-72	-1.0	0.5	30.0	1500	3.18	2.74	3	
74	13572-76	3.5	0.5	28.0	1500	3.18	2.66	4	
75	13576-78	0.5	0.5	23.0	1500	3.18	2.71	2	
76	13578-83	4.0	0.5	21.5	1500	3.18	2.65	5	
77	13583-86	1.5	0.5	30.0	1500	3.18	2.69	3	
78	13586-89	4.5	0.4	25.0	1500	3.18	2.64	3	
79	13589-96	3.0	0.5	24.0	1300	3.11	2.67	7	
80	13596-13000	2.0	0.7	27.0	900	2.95	2.69	4	
81	13600-03	-2.0	0.8	30.0	700	2.85	2.76	3	
82	13603-06	3.0	0.8	19.5	900	2.95	2.67	3	
83	13606-08	0.3	0.2	28.0	650	2.81	2.71	2	
84	13608-10	-1.0	0.3	24.0	1200	3.08	2.73	2	H
85	13610-13	3.2	0.0	20.0	800	2.90	2.66	3	
86	13613-15	0.2	0.0	19.5	650	2.81	2.71	2	
87	13615-19	2.0	0.0	15.0	500	2.70	2.68	4	
88	13619-23	-0.6	0.0	15.0	500	2.70	2.72	4	
89	13623-26	-1.0	0.1	13.5	200	2.30	2.73	3	
90	13626-28	-2.7	1.0	12.0	60	1.78	2.77	2	
91	13628-32	0.5	6.0	10.5	32	1.51	2.81	4	
92	13632-34	-2.5	2.0	10.5	70	1.85	2.79	2	
93	13634-35	1.3	1.0	12.0	150	2.18	2.70	1	
94	13635-36	-4.0	0.5	14.0	200	2.30	2.79	1	
95	13636-37	2.5	0.0	15.0	210	2.32	2.67	1	
96	13637-38	-2.3	0.0	14.0	300	2.48	2.75	1	
97	13638-40	2.0	0.2	16.0	400	2.60	2.68	2	
98	13640-43	-2.6	0.5	13.0	450	2.65	2.76	3	
99	13643-46	-0.2	0.1	15.0	500	2.70	2.72	3	
100	13646-49	-2.2	0.1	15.0	1500	3.18	2.75	3	
101	13649-53	9.0	1.0	18.0	200	2.30	2.57	4	
102	13653-56	1.0	0.3	15.0	1000	3.00	2.70	3	
103	13656-59	-2.6	0.3	15.0	300	2.48	2.76	3	

Well 10 continued

Zone	Depth Interval (GR)	ϕ_D(%)	ϕ_N(%)	GR (API Units)	RT (ohm-m)	log Rt	ρ_{mc} (gm/cc)	Thickness (ft)	Marker
104	13659-61	0.0	0.3	11.5	250	2.40	2.72		
105	13661-64	-3.4	0.3	12.0	160	2.20	2.77		
106	13664-68	0.8	0.0	9.0	100	2.00	2.70		
107	13668-70	-5.2	0.5	11.0	55	1.74	2.81		
108	13670-75	-0.7	0.7	12.0	40	1.60	2.73		
109	13675-78	-2.0	2.0	15.0	24	1.38	2.78		
110	13678-83	6.0	8.0	15.0	12	1.08	2.75		
111	13683-86	1.0	4.0	18.0	33	1.52	2.76		
112	13686-88	-0.5	3.2	21.5	42	1.62	2.78		
113	13688-92	3.0	1.5	18.0	70	1.85	2.68		
114	13692-96	0.0	1.0	25.0	110	2.04	2.73		I

Well 11
WOODS UNIT NO. 1
C SE/4 13-17N-18W

Zone	Depth Interval (GR)	ϕ_D(%)	ϕ_N(%)	GR (API Units)	RT (ohm-m)	log Rt	ρ_{mc} (gm/cc)	Thickness (ft)	Marker
1	13339-41	1.5	6.0	17.0	50	1.70	2.79	2	A
2	13341-44	4.1	7.6	17.5	48	1.68	2.77	3	
3	13344-46	2.0	6.0	19.0	65	1.81	2.78	2	
4	13346-49	6.7	6.8	18.0	55	1.74	2.71	3	
5	13349-51	3.0	3.0	18.0	52	1.72	2.71	2	
6	13351-57	-4.0	2.0	18.5	70	1.85	2.81	6	
7	13357-61	-1.5	0.8	24.0	110	2.04	2.75	4	
8	13361-64	-5.5	0.5	15.0	170	2.23	2.81	3	
9	13364-66	-1.5	0.6	17.0	170	2.23	2.75	2	
10	13366-70	-3.0	0.0	15.0	200	2.30	2.76	4	
11	13370-76	-5.0	0.5	19.5	420	2.62	2.80	6	
12	13376-79	-8.0	0.1	19.0	300	2.48	2.85	3	
13	13379-81	-2.2	0.0	15.0	260	2.41	2.75	2	
14	13381-83	-1.0	0.4	14.5	380	2.58	2.73	2	
15	13383-85	-5.0	0.0	11.0	200	2.30	2.80	2	
16	13385-87	-3.0	0.0	10.0	300	2.48	2.76	2	
17	13387-88	0.0	0.0	15.0	220	2.34	2.71	1	
18	13388-90	-3.5	0.2	18.0	390	2.58	2.77	2	
19	13390-96	-4.0	0.8	22.5	250	2.40	2.79	6	
20	13396-98	2.6	0.9	19.0	375	2.57	2.68	2	
21	13398-13400	-7.4	0.0	18.0	190	2.28	2.84	2	
22	13400-02	-3.0	0.1	18.5	250	2.40	2.76	2	
23	13402-04	-2.0	0.2	22.5	160	2.20	2.75	2	
24	13404-06	-2.0	0.3	26.0	400	2.60	2.75	2	
25	13406-08	-4.5	0.5	29.0	240	2.38	2.80	2	D?
26	13408-10	-2.6	0.3	29.0	270	2.43	2.76	2	
27	13410-12	-5.0	0.5	28.0	265	2.42	2.80	2	
28	13412-15	-2.0	0.0	15.0	265	2.42	2.74	3	E?
29	13415-20	1.0	0.0	20.0	290	2.46	2.69	5	
30	13420-23	0.0	0.1	22.0	360	2.56	2.71	3	
31	13423-27	-6.0	0.0	21.0	280	2.45	2.81	4	
32	13427-32	-0.6	0.0	19.0	240	2.38	2.72	5	
33	13432-40	-3.0	0.2	22.0	300	2.48	2.76	8	

Well 11continued

Zone	Depth Interval (GR)	ϕ_D(%)	ϕ_N(%)	GR (API Units)	RT (ohm-m)	log Rt	ρ_{mc} (gm/cc)	Thickness (ft)	Marker
34	13440-44	-0.2	0.0	15.5	300	2.48	2.71	4	
35	13444-48	-1.7	0.3	15.0	340	2.53	2.74	4	
36	13448-54	-6.0	0.5	15.0	260	2.41	2.80	6	F
37	13454-61	-7.0	1.0	15.0	260	2.41	2.85	7	
38	13461-64	1.0	4.0	11.0	150	2.18	2.76	3	
39	13464-67	1.1	7.0	12.0	60	1.78	2.82	3	
40	13467-70	0.1	6.6	14.5	45	1.65	2.83	3	
41	13470-72	6.0	9.0	13.0	70	1.85	2.77	2	
42	13472-76	10.0	12.0	15.0	110	2.04	2.75	4	
43	13476-79	11.5	10.0	14.0	120	2.08	2.68	3	
44	13479-82	14.0	13.2	12.0	120	2.08	2.69	3	
45	13482-84	9.9	11.1	15.0	110	2.04	2.73	2	
46	13484-88	13.5	12.0	16.5	90	1.95	2.68	4	
47	13488-92	16.8	14.0	15.5	75	1.88	2.65	4	
48	13492-95	12.0	14.5	15.0	60	1.78	2.76	3	
49	13495-13500	13.0	11.8	15.5	75	1.88	2.69	5	
50	13500-05	18.1	11.0	15.0	92	1.96	2.57	5	
51	13505-10	13.5	16.0	16.5	87	1.94	2.76	5	
52	13510-16	8.0	11.0	19.0	40	1.60	2.77	4	
53	13516-19	11.5	12.0	30.0	39	1.59	2.72	3	G
54	13519-22	-4.5	4.0	33.0	32	1.51	2.86	3	
55	13522-25	-9.0	2.0	25.0	30	1.48	2.90	3	
56	13525-29	-1.0	0.5	20.0	53	1.72	2.74	4	
57	13529-31	0.5	0.2	24.0	80	1.90	2.70	2	
58	13531-36	-2.5	0.0	15.5	200	2.30	2.75	4	
59	13536-50	-1.0	0.0	20.0	300	2.48	2.73	14	
60	13550-56	-2.0	0.0	15.0	370	2.57	2.74	5	
61	13556-59	-1.5	0.0	19.0	300	2.48	2.74	3	
62	13559-61	0.0	0.0	15.0	250	2.40	2.71	2	
63	13561-63	-2.0	0.0	20.0	270	2.43	2.74	2	
64	13563-65	1.8	0.0	22.0	250	2.40	2.68	2	
65	13565-68	-1.0	0.0	20.0	260	2.41	2.73	3	
66	13568-70	2.0	0.0	19.0	260	2.41	2.68	2	
67	13570-72	-2.0	0.0	15.0	250	2.40	2.74	2	
68	13572-75	3.0	0.0	19.0	250	2.40	2.66	3	

Well 11 continued

Zone	Depth Interval (GR)	ϕ_D(%)	ϕ_N(%)	GR (API Units)	RT (ohm-m)	log Rt	ρ_{mc} (gm/cc)	Thickness (ft)	Marker
69	13575-79	-1.0	0.0	16.5	280	2.45	2.73	4	
70	13579-82	1.2	0.0	16.5	245	2.39	2.69	3	
71	13582-86	-0.5	0.0	19.5	210	2.32	2.72	4	
72	13586-90	-0.5	0.0	18.0	205	2.31	2.72	4	
73	13590-94	-0.6	0.0	15.5	240	2.38	2.72	4	
74	13594-96	1.2	0.0	15.0	250	2.40	2.69	2	
75	13598-98	-2.4	0.0	15.0	200	2.30	2.75	2	
76	13598-13601	0.2	0.0	18.5	190	2.28	2.71	3	
77	13601-04	-2.0	0.3	20.0	175	2.24	2.75	3	
78	13604-06	2.0	0.0	15.0	140	2.15	2.68	2	
79	13606-09	-2.0	0.0	17.5	150	2.18	2.74	3	
80	13609-12	2.0	0.5	25.0	190	2.28	2.68	3	
81	13612-22	1.0	0.0	19.0	200	2.30	2.69	10	
82	13622-29	-0.5	1.0	25.0	180	2.26	2.74	7	
83	13629-34	5.0	0.7	25.0	70	1.85	2.64	5	
84	13634-38	2.9	0.6	20.5	75	1.88	2.67	4	
85	13638-42	4.2	1.0	21.0	120	2.08	2.65	4	
86	13642-44	6.0	1.2	22.5	100	2.00	2.63	2	
87	13644-46	5.0	0.8	22.0	80	1.90	2.64	2	
88	13646-68	4.0	0.7	25.0	75	1.88	2.65	2	
89	13648-51	5.0	1.0	23.5	90	1.95	2.64	3	
90	13651-58	4.0	1.5	25.0	80	1.90	2.67	7	
91	13658-62	2.0	2.5	23.5	70	1.85	2.72	4	
92	13662-66	-0.5	4.0	25.0	30	1.48	2.79	4	
93	13666-68	1.0	1.0	20.5	32	1.51	2.71	2	
94	13668-70	-0.3	1.8	22.5	40	1.60	2.75	2	H
95	13670-74	2.0	1.3	20.5	100	2.00	2.70	4	
96	13674-77	0.5	0.0	14.0	200	2.30	2.70	3	
97	13677-79	-2.0	0.0	14.5	105	2.02	2.74	2	
98	13679-84	-0.3	0.5	12.5	90	1.95	2.72	5	
99	13684-94	4.7	13.0	22.5	4	0.60	2.87	10	
100	13694-13700	-2.0	1.5	14.0	25	1.40	2.77	6	
101	13700-06	-5.0	2.0	12.5	65	1.81	2.83	6	
102	13706-08	-2.0	0.7	14.0	79	1.90	2.76	2	
103	13708-10	-4.7	0.6	9.0	80	1.90	2.80	2	

Well 11 continued

Zone	Depth Interval (GR)	ϕ_D(%)	ϕ_N(%)	GR (API Units)	RT (ohm-m)	log Rt	ρ_{mc} (gm/cc)	Thickness (ft)	Marker
104	13710-12	-0.6	0.7	11.0	57	1.76	2.73	2	
105	13712-16	-3.0	4.0	19.0	21	1.32	2.83	4	
106	13716-20	-1.8	1.0	13.0	18	1.26	2.76	4	
107	13720-24	-0.6	4.0	11.0	10	1.00	2.79	4	
108	13724-28	4.0	13.0	15.0	2.5	0.40	2.89	4	
109	13728-30	-5.0	9.0	19.0	4.5	0.65	2.97	2	
110	13730-32	9.0	12.0	14.0	4	0.60	2.77	2	
111	13732-37	4.5	10.0	15.0	3.8	0.58	2.81	4	
112	13737-42	7.0	11.5	15.0	2.5	0.40	2.80	5	
113	13742-44	3.0	10.0	15.0	2.8	0.45	2.84	2	
114	13744-48	6.0	7.5	15.0	3.4	0.53	2.74	4	
115	13748-50	5.0	6.5	18.0	5	0.70	2.74	2	
116	13750-54	-3.0	6.0	20.0	8	0.90	2.87	3	I

Well 12
DALE NO. 1-24
C-NE-SW-24-17N-18W

T-2142

Zone	Depth Interval (GR)	ϕ_D(%)	ϕ_N(%)	GR (API Units)	Rt (ohm-m)	log Rt	ρ_{mc} (gm/cc)	Thickness (ft)	Marker
									A
1	13472-75	-1.2	5.2	22.0	120	2.08	2.83	3	
2	13475-78	4.2	7.3	21.0	90	1.95	2.77	3	
3	13478-80	0.0	6.0	27.0	80	1.90	2.82	2	
4	13480-82	-1.5	5.8	24.0	90	1.95	2.84	2	
5	13482-84	-3.0	1.0	21.0	130	2.11	2.78	2	
6	13484-88	-0.5	4.0	15.0	200	2.30	2.79	4	
7	13488-91	-8.0	4.0	26.0	110	2.04	2.92	3	
8	13491-93	-4.0	0.5	18.0	90	1.95	2.79	2	
9	13493-94	-7.5	3.8	21.0	90	1.95	2.91	1	
10	13494-97	-4.0	4.2	21.0	180	2.26	2.86	3	
11	13497-13500	-6.5	3.9	25.0	180	2.26	2.90	2	
12	13500-03	4.0	3.3	12.0	100	2.00	2.70	3	
13	13503-06	0.5	4.5	14.5	160	2.20	2.78	3	
14	13506-08	1.9	3.2	15.5	110	2.04	2.73	2	
15	13508-10	5.5	6.4	10.5	85	1.93	2.73	2	
16	13510-12	1.0	5.5	10.5	70	1.85	2.79	2	
17	13512-14	-5.0	4.6	12.0	72	1.86	2.88	2	
18	13514-16	-3.0	4.3	11.5	60	1.78	2.84	2	
19	13516-18	-4.0	4.5	10.0	60	1.78	2.86	2	
20	13518-21	4.0	3.0	12.0	60	1.78	2.69	3	
21	13521-26	-2.0	2.0	13.0	130	2.11	2.78	5	
22	13526-30	0.0	1.3	15.0	210	2.32	2.73	4	
23	13530-33	-4.5	2.0	15.0	140	2.15	2.82	3	
24	13533-35	-8.5	2.5	20.0	90	1.95	2.90	2	
25	13535-36	-6.0	3.5	22.5	105	2.02	2.89	1	
26	13536-38	-8.5	3.0	23.0	110	2.04	2.91	2	
27	13538-40	-4.5	2.5	25.0	230	2.36	2.83	2	
28	13540-42	0.5	2.0	25.0	200	2.30	2.74	2	
29	13542-45	-5.5	2.8	22.5	100	2.00	2.86	3	
30	13545-47	-2.5	2.5	22.5	90	1.95	2.80	2	
31	13547-50	-4.5	2.8	24.0	120	2.08	2.84	3	
32	13550-53	-3.0	2.8	31.0	150	2.18	2.81	3	
33	13553-58	-3.2	2.6	22.0	100	2.00	2.81	5	E?

Well 12 continued

Zone	Depth Interval (GR)	ϕ_D(%)	ϕ_N(%)	GR (API Units)	RT (ohm-m)	log Rt	ρ_{mc} (gm/cc)	Thickness (ft)	Marker
34	13558-62	-4.0	1.5	20.0	510	2.71	2.81	4	
35	13562-67	-0.5	1.7	20.0	500	2.70	2.75	5	
36	13567-70	-4.0	2.1	19.5	230	2.36	2.82	3	
37	13570-74	-5.0	2.0	16.5	250	2.40	2.83	4	
38	13574-77	0.2	1.8	14.5	440	2.64	2.74	3	
39	13577-81	-4.0	2.0	15.0	590	2.77	2.81	4	
40	13584-88	-4.0	5.5	15.0	50	1.70	2.88	4	F
41	13588-94	5.0	8.0	15.0	30	1.48	2.77	5	
42	13594-97	4.0	10.0	12.5	39	1.59	2.84	3	
43	13597-13600	6.0	9.7	10.5	50	1.70	2.78	3	
44	13600-02	5.0	9.6	10.0	70	1.85	2.80	2	
45	13602-07	6.5	10.5	8.0	90	1.95	2.79	5	
46	13607-11	11.0	13.0	7.5	100	2.00	2.75	4	
47	13611-14	7.0	12.2	7.0	92	1.96	2.81	3	
48	13614-20	13.0	14.1	8.0	90	1.95	2.74	6	
49	13620-26	5.5	10.2	8.0	85	1.93	2.80	6	
50	13626-32	12.0	14.0	10.0	50	1.70	2.75	6	
51	13632-36	8.0	12.2	12.0	38	1.58	2.79	4	
52	13636-38	10.6	13.0	13.5	38	1.58	2.76	2	
53	13638-42	10.5	14.0	10.0	37	1.57	2.78	4	
54	13642-45	7.0	13.8	10.0	25	1.40	2.84	3	
55	13645-52	11.0	17.5	9.0	4	0.60	2.84	7	
56	13652-54	9.5	16.0	10.0	4.5	0.65	2.84	2	
57	13654-56	0.2	13.4	9.0	5	0.70	2.97	2	
58	13656-58	6.5	13.0	11.0	5.3	0.72	2.84	2	
59	13658-60	4.0	11.2	12.0	6	0.78	2.85	2	
60	13660-64	1.5	10.8	11.0	9	0.95	2.89	4	
61	13664-66	-3.5	8.5	13.0	13	1.11	2.93	2	
62	13666-69	-1.0	7.5	11.5	18	1.26	2.87	2	
63	13668-71	-6.8	5.5	17.0	70	1.85	2.93	3	
64	13671-73	-5.0	2.5	23.0	125	2.10	2.84	3	
65	13673-75	-1.2	1.5	16.0	170	2.23	2.76	2	
66	13675-78	-3.5	1.8	20.5	230	2.36	2.80	3	
67	13678-80	-3.0	1.8	20.0	300	2.48	2.79	2	
68	13680-82	-5.0	1.5	15.0	400	2.60	2.82	2	

Well 12 continued

Zone	Depth Interval (GR)	ϕ_D(%)	ϕ_N(%)	GR (API Units)	RT (ohm-m)	log Rt	ρ_{mc} (gm/cc)	Thickness (ft)	Marker
69	13682-85	-2.5	1.5	15.5	500	2.70	2.78	3	
70	13685-88	-0.5	1.4	19.0	700	2.85	2.74	3	
71	13688-90	-3.0	1.4	21.0	850	2.93	2.79	2	
72	13690-92	0.5	1.4	18.5	1300	3.11	2.74	2	
73	13692-94	-2.0	1.0	15.0	1500	3.18	2.76	2	
74	13694-96	-4.5	1.0	14.0	1500	3.18	2.81	2	
75	13696-98	0.0	0.9	15.0	1400	3.15	2.73	2	
76	13698-99	-2.5	1.0	19.0	1200	3.08	2.77	1	
77	13699-13701	-1.0	1.0	15.0	1300	3.11	2.74	2	
78	13701-05	1.0	1.0	15.0	800	2.90	2.71	4	
79	13705-07	-2.5	1.2	21.0	1000	3.00	2.77	2	
80	13707-09	1.2	1.2	13.0	1300	3.11	2.71	2	
81	13709-11	-3.5	1.5	18.0	1300	3.11	2.80	2	
82	13711-14	-0.5	1.3	15.5	900	2.95	2.74	3	
83	13714-16	-4.5	1.5	18.0	1000	3.00	2.81	2	
84	14716-18	-1.7	1.3	15.0	1200	3.08	2.76	2	
85	13718-20	0.1	1.1	15.5	1300	3.11	2.73	2	
86	13720-22	1.0	1.0	15.0	800	2.90	2.71	2	
87	13722-27	-1.0	1.0	21.0	800	2.90	2.74	5	
88	13727-29	0.0	1.2	21.0	1000	3.00	2.73	2	
89	13729-34	-1.5	1.2	21.0	350	2.54	2.76	5	
90	13734-40	1.5	0.8	13.0	1500	3.18	2.70	6	
91	13740-44	0.5	1.2	20.0	900	2.95	2.72	4	
92	13744-47	1.0	1.2	21.0	330	2.52	2.71	3	
93	13747-50	-0.5	1.4	24.0	320	2.51	2.74	3	
94	13750-55	0.5	1.4	21.5	460	2.66	2.73	5	
95	13755-60	1.5	1.0	20.0	1000	3.00	2.70	5	
96	13760-63	-2.2	1.2	19.0	400	2.60	2.77	3	
97	13763-66	5.2	1.1	22.0	500	2.70	2.64	3	
98	13766-69	1.0	1.5	23.0	650	2.81	2.72	3	
99	13769-72	-1.0	1.8	22.5	700	2.85	2.76	2	
100	13772-76	0.0	2.0	27.0	300	2.48	2.74	4	
101	13776-79	2.3	1.9	21.0	200	2.30	2.70	3	
102	13779-81	-0.3	2.0	23.0	290	2.46	2.75	2	
103	13781-83	2.8	2.0	20.0	360	2.56	2.70	2	

Well 12 continued

Zone	Depth Interval (GR)	ϕ_D(%)	ϕ_N(%)	GR (API Units)	RT (ohm-m)	log Rt	ρ_{mc} (gm/cc)	Thickness (ft)	Marker
104	13783-84	-1.2	1.7	22.5	550	2.74	2.76	1	
105	13784-86	2.0	1.2	25.0	900	2.95	2.70	2	H
106	13786-88	-2.8	0.9	21.5	1500	3.18	2.77	2	
107	13788-92	-0.5	0.9	16.0	1500	3.18	2.73	4	
108	13792-94	1.0	1.0	10.0	1400	3.15	2.71	2	
109	13794-96	-1.0	2.0	6.0	550	2.74	2.76	2	
110	13796-99	2.0	7.2	8.0	31	1.49	2.81	5	
111	13799-13801	-7.0	4.0	7.5	70	1.85	2.91	2	
112	13801-06	2.5	1.0	7.5	700	2.85	2.68	5	
113	13806-09	-1.0	1.3	9.0	250	2.40	2.75	3	
114	13809-13	-5.0	3.0	9.0	80	1.90	2.85	4	
115	13813-15	-2.0	2.6	11.0	95	1.98	2.79	2	
116	13815-16	-6.5	3.0	13.0	90	1.95	2.88	1	
117	13816-18	-3.0	3.4	14.0	100	2.00	2.82	2	
118	13818-21	-4.0	3.0	8.5	110	2.04	2.83	3	
119	13821-24	-3.0	2.9	9.0	140	2.15	2.81	3	
120	13824-26	-1.5	2.0	7.5	120	2.08	2.77	2	
121	13826-28	-3.0	1.2	7.0	250	2.40	2.78	2	
122	13828-32	2.0	1.2	6.5	500	2.70	2.70	4	
123	13832-34	-2.5	1.3	6.5	330	2.52	2.78	2	
124	13834-36	-0.5	1.4	7.5	300	2.48	2.74	2	
125	13836-38	-4.0	1.5	7.0	200	2.30	2.81	2	
126	13838-40	-1.0	2.0	8.0	120	2.08	2.76	2	
127	13840-42	-4.0	2.6	10.0	130	2.11	2.83	2	
128	13842-47	-1.0	3.0	10.0	550	2.74	2.78	2	
129	13847-50	8.0	15.0	14.0	7	0.85	2.85	3	
130	13850-52	-1.0	9.0	13.0	10	1.00	2.90	2	
131	13852-55	5.0	12.0	8.5	9	0.95	2.85	3	
132	13855-58	-3.0	6.0	8.0	20	1.30	2.87	3	
133	13858-60	-6.0	4.0	10.5	60	1.78	2.89	2	
134	13860-69	-4.5	2.0	11.0	220	2.34	2.82	9	
135	13869-72	0.5	3.0	12.5	55	1.74	2.75	3	
136	13872-76	-1.0	3.0	20.0	36	1.56	2.78	4	
137	13876-78	-6.0	3.2	13.0	105	2.02	2.87	2	
138	13878-80	0.5	2.8	15.0	120	2.08	2.75	2	
139	13880-86	-5.0	4.5	15.0	110	2.04	2.88	2	I

Well 13
HICKMAN NO. 1-24
C-NE/4 24-17N-18W

Zone	Depth Interval (GR)	ϕ_D(%)	ϕ_N(%)	GR (API Units)	RT (ohm-m)	log Rt	ρ_{mc} (gm/cc)	Thickness (ft)	Marker
									A
1	13369-72	0.0	6.5	32.0	80	1.90	2.83	3	
2	13372-75	12.5	14.0	25.0	65	1.81	2.74	3	
3	13375-79	8.0	13.0	21.0	55	1.74	2.81	4	
4	13379-81	8.0	14.0	23.5	43	1.63	2.83	2	
5	13381-84	11.5	15.2	19.0	49	1.69	2.78	3	
6	13384-88	3.7	6.0	26.0	70	1.85	2.75	4	
7	13388-93	11.0	13.8	15.0	58	1.76	2.77	4	
8	13393-96	19.7	18.1	12.0	190	2.28	2.68	3	
9	13396-98	15.0	16.0	13.5	180	2.26	2.73	2	
10	13398-13400	22.0	19.0	12.0	170	2.23	2.65	2	
11	13400-04	16.0	17.8	12.5	130	2.11	2.75	4	
12	13404-07	5.5	11.0	13.0	145	1.16	2.82	3	
13	13407-11	14.5	17.0	14.5	110	2.04	2.76	4	
14	13411-16	6.0	11.0	15.0	90	1.95	2.81	5	
15	13416-19	4.0	10.5	19.5	110	2.04	2.83	3	
16	13419-23	6.0	6.5	11.0	200	2.30	2.72	4	
17	13423-29	2.0	5.8	15.0	70	1.85	2.78	6	
18	13429-31	5.0	5.0	17.0	90	1.95	2.71	2	
19	13431-36	19.0	18.0	18.0	85	1.93	2.69	5	
20	13436-38	13.0	14.0	16.5	65	1.81	2.73	2	
21	13438-41	3.0	11.5	20.0	45	1.65	2.87	3	D?
22	13441-44	8.0	11.0	25.0	30	1.48	2.77	3	
23	13444-47	0.8	10.5	25.0	21	1.32	2.90	3	
24	13447-49	2.5	9.7	25.5	17	1.23	2.85	2	
25	13449-51	9.0	11.0	31.5	15	1.18	2.75	2	
26	13451-52	2.0	6.5	28.0	12	1.08	2.79	1	E?
27	13452-54	5.0	6.0	30.0	12	1.08	2.73	2	
28	13454-56	-0.8	4.6	28.0	14.5	1.16	2.81	2	
29	13456-58	2.0	6.2	32.0	15	1.18	2.79	2	
30	13458-60	4.7	6.0	25.0	13.5	1.13	2.73	2	
31	13460-61	4.0	8.0	28.0	13	1.11	2.78	1	
32	13461-67	7.0	9.4	22.0	12	1.08	2.76	6	
33	13467-69	3.6	9.4	27.0	20	1.30	2.82	2	

Well 13continued

Zone	Depth Interval (GR)	ϕ_D(%)	ϕ_N(%)	GR (API Units)	RT (ohm-m)	log Rt	ρ_{mc} (gm/cc)	Thickness (ft)	Marker
34	13469-73	-1.5	6.0	42.0	30	1.48	2.85	4	
35	13473-77	2.0	7.0	30.0	26	1.41	2.80	4	
36	13477-79	5.5	8.0	31.0	22	1.34	2.76	2	
37	13479-82	7.0	10.2	27.0	30	1.48	2.77	3	F
38	13482-84	3.1	8.0	24.0	40	1.60	2.80	2	
39	13484-86	5.0	8.0	18.5	52	1.72	2.77	2	
40	13486-88	2.0	8.0	18.0	68	1.83	2.82	2	
41	13488-91	9.2	13.4	15.0	100	2.00	2.79	3	
42	13491-93	5.5	13.0	15.0	200	2.30	2.86	2	
43	13493-95	12.8	12.7	15.0	250	2.40	2.71	2	
44	13495-98	9.4	12.0	15.0	210	2.32	2.76	3	
45	13498-13502	13.0	14.5	15.0	195	2.29	2.74	4	
46	13502-04	11.5	11.0	14.5	230	2.36	2.70	2	
47	13504-06	8.0	9.6	12.0	230	2.36	2.74	2	
48	13506-07	7.0	12.0	12.0	210	3.22	2.81	1	
49	13507-09	9.0	13.0	13.0	205	2.31	2.79	2	
50	13509-11	7.0	12.5	12.5	235	2.37	2.82	2	
51	13511-12	10.0	13.0	11.0	305	2.48	2.77	1	
52	13512-14	8.5	10.0	11.5	310	2.49	2.74	2	
53	13514-16	6.5	11.0	13.0	240	2.38	2.80	2	
54	13516-20	10.5	14.6	15.0	200	2.30	2.79	4	
55	13520-24	6.0	10.0	30.0	300	2.48	2.79	4	
56	13524-30	13.0	15.8	19.5	80	1.90	2.77	6	
57	13530-36	17.0	17.0	20.0	70	1.85	2.71	6	
58	13536-39	10.0	14.4	21.0	50	1.70	2.79	3	
59	13539-43	12.0	14.7	15.0	42	1.62	2.76	4	
60	13543-45	1.5	7.0	15.0	50	1.70	2.81	2	
61	13545-47	5.0	7.7	16.5	66	1.82	2.76	2	G
62	13547-49	-4.0	4.0	24.0	70	1.85	2.85	2	
63	13549-51	-2.0	2.7	21.0	68	1.83	2.79	2	
64	13551-52	0.7	2.7	22.0	73	1.86	2.75	1	
65	13552-54	-2.0	2.9	21.0	80	1.90	2.80	2	
66	13554-56	-0.8	2.2	20.5	100	2.00	2.76	2	
67	13556-59	-2.5	1.7	19.5	170	1.85	2.78	3	
68	13559-61	0.0	1.7	16.0	200	2.30	2.74	2	

Well 13 continued

Zone	Depth Interval (GR)	ϕ_D(%)	ϕ_N(%)	GR (API Units)	RT (ohm-m)	log Rt	ρ_{mc} (gm/cc)	Thickness (ft)	Marker
69	13561-62	-1.5	1.7	15.0	250	2.40	2.77	1	
70	13562-64	1.2	1.2	15.0	270	2.43	2.71	2	
71	13564-68	-0.5	1.5	19.0	400	2.60	2.74	4	
72	13568-71	5.0	2.4	19.5	280	2.45	2.66	3	
73	13571-73	-2.5	1.5	16.0	400	2.60	2.78	2	
74	13573-76	0.0	0.8	15.0	590	2.77	2.72	3	
75	13576-78	-1.0	0.8	15.0	410	2.61	2.74	2	
76	13578-83	2.0	0.5	15.5	450	2.65	2.68	5	
77	13583-86	0.0	0.4	16.0	400	2.66	2.72	3	
78	13586-89	1.5	0.3	18.0	320	2.51	2.69	3	
79	13589-92	4.0	0.4	15.5	590	2.77	2.65	3	
80	13592-94	-1.5	0.5	19.0	475	2.68	2.74	2	
81	13594-97	0.5	0.5	15.0	430	2.63	2.71	3	
82	13597-99	1.0	0.7	15.0	300	2.48	2.70	2	
83	13599-13602	2.0	0.5	15.0	380	2.58	2.68	3	
84	13602-04	-2.3	0.5	15.0	400	2.60	2.76	2	
85	13604-06	3.4	1.0	20.0	220	2.34	2.67	2	
86	13606-07	-3.0	1.5	24.0	180	2.26	2.79	1	
87	13607-10	0.0	0.8	21.0	180	2.26	2.72	3	
88	13610-14	3.0	1.0	22.0	250	2.40	2.68	4	
89	13614-16	0.0	1.7	22.5	140	2.15	2.74	2	
90	13616-18	4.5	1.0	20.5	125	2.10	2.65	2	
91	13618-22	3.0	0.6	15.0	400	2.60	2.67	4	
92	13622-25	5.5	0.5	20.0	700	2.85	2.62	3	
93	13625-27	2.0	0.5	20.0	320	2.51	2.68	2	
94	13627-29	-1.0	0.4	18.5	450	2.65	2.73	2	
95	13629-32	3.0	0.3	16.5	900	2.95	2.66	3	
96	13632-34	3.2	0.9	20.5	280	2.45	2.67	2	
97	13634-38	0.5	1.0	22.5	160	2.20	2.72	4	
98	13638-43	4.0	1.5	20.5	200	2.30	2.67	5	
99	13643-48	2.5	1.0	18.5	400	2.60	2.68	5	
100	13648-49	0.5	1.0	19.0	510	2.71	2.72	1	
101	13649-52	0.7	1.0	20.0	240	2.38	2.72	3	
102	13652-54	4.0	0.9	20.5	300	2.48	2.66	2	
103	13654-59	3.5	0.5	22.5	700	2.85	2.66	5	

Well 13 continued

Zone	Depth Interval (GR)	ϕ_D(%)	ϕ_N(%)	GR (API Units)	RT (ohm-m)	log Rt	ρ_{mc} (gm/cc)	Thickness (ft)	Marker
104	13659-63	2.5	0.8	21.5	300	2.48	2.68	4	
105	13663-66	3.8	0.7	25.0	310	2.49	2.66	3	
106	13666-70	1.0	1.0	22.5	150	2.18	2.71	4	
107	13670-72	3.5	2.0	22.5	90	1.95	2.68	2	
108	13672-76	1.0	1.5	33.0	200	2.30	2.72	4	
109	13678-80	-1.5	0.3	21.0	1100	3.04	2.74	2	H
110	13680-82	2.0	0.1	18.0	1000	3.00	2.68	2	
111	13682-84	-0.7	0.0	16.5	1200	3.08	2.72	2	
112	13684-88	2.5	0.0	20.0	500	2.70	2.67	4	
113	13688-92	-1.0	0.0	15.0	350	2.54	2.73	4	
114	13692-95	-4.0	2.0	14.0	100	2.00	2.81	3	
115	13695-99	4.8	10.0	9.0	17	1.23	2.81	4	
116	13699-13701	-1.0	5.0	10.5	20	1.30	2.82	2	
117	13701-06	-3.0	0.7	13.0	80	1.90	2.77	4	
118	13706-09	-0.4	0.3	15.0	160	2.20	2.72	3	
119	13709-12	-5.5	0.1	15.0	800	2.90	2.81	3	
120	13712-15	-3.0	0.2	13.0	450	2.65	2.76	3	
121	13715-21	-1.5	1.0	12.0	200	2.30	2.75	6	
122	13721-24	1.0	1.0	12.5	170	2.23	2.71	3	
123	13724-26	-2.5	1.2	13.0	150	2.18	2.77	2	
124	13726-28	-1.2	1.3	13.5	110	2.04	2.75	2	
125	13728-31	-4.0	0.8	12.0	130	2.11	2.79	3	
126	13731-37	8.0	11.2	13.5	26	1.41	2.77	6	
127	13737-39	2.0	8.0	15.0	18	1.26	2.82	2	
128	13739-41	10.0	10.0	15.0	9	0.95	2.71	2	
129	13741-44	0.7	6.0	14.0	12	1.08	2.81	3	
130	13744-47	4.0	7.0	15.0	10	1.00	2.77	3	
131	13747-50	9.0	11.5	15.0	3.6	0.56	2.76	3	
132	13750-52	5.0	7.0	15.0	4.3	0.63	2.75	2	
133	13752-56	3.2	6.0	15.0	6.5	0.81	2.76	4	
134	13756-60	9.0	12.0	15.0	3	0.48	2.77	4	
135	13760-62	0.5	7.0	17.0	6.5	0.81	2.83	2	
136	13762-64	-3.5	4.0	21.0	27	1.43	2.84	2	I

Well 14
CHAIN NO. 1-25
C-NE 25-17N-18W

Zone	Depth Interval (GR)	ϕ_D(%)	ϕ_N(%)	GR (API Units)	Rt (ohm-m)	log Rt	ρ_{mc} (gm/cc)	Thickness (ft)	Marker
1	13469-71	-2.0	4.0	19.0	700	2.85	2.82	2	A
2	13471-74	-1.0	2.0	27.0	400	2.60	2.76	3	
3	13474-77	-3.3	3.2	21.0	170	2.23	2.82	3	
4	13477-80	-1.5	5.1	15.0	120	2.08	2.83	3	
5	13480-82	1.3	4.7	22.5	75	1.88	2.77	2	
6	13482-85	-2.3	4.5	21.0	80	1.90	2.83	3	
7	13485-87	0.3	3.5	24.5	110	2.04	2.77	2	
8	13487-92	-4.0	2.3	32.0	200	2.30	2.82	5	
9	13492-94	-2.0	2.0	22.5	80	1.90	2.78	2	
10	13494-97	-2.3	0.8	20.0	155	2.19	2.76	3	
11	13497-99	0.0	0.1	21.0	250	2.40	2.71	2	
12	13499-13502	-4.2	0.4	18.5	170	2.23	2.79	3	
13	13502-06	-1.0	0.5	16.0	190	2.28	2.74	4	
14	13506-08	-5.1	0.3	22.5	200	2.30	2.80	2	
15	13508-12	-1.0	1.2	23.0	130	2.11	2.75	4	D?
16	13512-14	-3.0	0.7	25.0	200	2.30	2.77	2	
17	13514-16	-2.0	0.7	28.0	400	2.60	2.76	2	
18	13516-18	-8.3	0.6	27.0	340	2.53	2.86	2	
19	13518-20	-2.0	0.4	21.0	280	2.45	2.75	2	E?
20	13520-24	-0.5	0.0	15.0	300	2.48	2.72	4	
21	13524-27	-1.5	0.1	19.5	450	2.65	2.74	3	
22	13527-30	-1.0	0.0	19.0	1000	3.00	2.73	3	
23	13530-33	-4.0	0.2	21.5	200	2.30	2.78	3	
24	13533-34	1.0	1.0	20.0	210	2.32	2.71	1	
25	13534-36	2.5	2.5	21.0	200	2.30	2.71	2	F
26	13536-38	-8.3	1.5	21.0	150	2.18	2.88	2	
27	13538-39	-1.2	3.0	20.0	110	2.04	2.78	1	
28	13539-40	-7.5	3.5	19.5	110	2.04	2.90	1	
29	13540-42	-2.3	5.5	20.5	110	2.04	2.85	2	
30	13542-44	3.5	9.5	19.0	125	2.10	2.82	2	
31	13544-46	5.5	10.2	22.0	150	2.18	2.80	2	
32	13546-49	10.5	11.0	19.0	210	2.32	2.72	3	
33	13549-51	10.5	9.0	17.0	230	2.36	2.69	2	

Well 14 continued

Zone	Depth Interval (GR)	ϕD(%)	ϕN(%)	GR (API Units)	Rt (ohm-m)	log Rt	ρmc (gm/cc)	Thickness (ft)	Marker
34	13551-53	8.1	11.0	15.0	180	2.26	2.77	2	
35	13553-55	7.5	8.3	15.0	175	2.24	2.72	2	
36	13555-58	3.8	6.7	19.5	180	2.26	2.76	3	
37	13558-61	6.5	9.5	19.0	150	2.18	2.77	3	
38	13561-64	11.5	12.3	20.0	140	2.15	2.73	3	
39	13564-66	8.6	12.3	20.5	150	2.18	2.78	2	
40	13566-69	6.6	10.6	16.5	140	2.15	2.79	3	
41	13569-72	10.0	13.5	15.0	110	2.04	2.78	3	
42	13572-74	7.0	12.0	13.5	100	2.00	2.81	2	
43	13574-76	10.0	12.4	13.0	100	2.00	2.76	2	
44	13576-78	4.0	10.0	12.0	110	2.04	2.82	2	
45	13578-81	8.0	9.0	10.0	120	2.08	2.73	3	
46	13581-83	5.5	9.0	15.0	145	2.16	2.78	2	
47	13583-86	2.1	9.0	15.0	190	2.28	2.84	3	
48	13586-90	6.0	9.2	15.0	190	2.28	2.77	4	
49	13590-92	6.5	11.0	13.5	125	2.10	2.80	2	
50	13592-95	9.8	10.7	14.5	85	1.93	2.73	3	
51	13595-98	6.3	10.5	15.5	80	1.90	2.79	3	
52	13598-13600	8.3	11.5	13.0	73	1.86	2.77	2	
53	13600-05	12.0	14.0	13.0	4.0	0.60	2.75	5	
54	13605-08	6.6	10.0	14.5	4.5	0.65	2.77	3	
55	13608-10	1.6	4.0	15.0	7.3	0.86	2.75	2	-G
56	13610-14	-3.3	0.7	30.0	900	2.95	2.78	4	
57	13614-18	-4.4	0.3	22.5	750	2.88	2.79	4	
58	13618-20	-2.4	0.2	17.5	1050	3.02	2.75	2	
59	13620-23	-1.8	0.1	16.0	1500	3.18	2.74	3	
60	13623-29	0.2	0.1	17.5	1500	3.18	2.71	6	
61	13629-32	1.5	0.3	17.5	1500	3.18	2.69	3	
62	13632-36	-1.5	0.1	15.0	1500	3.18	2.74	4	
63	13636-38	0.9	0.1	15.0	1500	3.18	2.70	2	
64	13638-40	-1.0	0.2	17.5	1200	3.08	2.70	2	
65	13640-43	-4.0	0.1	16.0	1500	3.18	2.78	3	
66	13643-47	1.0	0.0	16.0	1500	3.18	2.69	4	
67	13647-54	-3.0	0.1	20.0	900	2.95	2.76	7	
68	13654-59	1.4	0.1	15.5	1500	3.18	2.69	5	

Well 14 continued

Zone	Depth Interval (GR)	ϕD(%)	ϕN(%)	GR (API Units)	Rt (ohm-m)	log Rt	ρmc (gm/cc)	Thickness	Marker
69	13659-62	-2.5	0.1	17.0	1100	3.04	2.75	3	
70	13662-66	-1.0	0.6	25.0	750	2.88	2.74	4	
71	13666-68	-2.2	0.2	20.0	1200	3.08	2.75	2	
72	13668-71	-0.8	0.1	22.0	750	2.88	2.73	3	
73	13671-73	2.7	0.0	15.0	950	2.98	2.66	2	
74	13673-78	2.6	0.4	21.0	1200	3.08	2.67	5	
75	13678-81	-2.0	0.5	20.0	950	2.98	2.75	3	
76	13681-84	2.6	0.8	22.0	700	2.85	2.68	3	
77	13684-87	-0.6	0.8	19.0	800	2.90	2.73	3	
78	13687-89	-2.5	1.3	23.0	600	2.78	2.78	2	
79	13689-92	-0.7	1.1	22.0	700	2.85	2.74	3	
80	13692-95	2.0	1.8	22.0	1200	3.08	2.71	3	
81	13695-97	-0.4	1.8	21.0	700	2.85	2.75	2	
82	13697-13701	1.9	1.9	18.0	530	2.72	2.71	4	
83	13701-03	-0.4	2.6	23.5	690	2.84	2.76	2	
84	13703-05	2.5	2.5	23.0	510	2.71	2.71	2	
85	13705-08	1.0	2.8	22.0	1500	3.18	2.74	3	
86	13708-10	2.6	2.6	23.5	550	2.74	2.71	2	
87	13710-12	5.0	2.7	24.0	450	2.65	2.67	2	
88	13712-16	2.5	3.0	24.0	500	2.70	2.72	4	
89	13716-18	0.8	3.1	24.5	430	2.63	2.75	2	
90	13718-20	-2.5	3.2	24.5	270	2.43	2.81	2	
91	13720-22	2.0	3.3	24.0	300	2.48	2.73	2	
92	13722-25	-4.2	3.9	30.0	350	2.54	2.85	3	
93	13722-25	-4.2	3.9	30.0	350	2.54	2.85	3	H
94	13725-28	2.0	1.30	15.0	1200	3.08	2.70	3	
95	13728-32	-1.0	1.4	12.0	600	2.78	2.72	4	
96	13732-34	-3.0	1.5	9.0	1500	3.18	2.79	2	
97	13734-36	1.9	1.0	10.0	900	2.95	2.69	2	
98	13736-41	1.0	1.0	11.0	950	2.98	2.71	5	
99	13741-43	-1.0	1.0	11.0	1000	3.18	2.74	2	
100	13743-45	-4.0	1.0	10.5	1500	3.18	2.80	2	
101	13745-49	-1.5	1.0	8.0	700	2.85	2.75	5	
102	13749-52	0.0	1.3	11.0	700	2.85	2.73	3	
103	13752-55	-4.0	2.0	11.0	600	2.78	2.81	3	

Well 14 continued

Zone	Depth Interval (GR)	ϕD(%)	ϕN(%)	GR (API Units)	Rt (ohm-m)	log Rt	ρmc (gm/cc)	Thickness (ft)	Marker
104	13755-57	0	2.0	13.0	200	2.30	2.74	2	
105	13757-59	-2.0	2.0	11.0	400	2.60	2.78	2	
106	13759-62	-2.5	1.5	9.5	500	2.70	2.78	3	
107	13762-65	1.0	1.0	8.5	500	2.70	2.71	3	
108	13765-67	-2.5	1.0	8.5	800	2.90	2.77	2	
109	13767-71	1.0	1.0	7.5	600	2.78	2.71	4	
110	13771-73	-3.0	0.8	7.5	450	2.65	2.78	2	
111	13773-75	1.0	0.8	8.0	600	2.78	2.71	2	
112	13775-81	0.0	0.8	8.0	320	2.51	2.72	6	
113	13781-85	1.5	0.5	7.5	1500	3.18	2.69	4	
114	13785-89	-0.5	0.6	9.0	600	2.78	2.73	4	
115	13789-94	1.0	0.7	7.0	350	2.54	2.70	5	
116	13794-96	2.5	0.7	8.0	540	2.73	2.68	2	
117	13796-98	0.0	0.7	8.0	500	2.70	2.72	2	
118	13798-13800	2.0	0.7	7.5	400	2.60	2.69	2	
119	13800-02	-0.5	0.8	8.0	500	2.70	2.73	2	
120	13802-04	2.0	0.8	8.0	550	2.74	2.69	2	
121	13804-07	-2.0	0.9	8.0	300	2.48	2.76	3	
122	13807-13	1.5	0.9	7.5	300	2.48	2.70	6	
123	13813-17	3.0	0.8	8.0	340	2.53	2.67	4	
124	13817-20	0.0	0.9	8.0	230	2.36	2.73	3	
125	13820-25	-1.0	1.0	11.0	1000	3.00	2.74	5	
126	13825-28	18.0	13.0	13.5	20	1.30	2.61	3	
127	13828-31	2.0	10.5	16.0	11.0	1.04	2.87	3	
128	13831-34	-1.0	5.0	14.0	35	1.54	2.82	3	
129	13834-39	5.0	6.0	13.5	24	1.38	2.73	5	
130	13839-43	-1.0	3.5	15.0	50	1.70	2.79	4	
131	13843-45	0.5	1.5	15.5	60	1.78	2.73	2	
132	13845-48	-3.0	1.0	16.0	95	1.98	2.78	3	
133	13848-52	-1.0	2.0	18.0	50	1.70	2.76	4	

T-2142

Well 15
RAY HAMMER No. 1-19
500' C-SE-NW 19-17N-17W

Zone	Depth Interval (GR)	ϕD(%)	ϕN(%)	GR (API units)	Rt (ohm-m)	log Rt	ρ_{mc} (gm/cc)	Thickness (ft)	Marker
1	13306-09	2.0	3.5	16.0	70	1.85	2.74	3	A
2	13309-12	-4.0	3.7	12.0	150	2.18	2.85	3	
3	13312-18	9.0	6.7	8.0	220	2.34	2.67	6	
4	13318-22	5.0	4.2	11.5	190	2.28	2.70	4	
5	13322-26	-4.0	2.2	15.0	100	2.00	2.82	4	
6	13326-29	-1.0	2.7	16.5	70	1.85	2.78	3	
7	13329-31	1.0	1.3	18.5	50	1.70	2.72	2	
8	13331-34	-2.1	1.6	17.0	60	1.78	2.77	3	
9	13334-37	-3.0	3.4	17.0	75	1.88	2.82	3	
10	13337-44	0.3	0.8	18.0	33	1.52	2.72	7	
11	13344-50	-2.0	0.7	17.0	110	2.04	2.76	6	
12	13350-54	-4.2	0.8	17.0	90	1.95	2.80	4	
13	13354-56	-2.3	0.4	15.0	100	2.00	2.76	2	
14	13356-58	-0.1	0.1	14.5	110	2.04	2.71	2	D?
15	13358-61	0.4	0.1	13.5	210	2.32	2.70	3	
16	13361-63	-4.2	0.2	15.0	300	2.48	2.79	2	
17	13363-66	0.0	0.1	16.5	200	2.30	2.71	3	E?
18	13366-69	-6.0	0.4	18.5	190	2.28	2.82	3	
19	13369-71	-2.0	0.2	16.0	160	2.20	2.75	2	
20	13371-74	-3.0	0.0	15.0	210	2.32	2.76	3	
21	13374-77	-2.2	0.0	15.0	500	2.70	2.75	3	
22	13377-80	-4.3	0.3	15.0	300	2.48	2.79	3	
23	13380-84	0.0	0.2	12.0	240	2.38	2.71	4	
24	13384-88	-4.5	0.7	15.0	200	2.30	2.80	4	
25	13388-91	-3.0	0.9	14.0	180	2.26	2.78	3	
26	13391-96	-6.0	2.0	13.5	210	2.32	2.85	5	
27	13396-98	0.0	3.9	12.0	120	2.08	2.78	2	F
28	13398-13406	2.0	7.0	11.5	73	1.86	2.80	8	
29	13406-12	7.5	10.0	11.0	320	2.51	2.76	6	
30	13412-16	2.0	6.5	11.0	320	2.51	2.79	4	
31	13416-19	5.0	9.5	12.5	270	2.43	2.80	3	
32	13419-21	9.0	10.6	12.0	300	2.48	2.74	2	
33	13421-24	7.0	10.0	10.0	250-260	2.41	2.77	3	

100

Well 15 continued

Zone	Depth Interval (GR)	ϕ_D(%)	ϕ_N(%)	GR (API units)	Rt (ohm-m)	log Rt	ρ_{mc} (gm/cc)	Thickness (ft)	Marker
34	13424-27	11.0	11.2	11.0	150	2.18	2.71	3	
35	13427-29	8.0	9.7	13.0	300	2.48	2.74	2	
36	13429-31	10.0	10.3	11.0	370	2.57	2.72	2	
37	13431-34	5.6	8.5	13.0	340	2.53	2.76	3	
38	13434-38	9.0	8.8	10.0	300	2.48	2.71	5	
39	13438-41	11.0	8.5	9.0	230	2.36	2.66	3	
40	13441-45	4.0	6.8	7.0	370	2.57	2.76	4	
41	13445-58	8.2	9.4	7.5	280	2.45	2.73	13	G
42	13458-66	-5.0	2.0	11.0	100	2.00	2.83	6	
43	13466-70	-4.5	0.5	16.0	800	2.90	2.80	4	
44	13470-76	-4.2	0.1	15.5	750	2.88	2.78	6	
45	13476-79	0.1	0.0	15.0	700	2.85	2.71	3	
46	13479-82	-1.0	0.0	13.5	1500	3.18	2.73	3	
47	13482-89	0.1	0.0	15.0	700	2.85	2.71	7	
48	13489-92	-3.2	0.0	15.0	720	2.86	2.76	3	
49	13492-95	-1.0	0.0	13.0	1300	3.11	2.73	3	
50	13495-98	0.2	0.0	12.0	1400	3.15	2.71	3	
51	13498-13500	-1.0	0.0	17.0	900	2.95	2.73	2	
52	13500-04	-0.8	0.1	15.0	1000	3.00	2.73	4	
53	13504-06	-2.7	0.0	16.0	1000	3.00	2.76	2	
54	13506-12	-0.8	0.0	13.5	800	2.90	2.72	6	
55	13512-15	2.0	0.0	13.0	1100	3.04	2.68	3	
56	13515-18	-2.0	0.2	15.0	1500	3.18	2.75	3	
57	13518-22	0.2	0.1	15.0	800	2.90	2.71	4	
58	13522-28	-1.5	0.1	15.0	750	2.88	2.74	6	
59	13528-31	-3.0	0.3	15.0	800	2.90	2.77	3	
60	13531-34	2.6	0.4	15.5	400	2.60	2.67	3	
61	13534-40	1.0	0.9	18.0	1300	3.11	2.71	6	
62	13540-45	2.0	0.3	12.5	500	2.70	2.68	5	
63	13545-48	-1.0	0.2	12.0	800	2.90	2.73	3	
64	13548-52	1.8	0.5	17.0	1500	3.18	2.69	4	
65	13552-56	3.0	0.3	16.0	500	2.70	2.66	4	
66	13556-60	-2.0	0.4	19.0	750	2.88	2.75	4	
67	13560-64	3.8	0.3	18.0	490	2.69	2.65	4	
68	13564-67	2.8	0.4	19.0	500	2.70	2.67	3	
69	13567-70	0.0	0.4	18.0	700	2.84	2.72	3	

Well 15 continued

Zone	Depth Interval (GR)	ϕ_D(%)	ϕ_N(%)	GR (API units)	Rt (ohm-m)	log Rt	ρ_{mc} (gm/cc)	Thickness (ft)	Marker
70	13570-83	3.0	0.6	20.0	600	2.78	2.67	13	
71	13583-85	0.0	0.5	19.0	600	2.78	2.72	2	
72	13585-87	3.0	0.5	21.0	440	2.64	2.67	2	
73	13587-89	-1.5	0.5	22.0	400	2.60	2.74	2	
74	13589-91	0.8	0.8	25.0	550	2.74	2.71	2	
75	13591-93	2.5	0.7	21.0	400	2.60	2.68	2	
67	13593-96	-3.5	0.7	26.0	290	2.46	2.78	3	
77	13596-99	-0.5	0.0	15.5	350	2.54	2.72	3	H
78	13599-13604	2.5	0.1	11.0	300	2.48	2.67	5	
79	13604-06	-0.5	0.2	10.0	320	2.51	2.72	2	
80	13606-10	-5.0	0.5	11.0	500	2.70	2.80	4	
81	13610-16	3.0	11.0	8.0	8.5	0.93	2.86	6	
82	13616-18	-3.0	4.0	9.0	20	1.30	2.83	2	
83	13618-20	-7.5	2.5	11.0	40	1.60	2.89	2	
84	13620-23	-4.0	4.6	12.5	34	1.53	2.86	3	
85	13623-27	-1.0	0.5	15.0	100	2.00	2.74	4	
86	13627-29	-3.0	0.5	11.0	270	2.43	2.77	2	
87	13639-32	0.0	0.4	10.0	300	2.48	2.72	3	
88	13632-35	-1.0	0.4	8.0	420	2.62	2.73	3	
89	13635-39	-7.0	0.8	11.0	300	2.48	2.84	4	
90	13639-43	-3.5	0.7	9.5	280	2.45	2.78	4	
91	13643-49	-1.0	0.5	9.0	250	2.40	2.74	6	
92	13649-51	-4.0	1.8	8.0	170	2.23	2.81	2	
93	13651-54	-1.5	2.0	8.0	140	2.15	2.77	3	
94	13654-59	-2.0	1.5	7.5	90	1.95	2.77	5	
95	13659-63	0.0	3.0	9.5	55	1.74	2.76	4	
96	13663-69	1.0	9.0	10.0	9	0.95	2.86	6	
97	13669-71	-2.0	6.0	10.5	8	0.90	2.86	2	
98	13671-73	1.0	6.0	10.0	8	0.90	2.80	2	
99	13678-75	-2.0	5.5	10.0	7.5	0.88	2.85	2	
100	13675-78	2.0	8.0	9.5	10	1.00	2.82	3	
101	13678-84	3.0	11.0	8.0	8	0.90	2.86	6	
102	13684-88	0.0	2.0	11.0	32	1.51	2.74	4	
103	13688-94	0.5	4.6	10.0	26	1.41	2.78	6	
104	13694-98	-8.0	2.0	--	50	1.70	2.88	4	I

Well 16
MILLIE NO. 1-20 W.I.
500' S of C NW/4 20-17N-17W

Zone	Depth Interval (GR)	ϕ_D(%)	ϕ_N(%)	GR (API Units)	Rt (ohm-m)	log Rt	ρ_{mc} (gm/cc)	Thickness (ft)	Marker
1	13291-96	-3.0	2.0	24.5	85	1.93	2.80	5	A
2	13296-13300	-2.0	4.5	28.0	55	1.74	2.83	4	
3	13300-03	-6.5	3.3	33.0	70	1.85	2.88	3	
4	13303-05	-1.2	3.5	32.0	75	1.88	2.80	2	
5	13305-08	-8.5	2.6	24.0	78	1.89	2.90	3	
6	13308-18	-3.5	3.4	23.0	60	1.78	2.83	10	
7	13318-20	-7.0	2.3	24.0	80	1.90	2.87	2	
8	13320-23	-1.5	2.3	27.5	85	1.93	2.78	3	
9	13323-27	-2.0	2.4	23.5	52	1.72	2.79	4	
10	13327-28	-4.0	2.0	23.0	60	1.78	2.81	1	
11	13328-31	-0.7	2.0	22.5	90	1.95	2.76	3	
12	13331-35	-2.2	1.7	22.0	110	2.04	2.78	4	
13	13335-38	1.5	1.3	19.5	100	2.00	2.71	3	
14	13338-40	-1.0	1.3	18.0	140	2.15	2.75	2	
15	13340-42	-1.5	1.2	20.0	130	2.11	2.76	2	
16	13342-45	-2.0	2.2	26.0	115	2.06	2.78	3	
17	13345-48	-4.5	2.5	20.0	120	2.08	2.83	3	
18	13348-51	0.0	1.7	17.0	150	2.18	2.74	3	D?
19	13351-53	-4.5	2.4	25.0	110	2.04	2.83	2	
20	13353-56	-1.1	1.4	20.5	160	2.20	2.75	3	
21	13356-58	-2.0	1.2	24.0	130	2.11	2.77	2	
22	13358-64	-8.5	2.0	22.5	155	2.19	2.89	6	E?
23	13364-67	-2.3	4.3	20.5	60	1.78	2.83	3	
24	13367-70	-0.3	5.4	16.0	38	1.58	2.81	3	F
25	13370-72	2.0	6.0	15.0	40	1.60	2.78	2	
26	13372-74	4.5	8.1	14.5	46	1.66	2.78	2	
27	13374-76	0.0	8.0	13.0	50	1.70	2.82	2	
28	13376-79	11.0	10.0	12.0	60	1.78	2.69	3	
29	13379-83	1.0	4.5	8.5	250	2.40	2.77	4	
30	13383-89	15.0	11.5	9.5	90	1.95	2.64	6	
31	13389-96	4.0	5.5	9.0	140	2.15	2.74	7	
32	13396-13402	17.5	11.2	9.0	80	1.90	2.59	6	
33	13402-04	14.0	9.4	7.5	100	2.00	2.62	2	

Well 16 continued

Zone	Depth Interval (GR)	ϕ_D(%)	ϕ_N(%)	GR (API Units)	Rt (ohm-m)	log Rt	ρ_{mc} (gm/cc)	Thickness (ft)	Marker
34	13404-07	11.5	8.5	9.0	90	1.95	2.65	3	G
35	13407-14	3.5	7.5	10.0	90	1.95	2.78	7	
36	13414-16	-1.7	4.9	10.5	190	2.28	2.83	2	
37	13416-18	-6.6	4.2	12.5	130	2.11	2.90	2	
38	13418-20	-4.0	4.0	18.0	115	2.06	2.85	2	
39	13420-22	-6.5	3.6	20.5	100	2.00	2.89	2	
40	13422-24	-10.5	3.0	20.0	250	2.40	2.95	2	
41	13424-28	-1.5	2.0	19.0	180	2.26	2.77	4	
42	13428-32	0.0	1.0	15.5	150	2.18	2.73	4	
43	13432-37	-0.5	1.2	25.0	280	2.45	2.74	5	
44	13437-42	-3.5	1.1	18.0	560	2.75	2.79	5	
45	13442-49	-3.0	1.7	18.5	250	2.40	2.79	7	
46	13449-54	-3.5	1.6	24.0	180	2.26	2.80	5	
47	13454-62	-2.7	1.2	16.5	850	2.93	2.78	8	
48	13462-65	-7.0	1.3	16.0	300	2.48	2.85	3	
49	13465-70	-3.0	1.2	20.0	350	2.54	2.78	5	
50	13470-74	-1.3	1.2	15.0	510	2.71	2.75	4	
51	13474-77	0.5	1.2	20.0	700	2.85	2.72	3	
52	13477-79	-0.5	1.2	15.5	1500	3.18	2.74	2	
53	13479-81	-2.1	1.2	15.0	1500	3.18	2.77	2	
54	13481-84	-0.5	1.3	20.0	1500	3.18	2.74	3	
55	13484-87	1.4	1.2	15.0	1500	3.18	2.71	3	
56	13487-94	-2.0	1.0	15.0	1500	3.18	2.76	7	
57	13494-96	-3.5	1.0	16.0	1500	3.18	2.79	2	
58	13496-98	0.0	1.0	16.0	1500	3.18	2.73	2	
59	13498-13500	-2.1	1.2	20.0	1500	3.18	2.77	2	
60	13500-04	-1.0	1.1	16.0	1300	3.11	2.75	4	
61	13504-07	-2.5	1.8	23.0	700	2.85	2.78	3	
62	13507-09	-0.2	1.3	20.5	450	2.65	2.74	2	
63	13509-13	2.0	1.3	21.0	810	2.91	2.70	4	
64	13513-15	-0.5	1.1	22.5	730	2.86	2.74	2	
65	13515-20	-0.8	1.7	24.0	280	2.45	2.75	5	
66	13520-22	-3.0	1.2	22.0	320	2.51	2.78	2	
67	13522-24	0.0	1.5	24.0	1500	3.18	2.74	2	
68	13524-26	4.5	1.6	20.5	550	2.74	2.66	2	

Zone	Depth Interval (GR)	ϕ_D(%)	ϕ_N(%)	GR (API Units)	Rt (ohm-m)	log Rt	ρ_{mc} (gm/cc)	Thickness (ft)	Marker
69	13526-29	2.0	1.5	21.0	950	2.98	2.70	3	
70	13529-32	1.0	1.5	21.0	900	2.95	2.72	4	
71	13532-34	-1.5	1.8	23.5	300	2.48	2.77	2	
72	13534-39	1.0	1.8	20.0	180	2.26	2.72	5	
73	13539-42	3.1	1.7	29.0	590	2.77	2.69	3	
74	13542-46	-0.5	1.8	27.5	290	2.46	2.75	4	
75	13546-49	1.7	2.5	30.0	120	2.08	2.72	3	
76	13549-53	-2.0	2.0	24.0	100	2.00	2.78	4	H
77	13553-62	1.5	1.0	14.0	180	2.26	2.70	9	
78	13562-68	-4.0	1.2	10.0	400	2.30	2.80	6	
79	13568-74	9.0	14.5	7.0	5.0	0.70	2.82	6	
80	13574-82	-4.5	3.0	11.0	85	1.93	2.84	8	
81	13582-86	0.5	7.0	8.5	25	1.40	2.83	4	
82	13586-88	-3.0	4.5	8.5	45	1.65	2.84	2	
83	13588-90	-1.0	3.0	8.5	50	1.70	2.78	2	
84	13590-93	-4.0	2.7	10.0	240	2.38	2.83	3	
85	13593-95	-6.0	2.0	11.0	300	2.48	2.85	2	
86	13595-97	-1.5	2.0	7.5	240	2.38	2.77	2	
87	13597-99	-4.5	1.8	7.0	240	2.38	2.82	2	
88	13599-13601	-2.0	1.7	7.0	300	2.48	2.77	2	
89	13601-04	0.0	1.5	7.5	200	2.30	2.74	3	
90	13604-07	-2.0	1.3	7.0	250	2.40	2.77	3	
91	13607-11	1.0	1.2	6.0	90	1.95	2.71	4	
92	13611-18	-0.5	3.0	9.0	70	1.85	2.77	7	
93	13618-22	2.0	4.5	10.0	20	1.30	2.75	4	
94	13622-25	-1.0	7.0	9.0	12	1.08	2.86	3	
95	13625-27	1.0	9.0	11.0	10	1.00	2.86	2	
96	13627-29	-2.5	7.5	10.0	9	0.95	2.89	2	
97	13629-32	1.5	7.2	10.0	9	0.95	2.82	3	
98	13632-37	-2.0	6.0	10.0	12	1.08	2.86	5	
99	13637-41	10.0	10.5	7.5	14	1.15	2.72	4	
100	13641-45	2.0	5.0	8.0	20	1.30	2.76	4	
101	13645-50	-1.5	8.0	10.5	13	1.11	2.89	5	
102	13650-53	6.0	12.4	11.0	10	1.00	2.83	3	
103	13653-55	-3.0	10.0	12.0	22	1.34	2.96	2	
104	13655-62	3.0	7.0	12.0	15	1.18	2.78	7	
105	13662-66	0.0	8.5	14.0	10	1.00	2.87	4	
106	13666-70	-10.0	4.0	16.0	60	1.78	2.96	4	

Well 17
KOUNS NO. A-1
C/W/2 17-17N-17W

Zone	Depth Interval (GR)	ϕD(%)	ϕN(%)	GR (API units)	Rt (ohm-m)	log Rt	ρ_{mc} (gm/cc)	Thickness (ft)	Marker
1	13274-77	-2.6	5.0	33.0	140	2.15	2.85	3	
2	13277-81	1.0	5.0	23.0	190	2.28	2.78	4	
3	13281-85	-2.2	4.0	27.0	105	2.02	2.82	4	
4	13285-88	0.0	3.5	26.0	600	2.78	2.77	3	
5	13288-92	-3.0	2.3	20.0	350	2.54	2.80	4	
6	13292-95	-7.2	2.0	25.0	500	2.70	2.87	3	
7	13295-98	-0.7	1.6	22.0	200	2.30	2.75	3	
8	13298-13300	2.0	2.0	21.0	1200	3.08	2.71	2	
9	13300-02	-6.0	2.0	22.5	1500	3.18	2.76	2	
10	13302-06	-2.7	1.7	20.5	1500	3.18	2.79	4	
11	13306-10	-0.5	0.6	20.5	1500	3.18	2.73	4	
12	13310-14	-2.2	0.8	22.5	790	2.90	2.76	4	
13	13314-19	-1.8	0.5	19.5	1500	3.18	2.75	5	
14	13319-23	-0.2	0.5	22.5	1500	3.18	2.72	4	
15	13323-28	-3.5	1.1	24.0	1500	3.18	2.79	5	
16	13328-38	-1.0	0.6	21.0	1500	3.18	2.74	10	
17	13338-40	-2.0	0.6	17.0	1500	3.18	2.75	2	
18	13340-43	0.5	0.5	18.0	1500	3.18	2.71	3	
19	13343-46	-6.0	0.8	20.0	1500	3.18	2.83	3	
20	13346-50	-3.5	0.7	21.5	1500	3.18	2.78	4	
21	13350-52	-5.2	0.7	20.0	1500	3.18	2.81	2	
22	13352-56	-1.0	0.5	19.5	1500	3.18	2.74	4	
23	13356-58	-5.2	0.4	19.0	1500	3.18	2.81	2	
24	13358-62	-2.0	0.3	16.0	1500	3.18	2.75	4	D?
25	13362-66	-6.0	0.6	22.5	1500	3.18	2.82	4	
26	13366-72	-3.0	0.3	21.0	1500	3.18	2.77	6	
27	13372-75	-9.0	1.0	23.0	1500	3.18	2.88	3	
28	13375-77	-6.0	1.2	21.5	1500	3.18	2.83	2	
29	13377-80	-5.5	1.9	21.0	1500	3.18	2.84	3	
30	13380-82	-4.0	2.1	21.0	1500	3.18	2.82	2	
31	13382-84	-8.1	2.3	16.0	1500	3.18	2.89	2	E?
32	13384-86	0.0	2.5	16.0	1500	3.18	2.75	2	
33	13386-90	-2.5	0.8	14.0	1500	3.18	2.77	4	F

Well 17 continued

Zone	Depth Interval (GR)	ϕ_D(%)	ϕ_N(%)	GR (API units)	Rt (ohm-m)	log Rt	ρ_{mc} (gm/cc)	Thickness (ft)	Marker
34	13390-92	-1.0	2.3	13.0	850	2.93	2.77	2	
35	13392-95	2.5	5.8	14.5	470	2.67	2.77	3	
36	13395-97	9.0	7.2	15.0	300	2.48	2.68	2	
37	13397-99	3.8	8.0	15.0	400	2.60	2.79	2	
38	13399-13402	8.0	9.5	14.0	200	2.30	2.74	3	
39	13402-06	7.0	8.7	11.5	120	2.08	2.74	4	
40	13406-09	7.8	8.5	13.5	350	2.54	2.72	3	
41	13409-14	30.0	9.5	13.0	900	2.95	2.32	5	
42	13414-16	23.0	8.0	10.0	730	2.86	2.43	2	
43	13416-20	19.0	12.0	11.0	1500	3.18	2.57	4	
44	13420-24	7.2	10.0	11.5	240	2.38	2.76	4	
45	13424-28	6.5	10.7	11.5	270	2.43	2.79	4	
46	13428-32	14.4	13.2	13.5	200	2.30	2.68	4	
47	13432-36	5.0	9.0	15.0	60	1.78	2.77	4	G
48	13436-41	-5.0	5.0	22.5	27.5	1.44	2.89	5	
49	13441-48	-3.5	2.0	22.5	35.0	1.54	2.81	7	
50	13448-51	0.0	1.0	19.5	170	2.23	2.73	3	
51	13451-55	-0.5	2.0	26.0	120	2.08	2.75	4	
52	13455-61	0.0	1.2	20.5	800	2.90	2.73	6	
53	13461-66	0.5	1.0	22.0	1500	3.18	2.72	5	
54	13466-69	-2.0	0.9	25.0	650	2.81	2.76	3	
55	13469-71	0.7	0.7	23.0	800	2.90	2.71	2	
56	13471-75	-0.3	0.7	19.5	1500	3.18	2.73	4	
57	13475-79	-2.7	0.7	17.0	1500	3.18	2.77	4	
58	13479-81	0.0	0.9	19.0	1500	3.18	2.73	2	
59	13481-83	-1.2	1.0	22.0	1500	3.18	2.75	2	
60	13483-89	1.0	1.0	21.0	1200	3.08	2.71	6	
61	13489-94	1.5	0.7	20.0	1500	3.18	2.70	5	
62	13494-99	0.5	1.0	21.5	1500	3.18	2.72	5	
63	13499-13504	-1.0	1.1	20.5	1500	3.18	2.75	5	
64	13504-07	2.0	0.9	20.0	1500	3.18	2.69	3	
65	13507-09	-0.2	1.0	20.5	1200	3.08	2.73	2	
66	13509-11	1.8	1.1	18.0	1500	3.18	2.70	2	
67	13511-12	4.0	1.0	19.0	1500	3.18	2.66	1	
68	13512-19	19.0	1.0	20.0	1500	3.18	2.40	7	

Well 17 continued

Zone	Depth Interval (GR)	ϕ_D(%)	ϕ_N(%)	GR (API units)	Rt (ohm-m)	log Rt	ρ_{mc} (gm/cc)	Thickness (ft)	Marker
69	13519-22	2.0	0.8	19.0	1500	3.18	2.69	3	
70	13522-24	4.5	0.7	19.0	1500	3.18	2.64	2	
71	13524-28	1.4	1.4	18.5	1500	3.18	2.71	4	
72	13528-32	12.0	2.1	21.0	1500	3.18	2.54	4	
73	13532-35	5.7	2.2	20.0	1500	3.18	2.65	3	
74	13535-38	1.2	2.2	26.0	500	2.70	2.73	3	
75	13538-41	7.5	1.0	21.0	1300	3.11	2.60	3	
76	13541-46	18.0	1.0	23.0	1500	3.18	2.42	5	
77	13546-49	6.0	2.0	28.0	900	2.95	2.64	3	
78	13549-51	11.0	1.5	26.0	1000	3.00	2.55	2	
79	13551-54	4.5	2.2	26.0	1500	3.18	2.67	3	
80	13554-59	11.0	1.8	23.5	1500	3.18	2.55	5	
81	13559-62	1.5	1.5	21.0	1500	3.18	2.71	3	
82	13562-64	3.0	2.5	24.0	1500	3.18	2.70	2	
83	13564-68	9.0	3.1	30.0	1500	3.18	2.61	4	
84	13568-70	2.5	2.0	29.0	1500	3.18	2.70	2	
85	13570-72	5.5	1.0	25.0	1500	3.18	2.63	2	
86	13572-74	7.2	1.7	30.0	1500	3.18	2.61	2	
87	13574-76	10.0	2.0	25.0	1500	3.18	2.57	2	
88	13576-79	4.0	2.0	30.0	900	2.95	2.68	3	
89	13579-81	8.5	2.5	30.0	250	2.40	2.60	2	
90	13581-82	2.0	3.5	27.0	150	2.18	2.74	1	
91	13582-86	-1.0	4.0	29.5	100	2.00	2.80	4	H
92	13586-90	0.0	1.0	20.0	1500	3.18	2.73	4	
93	13590-92	2.5	1.5	19.0	1500	3.18	2.69	2	
94	13592-96	6.0	0.5	17.0	1500	3.18	2.62	4	
95	13596-98	3.0	0.2	16.5	1500	3.18	2.66	2	
96	13598-13601	0.0	0.3	15.0	150	2.18	2.72	3	
97	13601-05	1.5	8.0	11.0	18	1.26	2.83	4	
98	13605-07	-1.0	2.0	15.5	100	2.00	2.76	2	
99	13607-12	2.0	0.6	19.5	700	1.85	2.69	5	
100	13612-19	-6.0	2.0	15.0	300	2.48	2.85	7	
101	13619-24	0.0	0.2	15.0	1500	3.18	2.71	5	
102	13624-30	-3.0	0.2	15.0	1500	3.18	2.76	6	
103	13630-34	-4.0	0.7	15.0	1500	3.18	2.79	4	

Well 17 continued

Zone	Depth Interval (GR)	ϕ_D(%)	ϕ_N(%)	GR (API Units)	Rt (ohm-m)	log Rt	ρ_{mc} (gm/cc)	Thickness (ft)	Marker
104	13634-37	-2.0	0.8	15.0	1500	3.18	2.76	3	
105	13637-41	1.0	0.8	14.0	500	2.70	2.71	4	
106	13641-44	-2.0	1.0	15.0	200	2.30	2.76	3	
107	13644-46	0.0	2.5	14.5	90	1.95	2.75	2	
108	13646-48	-3.5	8.5	15.0	40	1.60	2.93	2	
109	13648-52	0.0	5.5	15.0	20	1.30	2.81	4	
110	13652-59	7.0	10.0	15.0	4.2	0.62	2.77	7	
111	13659-62	6.0	2.0	16.0	20	1.30	2.64	3	
112	13662-66	-0.5	1.0	18.0	100	2.00	2.74	4	
113	13366-68	1.0	2.0	21.5	80	1.90	2.73	2	
114	13368-72	-4.0	1.0	22.0	95	1.98	2.80	4	I

Well 18
JONES 'H' No. 1
N/2-NW/4-SE/4 21-19N-17W

Zone	Depth Interval (GR)	ϕ_D(%)	ϕ_N(%)	GR (API units)	Rt (ohm-m)	log Rt	ρ_{mc} (gm/cc)	Thickness (ft)	Marker
1	11954-60	-3.5	0.6	15.0	240	2.38	2.78	6	A
2	11960-63	-2.0	0.5	15.0	280	2.45	2.75	3	
3	11963-66	-3.5	0.7	16.5	120	2.08	2.78	3	
4	11966-68	-3.0	0.4	15.0	150	2.18	2.77	2	
5	11968-70	0.2	0.2	15.5	300	2.48	2.71	2	
6	11970-73	-0.5	0.2	14.0	520	2.72	2.72	3	
7	11973-77	0.3	0.2	13.0	600	2.78	2.71	4	
8	11977-80	1.0	0.2	13.0	460	2.66	2.71	3	
9	11980-85	-1.7	0.4	21.0	480	2.68	2.75	5	
10	11985-88	0.0	0.3	18.0	520	2.72	2.72	3	
11	11988-90	1.0	0.5	19.0	500	2.70	2.70	2	
12	11990-03	-4.0	0.8	23.0	330	2.52	2.79	3	
13	11993-96	1.3	0.7	19.0	280	2.45	2.70	3	
14	11996-99	-1.5	0.7	19.0	320	2.51	2.75	3	
15	11999-12002	1.0	0.7	18.0	400	2.60	2.70	3	
16	12002-04	-2.2	0.4	15.0	460	2.66	2.75	2	D?
17	12004-14	-0.7	0.8	20.0	320	2.51	2.74	10	E?
18	12014-18	-2.0	0.2	22.5	450	2.65	2.75	4	
19	12018-21	1.0	0.1	15.0	900	2.95	2.69	3	
20	12021-25	0.0	0.0	15.0	1500	3.18	2.71	4	
21	12025-38	-2.0	0.0	14.0	1300	3.11	2.74	13	
22	12038-45	-1.0	0.0	14.0	1500	3.18	2.73	7	
23	12045-50	2.0	0.0	10.0	1500	3.18	2.68	5	
24	12050-55	-2.0	0.0	12.0	1500	3.18	2.74	5	
25	12055-57	-3.0	0.0	13.0	1500	3.18	2.76	2	
26	12057-63	0.5	0.0	10.5	1500	3.18	2.70	6	
27	12063-65	-1.5	0.0	10.5	1500	3.18	2.74	2	
28	12065-67	2.0	0.2	10.5	1500	3.18	2.76	2	
29	12065-70	2.0	0.0	10.5	600	2.78	2.68	3	F?
30	12070-75	2.2	0.0	11.0	400	2.60	2.67	5	

Well 18 continued

Zone	Depth Interval (GR)	ϕ_D(%)	ϕ_N(%)	GR (API units)	Rt (ohm-m)	log Rt	ρ_{mc} (gm/cc)	Thickness (ft)	Marker
31	12075-77	6.0	0.0	10.5	310	2.49	2.61	2	
32	12077-80	10.0	0.5	12.0	300	2.48	2.55	3	
33	12080-83	4.5	0.0	11.0	200	2.30	2.63	3	
34	12083-84	-0.2	0.0	12.0	205	2.31	2.71	1	
35	12084-87	3.5	0.0	11.0	200	2.30	2.65	3	
36	12087-89	0.5	0.0	11.0	220	2.34	2.70	2	
37	12089-95	22.0	0.0	12.0	270	2.43	2.33	6	G?
38	12095-98	6.0	0.0	15.0	160	2.20	2.61	3	
39	12098-12102	5.5	0.2	15.0	170	2.23	2.62	4	
40	12102-08	1.0	0.5	15.0	70	1.85	2.70	6	
41	12108-11	-3.0	0.5	14.5	90	1.95	2.77	3	
42	12111-14	3.0	0.5	16.0	150	2.18	2.67	3	
43	12114-16	-1.8	0.6	17.0	300	2.48	2.75	2	
44	12116-19	2.5	0.6	20.0	400	2.60	2.68	3	
45	12119-23	1.0	0.5	17.5	750	2.88	2.70	4	
46	12123-31	0.0	0.5	15.0	600	2.78	2.72	8	
47	12131-33	-3.3	0.8	16.0	450	2.65	2.78	2	
48	12133-37	-1.0	0.6	19,0	270	2.43	2.74	4	
49	12137-40	0.0	0.8	26.0	290	2.46	2.72	3	
50	12140-46	1.3	1.5	28.0	130	2.11	2.71	6	H
51	12146-48	-1.0	2.0	29.0	130	2.11	2.76	2	
52	12148-51	0.5	1.6	30.0	85	1.93	2.73	3	
53	12151-55	-1.5	2.0	30.0	72	1.86	2.77	4	
54	12155-58	-2.0	1.5	23.0	100	2.00	2.77	3	
55	12158-60	0.0	0.7	15.0	140	2.15	2.72	2	
56	12160-64	-1.0	0.8	20.0	190	2.28	2.71	4	
57	12164-67	-2.0	1.0	15.0	130	2.11	2.76	3	
58	12167-73	2.0	3.0	8.0	70	1.85	2.73	6	
59	12173-76	6.0	11.0	15.0	10	1.00	2.81	3	
60	12176-78	0.0	7.0	12.0	13	1.11	2.84	2	

Well 18 continued

Zone	Depth Interval (GR)	ϕ_D(%)	ϕ_N(%)	GR (API units)	Rt (ohm-m)	log Rt	ρ_{mc} (gm/cc)	Thickness (ft)	Marker
61	12178-80	-3.0	6.5	12.0	16	1.20	2.88	2	
62	12180-83	-0.5	6.5	12.5	20	1.30	2.84	3	
63	12183-85	1.3	4.5	12.0	22	1.34	2.77	2	
64	12185-87	-3.2	5.0	12.5	27	1.43	2.86	2	
65	12187-89	2.5	2.0	12.0	40	1.60	2.70	2	
66	12189-93	-0.5	1.0	16.0	80	1.90	2.74	4	
67	12193-95	1.4	0.6	11.0	100	2.00	2.70	2	
68	12195-98	2.8	0.6	14.0	190	2.28	2.67	3	
69	12198-12200	-1.0	0.7	13.0	140	2.15	2.74	2	
70	12200-05	-3.0	2.0	13.5	65	1.81	2.80	5	
71	12205-07	1.3	2.0	14.5	63	1.80	2.72	2	
72	12207-13	-1.0	3.0	14.5	50	1.70	2.78	6	
73	12213-16	2.0	2.6	13.0	55	1.74	2.72	3	
74	12216-20	0.5	2.0	13.5	80	1.90	2.74	4	
75	12220-24	-0.5	2.5	15.0	90	1.95	2.76	4	
76	12224-27	-3.0	2.6	13.0	50	1.70	2.81	3	
77	12227-29	0.8	2.4	15.0	42	1.62	2.74	2	
78	12229-31	3.0	2.0	15.0	40	1.60	2.69	2	
79	12231-34	2.0	2.0	15.5	40	1.60	2.71	3	
80	12234-36	-1.0	2.0	13.5	46	1.66	2.76	2	
81	12236-38	2.0	2.0	15.0	50	1.70	2.71	2	
82	12238-42	0.5	1.8	18.0	75	1.88	2.73	4	

APPENDIX B

Tabulated log statistical parameters (Interval average and standard deviationsof GR, log Rt, and ρ_{mc} values) and interval thicknesses by wells and intervals.

Well 1

	AVERAGES			STANDARD DEVIATIONS			THICKNESS	
Interval	GR	log RT	ρ_{mc}	GR	log RT	ρ_{mc}	h	
AE	23.6	2.62	2.77	4.51	0.42	0.05	94	
EF	14.8	2.35	2.70	0.35	0.24	0.01	10	
FG	14.2	1.68	2.73	1.10	0.48	0.04	56	
GH	22.3	3.00	2.70	3.22	0.38	0.01	164	
HI	15.9	1.99	2.76	3.27	0.67	0.05	60	
							AI	384

Well 2

Interval	AVERAGES GR	AVERAGES log RT	AVERAGES ρ_{mc}	STANDARD DEVIATIONS GR	STANDARD DEVIATIONS log RT	STANDARD DEVIATIONS ρ_{mc}	THICKNESS h
AE	20.1	2.02	2.83	4.67	0.52	0.06	111
EF	11.0	1.31	2.80	1.0	0.20	0.06	6
FG	10.7	1.23	2.82	2.42	0.26	0.05	57
GH	20.1	2.59	2.73	3.95	0.46	0.04	144
HI	14.5	2.01	2.79	2.92	0.43	0.06	78
						AI	377

Well 3

Interval	AVERAGES GR	AVERAGES log RT	AVERAGES ρ_{mc}	STANDARD DEVIATIONS GR	STANDARD DEVIATIONS log RT	STANDARD DEVIATIONS ρ_{mc}	THICKNESS h
AE	20.0	2.19	2.18	2.63	0.26	0.04	74
EF	9.5	2.81	2.72	0.93	0.36	0.02	37
FG	11.2	2.52	2.74	1.41	0.33	0.05	45
GH	19.2	1.41	2.73	3.59	0.48	0.07	156
HI	11.6	2.15	2.75	3.44	0.57	0.05	91
						AI	403

Well 4

	AVERAGES			STANDARD DEVIATIONS			THICKNESS	
Interval	GR	log RT	ρ_{mc}	GR	log RT	ρ_{mc}	h	
AE	18.2	2.00	2.77	4.41	0.19	0.04	77	
EF	15.7	2.57	2.74	3.15	0.15	0.03	38	
FG	11.1	2.06	2.76	1.36	0.10	0.02	48	
GH	17.7	2.78	2.70	3.66	0.48	0.04	135	
HI	12.8	1.59	2.77	3.00	0.71	0.04	85	
							AI	383

Well 5

Interval	AVERAGES GR	AVERAGES log RT	AVERAGES ρ_{mc}	STANDARD DEVIATIONS GR	STANDARD DEVIATIONS log RT	STANDARD DEVIATIONS ρ_{mc}	THICKNESS h
AE	35.0	1.30	2.78	10.46	0.41	0.05	78
EF	15.0	2.10	2.74	2.55	0.34	0.02	25
FG	13.8	1.49	2.73	1.62	0.23	0.02	40
GH	23.2	2.58	2.72	2.77	0.51	0.03	104
HI	16.4	2.35	2.75	5.11	0.59	0.05	100
						AI	347

Well 6

Interval	AVERAGES GR	log RT	ρ_{mc}	STANDARD DEVIATIONS GR	log RT	ρ_{mc}	THICKNESS h
AE	24.2	2.72	2.83	3.89	0.47	0.05	78
EF	18.1	2.17	2.79	2.80	0.38	0.06	24
FG	17.4	1.38	2.88	2.58	0.51	0.06	44
GH	23.8	3.11	2.73	3.73	0.15	0.03	87
HI	16.1	2.55	2.78	3.21	0.60	0.06	87
						AI	320

Well 7

Interval	AVERAGES GR	AVERAGES log RT	AVERAGES ρ_{mc}	STANDARD DEVIATIONS GR	STANDARD DEVIATIONS log RT	STANDARD DEVIATIONS ρ_{mc}	THICKNESS h
AE	31.0	2.87	2.80	7.75	0.43	0.05	39
EF	9.54	3.18	2.71	1.16	0.0	0.03	60
FG	19.7	2.69	2.87	4.23	0.52	0.02	21
GH	20.8	3.15	2.75	6.91	0.13	0.04	229
HI	14.7	3.14	2.76	3.32	0.15	0.06	92

AI 441

Well 8

Interval	AVERAGES GR	AVERAGES log RT	AVERAGES ρ_{mc}	STANDARD DEVIATIONS GR	STANDARD DEVIATIONS log RT	STANDARD DEVIATIONS ρ_{mc}	THICKNESS h
AE	17.3	2.28	2.76	3.30	0.22	0.04	68
EF	12.8	2.41	2.74	1.68	0.16	0.03	52
FG	10.7	1.05	2.83	1.38	0.55	0.03	46
GH	22.1	2.34	2.72	5.93	0.30	0.05	37
HI	12.0	1.90	2.74	3.06	0.57	0.05	101
						AI	304

Well 9

Interval	AVERAGES GR	AVERAGES log RT	AVERAGES ρ_{mc}	STANDARD DEVIATIONS GR	STANDARD DEVIATIONS log RT	STANDARD DEVIATIONS ρ_{mc}	THICKNESS h
AE	13.9	2.01	2.74	4.83	0.27	0.02	94
EF	14.4	1.77	2.74	4.15	0.18	0.02	23
FG	10.7	2.03	2.73	1.30	0.22	0.05	47
GH	17.3	2.36	2.68	3.35	0.14	0.03	146
HI	10.6	1.84	2.73	3.67	0.50	0.04	90
						AI	400

Well 10

Interval	AVERAGES GR	AVERAGES log RT	AVERAGES ρ_{mc}	STANDARD DEVIATIONS GR	STANDARD DEVIATIONS log RT	STANDARD DEVIATIONS ρ_{mc}	THICKNESS h
AE	23.4	1.97	2.81	4.93	0.23	0.03	35
EF	22.5	2.32	2.76	1.08	0.22	0.03	40
FG	21.1	1.97	2.82	3.13	0.22	0.03	38
GH	22.9	2.65	2.71	3.95	0.51	0.04	190
HI	15.2	2.23	2.74	3.85	0.54	0.04	99
						AI	391

Well 11

Interval	AVERAGES GR	AVERAGES log RT	AVERAGES ρ_{mc}	STANDARD DEVIATIONS GR	STANDARD DEVIATIONS log RT	STANDARD DEVIATIONS ρ_{mc}	THICKNESS h
AE	19.0	2.25	2.77	4.90	0.30	0.04	73
EF	18.3	2.48	2.74	3.13	0.06	0.04	42
FG	14.7	1.94	2.75	1.97	0.20	0.06	62
GH	20.6	2.12	2.71	4.21	0.33	0.05	154
HI	15.2	1.20	2.79	3.39	0.65	0.07	84
							AI 415

Well 12

Interval	AVERAGES GR	AVERAGES log RT	AVERAGES ρ_{mc}	STANDARD DEVIATIONS GR	STANDARD DEVIATIONS log RT	STANDARD DEVIATIONS ρ_{mc}	THICKNESS h
AE	19.1	2.04	2.82	5.72	0.16	0.06	87
EF	17.6	2.60	2.79	2.56	0.17	0.04	27
FG	10.6	1.42	2.82	2.25	0.48	0.06	84
GH	19.0	2.79	2.75	3.48	0.32	0.05	118
HI	10.6	2.12	2.80	3.80	0.59	0.06	100
						AI	416

Well 13

	AVERAGES			STANDARD DEVIATIONS			THICKNESS	
Interval	GR	log RT	ρ_{mc}	GR	log RT	ρ_{mc}	h	
AE	19.1	1.85	2.77	6.12	0.31	0.06	83	
EF	30.0	1.24	2.78	4.94	0.16	0.01	31	
FG	16.1	2.12	2.78	4.38	0.31	0.04	65	
GH	19.4	2.41	2.71	3.59	0.29	0.05	129	
HI	14.8	1.78	2.76	2.79	0.83	0.04	86	
							AI	394

Well 14

Interval	AVERAGES GR	AVERAGES log RT	AVERAGES ρ_{mc}	STANDARD DEVIATIONS GR	STANDARD DEVIATIONS log RT	STANDARD DEVIATIONS ρ_{mc}	THICKNESS h
AE	22.5	2.26	2.79	4.28	0.26	0.04	49
EF	19.6	2.50	2.73	2.21	0.25	0.03	18
FG	16.4	1.98	2.78	3.14	0.45	0.05	74
GH	20.7	2.92	2.73	3.90	0.22	0.04	115
HI	10.4	2.52	2.74	3.02	0.55	0.05	127
						AI	383

Well 15

Interval	AVERAGES GR	AVERAGES log RT	AVERAGES ρ_{mc}	STANDARD DEVIATIONS GR	STANDARD DEVIATIONS log RT	STANDARD DEVIATIONS ρ_{mc}	THICKNESS h
AE	15.4	2.04	2.76	2.72	0.26	0.05	64
EF	14.2	2.34	2.77	1.41	0.18	0.04	29
FG	10.7	2.42	2.75	1.85	0.19	0.04	60
GH	16.6	2.84	2.72	3.51	0.23	0.04	138
HI	10.1	1.81	2.79	1.92	0.65	0.06	102
						AI	393

Well 16

Interval	AVERAGES GR	AVERAGES log RT	AVERAGES ρ_{mc}	STANDARD DEVIATIONS GR	STANDARD DEVIATIONS log RT	STANDARD DEVIATIONS ρ_{mc}	THICKNESS h
AE	23.6	1.98	2.80	4.0	0.15	0.05	73
EF	18.3	1.68	2.82	3.18	0.14	0.01	6
FG	10.6	1.91	2.71	2.56	0.23	0.08	44
GH	19.8	2.67	2.77	4.28	0.39	0.06	139
HI	9.7	1.63	2.82	2.35	0.59	0.07	117
							AI 379

Well 17

Interval	AVERAGES GR	AVERAGES log RT	AVERAGES ρ_{mc}	STANDARD DEVIATIONS GR	STANDARD DEVIATIONS log RT	STANDARD DEVIATIONS ρ_{mc}	THICKNESS h
AE	21.5	2.99	2.79	3.30	0.35	0.05	110
EF	15.0	3.18	2.76	1.41	0.0	0.01	6
FG	13.0	2.53	2.75	1.65	0.37	0.04	46
GH	23.0	2.95	2.71?	3.77	0.46	0.06	150
HI	16.3	2.34	2.75	2.60	0.79	0.07	86
							AI 398

Well 18

Interval	AVERAGES GR	AVERAGES log RT	AVERAGES ρ_{mc}	STANDARD DEVIATIONS GR	STANDARD DEVIATIONS log RT	STANDARD DEVIATIONS ρ_{mc}	THICKNESS h
AE	17.0	2.53	2.74	2.90	0.19	0.03	62
EF	13.1	3.08	2.72	3.50	0.18	0.03	56
FG	12.3	2.32	2.66	1.79	0.20	0.04	38
GH	21.5	2.32	2.73	5.96	0.34	0.04	50
HI	13.9	1.73	2.76	2.23	0.33	0.05	84
						AI	290

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SECTION AA'

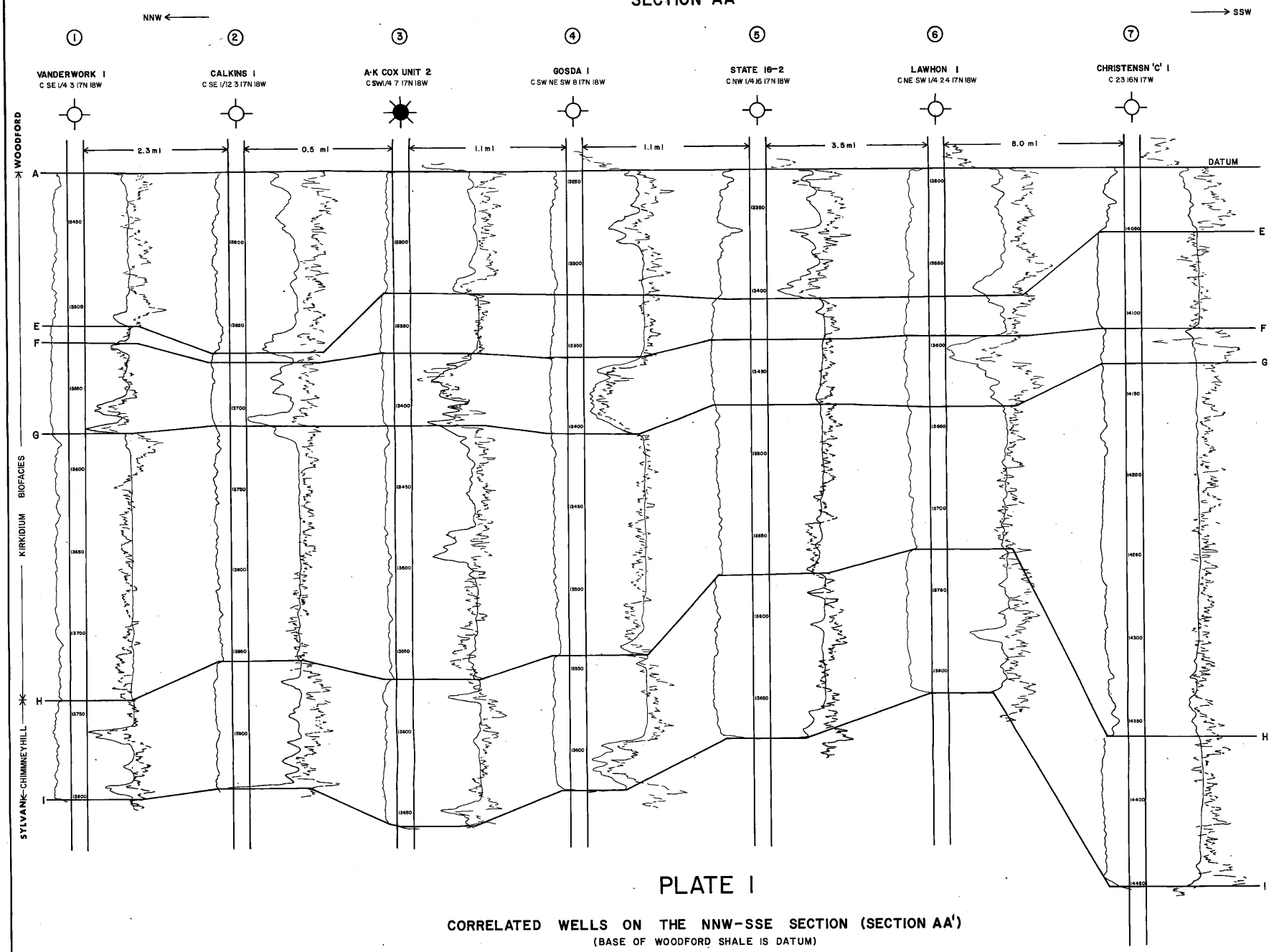

PLATE 1

CORRELATED WELLS ON THE NNW-SSE SECTION (SECTION AA')

(BASE OF WOODFORD SHALE IS DATUM)

T 2142

KILLIAN C. IKWUAKOR

NOV. 30, 1978

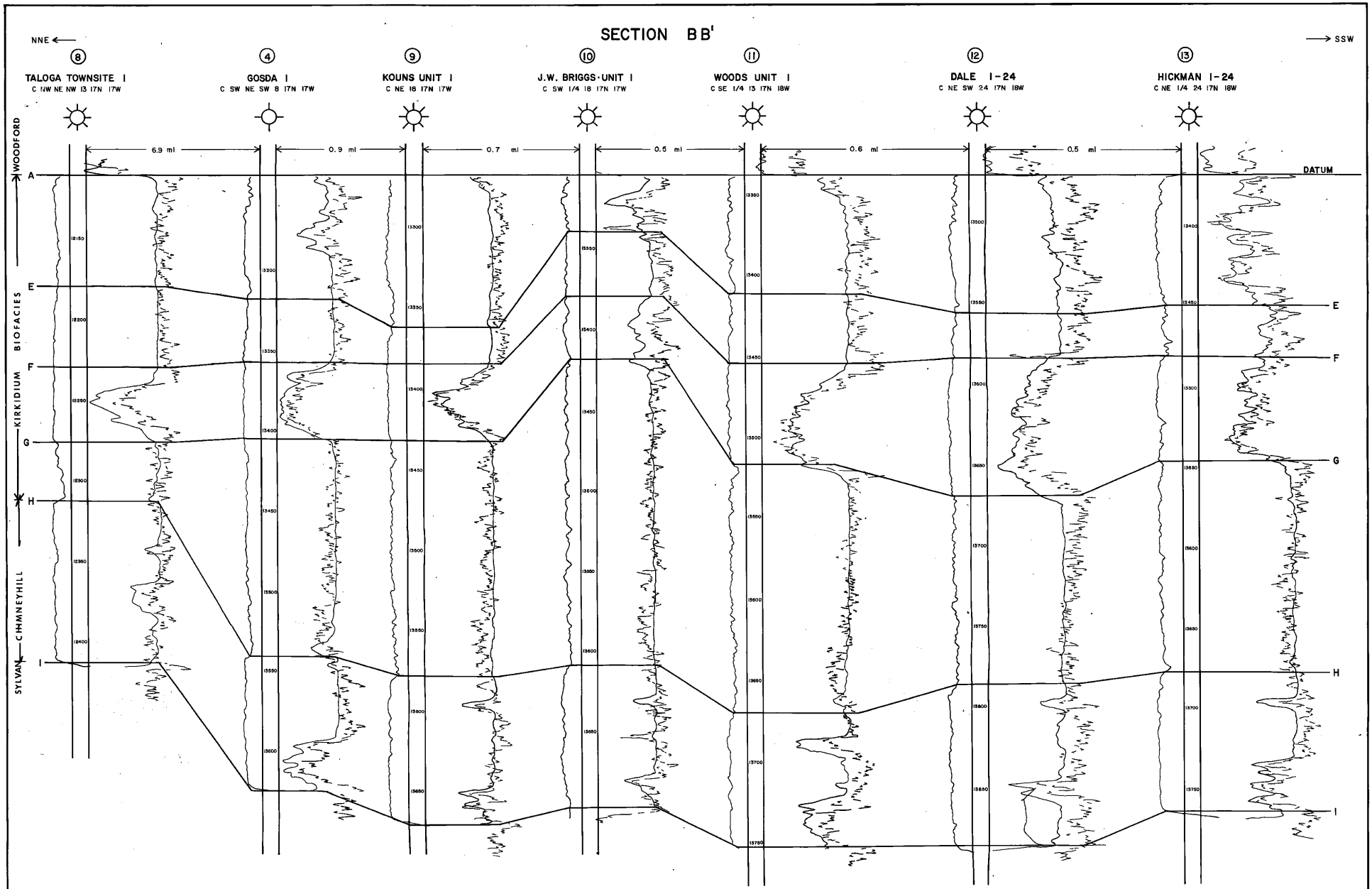

PLATE 2

CORRELATED WELLS ON THE NNE–SSW SECTION (SECTION BB')

(BASE OF WOODFORD SHALE IS DATUM)

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KILLIAN C. IKWUAKOR
NOV. 30, 1978

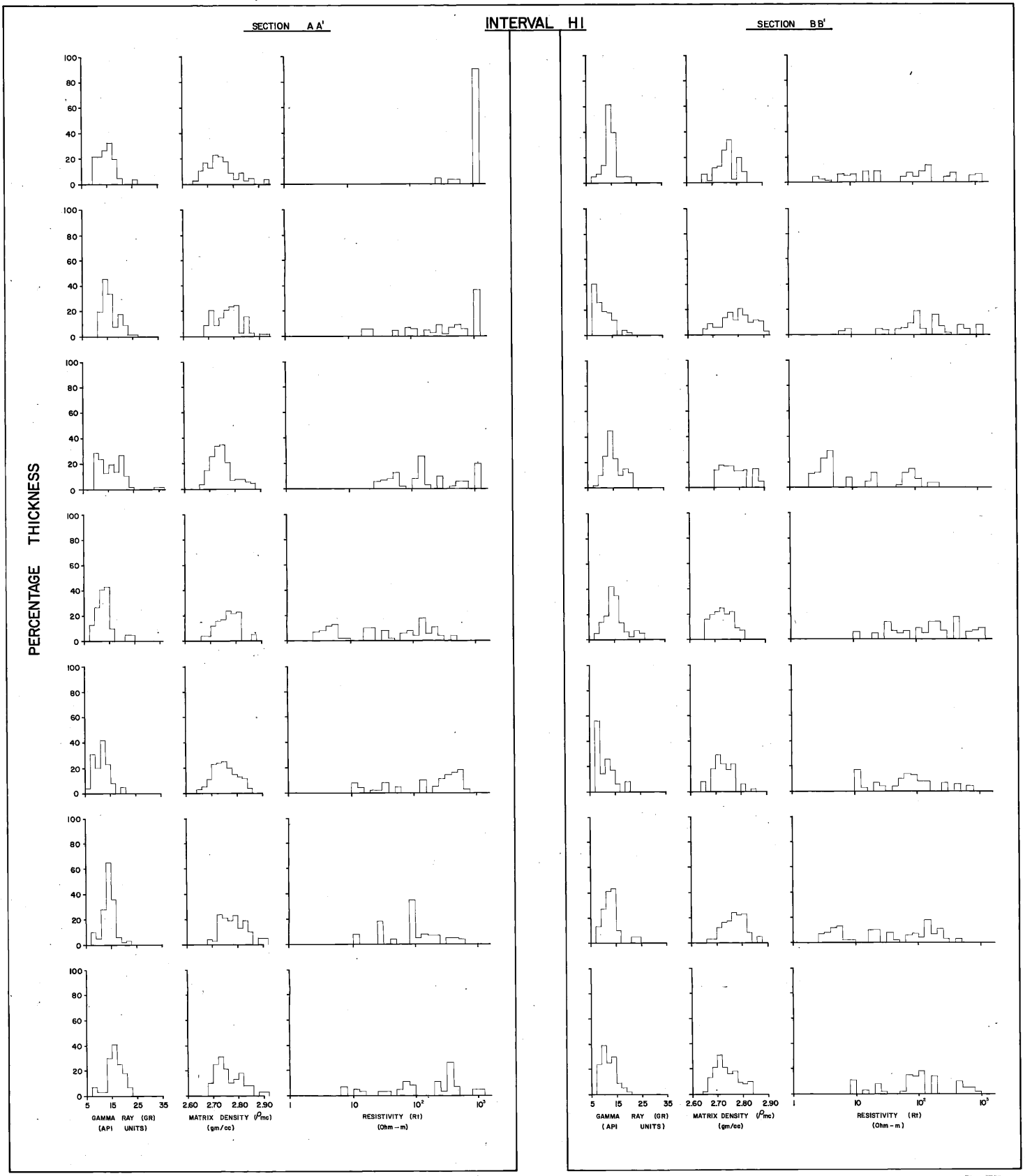

PLATE 3

HISTOGRAMS OF INTERVAL H1 FOR SECTIONS AA' & BB'

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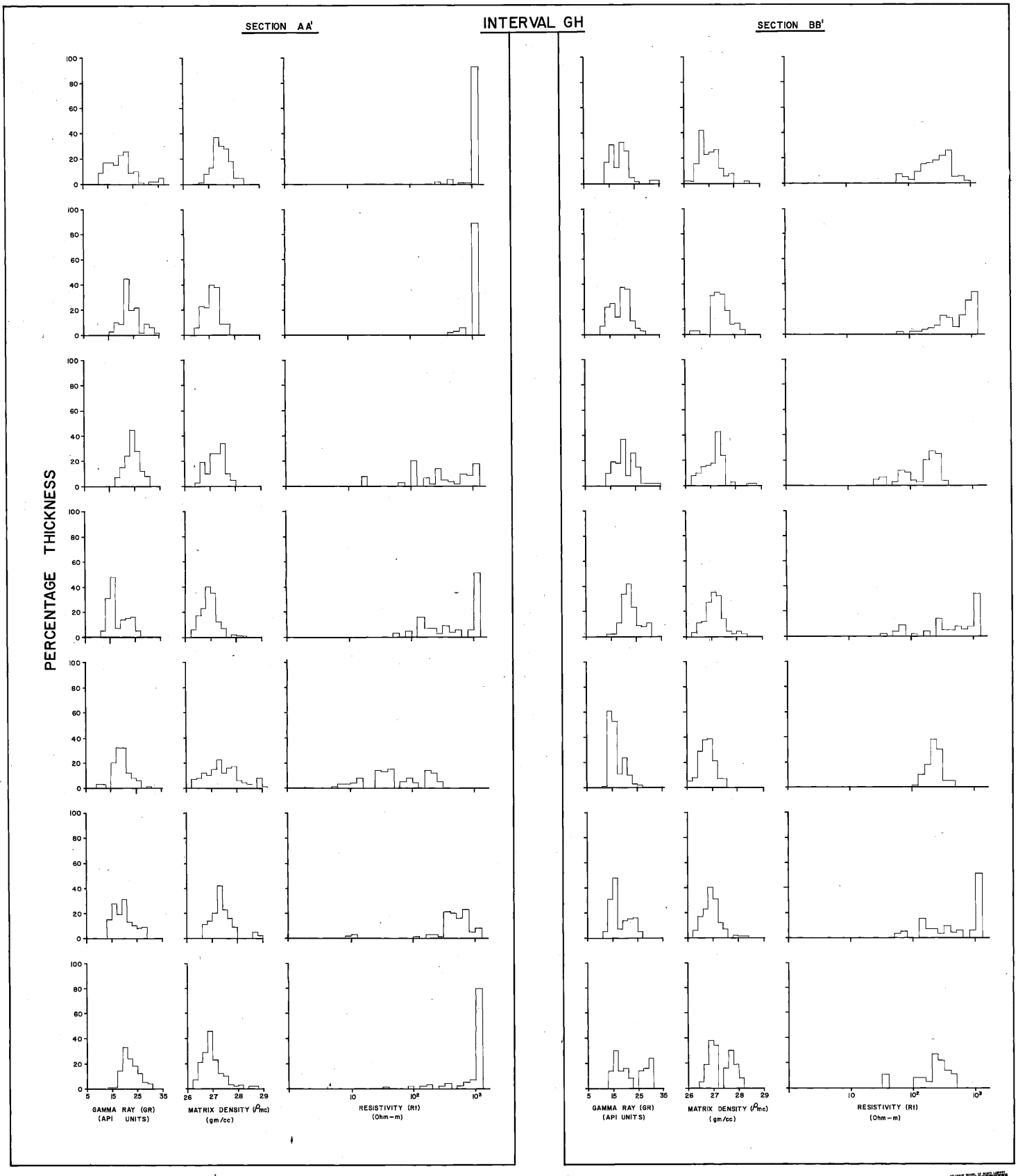

PLATE 4

HISTOGRAMS OF INTERVAL GH FOR SECTIONS AA' & BB'

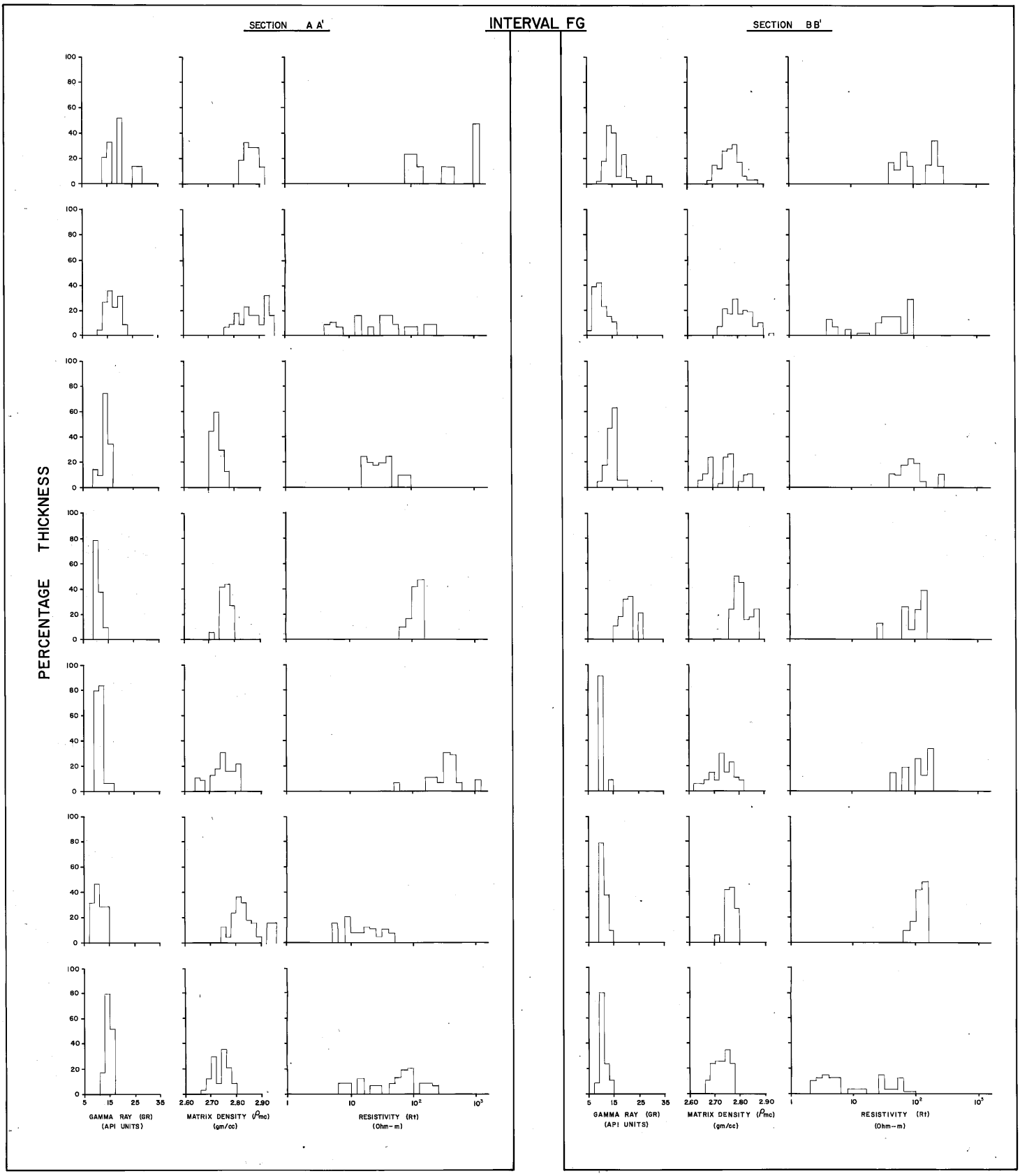

PLATE 5

HISTOGRAMS OF INTERVAL FG FOR SECTIONS AA' & BB'

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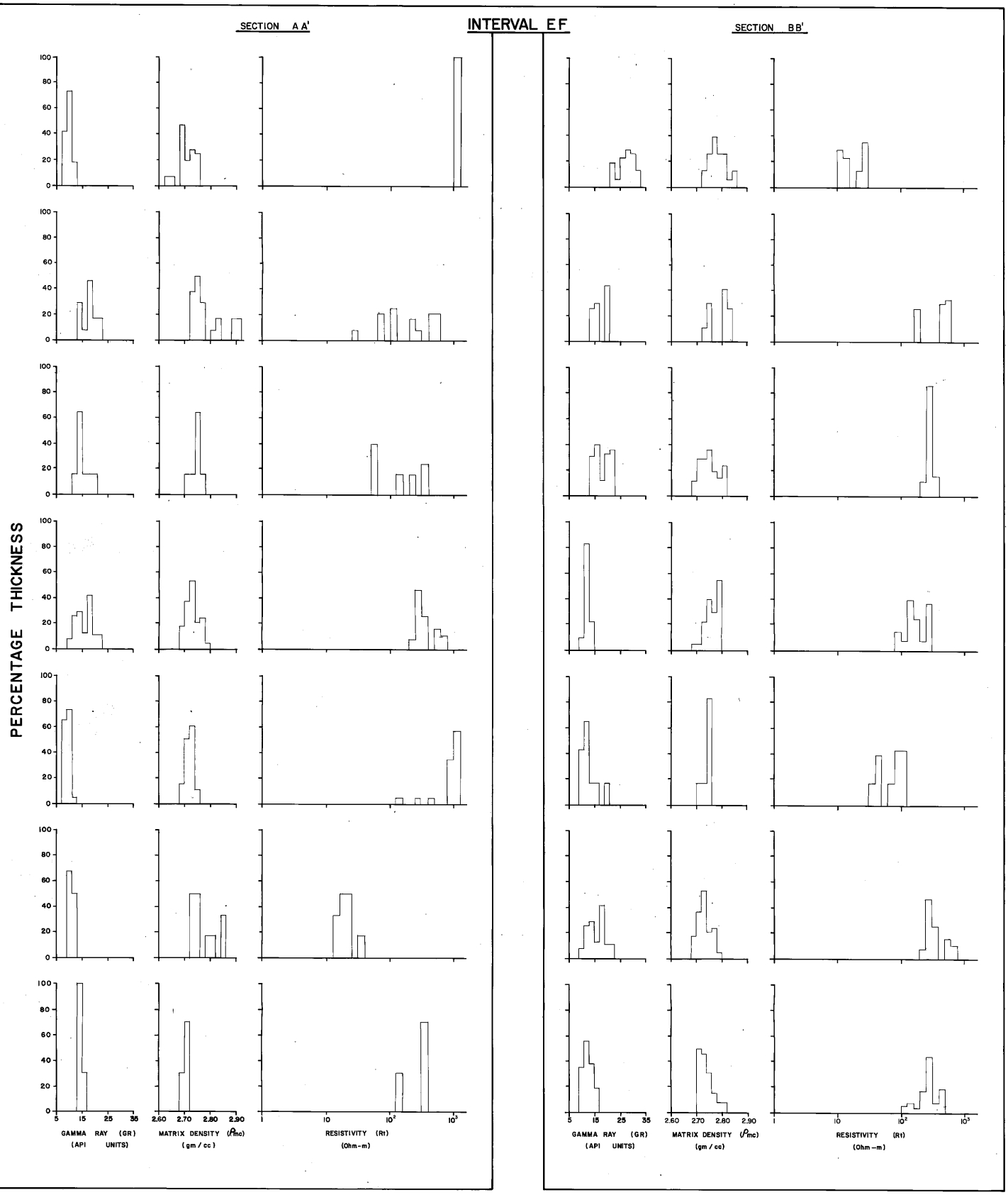

PLATE 6

HISTOGRAMS OF INTERVAL EF FOR SECTIONS AA' & BB'

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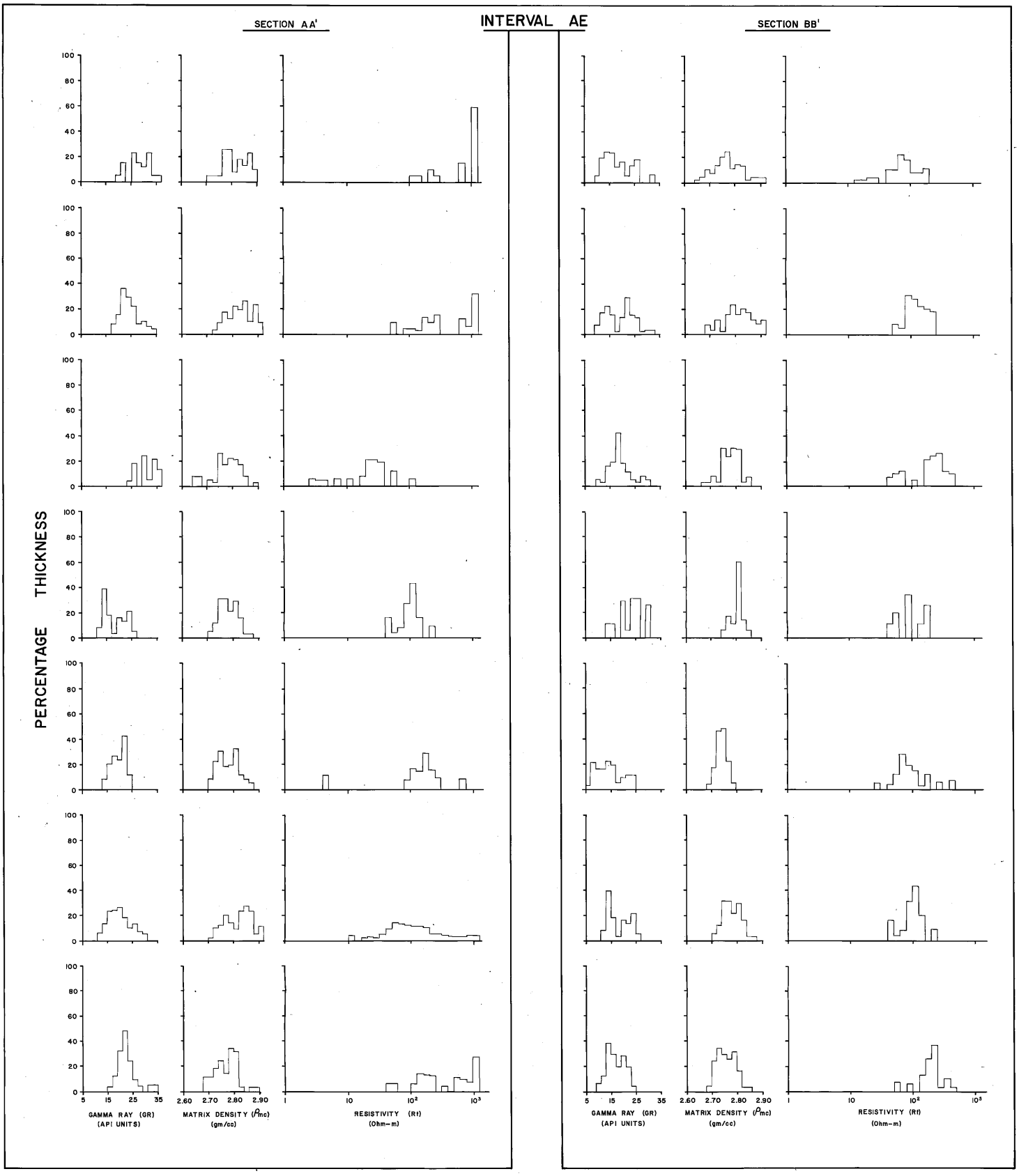

PLATE 7

HISTOGRAMS OF INTERVAL AE FOR SECTIONS AA' & BB'

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NOV. 30, 1978