AREAS REQUESTED FOR TIGHT FORMATION DESIGNATION OF THE BEREA SANDSTONE IN LAWRENCE COUNTY, KENTUCKY

Eastern Kentucky Tight Formation Committee
John Avila, Chairman
Junior Jenkins

November, 1981

November 30, 1981

Henry M. Morgan, Director
Commonwealth of Kentucky
Department of Mines and Minerals
Division of Oil and Gas

Dear Mr. Morgan:

This report contains the conclusions and recommendations of the Tight Formation Committee for the designation of tight sand areas in Lawrence County, Kentucky, for the Berea Sandstone Formation.

The committee believes that these recommended areas satisfy the Federal Energy Regulatory Commission's order no. 99 for tight formation designation. We hereby submit this report for your consideration and approval.

Please contact me if there are any questions concerning this report.

Sincerely yours,

EASTERN KENTUCKY
TIGHT FORMATION COMMITTEE

John Avila
Chairman

JA/dkb

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7 1/2 MINUTE TOPOGRAPHIC QUADRANGLES

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Willard

I. Introduction

A. THE EASTERN KENTUCKY TIGHT FORMATION COMMITTEE

The Eastern Kentucky Tight Formation Committee is an ad hoc committee, appointed by the President of the Kentucky Oil and Gas Association (KOGA), at the request of the Director of the Oil and Gas Division of the Department of Mines and Minerals to assist that Division as hereinafter stated. It is composed of persons presently operating in both the pipeline and producer segments of the oil and gas industry in the Commonwealth of Kentucky. The Committee was created to investigate, study, and report to the Department of Mines and Minerals, Oil and Gas Division (the Jurisdictional Agency for the Commonwealth of Kentucky as designated in 18 C.F.R., Chapter 1, Subchapter H, Part 274, Subpart E, Section 274.501), its determinations whether geological formations studied comply with legal standards for designation as a "tight formation" as set out in the rules and regulations of the Federal Energy Regulatory Commission (FERC).

B. REGULATORY GUIDELINES

In its Order 99, issued August 15, 1980, FERC promulgated final regulations establishing an incentive price ceiling for certain natural gas produced from tight formations, thus implementing Congressional authorization to the Commission in Section 107(b) of the Natural Gas Policy Act (NGPA), (15 U.S.C., Section 3317), to set a

"special price" which is "necessary to provide reasonable incentives for the production of...high cost natural gas".

In addition to specifying an incentive price, the regulations also provided guidelines for formally designating tight formations and for determining which wells drilled into such formations will qualify for the incentive price. (18 C.F.R., Chapter 1, Subchapter H, Subpart G of Part 271, Section 271.701 et seq.)

A "tight formation" is defined in Order 99 as "a sedimentary layer of rock cemented together in a manner that greatly hinders the flow of any gas through the rock".

The specific guidelines established by FERC and followed by the Committee are found in Section 271.703(c)(2), to wit:

> (2) Guidelines. (i) The Commission will approve the designation of any formation recommended by a jurisdictional agency if the formation meets each of the following guidelines:
>
> (A) The estimated average in situ gas permeability, throughout the pay section, is expected to be 0.1 millidarcy or less.
>
> (B) The stabilized production rate, against atmospheric pressure, of wells completed for production in the formation, without stimulation, is not expected to exceed the production rate determined in accordance with the following table:

If the average depth to the top of the formation (in feet)		The maximum allowable production rate (in MCF/day)
Exceeds:	But does not exceed:	May not exceed:
0	1000	44
1000	1500	51
1500	2000	59
2000	2500	68
2500	3000	79
3000	3500	91
3500	4000	105
4000	4500	122
4500	5000	141
5000	5500	163
5500	6000	188
6000	6500	217
6500	7000	251
7000	7500	290
7500	8000	336
8000	8500	388
8500	9000	449
9000	9500	519
9500	10000	600
10000	10500	693
10500	11000	802
11000	11500	927
11500	12000	1071
12000	12500	1238
12500	13000	1432
13000	13500	1655
13500	14000	1913
14000	14500	2212
14500	15000	2557

(C) No well drilled into the recommended tight formation is expected to produce, without stimulation, more than five barrels of crude oil per day.

(D) If the formation or any portion thereof was authorized to be developed by infill drilling prior to the date of recommendation and the jurisdictional agency has information which in its judgement indicates that such formation

or portion subject to infill drilling can be developed absent the incentive price established in paragraph (A) of this section then the jurisdictional agency shall not include such formation or portion thereof in its recommendation.

(ii) The Commission will consider and may approve or disapprove a recommendation by a jurisdictional agency to designate as a tight formation any formation which meets the guidelines contained in subparagraph (2)(i)(B) and (C), but does not meet the guideline contained in subparagraph (2)(i)(A), if the jurisdictional agency makes an adequate showing that the formation exhibits low permeability characteristics and the price established in paragraph (A) of this section is necessary to provide reasonable incentives for production of the natural gas from the recommended formation due to the extraordinary costs associated with such production.

C. GENERAL DESCRIPTION AND LOCATION OF THE GEOLOGICAL FORMATION STUDIED

Pursuant to its mandate, the Eastern Kentucky Tight Formation Committee has examined the Berea Sandstone formation in Lawrence County, Kentucky, to determine which geographical areas of said County qualify geologically in compliance with the legal requirements hereinabove described for tight formation

designation.

Lawrence County is located in northeastern Kentucky and covers an area of approximately 425 square miles (Exhibit I). This area is located in the Cumberland Plateau Region of Eastern Kentucky from which oil and gas has been produced since the early 1920's. Geologically, Lawrence County is located on the western flank of the Appalachian Basin. Approximately 500 wells have penetrated the Berea Sandstone in this County and about half of these wells are now producing, or have produced, gas and/or oil from this formation. Characteristically, the Berea Sandstone is a very fine grained to siltstone size, argillaceous, low porosity sand with shale laminations. In the past, extensive stimulation of the Berea Sandstone has been found to be necessary before the formation can be produced, and, in recent years, because of changing economic realities, drilling activity into this formation in Lawrence County has almost ceased.

II. Findings and Conclusions

Based on its extensive review of available well and production information, pertinent geological and engineering data, and by utilization of recognized analytical techniques and methodology, the Committee makes the following findings and conclusions.

A. The estimated average in situ gas permeability throughout the pay section of the Berea Sandstone in Lawrence County, Kentucky is expected to be 0.1 millidarcy or less.

B. The stabilized production rate from the Berea Sandstone against atmospheric pressure, in the geographical area

hereinafter recommended for designation as tight formations, is not expected to exceed the applicable production rate(s) set out in the table in Section 271.703(C)(2)(B), supra.

C. No well drilled into the recommended tight formation is expected to produce, without stimulation, more than five barrels of crude oil per day.

D. The Berea Sandstone in Lawrence County, Kentucky, has not been authorized by the Oil and Gas Division, Department of Mines or other agency having jurisdiction thereof to be developed by infill drilling prior to the date of this report.

E. Compliance by drillers with all existing applicable State and/or Federal laws, rules, and regulations will assure development of the Berea Sandstone during both hydraulic fracturing and waste disposal operations without adversely affecting any fresh water aquifers that are expected to be used for a domestic or agricultural water supply.

III. Recommendations of the Committee

The Eastern Kentucky Tight Formation Committee recommends to the Department of Mines, Oil and Gas Division, that it should consider and, in turn, recommend to the Federal Energy Regulatory Commission that it (FERC), approve the designation as a tight formation of the Berea Sandstone geological formation located in all geographical areas of Lawrence County, Kentucky which are not excluded. The excluded areas are shown on the map designated as Exhibit 5, attached hereto as a part hereof, and on the 7 1/2 minute quadrangle maps, attached hereto as a part hereof.

IV. Data and Supporting Information

A. METHODOLOGY UTILIZED BY THE COMMITTEE

Methods employed by the Eastern Kentucky Tight Formation Committee to recommend the Berea Sandstone for tight formation status in Lawrence County, Kentucky made use of the most recent data available. Well data was obtained from private records from the oil and gas industry, as well as records from the Kentucky State Geological Survey. A base map of Lawrence County showing locations of all known wells that penetrate the Berea Sandstone was constructed (Exhibit 5). These well locations were also plotted on 7 1/2 minute quadrangle maps which cover the county.

Geologic characteristics of the Lawrence County area are illustrated by structural and lithologic cross sections (Exhibits 2 - 3). These exhibits illustrate the physical nature of the Berea Sandstone in this area. Data for the structural cross sections were obtained mainly from drillers' logs and data for the lithologic cross sections were obtained mainly from electric logs.

Permeabilities and stabilized natural production rate guidelines set forth by FERC for tight formation designation were met as determined by natural production rates and calculations of permeabilities from available data. Permeability determination of the Berea Sandstone in Lawrence County was limited to wells with electric log information containing bulk density and resistivity data.

Permeability calculations using the Schlumberger Permeability Chart method utilize bulk density (ρb) and true resistivity (Rt) values of the formation. These values were obtained from compensated formation density and induction logs. However, if no induction logs were available, an assumed water saturation (Sw) of 35% was used. This is a very conservative value for the Berea Sandstone in the Lawrence County area. The formulas used to calculate permeability are listed below (Schlumberger 1972).

1) $\phi = \frac{\rho ma - \rho b + \sqrt{Rw/Rt}}{\rho ma}$

2) $Sw = (1/\phi)\sqrt{Rw/Rt}$

3) $K^{1/2} = c\phi^3/Swi$ (This formula is represented in graphical form in Exhibit 4.)

Variables

ϕ	porosity
ρma	matrix density (2.68 for the Berea Sandstone)
ρb	bulk density
Rw	constant resistivity of formation water (0.05)
Rt	true resistivity
Sw	water saturation
Swi	irreducible water saturation
K	permeability in millidarcies
C	hydrocarbon constant; ranges from 79 for a dry gas to 250 for a medium weight oil

Values were calculated every two feet through the Berea formation. These values were then averaged to obtain an average permeability value representative of the entire Berea Sandstone interval. Based on available data, average calculated permeabilities through the Berea interval in all wells were less than 0.1 millidarcy.

Since all of the calculated permeabilities fell within limits established by FERC (see exhibit 5), exclusion of areas from tight formation designation was based solely on unstabilized natural production rates which exceeded FERC's stabilized natural production rate limits (table on page 3).

B. DESCRIPTION OF THE RECOMMENDED FORMATION

1. Geological Description

The Berea interval in eastern Kentucky is composed almost entirely of argillaceous siltstone interbedded with thin shale layers. The Berea sequence was deposited on the outer limits of a deltaic system located in moderately deep water. Proposed source areas for the Berea sediments in eastern Kentucky are from the east and southeast (Pepper, et al, 1954). The relatively low energy depositional environment of the sediments resulted in uniform thickness of the Berea in Lawrence County. The thickness of the Berea in this area is an average of just over one hundred feet and remains relatively constant throughout the county (Exhibit 2).

The Berea Sandstone in Lawrence County consists of a dirty (contains clay matrix), calcareous siltstone containing numerous shale partings. The argillaceous and calcareous material contained in the matrix of the

fine-grained siltstone results in low porosities and permeabilities in the Berea.

Stratigraphically, the Berea Sandstone is located between the underlying Devonian Shale and the overlying Sunbury Shale and is used as a marker for the base of Mississippian age deposits in this area. The Berea truncates-out to the west of Lawrence County or toward the Cincinnati Arch area. The average drilling depth to the top of the Berea Sandstone in Lawrence County is 1400 feet.

A north-south cross section was constructed and illustrates the uniform thickness of the Berea Sandstone (Exhibit 2). The southern portion of the cross section indicates the presence of an anticlinal structure which tends to correlate with an area of higher natural open flows of gas from the Berea in the southern part of Lawrence County. The higher open flows seem to be related to this anticlinal structural feature rather than any lithologic or compositional features of the sandstone. Since the structure probably formed after lithification of the Berea Sandstone, fractures most likely have formed along the anticline crest resulting in the higher natural open flows of gas in this area. Selected areas of higher natural open flows have been omitted from recommended areas for tight formation designation.

Two additional cross sections constructed perpendicular to the north-south trending section also show the uniform thickness of the Berea Sandstone, which dips gently toward the east.

The lithology of the Berea Sandstone in Lawrence County is illustrated by the cross sections in Exhibit 3. These cross sections are constructed from gamma ray logs and illustrate the interbedded nature of the sandstone and shale lithology of the Berea formation. This interbedded lithology remains constant throughout Lawrence County.

2. Reservoir Characteristics

Based on electric log calculations from 34 wells, ranges and averages of porosity (ϕ) and water saturation (Sw) were determined. Porosity of the Berea Sandstone ranged from < 1.0 to 11.9 percent with an average porosity of about 6.5 percent. Water saturation of the Berea Sandstone ranged from 34.75 to 100 percent of the total pore space with an average of 66.20 percent.

3. Permeability Determination Methods

Various methods were studied to aid in determining in situ gas permeability of the Berea Sandstone in Lawrence County. Electric log analysis was decided to be the best method available.

Thirty-four wells had sufficient electric log data (as of 8/81) available for permeability calculations.

Porosity (ϕ) and water saturation (Sw) values were calculated from data obtained from formation density and induction logs. If no induction logs were available, an assumed water saturation for the area was used. These values were then plotted on Schlumberger's Permeability Chart K-2 (Exhibit 4 from Log Interpretation Charts, Schlumberger, 1972, p. 83) to determine permeabilities. Four examples of permeability determination by the Electric Log-Schlumberger Chart method are illustrated. (Exhibit 4) The four example wells used are:

1.	Columbia Gas	Marc Kranitz #20061 Section 9-T-82	(exhibit 4a)
2.	Monitor Petroleum	Arnold Edwards #1 Section 10-S-79	(exhibit 4b)
3.	Ashland Exploration	Hattie Neal #1 Section 2-T-81	(exhibit 4c)
4.	Ashland Exploration	Lucille Hammond #1 Section 21-T-81	(exhibit 4d)

A Schlumberger Permeability Chart for sandstones and shaley sands is plotted for each well. Included with the graphs are average calculated values for porosity (ϕa), water saturation (Swa), and permeability (Ka). A copy of the gamma ray and formation density compensated logs of the Berea Sandstone accompany these graphs for each of the four wells.

The Marc Kranitz #20061, the Arnold Edwards #1, and the Lucille Hammond #1 well (exhibits 4a, 4b, 4d) all plot excellent curvilinear trends on the permeability charts. These trends closely match a (ϕ X Sw) constant of about 0.045. These trends, which closely match a fixed constant,

indicate that the formation is at irreducible water saturation. This is essential for the Electric Log-Schlumberger Chart method to be valid.

The Hattie Neal #1 well (exhibit 4c) seems to plot across a wider range on the permeability chart. Actually, there are two separate trends which plot from the same formation. According to core analysis on the well, the upper curve represents porosity zones in the upper portion of the formation and the lower curve represents a lower porosity zone. These zones are separated by impervious shale beds, which consequently separate slightly different type reservoirs. However, we are interested only in the average permeabilities of the entire pay section and these permeabilities are well below the 0.1 millidarcy limit as measured in the Berea Sandstone represented by this data.

Core data is very limited in Lawrence County. Most of the cores were analyzed several years ago and lack the information necessary for a detailed permeability study of the Berea. Correlation between core analysis and electric log data is not reliable since the few cored wells do not have modern logs, with one exception, which will be discussed in detail later in this report. A total of six core analysis were located; three of which we cannot determine the ground locations of the wells.

Two additional core analyses have porosity and permeability values determined by plug core analysis and chip core analysis respectively. These methods of core analysis selectively sample the core, which is broken into one foot intervals, and do not accurately represent the entire foot of core. These types of core analysis are theoretical and are not expected to correlate with the actual in situ permeability of the formation.

The sixth well is a recent well drilled by Ashland Exploration; the Hattie Neal #1, located in Section 2-T-81 in Lawrence County, Kentucky. A portion of the Berea Sandstone interval was cored and analyzed by Core Laboratories, Inc. This was also a plug type core analysis and is not expected to be a representative sampling of the interval. However, the average measured permeability of the Berea Sandstone cored was 0.36 millidarcy. This value is higher than what the average in situ permeability for the entire Berea section is expected to be.

4. Discussion and Conclusions of Permeability Determination

All calculated permeabilities in the Berea Sandstone in Lawrence County, Kentucky, averaged less than 0.1 millidarcy. Thirty-four wells had sufficient data for these permeability calculations. Traditionally, the

Berea Sandstone in Lawrence County has been viewed as a "tight" formation that must be extensively treated before possible economic production can be achieved. At present conditions, the general consensus of operators in this area show the Berea Sandstone to be uneconomical to drill at current gas prices.

The average permeability of the Berea Sandstone in future wells drilled through the Berea formation in Lawrence County is not expected to be greater than 0.1 millidarcy.

5. Stabilized Natural Open Flows of Gas

Records of natural open flows of gas from the Berea Sandstone in Lawrence County obtained from drillers records do not indicate stabilized flow rates. Only short shut down periods were commonly used to test open flows before completing the wells. Generally, the wells did not flow long enough to stabilize a natural open flow of gas; hence, open flows tend to be very optimistic. It is not standard procedure to obtain a stabilized flow until the well is stimulated and cleaned out and ready for production. "Shows" of gas were assumed to be 10 MCF per day or less and "shows" of oil were assumed to be 1 BO per day or less as illustrated on the quadrangle maps and data sheets. In Order 99, FERC set standards for stabilized production rates, against atmospheric pressure, for wells completed

for production in the recommended formation without stimulation, to a corresponding depth to the top of the formation, to qualify for tight formation designation (table on page 3). The average depth to the top of the Berea Sandstone in Lawrence County is 1400 feet. This corresponds to a maximum natural flow rate of 51 MCF/D as determined by FERC. The Tight Formation Committee believes that if these wells with high natural open flows were allowed to stabilize, most of them would fall into the recommended limits set by FERC in Order 99. However, since no stabilized natural open flow data was available, the committee felt it must exclude wells with higher natural open flows, even though the permeabilities were less than 0.1 millidarcy. No distinct gas fields were defined by high natural open flows in Lawrence County. However, the high natural open flows were located in the south central part of the county and have been excluded from recommendations as a tight formation area (exhibit 5). A few randomly scattered wells with slightly high natural open flows were not included in the exclusions because they are not representative of the majority of wells in the area.

No trends or patterns could be seen in high natural open flow areas which may indicate possible areas of higher natural open flows of gas. Therefore, no area

recommended for tight formation designation is expected to have natural open flows that exceed limits set by FERC in Order 99.

6. Oil Production Rates

Oil flow from the Berea before stimulation does not exceed the five (5) barrels per day (BOPD) limit set by FERC in Order 99. New wells drilled through the Berea are not expected to exceed the five (5) BOPD limit. No Berea oil well to date in Lawrence County has exceeded the five (5) barrels of oil per day limit established by FERC in Order 99.

7. Protection of Fresh Water Zones

Future exploratory and development wells drilled through the Berea Sandstone will comply with all rules and regulations set forth by the State of Kentucky [Section 3(1) of 805 KAR 1:020] (Exhibit 6) and/or applicable Federal regulations to protect any known or expected fresh water zones from any contamination or harm to the human and agricultural environments. This will assure the protection of all fresh water zones in Lawrence County, Kentucky.

8. Infill Drilling

There has been no authorization by the Oil and Gas Division for the development of any formation in Lawrence County, Kentucky by infill drilling.

9. Geographical Areas Requested for Tight Formation Designation

Permeability and natural open flow rates of the Berea are shown on the 7 1/2 minute quadrangle maps. Committee members studied and determined which areas would be included and excluded for tight formation designation. Areas have been excluded in Lawrence County which do not fall into limits set by FERC under Order 99. These areas are shown in Exhibit 5 and are also shown in greater detail on the 7 1/2 minute quadrangle maps. There are no exclusions for tight formation designation in the Berea outside of the two outlined areas.

Respectfully submitted,

EASTERN KENTUCKY TIGHT FORMATION COMMITTEE

John Avila

John Avila, Chairman
Ashland Exploration, Inc.

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Columbia Gas Transmission Corporation

Ed Rothman
Columbia Gas Transmission
Corporation

W. A. Watson, Jr.
Inland Gas Company

Louis Ponsetto
Kentucky Geological Survey

Brandon Nuttall
Kentucky Geological Survey

C. References Cited

Morris, R. L., and Biggs, W. P., 1967, Using Log-derived Values of Water Saturation and Porosity, Schlumberger Well Services, Houston, Texas, 26 p.

Pepper, J. F. DeWitt, W., and Demarest, D. F., 1954, Geology of the Bedford Shale and Berea Sandstone in the Appalachian Basin; U.S. Geological Survey, Prof. Paper 259, 106 p.

Public Protection and Regulation Department of Mines and Minerals, Division of Oil and Gas, 805 KAR 1:020. Protection of fresh water zones.

Schlumberger, 1972 Log Interpretation Charts, Houston, Texas, 92 p.

United States of America Federal Energy Regulatory Commission, Order No. 99; High-Cost Natural Gas Produced from Tight Formations. Docket No. RM79-76, (Issued August 15, 1980).

D. Exhibits

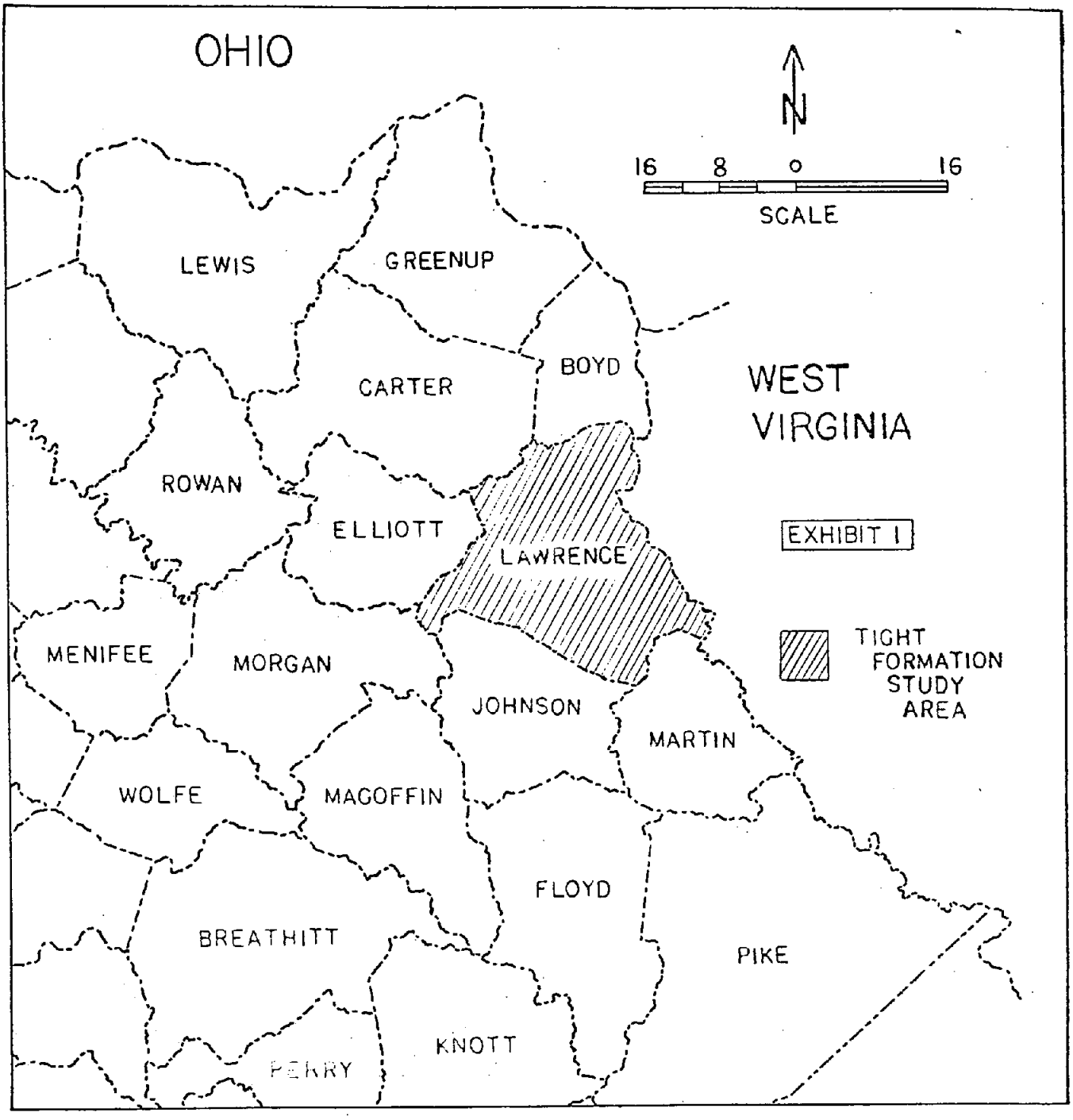
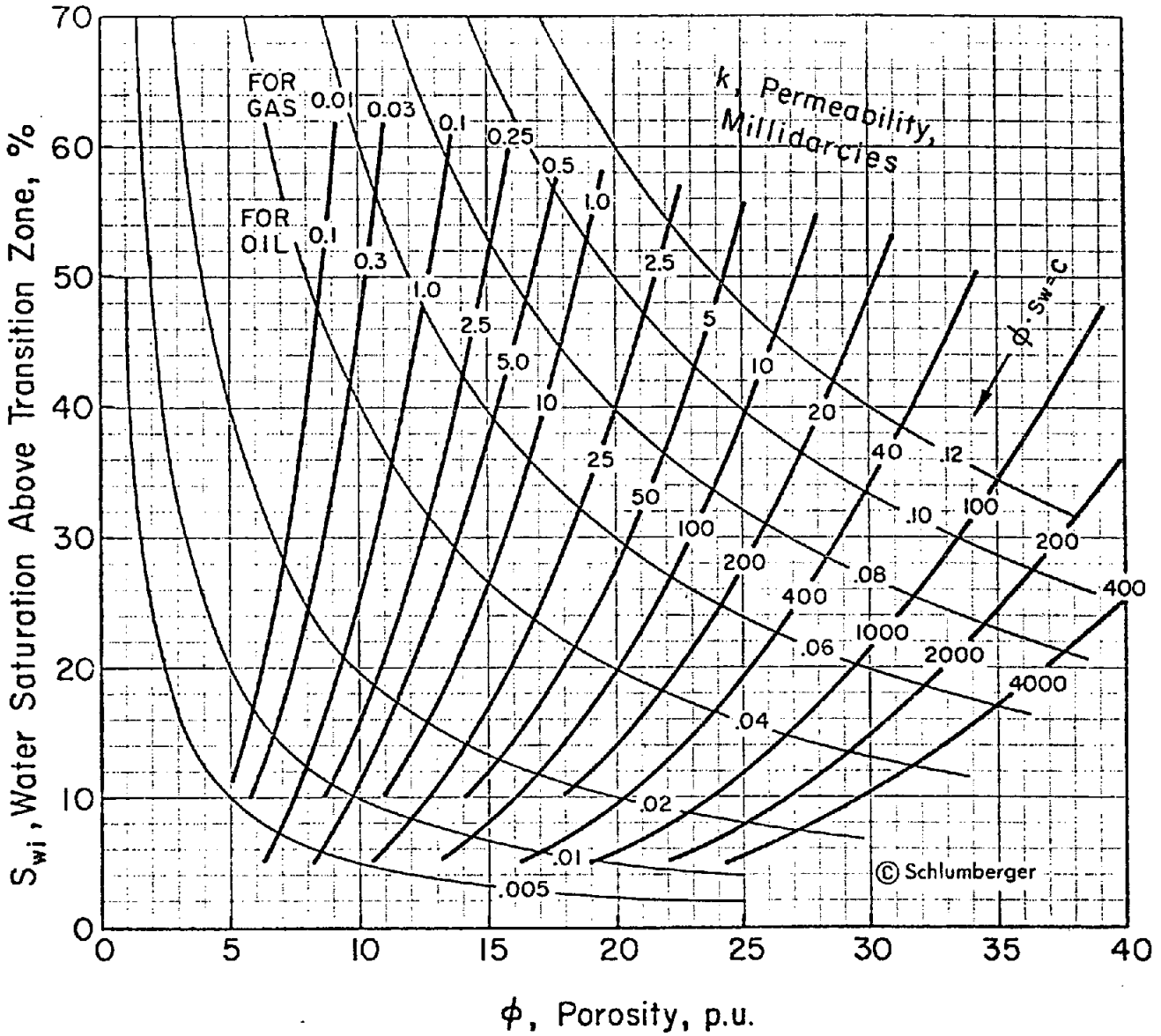


EXHIBIT 1: Location Map of the Berea Sandstone Tight Formation Study Area

PERMEABILITY: SANDSTONES, SHALY SANDS[16, 17]



The empirical relation used to make this chart is similar in form to a general expression given by Wyllie and Rose in 1950, which is $k^{1/2} = (c\phi/S_w) + c'$, where ϕ and S_w are in fractional units.

Field observation seems to show that the constant c is itself a function of ϕ, the porosity. Thus the empirical formulae used to construct the above chart are expressed as

$$k^{1/2} = 250\,\phi^3/S_{wi} \text{ (for medium gravity oils)}$$
$$\text{and } k^{1/2} = 79\,\phi^3/S_{wi} \text{ (for dry gas)}$$

EXAMPLE:

Given: $\phi = 25$, $S_{wi} = 40\%$, oil-bearing sand
Solution: $k \approx 100$ mD

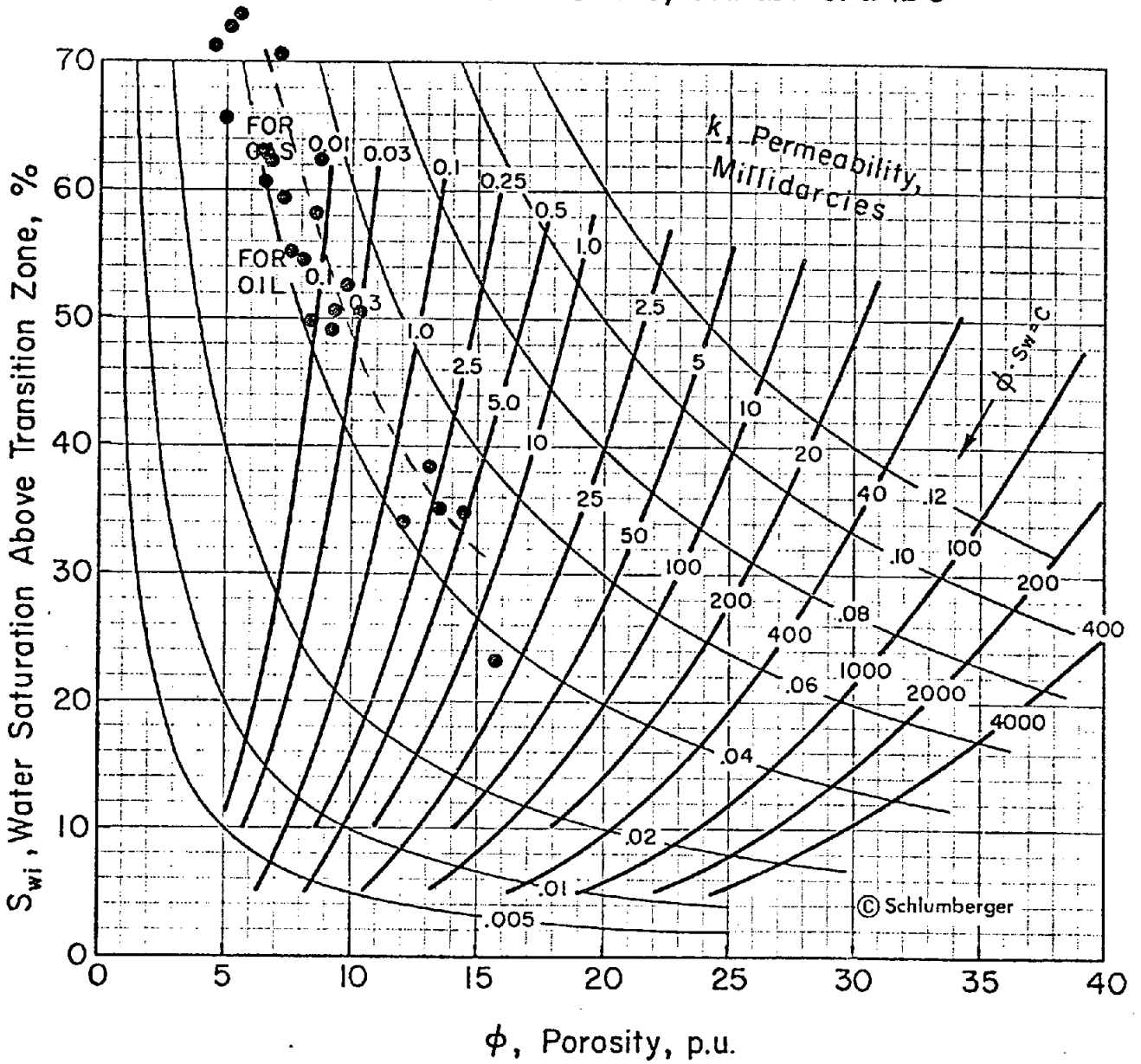
The above expressions are valid for estimating permeability only in zones that are at irreducible water saturation, S_{wi}. This chart may be used to recognize such zones. For levels above the transition zone, the product of porosity and water saturation is a constant. On this chart, the thin hyperbolic curves are lines of constant $\phi \times S_w$. Data points from levels at irreducible saturation fall in a fairly coherent pattern, on or parallel to one of the $\phi \times S_w$ lines; points from the same formation in a transition zone are scattered above this pattern.

EXHIBIT 4

K-2

Schlumberger

PERMEABILITY: SANDSTONES, SHALY SANDS[16, 17]



MARC KRANITZ
20061

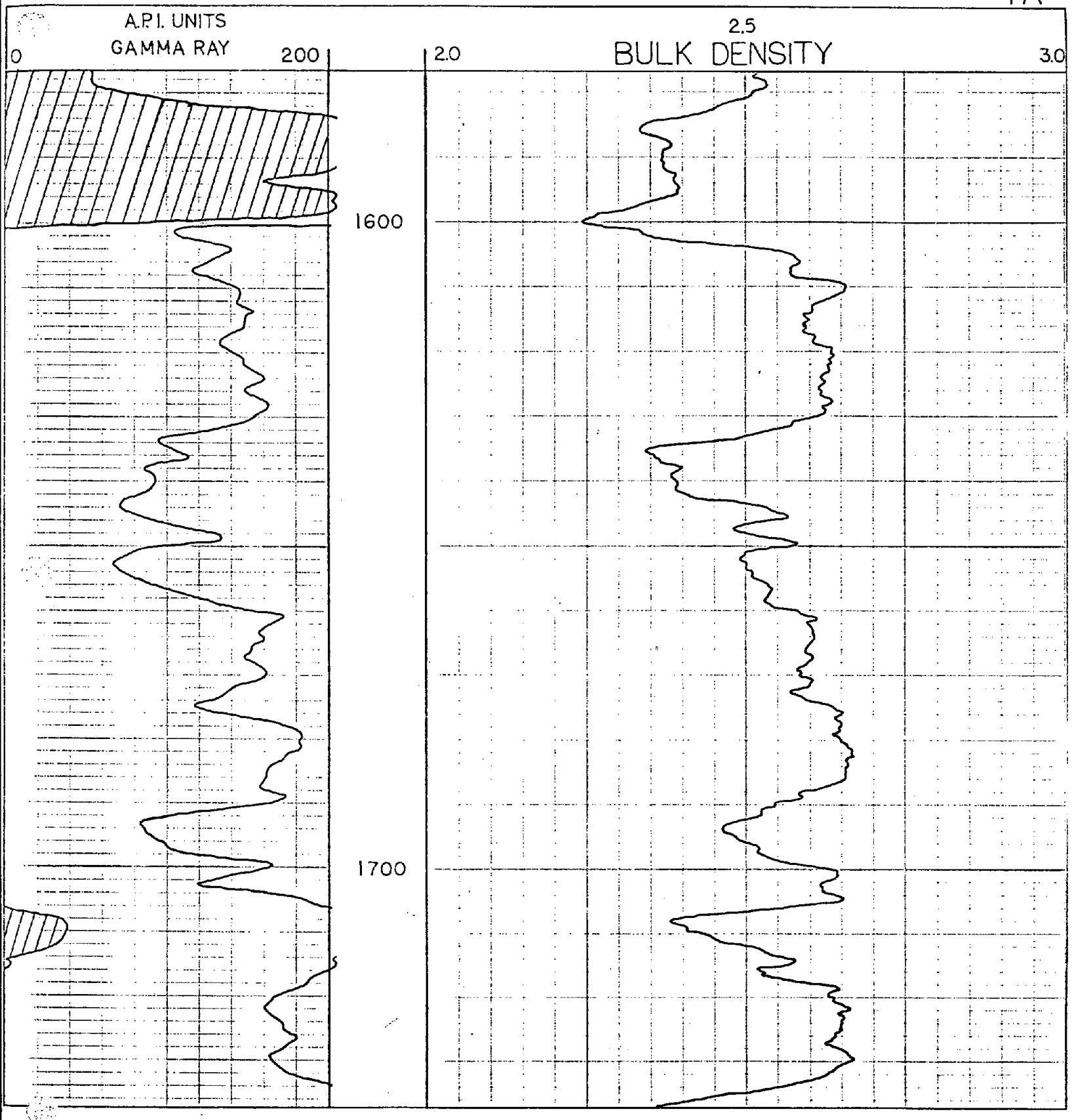
EXHIBIT 4a

AVERAGES

N = 53
Rw = 0.05
ϕma = 2.68
ϕa = 6.44
Swa = 72.60
Ka = 0.061

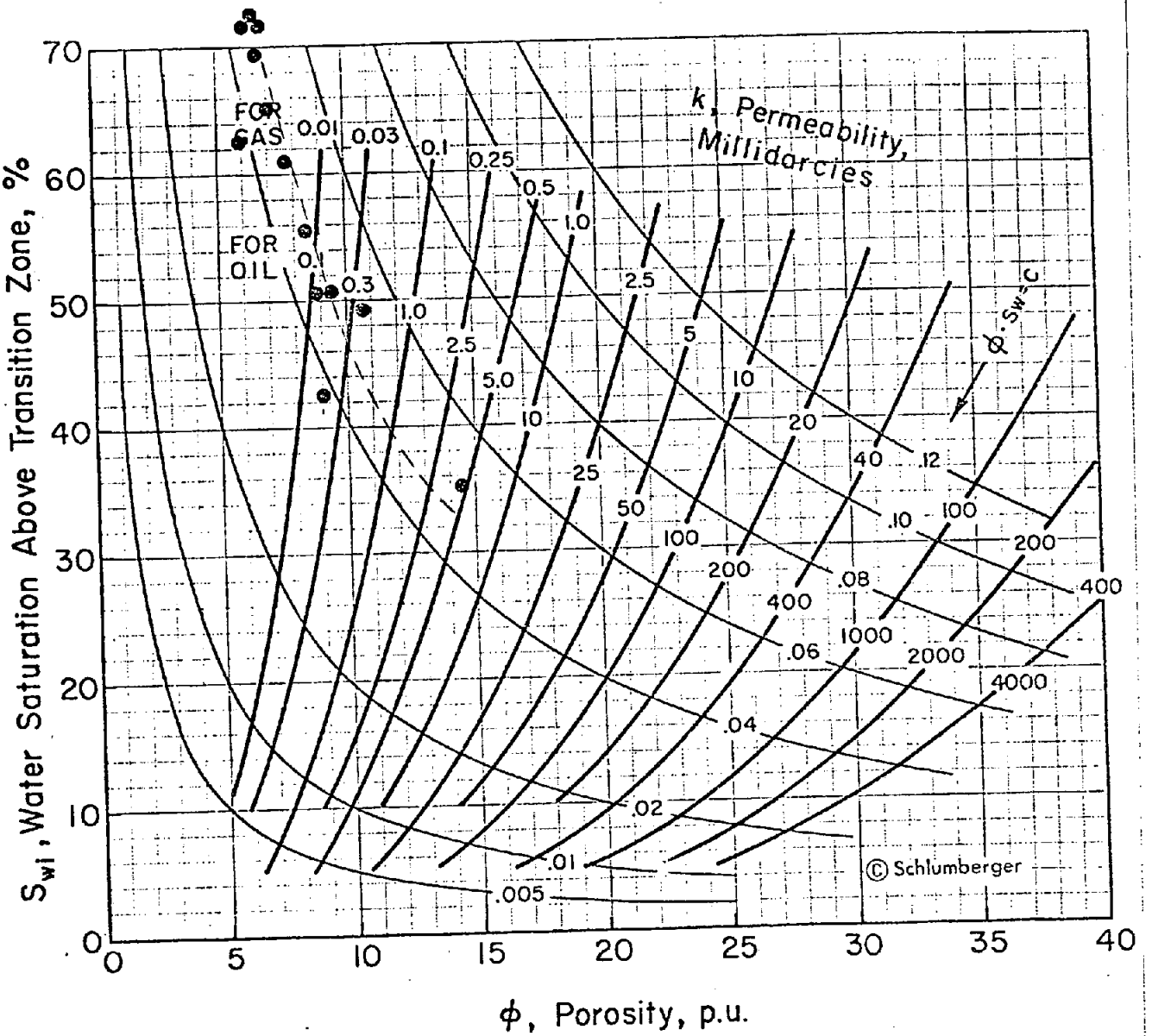
MARC KRANITZ #20061

4-A



Schlumberger

PERMEABILITY: SANDSTONES, SHALY SANDS[16, 17]



ARNOLD EDWARDS #1

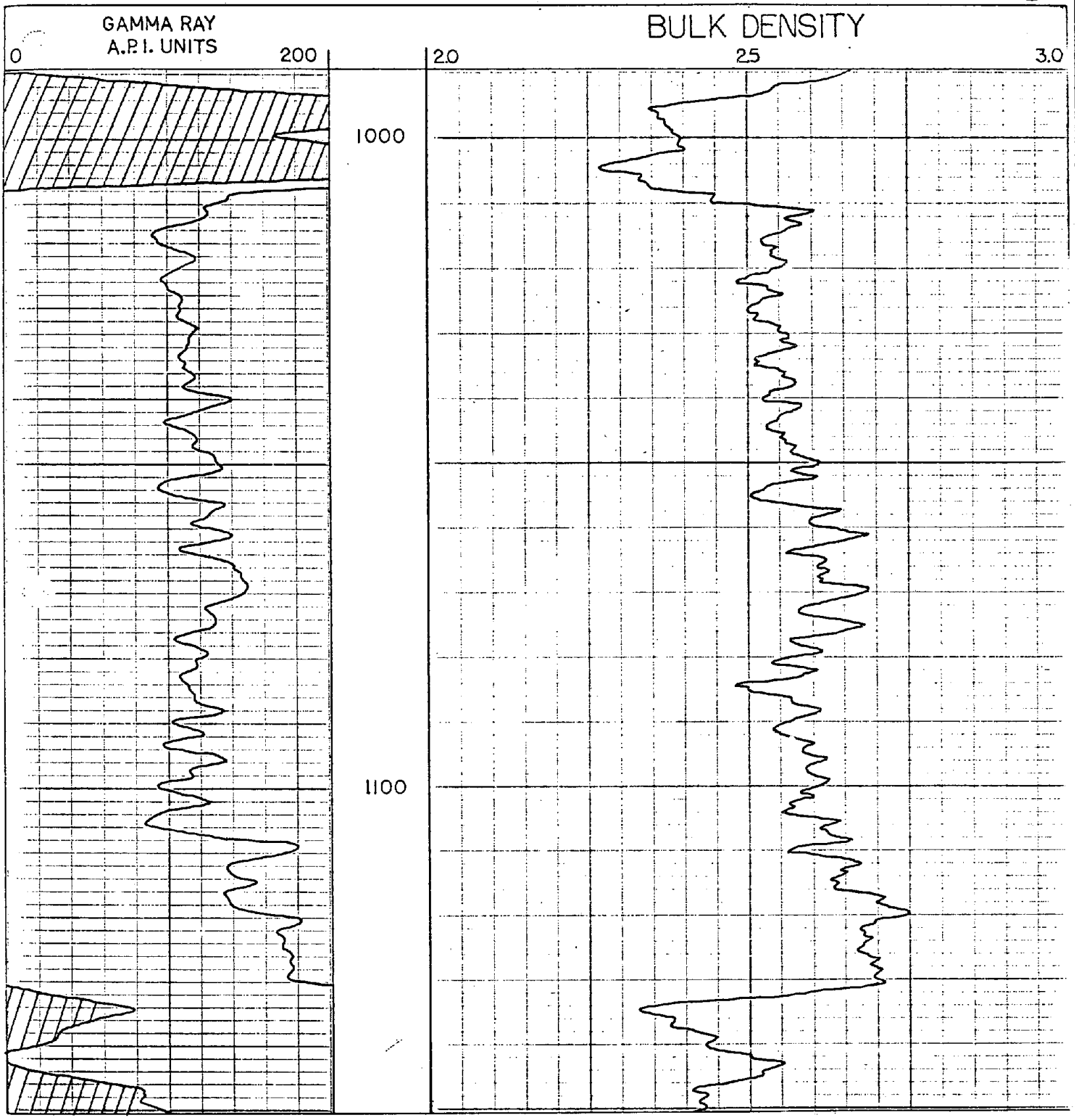
EXHIBIT 4b

AVERAGES

N = 63
Rw = 0.05
ρma = 2.68
φa = 5.99
Swa = 83.98
Ka = 0.01

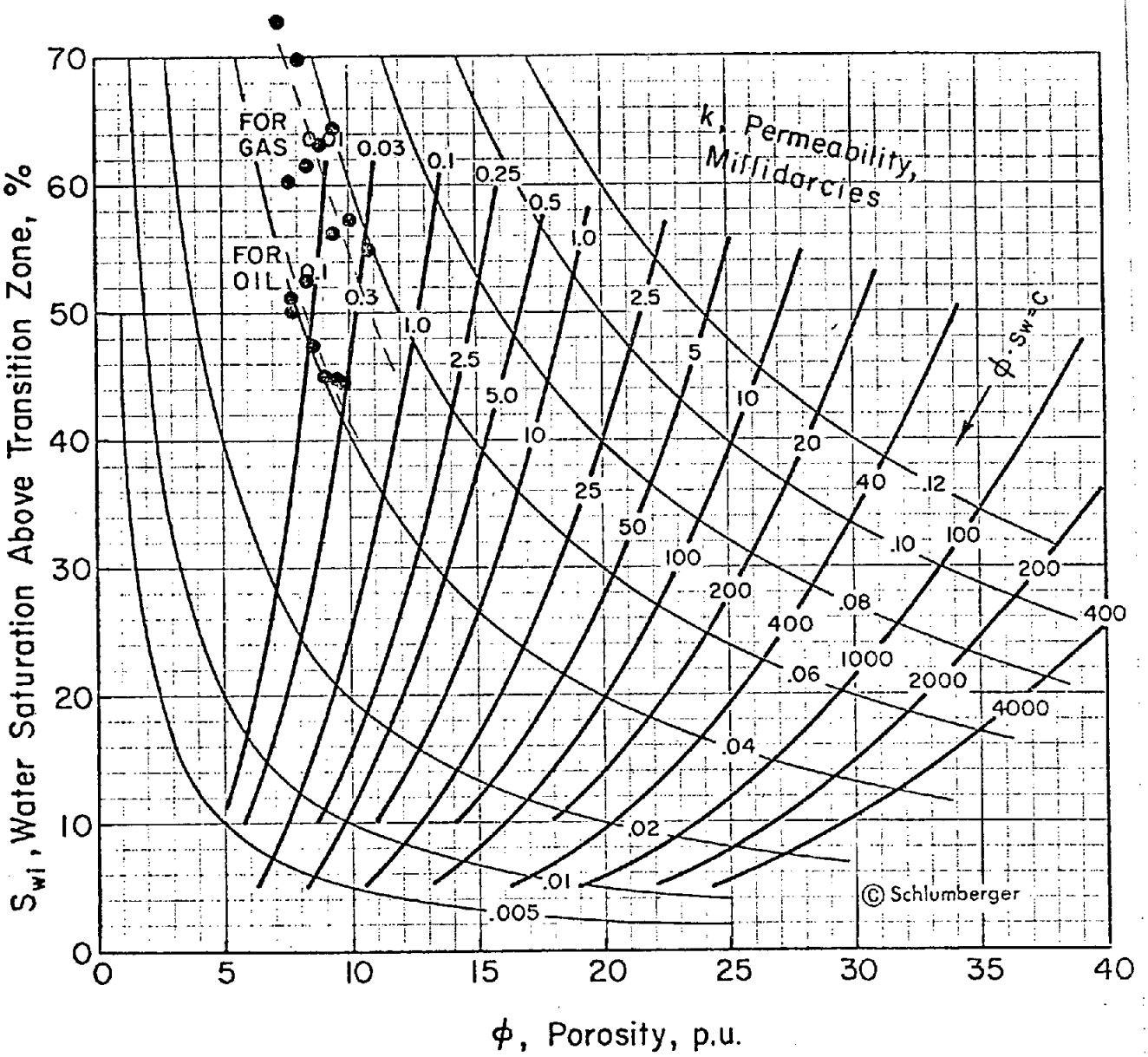
ARNOLD EDWARDS #1

4-B



Schlumberger

PERMEABILITY: SANDSTONES, SHALY SANDS[16, 17]



HATTIE NEAL # 1

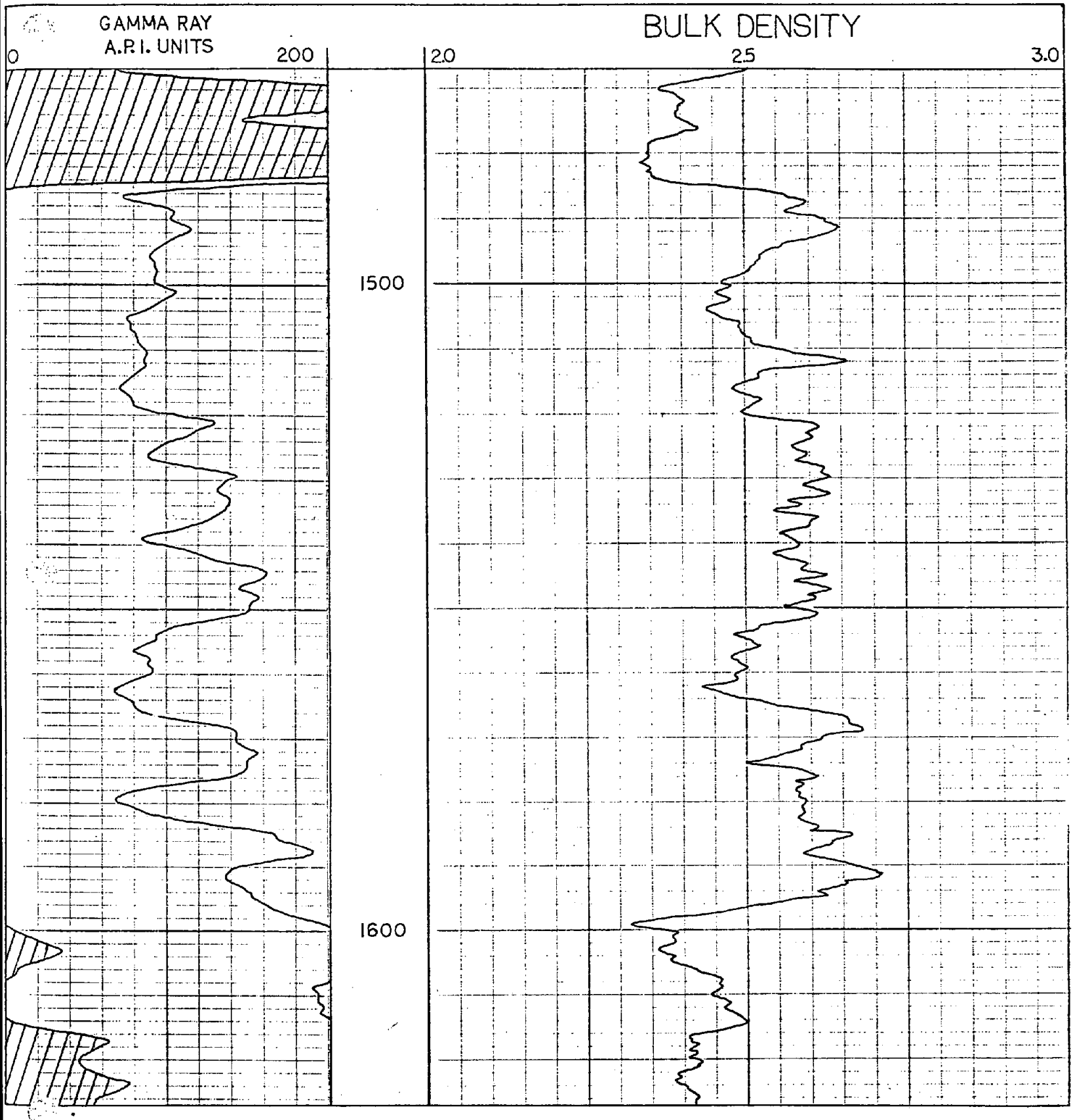
EXHIBIT 4c

AVERAGES

N = 57
Rw = 0.05
ρ_{ma} = 2.68
ϕ_a = 6.55
Swa = 77.98
Ka = 0.0008

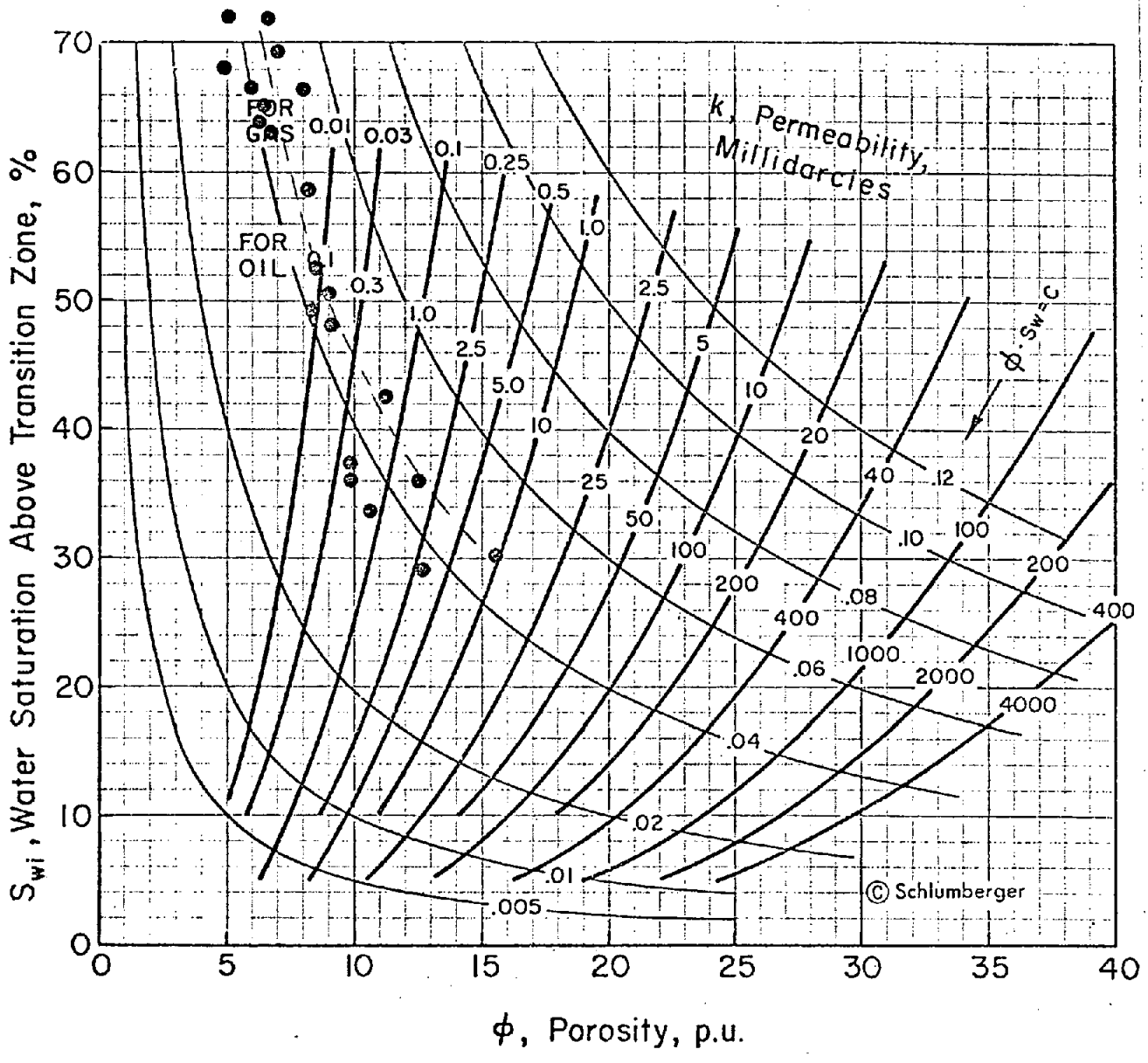
HATTIE NEAL #1

4-C



Schlumberger

PERMEABILITY: SANDSTONES, SHALY SANDS[16, 17]



LUCILLE HAMMOND #1

EXHIBIT 4d

AVERAGES

N = 56
Rw = 0.05
ϕma = 2.68
ϕa = 5.3
Swa = 78.7
Ka = 0.0002

LUCILLE HAMMOND #1

4-D

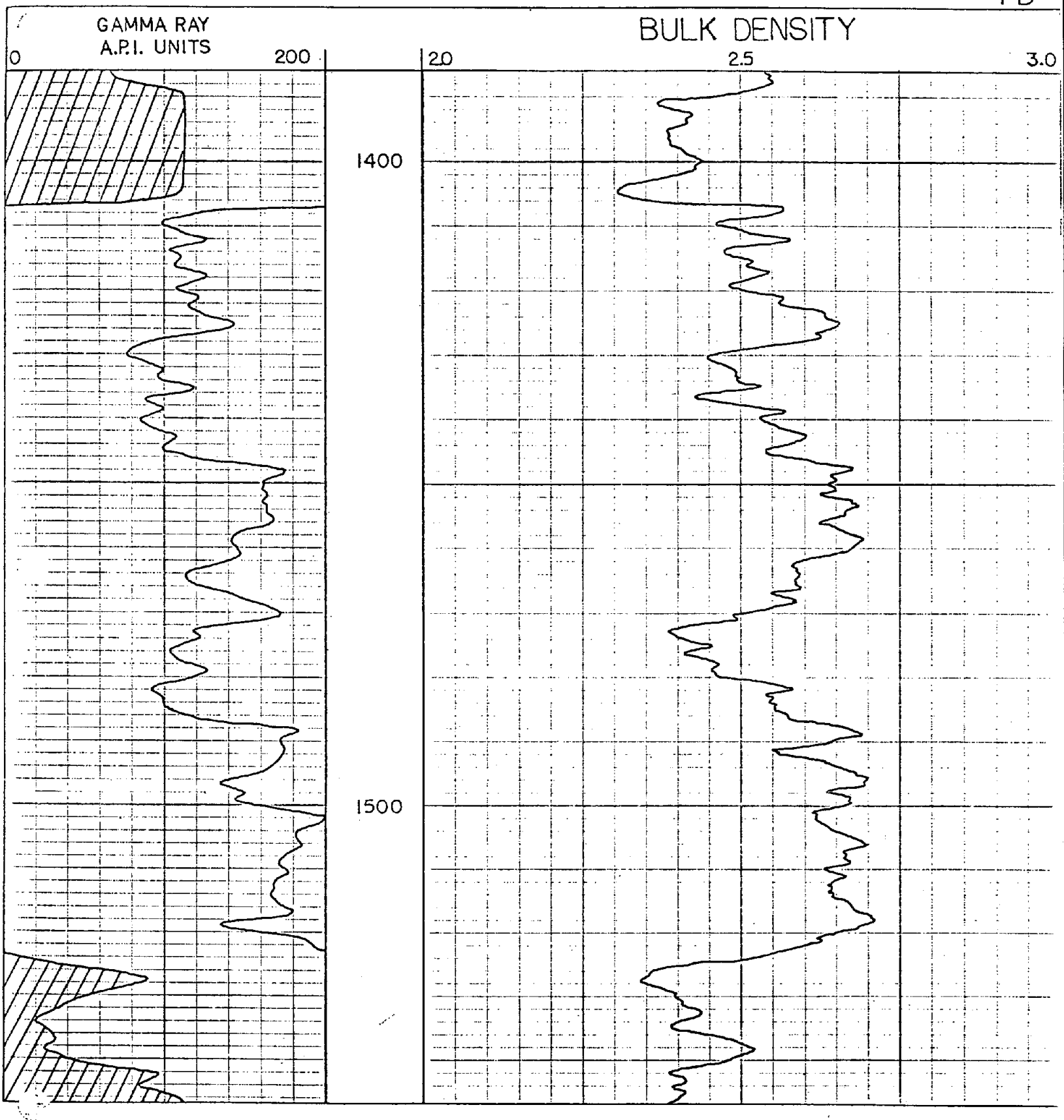


EXHIBIT 6

PUBLIC PROTECTION AND REGULATION
DEPARTMENT OF MINES AND MINERALS
Division of Oil and Gas

Effective date: August 2, 1978

805 KAR 1:020. Protection of fresh water zones.

RELATES TO: KRS 353.520
PURSUANT TO: KRS 13.082, 353.540, 353.550, 353.560
NECESSITY AND FUNCTION: (KRS 353.070(12) provides that the Commissioner, Department of Mines and Minerals, shall have the power and authority to adopt such regulations as he deems necessary and suitable for the proper administration of the department.) KRS 353.540 authorized the Department of Mines and Minerals to administer and enforce the provisions of KRS 353.500 to 353.720. The waste of oil and gas is prohibited by KRS 353.520, which provides that such prohibited waste includes: (1) the unreasonable damage to underground, fresh or (to) mineral water supply, workable coal seams, or other mineral deposits in the operations for the discovery, development, production, or handling of oil and gas, (2) the unnecessary or excessive surface loss or destruction of oil or gas or their constituents, and (3) the drowning with water of any stratum or part thereof capable of providing oil or gas in paying quantities, except for secondary recovery purposes, or in hydraulic fracturing or other completion practices. It is the purpose of this regulation to protect fresh water zones from contamination associated with the production of oil and gas. KRS 353.550 provides that the department shall have the authority to set forth the requirements for casing, operation and plugging of wells to prevent escape of oil or gas, the detrimental intrusion of water, blowouts, caveings, seepages and fires.

Section 1. Definitions. The definitions contained in KRS 353.510 and the following additional definitions shall apply to this regulation:

(1) "Abnormal pressure" means a reservoir pressure that exceeds the hydrostatic pressure of fresh water extending from the reservoir to the surface.

(2) "Annulus" means the space between two (2) strings of casing or between a string of casing and the bore hole wall.

(3) "Casing (casing string)" means steel tubes or pipes installed in a well.

(4) "Surface casing" means the first and largest diameter casing installed in a well and its primary uses are to make the borehole stand up and to protect the fresh water zones.

(5) "Intermediate casing" means one or more strings of pipes installed in a well in addition to the surface casing in which each string is smaller in diameter than the previous.

(6) "Long casing string" means the last casing installed in a well to be used for production or injection purposes.

(7) "Zone" means a layer of strata capable of producing or receiving fluids.

Section 2. Protection of Fresh Water Zones for Drilling and/or Plugging Operations. (1) During drilling operations, one (1) of the following methods shall be used to protect Fresh Water Zones:

(a) Method A: Casing shall be set on a casing shoulder and said casing shall have a shoe installed on the bottom of the bottom joint. Upon the completion of the drilling program, all the recoverable casing must be removed or cemented to the surface.

(b) Method B: Casing shall be set on a shoulder and cemented sufficiently to cover 100 feet including the shoe. Upon completion of the drilling, all of the recoverable casing must be removed or cemented to the surface.

(c) Method C: A top to bottom drilling mud system with a filtrate water loss of less than ten (10) cubic centimeters, as determined by American Petroleum Institute standards, in its publication "Standard Procedure for Testing Drilling Fluids" API RP 13B (138), Sections 1, 2 and 3, April, 1976, filed herein by reference. Copies may be obtained from the Department of Mines and Minerals, P.O. Box 680, Lexington, Kentucky 40586. Certification of filtrate water loss must be made by the operator.

(2) In the event a well is to be plugged, then it shall be plugged in the manner prescribed by 805 KAR 1:060 or 805 KAR 1:080.

Section 3. Protection of Fresh Water Zones. Any well drilled in the Commonwealth of Kentucky subject to the jurisdiction of the Department of Mines and Minerals subsequent to the effective date of this regulation shall be equipped with the following fresh water protection prior to production or injection.

(1) A protective string of casing, be it surface, intermediate, or long string, shall extend thirty (30) feet below the deepest known fresh water zone. Such protective string shall have cement circulated in the annular space outside said casing of a sufficient volume of cement, calculated using approved engineering methods, to assure the return of the cement to the surface. In the event cement does not return to the surface, every reasonable attempt will be made to fill the annular spaces by introducing cement from the surface. If the intermediate casing or long casing string is (i) cemented to the surface, or (ii) cemented thirty feet into the next larger string of cemented casing in conformity with prescribed procedure, the string or combination of strings shall be considered as the fresh water protection.

(2) In areas where abnormal pressures are expected or encountered, the surface and/or intermediate casing string shall be anchored in sufficient cement, at a sufficient depth to contain said pressures, and blow-out prevention valves and related equipment shall be installed.

Section 4. Wells Used for Injection of Fluids. (1) The injection of fluids shall be accomplished through a tubing and packer arrangement with the packer set immediately above the injection zone, and the annulus between the tubing and casing shall be monitored by pressure sensitive devices. The injection pressure shall be regulated to minimize the possibility of fracturing the confining strata. Upon application, and after notice and hearing, a variance from this requirement may be granted by the Director, upon a showing by an individual operator that alternate prudent engineering practices shall result in fresh water protection. The following are exempted from the requirements of this section:

(a) Injection of fluids for the purpose of well stimulation; and

(b) Injection of gas for the purpose of storage.

(2) Before injecting fluids into a well not previously permitted for injection purposes, the operator shall make application to the department for an injection permit for said well. The application for a permit to drill, deepen or convert a well for the purpose of injection of fluids shall include:

(a) A statement by the operator as to whether the well is to be used for pressure maintenance, secondary recovery, tertiary recovery, gas storage or for disposal purposes;

(b) The approximate depths of the known fresh water zones; and

(c) A plat showing:

1. The names of all lessees and lessors contiguous to the tract on which the injection shall occur;

2. The Carter Coordinate location and the elevation of the well site;

3. The geologic name and depth of the injection zone;

4. At least two (2) surface features, by bearing and distance from the proposed well site, which appear on the U.S.G.S. 7 1/2 minute topographic map of the area;

5. The name of said topographic map and county;

6. The location of all known fresh water wells within a radius of 1,000 feet of the proposed injection well site;

7. The location and completion and/or plugging record of all wells whether producing or plugged, within a radius of 1,000 feet of the proposed injection well site.

(3) Prior to injection into any well, the operator shall furnish the department with a certificate indicating that all

requirements of this regulation have been met. The certificate shall include the following:

(a) The identification of said well by permit number, operator's name, lease name, well number, Carter Coordinate location, elevation and county;

(b) The entire casing and cementing record, any packers and other special down hole equipment, and cement bond logs, if run;

(c) The anticipated maximum bottom hole pressure (psi) and volume in barrels of cubic feet, per day;

(d) The identification of the injection zone by geological name and depth (top and bottom of zone), the number of perforations if applicable, or the interval of open hole; and

(e) Certification by the operator that the mechanical integrity of the well has been tested.

Section 5. Exemptions for Pre-existing Wells. Any injection well in existence prior to the effective date of this regulation shall be exempt from the requirements of this regulation until such time as in the opinion of the department, said well is leaking fluids to other zones, or to the surface; provided, however, that this exemption shall not apply unless within one (1) year from the effective date of this regulation, the operator files an area plat, or plats, showing all of such operators injection and associated production wells.

Section 6. Record Keeping. The operator of an injection project shall monitor injection pressures and volumes at least monthly, and shall keep said records on file in his place of business for the life of the project; plus five (5) years. The director may require more frequent monitoring, if in his opinion, good reason therefor exists.

E. Appendices

MAPNO	OPERATOR	WELL NO	FARM NAME	COUNTY	LOCATION	ELEV	TD	BEREA	PERM	CMPL	IP	PAY
1	MYERS, WEBSTER	1	CONLEY, J E TRUSTE	LAWRENCE	1200FSL1300FWL22 V82	674	3725	1850		D&A	0	
2	ROBINSON, HOMER	1	BOGGS, J M	LAWRENCE	1650FSL2550FEL24 U80	760	2356	1349		D&A	10	
3	INLAND GAS CO, INC	588	STEWART, FRED M	LAWRENCE	2325FNL 550FEL21 U80	779	1660	1537	0.040	D&A	0	
4	COMPTON & LONG	1	WILSON, MARTHA	LAWRENCE	1000FNL2300FEL 1 T80	760	2770	1419		D&A	0	
5	INLAND GAS CO, INC	587	WEBB, JOHN	LAWRENCE	2675FSL1000FEL 2 T80	808	1574	1396	0.021	O&G	10	339BREA
6	RUSTON, JAMES ETAL	1	CRABTREE, OLIVER	LAWRENCE	750FSL 475FWL10 T80	705	1958	1194		D&A	10	
7	PERRY, W S	1	YUUNG, P W	LAWRENCE	180FNL 90FEL10 U81	768	2452	1787		D&A	10	
9	COLUMBIA GAS TRANS	20506	PRINCE, JOHN P	LAWRENCE	1190FSL 575FWL 1 T81	796	1750	1525	0.089	GAS	0	339BREA
10	MORRISON, B C	1	HILLMAN, DONALD	LAWRENCE	2300FSL 100FEL 6 T81	1020	2457	1638		D&A	10	
11	COLUMBIA GAS TRANS	20509	WEBB, HERMAN	LAWRENCE	2150FNL2150FWL 9 T81	907	1760	1610		GAS	0	339BREA
12	COLUMBIA GAS TRANS	1	JOBE, GEORGE D	LAWRENCE	350FSL1070FEL 9 T81	676	1507	1365	0.001	GAS	0	339BREA
13	COLUMBIA GAS TRANS	20502	SIMPSON, MARGARET	LAWRENCE	1730FSL 50FEL 9 T81	987	1815	1683	0.013	GAS	0	339BREA
14	COLUMBIA GAS TRANS	20504	SIMPSON, MARGARET	LAWRENCE	2350FSL2350FEL10 T81	740	1622	1460		GAS	0	339BREA
15	COLUMBIA GAS TRANS	20272	SIMPSON, M D	LAWRENCE	1750FNL1980FEL10 T81	626	1601	1352	0.000	GAS	10	3410HIO
16	COLUMBIA GAS TRANS	20507	KITCHEN, DEWEY	LAWRENCE	1850FNL 800FWL11 T81	734	1593	1445	0.000	GAS	0	339BREA
17	COLUMBIA GAS TRANS	20508	WRIGHT, ERIE	LAWRENCE	2910FNL2150FEL12 T81	938	1742	1625	0.020	GAS	0	339BREA
18	INLAND GAS CO	542	YOUNG, W P & ROBER	LAWRENCE	2500FNL1600FWL 6 U82	865	12712	1906	0.015	D&A	10	
19	COLUMBIA GAS TRANS	20271	MOORE, VICTOR E	LAWRENCE	2300FSL 400FEL 7 U82	710	2010	1832	0.014	O&G	60	339BREA
22	WILLIAMS, C L	2	PREECE, PHILIP	LAWRENCE	2400FNL1750FWL17 U82	612	1733	1662		D&A	10	
23	WILLIAMS, C L	1	SAVAGE, JOHN	LAWRENCE	3160FNL1580FWL18 U82	760	2449	1787			10	339BREA
24	EICHHOLZ & HYMAN	1	CHURCH, BEN	LAWRENCE	3450FSL1525FEL19 U82	595	3476	1660		D&A	0	
25	PET PROMOTIONS, IN	1	AUSTIN, H C HRS (N	LAWRENCE	500FSL 600FEL21 U82	810	1896	1820		OIL		339BREA
26	PET PROMOTIONS, IN	1	CARTER, J W	LAWRENCE	900FSL 950FWL21 U82	690	1746	1692		OIL	10	339BREA
27	PET PROMOTIONS, IN	1	DIAMOND, OSCAR	LAWRENCE	2700FNL 650FEL21 U82	601	1734	1627		OIL	0	339BREA
28	INLAND GAS	517	VANHORN, E ETAL	LAWRENCE	2910FSL2240FWL 4 U83	637	1995	1902		D&A	0	
29	PET PROMOTIONS, IN	1	AUSTIN, H C (SOUTH	LAWRENCE	550FSL 200FWL25 U83	830	1977	1866		OIL	0	339BREA
30	PET PROMOTIONS, IN	1	HEWLETT, DON	LAWRENCE	2350FSL 50FEL25 U83	616	1732	1625		D&A	0	
31	PET PROMOTIONS, IN	1	EVANS, JAKE	LAWRENCE	1625FSL 650FEL25 U83	604	1722	1610		OIL	0	339BREA
33	GLOVER GAS CO	1A	TACKET, JAMES I	LAWRENCE	1450FNL1480FWL 1 T82	574	1620	1541		OIL		339BREA
34	BECTELL, BOB & RIC	1	BALL, BLAINE	LAWRENCE	3700FNL3875FEL 1 T82	580	1613	1552		O&G	0	339BREA
35	PET PROMOTIONS, IN	2	YATES, JOHN W	LAWRENCE	1100FNL1150FWL 1 T82	580	1629	1560		OIL	10	339BREA
37	SCOTT, W A	1	MADDY, GEORGIA & B	LAWRENCE	100FNL3975FEL 1 T82	580	1641	1552		OIL	0	339BREA
38	BECTELL, ED & BOB	2	BALL, BLAINE	LAWRENCE	2000FSL1875FWL 1 T82	610	1633	1569		OIL	0	339BREA
39	EICHHOLZ & HYMAN	1	BENTLY, JOHN	LAWRENCE	1950FNL1200FEL 2 T82	640	1645	1569		OIL		339BREA
40	ROBINSON, HOMER	1	BUSH, LOMAN	LAWRENCE	2850FNL2000FEL 2 T82	660	2502	1602		GAS		3410HIO
41	HORSON OIL CO	1	ADKINS, ERNEST	LAWRENCE	4350FSL 700FWL 8 T82	615	2212	1477		D&A	0	
42	COLUMBIA GAS TRANS	20061	KRANITZ, MARC ETAL	LAWRENCE	900FNL 750FWL 9 T82	691	3174	1599	0.061	GAS	60	339BREA
43	ASSOCIATED DRLG CO	1	JOHNSON, ED	LAWRENCE	1100FNL1000FWL 9 T82	630	2385	1519		D&A	0	
44	JENKINS, OLIVER	3894	QUEEN, W E	LAWRENCE	2900FNL1200FEL 9 T82	650	2367	1525		D&A	10	
45	ASHLAND OIL & REFI	2	COMPTON, W D	LAWRENCE	70FNL2390FEL11 T82	669	1679	1611		D&A	10	

ELEV = GROUND LEVEL ELEVATION, IP = NATURAL OPEN FLOW IN MCF OF BEREA, PAY = DEEPEST PAY FORMATION

MAPNO	OPERATOR	WELL NO	FARM NAME	COUNTY	LOCATION	ELEV	TD	BEREA	PERM	CMPL	IP	PAY
46	BT & M OIL CO	4	ADKINS, WILLIAM (C	LAWRENCE	3890FSL 190FEL11 T82	819	1849	1794		OIL		339BREA
47	PET PROMOTIONS, IN	1	KELLY, MARY	LAWRENCE	1100FNL 200FWL 5 T83	860	2005	1897		OIL	0	339BREA
48	PET PROMOTIONS, IN	1	BENARD, JESSE	LAWRENCE	2600FSL1200FEL 5 T83	800	1974	1902		OIL	0	339BREA
49	PET PROMOTIONS, IN	1	CONLEY	LAWRENCE	600FSL1000FWL 5 T83	870	1944	1847		D&A	0	
50	PET PROMOTIONS, IN	1	KANE, W T	LAWRENCE	2700FNL 800FWL 5 T83	970	2041	1960		OIL	0	339BREA
51	COLUMBIA GAS TRANS	20505	SIMPSON, M D	LAWRENCE	2800FNL 400FWL 6 T83	910	1802	1660	0.090	GAS	10	339BREA
52	E C WARE	1	SHORT, J G	LAWRENCE	900FSL 650FWL 6 T83	713	1749	1696		OIL	0	339BREA
53	JOHNSON & PARKER	2	ADKINS, DREW	LAWRENCE	1300FNL1250FEL15 T83	859	1922	1867		OIL	0	339BREA
54	SHEWEY, C F	1	CYRUS	LAWRENCE	1800FNL2250FEL15 T83	803	1894	1834		OIL	0	339BREA
55	SHEWEY, C F	2	CYRUS, JEFF	LAWRENCE	750FNL2000FWL15 T83	804	1890	1827		OIL	0	339BREA
57	HOBBS, COLUMBUS	3	CYRUS, JEFF	LAWRENCE	1100FNL1000FWL15 T83	791	1834	1784		OIL	0	339BREA
58	HOBBS, COLUMBUS	1	PREECE, JEFF	LAWRENCE	1300FNL 100FWL15 T83	850	1864	1811		OIL	0	339BREA
59	HOBBS, COLUMBUS	2	PREECE, JEFF	LAWRENCE	900FNL 400FWL15 T83	840	1871	1816		OIL	0	339BREA
60	HOBBS, COLUMBUS	3	PREECE, JEFF	LAWRENCE	500FNL 300FWL15 T83	848	1873	1815		OIL	0	339BREA
61	HUTCHINSON, BUEL	3	GILLMAN, MATTIE	LAWRENCE	750FNL1550FEL15 T83	839	1902	1819		OIL	0	339BREA
62	SHEWEY, C F	2	SHORT, JAY	LAWRENCE	1000FNL2000FWL15 T83	765	1795	1749		OIL	0	339BREA
63	HOBBS, COLUMBUS	4	CYRUS, JEFF	LAWRENCE	1800FNL 725FWL15 T83	736	1802	1752		OIL	0	339BREA
64	HOBBS, COLUMBUS	2	CYRUS, JEFF	LAWRENCE	1000FNL 900FWL15 T83	790	1834	1784		OIL	0	339BREA
65	CYRUS, JEFF	2	CYRUS, JEFF	LAWRENCE	700FNL 850FWL15 T83	776	1843	1787		OIL	0	339BREA
66	HOBBS, COLUMBUS	1	CYRUS, JEFF	LAWRENCE	1350FNL 775FWL15 T83	810	1858	1805		OIL	0	339BREA
67	BERTRAM-THACKER	3	ADKINS, WILLIAM	LAWRENCE	2215FNL2630FEL15 T83	802	1866	1799		OIL	0	339BREA
68	SHEWEY, C F	1	SHORT, JAY	LAWRENCE	1050FNL2050FWL15 T83	765	1851	1788		OIL	0	339BREA
69	SHEWEY, C F	5	CYRUS, JEFF	LAWRENCE	1850FNL1100FWL15 T83	740	1825	1767		OIL	0	339BREA
70	SHEWEY, C F	4	CYRUS, JEFF	LAWRENCE	1950FNL2250FWL15 T83	762	1843	1790		OIL	0	339BREA
71	SHEWEY, C F	3	CYRUS, JEFF	LAWRENCE	1000FNL1020FWL15 T83	774	1846	1787		OIL	0	339BREA
72	BERTRAM-THACKER	4	ADKINS, WILLIAM	LAWRENCE	2250FNL3175FEL15 T83	801	1854	1793		OIL	0	339BREA
73	BERTRAM-THACKER	2	ADKINS, WILLIAM	LAWRENCE	2700FNL2250FWL15 T83	825	1878	1823		OIL	0	339BREA
74	COMMONWEALTH O&G	6681	HURT, THURSTON	LAWRENCE	1550FNL 50FEL12 U83	549	1702	1657		GAS	18	339BREA
75	COMMONWEALTH O&G	6692	HURT, THURSTON	LAWRENCE	3175FNL4350FWL12 U83	552	1712	1665		GAS	10	339BREA
76	COMMONWELATH O&G	736	TOMLIN, JOHN	LAWRENCE	2300FSL1740FEL12 U83	573	1729	1674		D&A	0	
77	BERTRAM THACKER BU	1	BURCHWELL, ELMER	LAWRENCE	10FSL 850FEL20 S78	864	1087	1031		OIL	0	339BREA
78	MONITOR PET CORP	1	JOHNSON, HOMER	LAWRENCE	2275FNL1400FWL 1 S79	818	2389	1072		GAS	10	352SALN
79	MONITOR PET CORP	1	LYONS, GRETTA	LAWRENCE	525FSL 390FEL 1 S79	804	2310	913		GAS	10	352SALN
80	MONITOR PET CORP	16	MCDOWELL, OKIE	LAWRENCE	1280FSL1080FWL 1 S79	799	2292	1050		GAS	0	344CORN
81	MONITOR PET CORP	1	EDWARDS, MORTON	LAWRENCE	2840FSL1125FWL 2 S79	925	2425	1151		GAS	0	344CORN
82	MONITOR PET CORP	1	LIMING, DELBERT	LAWRENCE	1890FNL 70FEL10 S79	734	2317	843	0.007	D&A	0	
83	MONITOR PET CORP	1	BOGGS, DELBERT	LAWRENCE	2000FNL1650FWL10 S79	760	2375	1000		GAS	10	352SALN
85	FYFFE BROTHERS DRL	3	SPARKS, RONALD	LAWRENCE	1200FNL 900FWL12 S79	820	1047	1028		GAS	10	338WEIR
86	RELIANCE OIL CO	21	SPARKS, R N	LAWRENCE	1290FNL2490FWL19 S79	718	2500	885		OIL	0	
87	ASHLAND-EVANS	23	DOBYNS, C K	LAWRENCE	1070FSL2080FEL20 S79	682	2363	835		D&A	0	

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MAPNO	OPERATOR	WELL NO	FARM NAME	COUNTY	LOCATION	ELEV	TD	BEREA	PERM CMPL	IP	PAY
88	UNKNOWN	3	COFFEY, MARY E	LAWRENCE	1575FSL 800FEL24 S79	878	1020	978	OIL	0	
89	CARSON ASSOC, INC	2	HAY, MARTIN	LAWRENCE	3950FSL1000FWL25 S79	798	995	963	OIL	0	339BREA
90	WARE, E C	K17	FYFFE HEIRS	LAWRENCE	2075FNL1300FEL25 S79	887	1373	1243	OIL	0	338WEIR
91	MONITOR PET CORP	1	BOGGS, J T	LAWRENCE	800FSL 755FWL 4 S80	691	2264	990	GAS		344CORN
92	MONITOR PET CORP	1	WILLIAMS, RAY ETAL	LAWRENCE	2155FSL1330FWL 5 S80	738	2342	1000	GAS	0	352SLNA
93	MONITOR PET CORP	1	DAVIS, CORBIA	LAWRENCE	3000FNL 90FWL15 S80	824	2384	1060	D&A	0	
94	LAUFFER OIL	1	RICE, N T	LAWRENCE	920FNL 780FWL24 S80	782	1030	922	OIL	0	339BREA
95	LAUFFER OIL CO	3	RICE, N T	LAWRENCE	2300FNL1160FWL24 S80	752	1074	977	O&G	50	339BREA
96	WILLIAMS, G T & SO	1	SKAGGS, JOHN H	LAWRENCE	1125FNL2125FWL24 S80	690	940	850	D&A	0	
97	NEW DOMAIN O&G CO	1	YOUNG, J A	LAWRENCE	2700FSL2300FEL19 T80	682	2000	1130	GAS	0	341OHIO
98	ALLEN AND RICE	1	YOUNG, R F	LAWRENCE	1725FNL 830FEL20 T80	750	2706	1300	D&A	10	
99	B T M OIL	3	CARTER, ADKINS, WI	LAWRENCE	2530FSL 240FWL15 T81	762	1808	1749	OIL	0	339BREA
100	3 B OIL CO	1	SHORT, ED	LAWRENCE	1550FSL2150FEL21 T81	605	1476	1380	O&G	10	339BREA
101	SEMCO OIL CO	5	BLAIR, WILLIAM WEL	LAWRENCE	1250FSL 550FWL21 T81	644	1464	1363	OIL	0	339BREA
102	WARDEN, RUSSELL	3	WELLS, WILLIAM	LAWRENCE	2150FSL1650FEL22 T81	640	2777	1341	D&A	10	
103	3 B OIL CO	4	WELLS, WILLIAM B	LAWRENCE	25FSL 650FEL22 T81	665	1495	1379	O&G	51	339BREA
104	WORDEN, R H	1	WELLS, W B	LAWRENCE	1650FSL 725FEL22 T81	654	1457	1366	GAS	30	339BREA
105	SEMCO OIL CO	6	WELLS, WILLIAM B	LAWRENCE	3350FSL 260FEL22 T81	721	1620	1525	GAS		339BREA
106	SEMCO OIL CO	8	WELLS, WILLIAM B	LAWRENCE	2100FNL 950FEL22 T81	818	1619	1518	GAS		339BREA
107	SEMCO OIL CO	9	WELLS, WILLIAM B	LAWRENCE	500FNL1750FEL22 T81	750	1537	1428	OIL	0	339BREA
108	WARE, E C	1	SPARKS HRS	LAWRENCE	1350FSL 450FEL10 S80	662	1258	1152	D&A	0	
109	KY WEST VA GAS CO	1594	HENSLEY, DENZIL L	LAWRENCE	2800FSL 925FEL 1 S81	721	3360	1487	GAS	10	355CLNT
110	SEMCO OIL	1	CARTER, TALMADGE	LAWRENCE	2400FSL2250FEL 3 S81	837	1619	1499	OIL	0	339BREA
111	OHIO FUEL OIL CO	2	HEWLETT, J L	LAWRENCE	550FNL2050FEL17 S81	645	1149	1078	D&A	0	
112	MONITOR PET CORP	1	JORDAN, EDGEL	LAWRENCE	1400FNL1475FWL17 S81	649	1185	1070	OIL	10	
113	MONITOR PET CORP	1	OSBORN, J S	LAWRENCE	1050FSL2000FEL17 S81	659	1121	936	GAS	10	
114	MONITOR PET CORP	1	SMITH, SIMON	LAWRENCE	2600FSL2150FWL17 S81	683	1668	1000	GAS	10	
115	BRADLEY, SMITH F	1	FYFFE, MILLAD	LAWRENCE	2400FSL1000FWL17 S81	750	1195	1072	D&A	0	
116	MONITOR PET CORP	1	FYFFE, MILLARD	LAWRENCE	2400FSL1000FWL17 S81	672			GAS	5	339BREA
117	MONITOR PET CORP	2	JORDEN, EDGEL	LAWRENCE	275FNL 475FWL17 S81	944	1519	1369	OIL	10	339BREA
118	WARE, E C	1	CORDLE, ELLA	LAWRENCE	175FSL 100FWL17 S81	748	1121	1022	D&A	0	
119	THACKER, CURT	1	CORDLE, ELLA	LAWRENCE	175FSL 100FWL17 S81	748			OIL	0	
120	KY OHIO GAS CO	1	GARTIN, SHERMAN	LAWRENCE	900FSL2200FWL18 S81	875	1913	1154	GAS	10	339BREA
121	CREST OIL CO	1	ADAMS, IKE	LAWRENCE	2650FSL1200FEL18 S81	840	1298	1159	GAS	10	339BREA
122	KY OHIO GAS CO	2	HAYS, ERNEST V	LAWRENCE	275FSL 975FWL19 S81	890	1252	1166	GAS	10	339BREA
123	KY WEST VA GAS CO	1160	THOMPSON, KITTY	LAWRENCE	450FSL1300FEL19 S81	915	2692	1225	GAS	10	344CORN
124	BELCHER & ASKINS	1	MOORE, MARVIN	LAWRENCE	2200FSL1850FEL20 S81	862	1309	1233	O&G	10	339BREA
125	ADKINS, R H	1	MOORE, MARVIN	LAWRENCE	450FSL 275FEL20 S81	739	1209	1103	GAS	54	339BREA
126	HAYS, TOM	1H	AYS, TOM	LAWRENCE	2900FNL2450FEL21 S81	780	1128	1091	GAS	21	339BREA
127	KY WEST VA GAS CO	1115	HAYS, ZEAL	LAWRENCE	3100FSL1150FWL21 S81	900	2204	1187	OIL	0	344CORN

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MAPNO	OPERATOR	WELL NO	FARM NAME	COUNTY	LOCATION	ELEV	TD	BEREA	PERM	CMPL	IP	PAY
128	KY WEST VA GAS CO	1138	MOORE, CLIFTON	LAWRENCE	300FSL1400FEL21 S81	915	2772	1230		GAS		344CORN
130	WEAVER OIL & GAS	1	HAYES-DAVGIRDS	LAWRENCE	2475FNL1250FWL21 S81	976	3281	1280	0.000	GAS	10	358CLNT
131	KY WEST VA GAS CO	1123	CORDLE, LEWIS R	LAWRENCE	1675FNL 800FWL21 S81	850	2651	1150		GAS	10	344CORN
132	KY WEST VA GAS CO	1140	BERRY, ROSCOE	LAWRENCE	1000FNL1620FEL22 S81	864	1295	1197		GAS	39	339BREA
133	CREST OIL CO	3	CORDEL, T M	LAWRENCE	1850FNL 360FWL22 S81	845	1200	1082		GAS		339BREA
134	CREST OIL CO	1	CORDLE, T M	LAWRENCE	1315FNL1150FWL22 S81	800	2632	1093		GAS	71	339BREA
135	CREST OIL CO	1	CORDLE, CAROLINE	LAWRENCE	800FSL1700FEL22 S81	895	2632	1105		GAS	10	344CORN
136	WARE, E C	1	CAUDILL, LILLIE	LAWRENCE	1450FSL 525FWL22 S81	799	2496	985		D&A	10	
137	KY OHIO GAS CO	1	HAYES, EARNEST V	LAWRENCE	600FNL 460FWL22 S81	850	1234	1136		GAS		339BREA
138	ENDICOTT, CLYDE	1	SMITH, DELLA HEIRS	LAWRENCE	800FSL 610FEL22 S81	852	2771	1224		GAS	10	355BGSX
139	KY WEST VA GAS CO	1135	BERRY, ROSLOE	LAWRENCE	1280FNL1650FWL22 S81	828	1249	1140		GAS	75	339BREA
140	KY WEST VA GAS CO	1199	ARRINGTON, FRED	LAWRENCE	1970FSL1480FEL22 S81	832	2613	1104		GAS	0	344CORN
141	KY WEST VA GAS CO	1172	ARRINGTON, SIMON	LAWRENCE	2500FNL1550FEL22 S81	923	2687	1200		GAS	0	355BGSX
142	CREST OIL CO	1	CORDLE, JESSE	LAWRENCE	5500FSL 900FWL23 S81	700	1234	1073		GAS		339BREA
143	CREST OIL CO	1	HOLBROOK, J T	LAWRENCE	2750FNL1700FWL23 S81	815	1080	980		GAS	10	339BREA
144	CREST OIL CO	1	THOMPSON, ARLIE	LAWRENCE	900FNL 950FWL23 S81	690	1420	935		GAS		339BREA
145	CREST OIL CO		SCORDLE, T M	LAWRENCE	4850FSL 500FEL23 S81	850	1140	1027		GAS	63	339BREA
146	CREST OIL CO	1	SKAGGS	LAWRENCE	2400FSL1100FWL23 S81	760	1203	1012		GAS		339BREA
147	CREST OIL CO	1	GARTIN, LUNDA	LAWRENCE	2910FNL1050FWL23 S81	770	1137	1024		GAS	49	339BREA
148	MILLS, CLIFFORD	1	GARTIN HEIRS	LAWRENCE	475FNL 650FWL23 S81	760	2300	998		GAS	0	341OHIO
149	CREST OIL CO	1	CORDLE, MARTIN	LAWRENCE	2300FNL 100FEL24 S81	712	1065	964		GAS	88	339BREA
150	CREST OIL CO	1	GARDNER, LUNDA	LAWRENCE	3800FNL1425FEL24 S81	720	1137	1024		GAS		339BREA
151	KY OHIO GAS CO	1	GARTIN, LUTHER	LAWRENCE	2290FSL2000FEL24 S81	757	1078	993		GAS		339BREA
152	SHAW, OBIE	2	GARTIN, LUTHER	LAWRENCE	1700FSL1875FWL24 S81	806	1130	1028		GAS		339BREA
153	BUTLER, R	1	CORDLE, M J	LAWRENCE	1300FSL 100FWL25 S81	762	9853	899		D&A	10	
154	PETRIE, RUSSELL	1	PRINCE, GEORGE S	LAWRENCE	1500FSL 200FEL15 T82	700	3385	1460		D&A	10	
155	BRADLEY PROD CO	1	BRADLEY, M H	LAWRENCE	2300FNL2350FEL16 T82	651	1507	1412	0.022	O&G		339BREA
156	BRADLEY PROD CO	2	BRADLEY, V & M H	LAWRENCE	1400FNL2550FEL16 T82	657	1514	1423		GAS	15	339BREA
157	BRADLEY PROD CO	3	BRADLEY, M H	LAWRENCE	200FNL2400FEL16 T82	709	1593	1511		O&G	25	339BREA
158	PARKER, ORVILLE	1	BLANKENSHIP, R	LAWRENCE	2450FNL 850FEL22 T82	700	1704	1639		OIL	0	339BREA
159	PARKER, ORVILLE	2	BLANKENSHIP, R	LAWRENCE	2480FNL 425FEL22 T82	690	1726	1657		OIL	10	339BREA
160	WARE, E C	1	BLANKENSHIP, R	LAWRENCE	1750FNL1680FEL22 T82	630	1642	1570		D&A	0	
161	REYNOLDS, W G	1	HUGHES H&I	LAWRENCE	10FSL1700FWL22 T82	863	3707	1783		GAS	0	355CLNT
162	KY WEST VA GAS CO	1420	ROBERTS, GUSSIE	LAWRENCE	2750FSL2100FWL24 T82	728	3457	1560	0.009	D&A	10	
163	BRADLEY, SOL J	1	PIGG, E C	LAWRENCE	2100FNL 300FEL 1 S82	840	1816	1754		OIL	0	339BREA
164	COLUMBIA GAS TRANS	9669	PIGG, E ET AL	LAWRENCE	2880FSL 240FEL 2 S82	704	3680	1662		GAS	10	355CLNT
165	BRADLEY, S J	7	ONEAL, W D & MCKIN	LAWRENCE	725FSL1000FEL 2 S82	741	1743	1669		OIL	0	339BREA
166	BELCHER LAKER OIL	1	ROBERTS, MCKINLEY	LAWRENCE	650FSL 350FEL 2 S82	710	1714	1624		OIL	0	339BREA
167	SEMCO OIL CO	1	CARTER, CECIL	LAWRENCE	280FSL2450FWL 3 S82	741	1663	1588		OIL	0	339BREA
168	MIERENDORF, DAVID	1	PRINCE, MARY	LAWRENCE	1250FSL 200FWL 3 S82	710	1624	1549		D&A	0	

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MAPNO	OPERATOR	WELL NO	FARM NAME	COUNTY	LOCATION	ELEV	TD	BEREA	PERM	CMPL	IP	PAY
169	KY WEST VA GAS CO	1444	ROBERTS, WILSON ET	LAWRENCE	1050FSL2090FEL 4 S82	743	3507	1585		GAS	10	355CLNT
170	KY WEST VA GAS CO	1429	COSSIN, CYNTHIA	LAWRENCE	800FSL 900FWL 4 S82	768	3572	1590	0.015	GAS	0	355CLNT
171	KY WEST VA GAS CO	1389	BALL, DAN D	LAWRENCE	2080FSL 100FEL 4 S82	760	3540	1620	0.050	GAS	10	355CLNT
172	KY WEST VA GAS CO	1409	BALL, DAN D	LAWRENCE	1950FNL1740FWL 4 S82	703	3477	1562		GAS	0	355CLNT
173	KY WEST VA GAS CO	1564	BALL, DAN D	LAWRENCE	2930FNL 400FEL 5 S82	733	3460	1564		GAS	0	355CLNT
174	KY WEST VA GAS CO	1579	BALL, DAN D	LAWRENCE	1250FNL1730FEL 5 S82	761	3493	1595	0.001	GAS	10	355CLNT
175	KY WEST VA GAS CO	1468	ROBERTS, MONNIE ET	LAWRENCE	150FSL 250FWL 5 S82	691	3320	1467		GAS	10	355CLNT
176	KY WEST VA GAS CO	1479	ROBERTS, MONNIE	LAWRENCE	590FSL2180FWL 5 S82	706	3376	1519	0.015	GAS	10	355CLNT
177	KY WEST VA GAS CO	1557	CARTER, ECK	LAWRENCE	2875FNL 60FWL 6 S82	793	3396	1522		GAS	0	355CLNT
178	KY WEST VA GAS CO	1373	THOMPSON, ROY	LAWRENCE	2790FNL1810FEL 6 S82	733	3530	1478		GAS	0	355CLNT
179	KY WEST VA GAS CO	1381	BURTON, JULIA	LAWRENCE	1650FNL1850FEL 7 S82	883	3603	1675	0.020	GAS	0	355CLNT
180	KY WEST VA GAS CO	1541	HAZLETTE, WILLIAM	LAWRENCE	50FSL2090FWL 7 S82	732	2449	1395		D&A	0	
181	KY WEST VA GAS CO	1442	PRINCE, MARY E	LAWRENCE	425FNL 60FEL 7 S82	770	3529	1589		GAS	0	355CLNT
182	KY WEST VA GAS CO	1451	THOMPSON, ROY	LAWRENCE	2050FSL 100FWL 7 S82	854	3510	1572	0.010	GAS	10	355CLNT
183	COLUMBIA GAS TRANS	9670	DELONG, ARLAND ETA	LAWRENCE	230FSL 760FEL 8 S82	687	3518	1440		D&A	0	
184	WARE, E C	1	DELONG, SHERMAN	LAWRENCE	50FNL1375FEL 8 S82	712	1656	1575		OIL	0	339BREA
185	KY WEST VA GAS CO	1350	HAYES, MARY JANE E	LAWRENCE	1160FSL 580FWL 8 S82	783	3581	1560	0.070	GAS	0	355CLNT
186	MASCH, W W	1	MOORE, STRODER	LAWRENCE	150FNL1440FWL 8 S82	662	1593	1526		OIL	0	339BREA
187	KY WEST VA GAS CO	1459	MOORE, STRODER	LAWRENCE	580FNL1660FWL 8 S82	765	3579	1629		GAS	10	355CLNT
188	BELCHER, MILLER	2	PACK, ELBERT	LAWRENCE	500FNL 450FEL 8 S82	800	1712	1637		OIL	10	339BREA
189	BELCHER, MILLER	2	CARTER, DOCK	LAWRENCE	200FNL 250FWL 9 S82	628	1580	1490		D&A	10	
191	ANDERSON OIL CO	1	BURGESS, F E	LAWRENCE	1820FSL1900FEL11 S82	1082	1925	1864		O&G	10	339BREA
192	ASH OIL & REF CO	1	ROBINETTE, DOVIE	LAWRENCE	1820FSL1900FEL11 S82	981	1826	1758		D&A	0	
193	KY WEST VA GAS CO	1267	AKERS, JAMES W	LAWRENCE	300FSL 650FWL13 S82	819	1528	1406		GAS	11	339BREA
194	KY WEST VA GAS CO	1272	AKERS, JAMES W	LAWRENCE	1275FSL 780FEL13 S82	800	2161	1463		D&A	10	
195	KY WEST VA GAS CO	1457	AKERS, JAMES W	LAWRENCE	3125FNL1910FEL13 S82	828	3483	1523		GAS	0	355CLNT
196	KY WEST VA GAS CO	1501	HAYES, LOWELL, S	LAWRENCE	1840FNL1050FWL13 S82	677	3301	1375		D&A	0	
197	KY WEST VA GAS CO	1514	ADAMS, E E	LAWRENCE	180FNL 60FEL15 S82	775	3370	1495	0.040	GAS	10	355CLNT
198	KY WEST VA GAS CO	1522	CARTER, JAMES D	LAWRENCE	1050FNL2150FEL15 S82	771	3303	1463		D&A	0	
199	KY WEST VA GAS CO	1101	MOORE, BERT W	LAWRENCE	790FSL 600FWL16 S82	777	1236	1152		GAS	24	339BREA
200	KY WEST VA GAS CO	1116	SAUL, OLIVER	LAWRENCE	2675FSL 400FEL16 S82	765	1831	1182		GAS	10	341OHIO
201	KY WEST VA GAS CO	1227	SAUL, OLIVER	LAWRENCE	1900FNL1100FEL16 S82	751	2737	1227		GAS	10	339BREA
202	KY WEST VA GAS CO	1309	CARTER, R & YATES,	LAWRENCE	2000FSL1950FWL16 S82	813	2740	1205		D&A	10	
203	KY WEST VA GAS CO	1102	BALL, NILES	LAWRENCE	400FSL 200FWL17 S82	776	1251	1176		GAS	42	339BREA
204	KY WEST VA GAS CO	1113	CANTRELL, OPAL MOO	LAWRENCE	2000FSL1360FWL17 S82	751	2711	1174		GAS	10	344CORN
205	KY WEST VA GAS CO	1148	CASTLE, FRED	LAWRENCE	1950FNL 475FWL17 S82	699	2668	1165		D&A	10	
207	KY WEST VA GAS CO	1233	MOORE, DAVID	LAWRENCE	650FSL 50FEL17 S82	787	2795	1216		GAS	10	344CORN
208	KY WEST VA GAS CO	1187	MOORE, STELLA	LAWRENCE	1750FSL1300FEL17 S82	715	2710	1145		GAS	10	344CORN
209	KY WEST VA GAS CO	1213	MOORE, STELLA S	LAWRENCE	2360FNL1000FEL17 S82	725	2621	1180		GAS	10	344CORN
210	KY WEST VA GAS CO	1211	ROBINETT, LEE	LAWRENCE	100FSL2150FWL17 S82	788	2704	1186		GAS	24	344CORN

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211	KY WEST VA GAS CO	1232	SHORT, J M	LAWRENCE	425FNL2030FEL17 S82	724	2821	1263	O&G	10	339BREA
212	KY WEST VA GAS CO	1247	ESTEP, KAY	LAWRENCE	2790FNL2550FEL18 S82	857	1448	1330	GAS	73	339BREA
213	KY WEST VA GAS CO	1167	ESTEP, WILLIAM	LAWRENCE	1100FSL2025FWL18 S82	792	2830	1250	GAS	10	344CORN
214	KY WEST VA GAS CO	1226	FARREL, HARRISON	LAWRENCE	2300FSL1275FEL18 S82	810	2884	1293	D&A	10	
215	KY WEST VA GAS CO	1231	MCBRAYER, CHARLES	LAWRENCE	2850FNL 350FWL18 S82	820	2844	1277	GAS	15	355BGSX
216	PETROLINI CORP	1	SHORT, OSCAR	LAWRENCE	2600FSL1325FWL18 S82	789	2300	1255	GAS		339BREA
217	DUQUESNE KY GAS CO	1	BLACKBURN, BASCOM	LAWRENCE	2700FSL 230FEL19 S82	700	1369	1299	GAS	73	339BREA
218	DUQUESNE KY GAS CO	1	BLACKBURN, ORA	LAWRENCE	1650FSL2700FEL19 S82	770	1389	1312	GAS	21	339BREA
219	DUQUESNE KY GAS CO	1	CHILDERS, IVORY	LAWRENCE	1100FSL 300FEL19 S82	738	1419	1330	GAS	30	339BREA
220	KY & OH GAS & DUQU	1	MCKINSTER, MITCHEL	LAWRENCE	750FNL 740FEL19 S82	680	1375	1300	GAS		339BREA
221	DUQUESNE NATL GAS	4	GARRED, L A	LAWRENCE	2000FSL 750FEL20 S82	620	1343	1271	GAS	119	339BREA
222	DUQUESNE KY GAS	6	GARRED, L W HRS	LAWRENCE	2900FSL2200FWL20 S82	735	1442	1360	GAS	40	339BREA
223	DUQUESNE KY GAS KY	7	GARRED, L A HRS	LAWRENCE	50FSL1350FEL20 S82	620	1324	1249	GAS	36	339BREA
224	VICTOR GAS CO	8	GARRED, L A HRS	LAWRENCE	1740FNL1625FEL20 S82	665	1388	1322		10	339BREA
225	MANNING, JACK		GARRED, L A HRS	LAWRENCE	1900FNL1400FEL21 S82	610	1293	1240	GAS	119	339BREA
226	KIDD, BARON	1	DANIELS, ROY	LAWRENCE	840FNL1570FEL22 S82	690	1321	1231	D&A	0	
227	KY WEST VA GAS CO	1073	ESTEP, EDGLE	LAWRENCE	1200FSL 900FWL22 S82	766	1367	1279	GAS	26	339BREA
228	KY WEST VA GAS CO	1300	MCKINSTER, EARL	LAWRENCE	1975FNL 350FWL22 S82	764	1362	1257	GAS	15	339BREA
229	KY WEST VA GAS CO	1198	ESTEP, WILLIAM	LAWRENCE	625FNL1325FEL23 S82	869	2924	1347	GAS	26	339BREA
230	KY WEST VA GAS CO	1201	ROBINETTE, L W	LAWRENCE	725FNL 575FWL23 S82	826	2862	1281	GAS	10	344CORN
231	KY EASTERN O&G	2	CASTLE, FREDDIE	LAWRENCE	550FSL1400FEL24 S82	849	1339	1262	GAS	20	339BREA
232	KY WEST VA GAS CO	1117	SHORT, SHELVA	LAWRENCE	1350FNL1040FWL24 S82	844	2809	1236	D&A	0	
233	KY WEST VA GAS CO	1224	THOMPSON, JAY N	LAWRENCE	2400FNL 275FEL24 S82	879	2920	1338	GAS	10	344CORN
234	ADKINS, R H	1	THOMPSON, BOB HRS	LAWRENCE	1410FSL1000FWL24 S82	900	3262	1309	GAS	10	339BREA
236	KY WEST VA GAS CO	0196	MOORE, CLYDE H	LAWRENCE	400FNL1450FEL25 S82	780	1235	1162	GAS	42	339BREA
237	KY WEST VA GAS CO	1079	MOORE, DILLON	LAWRENCE	1500FSL1080FWL25 S82	848	1255	1194	GAS	60	339BREA
238	KY WEST VA GAS CO	1099	MOORE, LINZY	LAWRENCE	1050FNL1800FWL25 S82	830	1268	1187	GAS	26	339BREA
239	KY WEST VA GAS CO	1089	MOORE, LOU ET AL	LAWRENCE	2650FNL1200FWL25 S82	822	1240	1181	GAS	21	339BREA
240	KY WEST VA GAS CO	1177	MOORE, LOU ET AL	LAWRENCE	150FSL2100FWL25 S82	942	1407	1298	GAS	33	339BREA
241	COLUMBIA GAS TRANS	9558T	JOBE, EDGAR M	LAWRENCE	1600FSL1780FEL 7 S83	761	3715	1708	D&A	0	
242	DUQUESNE NAT GAS C	2	BURGESS, F & T	LAWRENCE	2000FSL1975FWL16 S83	605	1334	1270	GAS	119	339BREA
243	SUQUESNE KY GAS CO	5	GARRED, L A HRS	LAWRENCE	2600FNL 420FWL16 S83	629	1380	1313	GAS	73	339BREA
244	MANNING, JACK CO	1	BURGESS, F & T	LAWRENCE	50FSL1475FEL16 S83	571	1275	1225	O&G	10	339BREA
245	CREST OIL CO	1	BURGESS, ADDIE	LAWRENCE	300FSL1800FWL18 S83	590	1390	1318	OIL	10	339BREA
248	MANNING, JACK	1	DOBBINS, J	LAWRENCE	2250FNL1700FWL18 S83	580	1385	1307	OIL	0	339BREA
249	BOARD PROD CO	4	ADAMS, E E & SHORT	LAWRENCE	2925FNL1725FWL24 S83	652	1400	1335	GAS	10	339BREA
250	BOARD & SAMPLES IN	3	SNYDER, AUGUST	LAWRENCE	1275FSL1050FWL24 S83	870	1626	1562	GAS		339BREA
251	BOARD PROD CO	5	ADAMS, E E & SHORT	LAWRENCE	2475FSL 350FEL25 S83	693	1433	1380	GAS	94	339BREA
255	ALLEN & MILLER GAS	1	VANHOOSE, ROY	LAWRENCE	1350FSL 500FWL25 S83	620	1292	1216	GAS	84	339BREA
256	RAY, G T & SON	1	BURGESS, DOCK	LAWRENCE	2350FSL2350FEL25 S83	631	2030	1275	GAS		339BREA

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257	MANNING, JACK ETAL	1	ARRINGTON, LON	LAWRENCE	650FSL2400FWL25 S83	574	1265	1215		GAS	10	339BREA
258	LOUISA DRLG	1	THACKER, CURTIS	LAWRENCE	1950FSL1960FEL18 T83	593	1766	1713		OIL	0	339BREA
259	WALTER PROCTOR TRU	2	PREECE, PHIL	LAWRENCE	75FNL 990FEL22 T83	830	1818	1765		OIL	0	339BREA
261		3	PREECE, PHIL	LAWRENCE	550FNL1450FEL22 T83	650	1818			OIL		339BREA
262	AMERICAN DRLG CO	1A	PREECE, PHIL	LAWRENCE	200FNL 250FEL22 T83	572	1829	1727		D&A		
263	AMERICAN DRLG CO	1B	PREECE, PHIL	LAWRENCE	300FNL 250FEL22 T83	573	1815	1730		OIL	0	339BREA
264	EAST KY O&G CO	8	STUMP, MAGGIE	LAWRENCE	2150FSL2325FWL 2 S83	700	1862	1780		OIL	0	339BREA
265		1	STUMP, MAGGIE	LAWRENCE	3100FNL2400FEL 2 S83	575	1692	1665		OIL	0	339BREA
266		2	STUMP, MAGGIE	LAWRENCE	3250FNL1900FEL 2 S83	600	1724	1690		OIL	0	339BREA
267	PARKER, ORVILLE H	1	CAUDILL, EARL	LAWRENCE	2100FSL 800FWL 2 S83	692	1830	1764		D&A	0	
268	UNITED FUEL GAS	9557T	FIEGER, THOMAS W	LAWRENCE	1300FSL 560FEL10 S83	799	4037	1879		D&A	0	
269	MANNING, JACK	1	WEBB, MARVIN	LAWRENCE	1025FNL 350FWL10 S83	738	1922	1850		OIL	10	339BREA
270	WHITELAND PET CORP	1	WALBRIDGE, H HRS	LAWRENCE	2525FSL 775FWL11 S83	884	2827	1841		GAS	0	3410HIO
272	SLAGER, A J	1	VINSON, CHARLES	LAWRENCE	1825FNL 175FWL 8 S84	580	2549	1755		D&A	10	
274	ENDICOTT, F	1	PERRY, NELL	LAWRENCE	1000FSL1950FWL22 S84	801	2515	1757		GAS	0	338INJN
275	ENDICOTT, FLOYD	1	DURFIELD, CHARLES	LAWRENCE	650FSL1600FEL22 S84	560	2245	1570		GAS	0	332BIGL
276	MILLER, GALE C	1	NORTHUP HRS	LAWRENCE	2250FNL 400FWL24 S84	620	2550	1485		GAS		339BREA
277	LOUISA DRLG CO	1	SKAGGS, LEO JR	LAWRENCE	1965FNL2465FEL10 R78	878	1028	970		OIL	0	339BREA
278		8	GAMBILL, J J	LAWRENCE	1700FNL1050FEL 1 R79	907	1025	1000		OIL	0	338WEIR
281		1	SKAGGS, L F	LAWRENCE	2530FSL 530FEL 5 R79	782	974	866		OIL	0	338WEIR
282	BERTRAM & THACKER	1	FERGUSON, ARTHUR	LAWRENCE	3320FNL1785FWL 6 R79	820	941	893		OIL	0	339BREA
283	BURNETT, BERTRAM T	2	FERGUSON, A	LAWRENCE	3230FNL2670FWL 6 R79	1024	1077	1077		OIL	0	339BREA
284	BRANHAM, GEORGE E	1	LYONS, W E	LAWRENCE	575FSL 75FWL 3 R80	851	958	867		GAS	20	339BREA
285	KY WEST VA GAS CO	1	WILLIAMS, H F	LAWRENCE	350FSL1725FEL 4 R80	875	1511	867		GAS	38	339BREA
286	SHAW, OBIE	3	BOGGS, BERTHA	LAWRENCE	2850FSL1650FEL 1 R80	802	990	905		GAS		339BREA
287	SHAW, OBIE	2	GREEN H G	LAWRENCE	425FSL1900FWL 1 R80	903	1004	910		GAS		339BREA
288	SHAW, OBIE	4	WELLS, RUSSELL	LAWRENCE	1900FNL1000FEL 1 R80	788	998	904		GAS		339BREA
289	WARE, E C	1	SPARKS	LAWRENCE	4350FNL1200FEL 1 R80	780	2490	965		D&A	10	
290	WARE, E C	1	SPARKS, WILLIAM	LAWRENCE	2400FSL 800FEL 1 R80	748	964	859		GAS	30	339BREA
291	SHAW, OBIE	9	GREEN, HOBART	LAWRENCE	1100FNL1000FWL10 R80	884	1020	884		GAS		339BREA
292	RANGE INVESTMENTS	1	SPARKS, W D ETAL	LAWRENCE	450FNL 900FEL10 R80	790	958	862		D&A	0	
293	WARE, E C	4	SPARKS, MARVIN	LAWRENCE	2300FNL 800FEL10 R80	802	998	924		GAS	20	339BREA
294	KY WEST VA GAS CO	1157	BALL, MARY	LAWRENCE	1500FNL 700FEL 1 R81	899	2844	1239		GAS	10	344CORN
295	KY WEST VA GAS CO	1258	BALL, M & CORDLE,	LAWRENCE	1800FNL2150FWL 1 R81	810	1253	1140		GAS	44	339BREA
296	MT CARMEL DRLG	1	BALL, V E	LAWRENCE	2950FSL2200FEL 1 R81	870	2835	1186	0.090	GAS	18	339BREA
297	KY WEST VA GAS CO	1240	CAUDILL, HOMER JAY	LAWRENCE	2950FSL 300FWL 1 R81	1044	2952	1344		GAS	10	339BREA
298	KY WEST VA GAS CO	1141	HAYES, ZEAL	LAWRENCE	50FNL1120FWL 1 R81	843	2660	1136		GAS	0	344CORN
299	KY WEST VA GAS CO	1223	THOMPSON, WILLIE	LAWRENCE	2600FSL 650FWL 1 R81	987	2984	1332		GAS	10	355BGSX
300	KY WEST VA GAS CO	1282	JOHNSON, LORENA	LAWRENCE	590FSL 330FEL 2 R81	963	2991	1035		GAS	112	344CORN
301	KY WEST VA GAS CO	1263	MOORE, LOUELLA	LAWRENCE	1150FSL2275FWL 2 R81	782	2748	1099		GAS	15	344CORN

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302	CREST OIL CO	1	OBRYAN, JOHN J	LAWRENCE	2500FNL1450FWL 2 R81	829	1257	1121		O&G	47	339BREA
303	PRATHER, EARL	1	SMITH, JAMES	LAWRENCE	1400FNL 150FWL 2 R81	840	1280	1162		O&G	10	339BREA
304	PINKERTON, KERMIT	1	SKAGGS, CALVIN	LAWRENCE	1000FSL1100FWL 2 R81	930	1336	1239		OIL	10	339BREA
305	PINKERTON, KERMIT	2	SKAGGS, CALVIN	LAWRENCE	500FSL 925FWL 2 R81	800	1184	1085		OIL	10	339BREA
306	PINKERTON BROS GAS	3	SKAGGS, CALVIN	LAWRENCE	800FSL 900FWL 2 R81	824	2887	1224		D&A	10	
307	ENDICOTT, FLOYD	1	SKAGGS, CORNELIUS	LAWRENCE	2350FSL 750FWL 2 R81	768	1200	1071		O&G	100	339BREA
308	CORDLE, WINDRED	1	LOWE, WALTER	LAWRENCE	3300FSL1700FEL 2 R81	960	1380	1299		O&G	10	339BREA
309		1	THOMPSON, W H C	LAWRENCE	1250FNL1700FEL 3 R81	725	1035	965		O&G		
311	BRUIN OIL PROP	2	BENTLEY, OPAL	LAWRENCE	1875FSL 865FEL 3 R81	796	1141	1062		O&G	10	339BREA
312	ENDICOTT, FLOYD	2	SKAGGS, JOHN M	LAWRENCE	2200FNL1700FWL 3 R81	786	1137	1027		GAS	10	339BREA
313	ENDICOTT, FLOYD	1	BENTLEY, OPAL	LAWRENCE	1500FSL 50FEL 3 R81	780	1180	1049		D&A		
314	PRATHER, EARL	1	WEBB, MAY	LAWRENCE	1900FNL 800FEL 3 R81	692	1084	991		OIL		339BREA
315	PRATHER, EARL	1	CLINE, MCKINLEY	LAWRENCE	1500FNL1150FEL 3 R81	675	1085	980		D&A	10	
316	PINKERTON, KERMIT	1	CLINE, CRAWFORD	LAWRENCE	500FSL1700FWL 3 R81	720	1085	971		D&A	0	
317	COLUMBIA GAS TRANS	20298	HAYES, ESTHER	LAWRENCE	2450FNL1200FEL 4 R81	812	5511	1021	0.020	GAS	0	368BKMN
318	SHAW, OBIE	5	WHEELER, REBECCA	LAWRENCE	2300FNL 700FWL 5 R81	855	1040	940		GAS	10	339BREA
319	WARE	2	SPARKS	LAWRENCE	2100FNL 450FEL 5 R81	820	964	859		GAS	33	339BREA
320	SHAW, OBIE	12	ROSS, E J	LAWRENCE	1475FNL1660FEL 6 R81	760	989	887		GAS		
321	SHAW, OBIE	4	SPARKS HRS	LAWRENCE	2600FNL 550FWL 6 R81	785	1035	905		GAS		
322	SHAW, OBIE	6	SPARKS HRS	LAWRENCE	1100FNL 550FWL 6 R81	740	971	857		GAS		339BREA
323	KY WEST VA GAS CO	1314	CORDLE, L M	LAWRENCE	1300FNL 625FEL 9 R81	799	2792	1127	0.000	GAS	0	344CORN
324	WARE, E C	1	CORDLE, W & C D	LAWRENCE	1275FSL1050FWL 9 R81	1026	2905	1315		D&A	0	
325	BUEHER OIL & GAS	1	CORDLE, W C	LAWRENCE	1350FSL2250FEL 9 R81	800	1205	1102		OIL	0	339BREA
326	TAYLOR, LEE	1	HAYES, THOMAS ETAL	LAWRENCE	1800FNL1800FEL 9 R81	790	2701	1073		D&A	10	
327	KY WEST VA GAS CO	1330	MOORE, LOVELLA	LAWRENCE	1100FNL1660FWL 9 R81	805	2689	1098		GAS	0	344CORN
328	WARE, E C	1	CORDLE, JESSE M	LAWRENCE	2650FNL 175FWL 9 R81	869	2798	1210		GAS	0	344CORN
329	CORDLE, WINFRED	1	CORDLE, JESSE	LAWRENCE	1900FSL 570FEL 9 R81	841	1231	1165		OIL	0	339BREA
330	BUEHRER OIL & GAS	1	JAMES, DARWIN	LAWRENCE	2850FSL 675FEL11 R81	711	1248	1140		D&G	10	339BREA
331	BUEHRER OIL & GAS	1	HAYES, OTTO	LAWRENCE	400FNL1400FWL11 R81		1300	1152		O&G		339BREA
332	BUEHRER OIL & GAS	1	VANHOOSE, N	LAWRENCE	2800FNL1400FWL19 R81	865	1376	1243		D&A	0	
333	BUEHRER OIL & GAS	1	HAYES, ALPHA	LAWRENCE	700FNL1100FEL20 R81	706	1310	1232		OIL		
334	BUEHRER OIL & GAS	1	MILLER, LEVI	LAWRENCE	2900FSL2100FWL20 R81	769	1334	1224		O&G	10	339BREA
335	MOOREHEAD O&G	1	MILLER, LEVI	LAWRENCE	2375FNL 550FEL 1 R82	572	1311	1201		GAS	10	339BREA
336	BUEHRER OIL & GAS	1	THOMPSON, GROVER	LAWRENCE	1100FSL1875FWL 3 R82	788	3276	1275		GAS	10	355CLNT
337	BUEHRER OIL & GAS	1	MILLER, CARL	LAWRENCE	60FSL1550FEL 4 R82	735	2852	1105		OIL	20	
338	BUEHRER OIL & GAS	1	SCHWANDER, NEUEN	LAWRENCE	2500FSL 700FEL 4 R82	975	3343	1355		D&A	10	
339	KY EASTERN O&G	1	CASTLE, FREDDIE	LAWRENCE	400FNL 500FEL 4 R82	892	1420	1322		GAS	35	339BREA
340	KY EASTERN O&G	1	THOMPSON, BELL	LAWRENCE	425FNL 850FWL 4 R82	820	1338	1220		GAS	30	339BREA
341	KY WEST VA GAS CO	1266	STAMBAUGH, EMMA H	LAWRENCE	1350FSL 400FWL 4 R82	892	1454	1345		O&G	15	339BREA
342	KY WEST VA GAS CO	1061	ESTEP, WILLIAM	LAWRENCE	1775FNL1900FEL 4 R82	779	1297	1211		GAS	15	339BREA

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343	KY WEST VA GAS CO	1064	ESTEP, S W	LAWRENCE	1450FSL2475FEL 4 R82	875	1397	1311		GAS	73	339BREA
344	BUEHRER OIL & GAS	1	MOORE, HERMAN	LAWRENCE	2750FNL1915FWL 5 R82	955	3007	1341		O&G	0	339BREA
345	KY WEST VA GAS CO	1212	MOORE, CALVIN	LAWRENCE	500FNL1080FEL 5 R82	915	2873	1300		O&G	10	339BREA
346	KY WEST VA GAS CO	1189	MOORE, OCTAVA	LAWRENCE	2000FNL 775FWL 5 R82	949	2927	1310		GAS	15	344CORN
347	ALLEN GAS & MILLER	1	DANIEL, LUCIEN	LAWRENCE	2875FNL1075FEL 2 R82	640	1270	1199		D&A	10	
348	KY WEST VA GAS CO	1256	WELLS, CARRIE B	LAWRENCE	560FNL 475FWL 5 R82	1046	2996	1398		GAS	15	344CORN
349	BUEHRER OIL & GAS	1	THOMPSON, MIL	LAWRENCE	2570FNL 150FEL 5 R82	900	2890	1260		D&A	10	
350	BUEHRER OIL & GAS	1	LYONS, OKLEY	LAWRENCE	2275FNL2000FWL 6 R82	674	1271	1147		O&G	10	339BREA
351	BUEHRER OIL & GAS	1	SWANN, NELSON	LAWRENCE	1400FSL 850FEL 6 R82	643	1205	1115		O&G	0	339BREA
352	BUEHRER OIL & GAS	1	HAYES, RAY	LAWRENCE	1090FSL 50FEL 7 R82	682	1369	1318		O&G	0	339BREA
353	BUEHRER OIL & GAS	1	MILLER, LAURA	LAWRENCE	2500FNL1725FEL 7 R82	655	1291	1172		O&G	0	339BREA
354	BUEHRER OIL & GAS	1	NICHOLS, LAURA	LAWRENCE	175FSL 500FWL 7 R82	674	1312	1185		O&G	10	339BREA
355	KY WEST VA GAS CO	1067	MOORE, LEVI	LAWRENCE	1250FNL 25FEL 7 R82	727	1308	1221		GAS	10	339BREA
356	BUEHRER OIL & GAS	1	BOLIN, EMERT	LAWRENCE	2975FNL 325FWL 8 R82	692	1302	1222		O&G	10	339BREA
357	BUEHRER OIL & GAS	1	COMPTON, INA	LAWRENCE	2350FNL 750FEL 8 R82	660	1329	1186		O&G	10	339BREA
358	BUEHRER OIL & GAS	1	ESTEP, FRED	LAWRENCE	300FNL 750FWL 8 R82	720	2815	1212		O&G	0	339BREA
359	KY EASTERN O&G	1	COMPTON, DENVER	LAWRENCE	1450FNL 175FEL 8 R82	700	1350	1250		GAS	50	339BREA
360	KY EASTERN O&G	1	ESTEP, FRED	LAWRENCE	600FNL1100FWL 8 R82	768	1407	1316		GAS	73	339BREA
361		1	HAYES, L C	LAWRENCE	2210FSL 200FWL 8 R82	586	1170	1169		D&A		
362	KY EASTERN O&G	2	COMPTON, DENVER	LAWRENCE	400FNL 25FEL 8 R82	807	1430	1345		GAS		339BREA
363	KY EASTERN O&G	3	COMPTON, DENVER	LAWRENCE	2050FNL 550FWL 9 R82	745	1439	1350		D&A	10	
364	COMBS, BERT	1	PRESTON, EDGAR	LAWRENCE	1300FSL1710FWL 9 R82		1441	1345		D&A	10	
365	ALLEN & MILLER GAS	1	MEADE, CHARLES	LAWRENCE	750FNL 700FWL10 R82		1357	1283		GAS	10	339BREA
366	DRAKE DRLG CO	1	ROWE, GEORGE	LAWRENCE	2200FSL1950FWL10 R82	597	3262	1259		D&A	0	
367	TUG RIVER NAT GAS	1	PRESTON, JIM	LAWRENCE	2660FNL1425FEL10 R82	660	1317	1261		GAS		339BREA
368	CARNEY, FRANK	1	ROWE	LAWRENCE	2325FSL1450FWL10 R82	600	3314	1256		GAS		344CORN
369	BUEHRER OIL & GAS	1	DOOLEY, BERTHA	LAWRENCE	1500FSL 125FWL12 R82	644	1473	1343		O&G	10	339BREA
370	BUEHRER OIL & GAS	1	MILLS, LACY	LAWRENCE	1175FNL 500FEL13 R82	656	1400	1282		O&G		339BREA
371	BUEHRER OIL & GAS	1	HALL, OLLIE	LAWRENCE	1900FNL2175FEL14 R82	728	1400	1282		O&G	10	339BREA
372	BUEHRER OIL & GAS	1	HAYES, FRED	LAWRENCE	175FNL 375FEL14 R82	832	1332	1210		O&G	10	339BREA
373	BUEHRER OIL & GAS	1	MILLER, DOLLY	LAWRENCE	2350FSL 690FEL14 R82	805	1545	1399		OIL	0	339BREA
374	BUEHRER OIL & GAS	1	PACK, MCADOO	LAWRENCE	1550FNL1450FWL14 R82	762	1429	1274		O&G	0	339BREA
375	KY EASTERN O&G	1	HAYES, FRED	LAWRENCE	1450FNL 475FEL14 R82	661	1324	1245		D&A	10	
376	KY EASTERN O&G	2	HAYES, FRED	LAWRENCE	625FNL1270FEL14 R82	684	1324	1230		GAS	20	339BREA
377	BUEHRER OIL & GAS	1	HAYES, OTTO B	LAWRENCE	3230FSL 820FWL15 R82	673	1218	1113		OIL	10	339BREA
378	BUEHRER OIL & GAS	1	THOMPSON, HOWARD	LAWRENCE	1775FNL2440FEL15 R82	671	1266	1113		O&G	0	339BREA
379	BUEHRER OIL & GAS	1	CORDIAL, CELICE	LAWRENCE	200FSL 60FWL16 R82	762	1424	1300		GAS	10	339BREA
380	GLENN SPRADLIN TRU	1	AUSTIN, A J	LAWRENCE	1100FNL1880FWL20 R82	760	1524	1439		D&A	10	
381	BOARD, CHESTER	2	SNYDER, A	LAWRENCE	300FNL2300FWL 4 R83	680	1471	1398		GAS	10	339BREA
382	TUG RIVER NAT GAS	1	KISE, R R	LAWRENCE	2550FSL 400FWL 5 R83	860	1309	1247		GAS		339BREA

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383	ALLEN & MILLER GAS	2	VANHOOSE, ROY	LAWRENCE	500FNL 750FWL 5 R83	830	1320	1249		GAS	10	339BREA
384	MOOREHEAD O&G CO	2	KISE HRS	LAWRENCE	2500FNL 400FWL 5 R83	615	1332	1255		GAS	100	339BREA
385	ROSKOPF, ALBERT	1	PRESTON, HARPER	LAWRENCE	2450FSL 575FEL 6 R83	602	2042	1335		GAS	10	3410HIO
386	OWENS BOTTLE CO	1	PRESTON, CHARLEY	LAWRENCE	2375FSL 550FWL 7 R83	620	2324	1354		D&A	0	
387	VIKING PET PROPERT	1	WEBB, W L	LAWRENCE	2075FSL 550FEL14 R83	635	2310	1530		D&A	0	
388	ALLEN & MILLER GAS	1	BRANHAM, ERNIE	LAWRENCE	2900FNL 550FWL17 R83		2163	1463		GAS	20	3410HIO
389	BUEHRER OIL & GAS	1	HINKLE, LAFE	LAWRENCE	1900FSL2100FWL23 R83	638	2310	1535		GAS	10	3410HIO
390	BUEHRER OIL & GAS	1	HINKLE, LAFE	LAWRENCE	1350FNL2075FWL23 R83	598	1810	1547		GAS	10	339BREA
391	CHANDLER BROS	1	PRESTON, EVERTT	LAWRENCE	1200FNL2750FEL10 Q82	605	2239	1538		GAS	10	3410HIO
392	BUEHRER OIL & GAS	1	HINKLE, LAFE	LAWRENCE	300FNL2200FWL 3 Q83	680	2367	1635		GAS	0	3410HIO
393	EVANS, E J ETAL	4	LIGHTFOOT TIMBER C	LAWRENCE	3200FSL1600FWL 3 Q83	660	2324	1615		GAS	0	3410HIO
394	WHITELAND PET CORP	1	FITCH, JERRY LEE	LAWRENCE	515FNL 200FEL 4 Q83	611	2486	1600		GAS	0	3410HIO
395	ROBERTSON COAL CO	1	ROBERTSON COAL CO	LAWRENCE	2290FNL 450FEL 4 Q83	645	3925	1630		GAS	10	355CLNT
396	UNITED FUEL GAS CO	8885	FITCH, JERRY	LAWRENCE	950FNL3425FEL 4 Q83	603	2185	1488		D&A	0	
397	UNITED FUEL GAS CO	8884	PREECE, PHILLIP	LAWRENCE	720FSL1760FEL 5 Q83	627	2339	1620		D&A	10	
398	ROBERTSON COAL CO	2	ROBERTSON COAL CO	LAWRENCE	1540FSL2050FWL20 R83	775	3960	1780	0.004	GAS	10	339BREA
399	KY WEST VA GAS CO	526	PREECE, RHILLIP	LAWRENCE	2450FSL1750FWL20 R83	660	3359	1613		D&A	0	
400	BUEHRER OIL & GAS	1	HINKLE, LAFE	LAWRENCE	3075FSL2100FEL23 R83	678	2367	1635		GAS	0	3410HIO
401	WARFIELD NAT GAS C	2	BRANHAM, U S	LAWRENCE	1075FSL1200FWL 2 R84	950	2797	1950		GAS	10	3410HIO
402	CUNNINGHAM, E E	1	HUGHES, NELSON	LAWRENCE	1775FSL 400FWL 2 R84	980	2685	1870		GAS	0	3410HIO
403	CUNNINGHAM, E E	2	PRUITT, JAMES	LAWRENCE	650FSL1175FWL 2 R84	950	2665	1855		GAS	0	3410HIO
404	LIBBY OWENS GAS DE	1	WALLACE, EUGENE	LAWRENCE	1800FSL2100FWL 2 R84	811	2905	1841		GAS	0	3410HIO
405	LIBBY OWENS BOTTLE		BRANHAM, SAM	LAWRENCE	1300FSL1900FWL 3 R84	590	2637	1586		D&A	33	3410HIO
406	OWENS, LIBBY		BRANHAM, U S	LAWRENCE	2300FSL 800FEL 3 R84	653	2705	1651		GAS	10	3410HIO
407	CUNNINGHAM, E E	1	SHANNON, U G	LAWRENCE	2300FNL1900FWL 3 R84	590	2385	1570		GAS	10	3410HIO
408	ENDICOTT, FLOYD	1	ENDICOTT, FLOYD	LAWRENCE	2775FSL1600FEL 3 R84	590	2362	1577		GAS	0	3410HIO
409	CUNNINGHAM, E E	1	MAYNARD, DAN	LAWRENCE	500FSL1800FWL 3 R84	580	2355	1570		GAS	10	3410HIO
410	WHITELAND PET CORP	1	WALBRIDGE HRS	LAWRENCE	350FSL2200FEL 5 R84	748	1732	1685		GAS		339BREA
411	KY WEST VA GAS CO	5194	CRUM W R	LAWRENCE	2500FSL 600FEL 8 R84	640	2631	1836		GAS		3410HIO
412	WARE, E C	1	ENDICOTT, FLOYD	LAWRENCE	2050FNL 950FWL 8 R84	612	2375	1569		GAS	10	3410HIO
413	ROCKCASTLE GAS CO		GOBLE, ANDY	LAWRENCE	1050FNL1975FEL 8 R84	580	2390	1594		GAS	0	3410HIO
414	CUNNINGHAM, E E	1	GOBLE, LIZZIE	LAWRENCE	1825FNL 50FEL 8 R84	790	2585	1777		GAS	10	3410HIO
415	ROCKCASTLE GAS CO	2	HALL, J W	LAWRENCE	725FSL2250FEL 8 R84	840	2655	1872		GAS	10	3410HIO
416	ROCKCASTLE GAS CO	1	HAMMOND, FRANK	LAWRENCE	2850FSL 900FEL 8 R84	590	2450	1602		GAS	0	3410HIO
417	ROCKCASTLE GAS CO	1	PRUITT, JAMES	LAWRENCE	525FNL 975FEL 8 R84	640	2430	1638		GAS	10	3410HIO
418	UNITED FUEL GAS		BRANHAM, U S	LAWRENCE	750FNL 475FWL 9 R84	780	2678	1839		GAS	10	
419	ROCKCASTLE GAS CO	3	HALL, J W	LAWRENCE	600FSL 100FWL 9 R84	640	2467	1670		GAS	0	3410HIO
420	CUNNINGHAM, E E	3	SHANNON, E E	LAWRENCE	2500FNL1780FWL 9 R84	843	2485	1687		GAS	0	3410HIO
421	ROCKCASTLE GAS CO	5	SHANNON, E E	LAWRENCE	2150FSL1470FEL 9 R84	781	2670	1865		GAS	0	3410HIO
422	LIBBY OWENS GAS DE	1	RATCLIFF, ROSCOE	LAWRENCE	850FNL2375FEL10 R84	627	3612	1712		D&A	10	

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423	RATCLIFF PROJECTS	R1	RATCLIFF, ROSCOE,	LAWRENCE	2000FSL 500FWL10 R84	748	2691	1792		GAS	0	3410HIO
424	RATCLIFF PROJECTS	R2	RATCLIFF, ROSCOE	LAWRENCE	1575FSL 200FEL10 R84	760	2721	1860		GAS	24	3410HIO
425	ROCKCASTLE GAS CO		DILLON, HARRISON	LAWRENCE	1900FNL2100FEL11 R84	1090	2933	2125		GAS	0	3410HIO
426	ROCKCASTLE GAS CO	6	SHANNON, E E	LAWRENCE	1000FNL 600FWL11 R84	860	2781	1960		GAS	0	3410HIO
427	ROCKCASTLE GAS CO		HALL, J W	LAWRENCE	600FNL1250FEL13 R84	720	2489	1686		GAS	0	3410HIO
428	TUG RIVER NAT GAS	1	HINKLE, J W	LAWRENCE	3000FNL2050FEL15 R84	960	2845	2280		GAS	0	3410HIO
429	EVANS, E J ETAL	2	LIGHTFOOT TIMBER C	LAWRENCE	1700FNL 600FWL 2 Q83	698	2432	1706		D&A	10	
430	EVANS, E J ETAL	3	LIGHTFOOT TIMER	LAWRENCE	1100FSL 400FWL 2 Q83	695	2542	1806		GAS	0	3410HIO
431	EVANS, E J ETAL	5	LIGHTFOOT TIMBER	LAWRENCE	3350FNL1550FEL 2 Q83	720	2635	1895		GAS	10	3410HIO
432	EVANS, E J ETAL	6	LIGHTFOOT TIMBER C	LAWRENCE	2000FSL 400FEL 2 Q83	780	2762	2029		GAS	10	3410HIO
433	EVANS, JENKINS ETA	1	LIGHTFOOT TIMBER C	LAWRENCE	2850FNL 800FEL 3 Q83	640	2421	1671		GAS	10	3410HIO
434	KY WEST VA GAS CO		EVANS O&G CO	LAWRENCE	1450FNL1750FEL 8 Q83	674	2522	1795		D&A	0	
435	ROBERTSON COAL INC	3	ROBERTSON COAL INC	LAWRENCE	710FNL1850FEL 9 Q83	950	4177	2055		GAS	10	3410HIO
436	BUEHRER OIL & GAS	1	SMITH, AMOS HRS	LAWRENCE	750FNL 600FWL10 Q83	671	2555	1807		GAS	0	3410HIO
437	KY WEST VA GAS CO	945	EVANS O&G CO	LAWRENCE	2350FNL3375FEL 9 Q83	729	2518	1795		D&A	30	
438	BAIDEN GAS	1	BRANHAM, SAMUEL	LAWRENCE	200FSL 950FEL 6 R85	784	2592	1768		D&A	0	
439	BAIDEN GAS	1	ENDICOTT, CLYDE	LAWRENCE	850FNL 700FWL16 R85	640	2564	1733		GAS	15	3410HIO
440	BAIDEN GAS	1	SMITH, JOHN B	LAWRENCE	1175FNL1975FEL16 R85	665	2649	1806		GAS	10	3410HIO
441	WILLIAMS, F F	1	ROSS, ALLEN	LAWRENCE	3250FNL 400FWL24 V83	560	2500	1809		D&A	0	
442	COLUMBIA GAS TRANS	20618	MOORE, VICTOR E	LAWRENCE	1850FSL2250FWL 7 U82	822	2000	1918	0.002	D&A		
443	PET PROMOTIONS, IN	1	AUSTIN, W B HRS	LAWRENCE	2950FSL1375FWL25 U83	870	1937	1869		OIL		339BREA
453	UNITED FUEL GAS CO	5	BURCHETT, T H	LAWRENCE	2700FNL1550FEL11 T82	858	4001	1807		D&A		
454	PET PROMOTIONS, IN		MCFUIRE, GEORGE HR	LAWRENCE	1600FNL1700FWL 4 T83	570	1669	1606		D&A		
455	PET PROMOTIONS, IN	1F	BERNARD, JESSE	LAWRENCE	1800FSL 100FWL 5 T83	910	1974	1902		OIL		339BREA
456	BERTRAM & THACKER	1	ADKINS, WILLIAM	LAWRENCE	2650FNL2450FEL15 T83	810	1867	1812		OIL	0	339BREA
457	CYRUS, JEFF	2	CYRUS, JEFF	LAWRENCE	1725FNL2075FEL15 T83	847	1894	1946		OIL	10	339BREA
458	COMMONWEALTH GAS C	2	HURT, THURSTON	LAWRENCE	75FNL 300FEL19 U83	552	1712	1665		GAS	10	339BREA
459	TOWNSEND, C F	1	PARKER, J	LAWRENCE	550FSL2000FEL21 T79	860	1983	1133		GAS	10	344CORN
460	INLAND GAS CORP	350	KITCHEN, W A HRS	LAWRENCE	400FNL1475FWL24 T80	749	2397	1112		D&A	0	
461	PURE OIL CO	1	SPARKS, HENRY	LAWRENCE	1275FSL2030FWL 6 S81	646	1221	1161		D&A	0	
462	KY WEST VA GAS CO	1150	SAMSEL, GENE, L	LAWRENCE	1000FSL1725FWL19 S81	888	1350	1250		GAS	33	339BREA
463	HAYSE, TOM	1	MOORE, WAYNE	LAWRENCE	200FSL 100FEL19 S81	868				GAS		339BREA
464	KY WEST VA GAS CO	1120	HAYES, ZEAL	LAWRENCE	2500FNL1850FEL21 S81	829	1217	1132		GAS	24	339BREA
465	KY WEST VA GAS CO	1151	MOORE, CLIFTON	LAWRENCE	1650FSL 300FWL21 S81	907	2705	1278		D&A		
466	KY WEST VA GAS CO	1105	MOORE, FOREST	LAWRENCE	1800FSL 960FEL21 S81	851	3240	1167		GAS	10	344CORN
467	KY WEST VA GAS CO	1107	MOORE, OCTAVIA	LAWRENCE	1450FNL 100FEL21 S81	728	1148	1066		GAS	10	339BREA
468	KY WEST VA GAS CO	1122	MOORE, MILTON	LAWRENCE	625FNL1125FWL21 S81	893	1888	1227		GAS	10	3410HIO
469	KY WEST VA GAS CO	1108	MOORE, OCTAVIA	LAWRENCE	550FNL1900FEL21 S81	869	1278	1189		GAS	10	339BREA
470	KY WEST VA GAS CO	1087	MOORE, REUBEN B	LAWRENCE	2050FNL 750FEL25 S82	832	1280	1212		GAS	10	339BREA
471	B T & M OIL CO	3	ADKINS, WM	LAWRENCE	2500FSL 200FWL15 T83	762	1798	1749		OIL	0	339BREA

ELEV = GROUND LEVEL ELEVATION, IP = NATURAL OPEN FLOW IN MCF OF BEREA, PAY = DEEPEST PAY FORMATION

MAPNO	OPERATOR	WELL NO	FARM NAME	COUNTY	LOCATION	ELEV	TD	BEREA	PERM	CMPL	IP	PAY
473	PIP PET CORP	1	LANEY, SAMUEL	LAWRENCE	1820FNL1430FWL16 T83	851	1948	1870		OIL	0	339BREA
474	DAWSON-BLAND-ARTHU	1	LANEY, SAM	LAWRENCE	1840FNL 900FWL16 T83	840	1878	1831		OIL	0	339BREA
475	INLAND GAS CO	288	PRESTON, BERECA	LAWRENCE	1300FSL1900FEL25 T83	645	3277	1690		D&A	0	
476	DELTA GAS	7	ROBERTSON COAL	LAWRENCE	3050FNL1105FWL 2 Q83	678	2575	1780	0	D&A		
477	ASHLAND EXPL INC	1	HAMMOND, LUCILLE	LAWRENCE	350FNL1950FWL21 T81	663	3308	1407	0	GAS	10	339BREA
478	ASHLAND EXPL INC	1	NEAL, HATTIE	LAWRENCE	3560FNL 420FEL 2 T81	734	3279	1485	0.001	O&G	10	339BREA
479	ASHLAND EXPL INC	1	HALL, CORRINE	LAWRENCE	2500FNL2050FWL 7 U82	680	3523	1763	0.050	D&A	10	

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