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FINAL REPORT

SPECIAL CORE ANALYSIS

ANADARKO PRODUCTION COMPANY
Walters A#1 and Nordling A#1
Stevens County, Kansas

4 March 1983 File DS109 Denver

ANADARKO PRODUCTION CO

FILE NO.: DC049
DATE: 7-5-82
ELEVATION:
STATE: KANSAS
FIELD: GENTZLER

WELL: NORDLING A #1
LOCATION:
COUNTY: STEVENS
FORMATION: CHASE GROUP
INTERVAL: 2555 TO 2867

Continental Laboratories

ANADARKO PRODUCTION COMPANY

FILE NO.: DC045A
DATE: 07-MAY-82
ELEVATION: UNKNOWN
STATE: KANSAS
FIELD: UNKNOWN

WELL: WALTERS A#1
LOCATION: SEC 13 T325N R38W
COUNTY: STEVENS
FORMATION: CHASE GROUP
INTERVAL: 2546 TO 2859

Continental Laboratories

SUBJECT: Permeability, porosity, grain density, ambient resistibity parameters m and n, m under confining stress, pore volume compressibility, irreducible water saturation.

AUTHOR AND QUALITY CONTROL: Alan P. Byrnes, Sr. Geologic Engineer

ANALYSIS PERFORMED BY: Alan P. Byrnes

PROCEDURE: One inch diameter by one to two inch long core plugs were obtained from whole core samples using a diamond core drill bit with water as a bit coolant. The plugs were cleaned by soxhlet extraction using toluene and alcohol to remove hydrocarbons and salts in the pores. Routine core analysis was performed to measure air permeability, helium porosity and grain density (Table 1). Plots of whole core permeability versus porosity and plug data are shown in Figures 1-5 for each of the formations. Walters data are shown as solid symbols and Nordling as open symbols. Plug data is accompanied by the letter P. Previously analyzed whole core data is shown in Appendix A. Subsequently the ends of the plugs were painted with a cross using silver paint to decrease contact resistance and the samples were then saturated with a simulated oil field brine of composition shown in Table 3. The cores were allowed to equilibrate with the brine for 10 days after which formation resistivity factors were measured by the standard two electrode conductivity bridge method described by Rust (1952) under conditions of no confining stress and at a temperature of 73°F. After six days the formation resistivity factors had decreased further and it was determined that there was a contact resistance problem with the silver paint-core connection. The samples were repainted and an initial formation resistivity factor measured (Tables 1 and 2). Plots of log formation resistivity factor versus log porosity are shown in Figures 6-10 for each of the formations. The samples were then desaturated using the multi-core-porous-plate-capillary pressure technique (Rose and Bruce, AIME 1949). After a short period of time at 40 PSI, the cores were removed and saturation and resistivity index were measured. The cores were then replaced into the capillary pressure cell and allowed to desaturate to equilibrium at 40 PSI. The cores were again removed and the saturation and resistivity index measured. Data are shown in Table 4 and 5 and plots of log resistivity index (ln I) versus log brine saturation (ln S_w) are shown in Figures 11-20. A plot of log permeability versus water saturation at 40 PSI capillary pressure is shown in Figure 21.

After the capillary desaturation tests were complete, the cores were resaturated with brine and retested for a final formation resistivity factor (Tables 1 and 2). Ten cores were selected for measurement of m under confining stress. These cores were subjected to increasing hydrostatic confining pressure inside a Hassler type cell. At each increasing confining pressure increment the pore volume compressibility and formation resistivity factor were measured. To correctly measure m values under confining pressure it is necessary to obtain values for porosity at each confining pressure also. It is safe to assume that the matrix compressibility is negligible. Making this assumption all pore volume decreases result in a similar valued bulk volume change. From the new values for pore volume and calculated bulk volume it is possible to calculate a new porosity at each confining pressure. The pore volume compressibility, porosity, formation resistivity factor and Archie m values are shown in Table 6. Pore volume compressibility data is shown in Figure 22. Pore volume compressibility data from 0 PSI to 100 PSI confining pressure was determined by extrapolation from 100-200 PSI data. Pore volume compressibilities were calculated from the higher confining pressure data and are discussed later.

Accuracy and precision are very much a function of the range in permeability, porosity and variations in lithology. For the measurements performed here rough estimates of the error bars associated with the reported values are approximately: porosity - ± 1.5%, permeability - ± 2%, formation resistivity factor - ± 3%, water saturation - ± 1%, cementation factor m - discussed further, pore volume compressibility - ± 2%, saturation exponent n - discussed further.

Core lithology descriptions are given in Table 7 and are accompanied by photographs of the plugs studied (Figures 23 and 24).

RESULTS AND DISCUSSION: Whole core permeability-porosity crossplots are shown in Figures 1-5 for both the Walters A#1 (solid circles) and Nordling A#1 (open circles). Plug data are also plotted as square symbols (Walters - solid square, Nordling - open square). All five formations displayed a reasonable correlation of permeability with porosity. The following linear regressions were calculated for each formation.

Herrington:	LogK = -0.656 + .092Ø	R^2 = .582
Krider :	LogK = -1.341 + .126Ø	R^2 = .492
Winfield :	LogK = -1.124 + .083Ø	R^2 = .400
Towanda :	LogK = -1.562 + .115Ø	R^2 = .682
Ft. Riley :	LogK = -2.348 + .155Ø	R^2 = .652

Value for the regression coefficient R^2 indicate the variance of data from the equation, an $R^2 = 1.00$ indicates a perfect fit while an $R^2 = 0.0$ indicates no correlation. Plug samples did not exhibit the same K and Ø values as did the whole core samples they were cored from. Examination of the whole core samples indicated sufficient variation in lithology (primarily porosity distribution, anhydrite crystallization), whithin a whole core sample, that plug samples could be expected to exhibit different values. Most plug K-Ø data fall on the same K-Ø trend as the whole core data indicating a consistency in overall lithologic properties. The linear regressions equations indicate a very general trend that for a given porosity the permeabilities tend to decrease with increasing depth (the Winfield and Towanda are fairly close).

Values for the cementation factor m are shown in Tables 1 and 2. After the early contact resistance problem, there was no significant change in m values over a 7-day period. A few cores show differences greater than the estimated error but this resulted from cores not resaturating to 100% saturation. The values for m were derived from the relation

$$F = \frac{R_o}{R_w} = C\text{Ø}^{-m} \quad \text{or} \quad \text{Log}F = \text{Log}C - m\text{Log}\text{Ø}$$

where

- F = Formation resistivity factor
- R_o = Rock resistivity at 100% brine saturation
- R_w = Brine resistivity
- C = f(tortuosity), intercept on lnF vs lnØ plot
- m = Cememtation factor

The values of m shown in Tables 1 and 2 were calculated assuming c = 1.0 in accord with the original Wyllie and Gardner (World Oil, 1950) interpretation. Because the data provide sufficient resolution to extrapolate values for c the following equations were determined

$$\log F = \log C - m \log \emptyset$$

Herrington :	$\log F = -.021 - 1.946 \log \emptyset$	$R^2 = .968$
Krider :	$\log F = -.045 - 2.298 \log \emptyset$	$R^2 = .807$
Winfield :	$\log F = .416 - 1.551 \log \emptyset$	$R^2 = .590$
Towanda :	$\log F = .342 - 1.544 \log \emptyset$	$R^2 = .834$
Ft. Riley :	$\log F = .881 - .873 \log \emptyset$	$R^2 = .637$

These data are shown in Figures 6-10

This equation results in the following values

	m	c
Herrington :	1.946	.950
Krider :	2.298	.902
Winfield :	1.551	2.606
Towanda :	1.544	2.197
Fr. Riley :	.873	7.603

For the carbonates (Krider, Winfield, Towanda, Ft. Riley) there is a general trend of increasing m value with increasing permeability. The c value for the Ft. Riley may be lower than the others because of the lack of data for rocks of higher porosity. If a value of 1.0 were assigned to c for all formation data, then the resulting m values are shown in Table 1 and 2. For the purpose of log interpretation either formula will result in a proper calculation of Ø within the large variation exhibited by the rock. It is interesting to note that the Ft. Riley plugs exhibit different lithologies within the formation while the other formations were more consistent lithologically. One notable exception to this is Walters #16 in the Krider. This sample plots well off the Krider trend and is also lithologically very different than the other Krider samples.

Resistivity index data for both the Walters and Nordling are shown for each well and formation in Figures 11-21 and in Tables 4 and 5. For the number of data points taken for each rock the error associated with each average n value is approximately ± 5%.

Values for n were determined using the following relation

$$I = \frac{R_t}{R_o} = \frac{1}{S_w{}^n}$$

where

R_t = rock resistivity at given saturation

R_o = rock resistivity at 100% saturation

S_w = water saturation

Average values for n from both Walters and Nordling data are as follows

Herrington :	n = 1.56 ± 4.0%
Krider :	n = 1.67 ± 2.4%
Winfield :	n = 1.61 ± 4.0%
Towanda :	n = 1.83 ± 2.7%
Ft. Riley :	n = 1.93 ± 1.6%

Average values of n for the Winfield and Ft. Riley were calculated without samples 59 and 115 respectively since they appeared spurious and dominated the average n values for each formation so strongly.

Although some individual rock samples varied from the average formation value for n by greater than ± 5%, the average formation n values were consistent between wells within ± 4% or better. The data also show that although there are differences between the formations, n values can overlap for some formations at the extreme values within error bars.

Figure 21 shows a plot of air permeability versus water saturation at 40 psi air capillary pressure. The saturation data are shown in Tables 4 and 5. For most core, capillary pressures of 40 psi result in water saturations that are considered irreducible or connate. Also many core, for a given formation, show a decrease in irreducible water saturation with increasing permeability. The consistency shown in Figure 21 indicates sufficient lithologic continuity that the following relation holds for both wells in the formation:

$$\text{LogK} = 2.332 - .030\ S_w \qquad R^2 = .681$$

If it is assumed that the water saturations shown are connate, then the permeability distribution in the well with depth may give some indication of water saturation changes as well. If it is assumed that each formation is close to irreducible saturation in the well, then electric log analysis using the m and n values measured here should result in water saturations that relate to core permeabilities by the above relation.

Pore volume compressibility data and the change in m with increasing confining stress are shown in Table 6 and Figure 22 for the Walters cores studied. Usually net effective stress experienced by a reservoir rock is estimated as the lithostatic stress produced by a column of rock (≈ 1.0 psi/ft) less the pore fluid stress (≈ 400 psi for this reservoir). The net effective stress for this reservoir is approximately 2100 - 2500 psi. All the plugs displayed very little pore volume change up to 2500 psi hydrostatic confining pressure. This is not unexpected considering the degree of consolidation and cementing in these cores. These cores appear to show a decrease in the change in formation resistivity factor with increasing depth. This also correlates roughly decreasing change with decreasing permeability and initial m values.

In general, assuming all the cores exhibited the increases in F factor measured, then the following relations would hold for F versus Ø

		Approximate Percent Increase in F
Herrington:	LogF ≈ .0712 - 1.946 LogØ	24%
Krider :	LogF ≈ .1320 - 2.267 LogØ	23%
Winfield :	LogF ≈ .0268 - 1.551 LogØ	17%
Towanda :	LogF ≈ .1550 - 1.570 LogØ	15%
Ft. Riley :	LogF ≈ .9570 - .855 LogØ	14%

Note that the slope m has not been changed, only the intercept, although this is reflected as an increase in m if c is assumed = 1.0 (Table 6).

Pore volume compressibilities are shown in Table 6 and Figure 22 for the Walters core studied. Using the data from 1500 - 2500 psi pore volume compressibilities were calculated using the following relation:

$$\beta = \frac{1}{V}\frac{dv}{dp})_{T,P_{pore}}$$

where

β = pore volume compressibility (psi^{-1})

V = reference volume

dv/dp = change in volume per change in confining pressure.

Herrington: 4-7 x 10^{-6}/PSI
Krider : 5-6 x 10^{-6}/PSI
Winfield : 5-6 x 10^{-6}/PSI
Towanda : 5-7 x 10^{-6}/PSI
Ft. Riley : 1 x 10^{-6}/PSI

These pore volume compressibilities were measured by applying hydrostatic loading. Some investigators believe that lithostatic loading better represents the stress conditions in the reservoir. If this is the case, then the pore volume compressibilities would be 50-70% of those shown. The value for the Ft. Riley core 106 appears too low and may reflect strange behavior of the rock at high pressure as indicated by the poor fit of data to a smooth curve.

Table 1

Walters A#1

BASIC CORE PROPERTIES FOR SELECTED CORE

Core I.D.	Air Permeability (md)	Helium Porosity (%)	Grain Density (gm/cc)	Initial Formation Resistivity Factor (F)	Final Formation Resistivity Factor (F)	Initial Archie Parameter (m)	Final Archie Parameter (m)
			Herrington				
6	2.78	15.0	2.75	35.2	35.9	1.88	1.89
7	3.83	15.6	2.75	-	36.4	-	1.93
8	10.2	16.1	2.78	37.6	39.0	1.99	2.01
9	29.9	27.3	2.69	12.2	12.2	1.93	1.93
12	5.86	15.9	2.75	31.9	32.8	1.88	1.90
13	0.43	10.7	2.79	59.8	60.0	1.83	1.83
			Krider				
16	1.72	14.3	2.85	45.1	46.1	1.96	1.97
19	6.36	12.9	2.86	72.8	89.6*	2.21	2.20
22	4.66	13.5	2.85	106	103	2.33	2.31
23	1.23	13.0	2.85	92.4	96.3	2.22	2.24
29	0.20	11.4	2.85	194	192	2.43	2.42
31	455	25.0	2.86	22.0	23.1	2.23	2.26
33	25.9	20.1	2.86	42.9	42.7	2.34	2.34
38	3.88	17.9	2.86	61.3	60.0	2.39	2.38
44	1.85	19.2	2.86	51.4	50.6	2.39	2.38

COMPANY Anadarko Production Co. WELL Walters A#1 and Nordling A#1
LOCATION Stevens County, Kansas
FILE NUMBER DS109 - Miazaki

Table 1

Walters A#1

BASIC CORE PROPERTIES FOR SELECTED CORE

Core I.D.	Air Permeability (md)	Helium Porosity (%)	Grain Density (gm/cc)	Initial Formation Resistivity Factor (F)	Final Formation Resistivity Factor (F)	Initial Archie Parameter (m)	Final Archie Parameter (m)
			Winfield				
45	1.02	17.3	2.76	30.3*	28.1	1.94	1.90
47	8.12	23.2	2.79	19.4	20.5	2.03	2.07
53	1.91	16.8	2.83	36.8	36.4	2.02	2.02
54	22.6	25.1	2.85	18.0	17.7	2.09	2.08
59	1.29	14.1	2.71	47.1	50.5	1.97	2.00
61	0.67	13.0	2.78	42.5	44.1	1.84	1.86
			Towanda				
83	1.86	18.3	2.79	34.1*	30.0	2.08	2.00
84	3.55	20.2	2.78	23.3	24.5*	1.97	2.00
89	7.91	19.3	2.74	29.4*	27.1	2.06	2.01
93	2.65	16.0	2.74	39.2	39.7	2.00	2.01
98	1.16	21.6	2.75	30.8	29.7	2.24	2.21
102	0.21	11.6	2.73	59.2	60.0	1.89	1.90
			Fort Riley				
106	3.71	19.3	2.73	26.3	26.4	1.99	1.99
109	1.24	21.6	2.73	32.1	32.6	2.26	2.27
115	3.02	21.3	2.74	30.4	30.5	2.21	2.21
119	0.20	13.9	2.78	35.7	37.2	1.81	1.83
126	0.23	12.0	2.72	48.1	49.3	1.83	1.84

* Saturation slightly below 100% resulting in higher F and m

COMPANY Anadarko Production Co. WELL Walters A#1 and Nordling A#1
LOCATION Stevens County, Kansas
FILE NUMBER DS109 - Miazaki

Table 2

Nordling A#1

BASIC CORE PROPERTIES FOR SELECTED CORE

Core I.D.	Air Permeability (md)	Helium Porosity (%)	Grain Density (gm/cc)	Initial Formation Resistivity Factor (F)	Final Formation Resistivity Factor (F)	Initial Archie Parameter (m)	Final Archie Parameter (m)
			Herrington				
3	16.9	18.9	2.71	24.3	24.3	1.92	1.92
4	16.4	17.3	2.71	27.4	27.5	1.89	1.89
8	8.79	13.3	2.78	49.0	49.6	1.93	1.94
14	30.3	17.6	2.67	26.8	26.0	1.89	1.88
			Krider				
26	31.9	19.8	2.85	53.0	52.9	2.45	2.45
29	0.054	12.4	2.84	155	154	2.42	2.42
30	3.26	14.9	2.85	83.9	80.3	2.33	2.30
33	0.89	14.9	2.84	118	117	2.50	2.50
37	153.2	25.8	2.84	17.1	17.4	2.10	2.11
38	108.9	24.6	2.85	22.2*	19.5	2.21	2.12
40	261.6	25.8	2.85	15.8	16.3	2.04	2.06
			Winfield				
50	1.30	17.9	2.83	54.4	54.3	2.32	2.32
52	1.73	21.8	2.84	44.0	44.1	2.49	2.49
57	0.52	11.3	2.70	69.4	71.1	1.94	1.96
59	0.85	14.0	2.91	98.6	104.1*	2.34	2.36

* Saturation slightly below 100% resulting in Higher F and m

Table 2

Nordling A#1

BASIC CORE PROPERTIES FOR SELECTED CORE

Core I.D.	Air Permeability (md)	Helium Porosity (%)	Grain Density (gm/cc)	Initial Formation Resistivity Factor (F)	Final Formation Resistivity Factor (F)	Initial Archie Parameter (m)	Final Archie Parameter (m)
Towanda							
71	2.90	14.7	2.70	38.3	39.9	1.90	1.92
87	1.53	14.6	2.75	50.1	51.7	2.03	2.05
90	13.73	20.0	2.70	21.5	21.7	1.91	1.91
92	3.07	16.3	2.72	32.6	32.3	1.92	1.92
Fort Riley							
104	0.82	15.8	2.73	48.6	48.8	2.11	2.11
110	1.62	16.8	2.73	36.3	36.0	2.01	2.01
115	3.34	17.8	2.74	30.4	32.9*	1.98	2.02
121	0.37	13.6	2.73	45.0	45.1	1.91	1.91

* Saturation slightly below 100% resulting in higher F and m

Table 3

SIMULATED BRINE COMPOSITION

ANALYSIS PROVIDED: Brent Miazaki, Verbal, 15 December 1982

Constituent	Concentration (PPM)	Constituent	Concentration (PPM)
Sodium (Na)	57,196	Chloride	190,000
Calcium (Ca)	33,500	Sulfate	1,150
Magnesium (Mg)	18,000	Carbonate	
Barium (Ba)		Bicarbonate	12
Iron (Fe)		Hydroxide	
Potassium (K)			

COMPOSITION OF PREPARED SOLUTION:

Constituent	Concentration (8/1000g)
Sodium Chloride (NaCl)	130.09
Calcium Chloride ($CaCl_2 \cdot 2\ H_2O$)	122.86
Potassium Chloride (KCl)	
Magnesium Chloride ($MgCl_2 \cdot 6\ H_2O$)	148.06
Barium Chloride ($BaCl_2 \cdot 2\ H_2O$)	
Sodium Carbonate (Na_2CO_3)	
Sodium Bicarbonate ($NaHCO_3$)	0.02
Sodium Sulfate (Na_2SO_4)	
Magnesium Sulfate ($MgSO_4$)	1.44

NOTE: Solution saturated at 73°F; not all chemicals went into solution.

Brine resistivity at 73°F = 0.050 ohm-mt

Table 4

RESISTIVITY INDEX, IRREDUCIBLE WATER SATURATION AND n DATA
FOR WALTERS A#1

Core I.D. Number	Water Saturation (%)	Resistivity Index R_t/R_0	Resistivity Index Exponent n	Average n
Herrington ($\bar{n}$ = 1.49)				
6 ◉	87.99	1.24	1.68	1.66
6	70.67	1.76	1.63	
7 ■	79.59	1.32	1.22	1.29
7	58.93	2.05	1.36	
8 ▲	82.58	1.39	1.72	1.64
8	42.37	3.82	1.56	
9 ○	42.37	3.82	1.56	1.50
9	38.73	3.98	1.45	
12* □	75.83	1.63	1.77	1.52
12	61.64	2.04	1.47	
13 △	87.99	1.17	1.23	1.20
13	85.06	1.21	1.18	
Krider ($\bar{n}$ = 1.62)				
16 ●	87.53	1.21	1.43	1.53
16	78.24	1.49	1.63	
19* ■	61.69	2.42	1.83	1.54
19	44.79	4.24	1.25	
22 ▲	55.53	2.47	1.54	1.54
22	44.47	3.46	1.53	
23 ◆	52.33	2.55	1.45	1.42
23	41.37	3.40	1.39	
29* ○	81.35	1.59	2.25	2.08
29	76.20	1.68	1.91	
31 □	23.25	12.80	1.75	1.68
31	14.99	21.10	1.61	
33 △	34.33	5.00	1.51	1.49
33	27.42	6.71	1.47	
38 ◇	63.21	2.28	1.80	1.71
38	42.07	4.06	1.62	
44* ◉	83.03	1.44	1.96	1.82
44	61.13	2.28	1.67	

RESISTIVITY INDEX, IRREDUCIBLE WATER SATURATION AND n DATA
FOR WALTERS A#1

Core I.D. Number	Water Saturation (%)	Resistivity Index R_t/R_0	Resistivity Index Exponent n	Average n
Fort Riley ($\bar{n}$)				
106 ●	95.16	1.09	1.24	1.71
106	63.62	2.14	1.68	
109 ■	96.07	1.07	1.69	1.57
109	80.79	1.36	1.44	
115 ▲	89.96	1.49	3.77	3.57
115	75.38	2.59	3.37	
119* ◆	94.76	1.14	2.43	1.90
119	86.53	1.22	1.37	
126 ○	92.05	1.22	2.40	2.40

Table 5

RESISTIVITY INDEX, IRREDUCIBLE WATER SATURATION AND n DATA
FOR NORDLING A#1

Core I.D. Number	Water Saturation (%)	Resistivity Index R_t/R_0	Resistivity Index Exponent n	Average n
	Herrington ($\bar{n}$ = 1.62)			
3 ●	84.44	1.34	1.73	1.67
3	28.84	7.38	1.61	
4 ■	80.83	1.49	1.87	1.78
4	41.04	4.52	1.69	
8 ▲	68.18	1.75	1.52	1.52
8	39.86	4.00	1.51	
14 ◆	70.80	1.72	1.57	1.51
14	43.53	3.35	1.45	
	Krider ($\bar{n}$ = 1.71)			
26 ●	29.46	7.10	1.60	1.59
26	18.60	14.05	1.57	
29 ■	84.55	1.49	2.38	2.26
29	78.54	1.68	2.15	
30 ▲	53.25	2.66	1.55	1.51
30	38.80	4.02	1.47	
33 ◆	69.95	1.80	1.64	1.77
33	57.64	2.84	1.89	
37 ○	27.66	7.52	1.57	1.54
37	15.53	16.59	1.51	
38 □	29.53	7.85	1.69	1.62
38	18.13	14.10	1.55	
40 △	48.73	3.70	1.82	1.71
40	29.15	7.20	1.60	

Table 5

RESISTIVITY INDEX, IRREDUCIBLE WATER SATURATION AND n DATA

FOR NORDLING A#1

Core I.D. Number	Water Saturation (%)	Resistivity Index R_t/R_0	Resistivity Index Exponent n	Average n
		Winfield ($\bar{n}$ = 1.82)		
50 ●	78.85	1.53	1.79	1.71
50	69.61	1.80	1.62	
52 ■	95.26	1.09	1.77	1.65
52	64.79	1.94	1.53	
57* ▲	89.42	1.24	1.92	1.66
57	74.68	1.50	1.39	
59 ◆	95.68	1.11	2.36	2.25
59	88.78	1.29	2.14	
		Towanda ($\bar{n}$ = 1.77)		
71* ●	88.97	1.36	2.63	2.10
71	47.06	3.25	1.56	
87 ■	91.58	1.13	1.39	1.44
87	69.62	1.72	1.50	
90 ▲	85.07	1.31	1.67	1.66
90	45.31	3.70	1.65	
92* ◆	89.15	1.27	2.08	1.87
92	79.61	1.46	1.66	
		Fort Riley ($\bar{n}$ = 1.96)		
104* ●	97.95	1.05	2.36	2.00
104	71.36	1.74	1.64	
110 ■	90.70	1.23	2.12	2.23
110	87.95	1.35	2.34	
115* ▲	91.18	1.22	2.15	1.98
115	52.51	3.22	1.82	
121 ◆	94.75	1.09	1.60	1.62
121	86.88	1.26	1.64	

Table 6 - Walters A#1

PORE VOLUME POROSITY COMPRESSIBILITY AND m UNDER CONFINING STRESS

Confining Pressure (PSI)	Percent Ambient Pore Vol. (%)	Porosity (%)	Percent of Ambient Porosity (%)	Formation Resistivity Factor (F)	Archie Parameter (m)
CORE 6 - Herrington ●					
0	100.00	14.99	100.00	35.21	1.88
100	99.31	14.87	99.39	36.48	1.89
200	98.61	14.79	98.86	37.32	1.89
500	97.58	14.68	98.12	39.05	1.91
1000	96.65	14.54	97.19	41.13	1.93
1500	96.05	14.47	96.72	42.39	1.94
2000	95.61	14.41	96.32	43.38	1.95
2500	95.33	14.32	96.12	44.12	1.95
CORE 8 - Herrington ■					
0	100.00	16.10	100.00	37.60	1.98
100	99.78	16.09	99.94	39.03	2.01
200	99.57	16.06	99.75	39.74	2.01
500	98.92	15.98	99.25	41.40	2.03
1000	98.49	15.92	98.88	43.47	2.05
1500	98.06	15.86	98.51	44.86	2.07
2000	97.85	15.83	98.32	45.68	2.07
2500	97.63	15.80	98.14	46.32	2.08
CORE 16 - Krider ▲					
0	100.00	14.31	100.00	45.08	1.96
100	99.76	14.30	99.93	45.98	1.97
200	99.51	14.27	99.72	46.97	1.98
500	98.78	14.18	99.09	49.32	2.00
1000	98.09	14.10	98.53	51.75	2.01
1500	97.68	14.05	98.18	53.65	2.03
2000	97.31	14.01	97.90	54.73	2.04
2500	97.07	13.98	97.69	55.67	2.04

Table 6 - Walters A#1

PORE VOLUME POROSITY COMPRESSIBILITY AND m UNDER CONFINING STRESS

Confining Pressure (PSI)	Percent Ambient Pore Vol. (%)	Porosity (%)	Percent of Ambient Porosity (%)	Formation Resistivity Factor (F)	Archie Parameter (m)
		CORE 33 - Krider ◆			
0	100.00	20.50	100.00	42.67	2.37
100	99.19	20.36	99.32	44.21	2.38
200	98.39	20.23	98.68	45.36	2.39
500	97.24	20.04	97.76	47.41	2.40
1000	96.43	19.90	97.07	49.54	2.42
1500	96.01	19.84	96.78	51.03	2.43
2000	95.74	19.79	96.54	52.14	2.44
2500	95.51	19.75	96.34	52.91	2.45
		CORE 47 - Winfield ○			
0	100.00	23.16	100.00	19.44	2.03
100	99.25	23.03	99.44	20.80	2.07
200	98.50	22.90	98.88	21.19	2.07
500	97.30	22.69	97.97	21.87	2.08
1000	96.58	22.57	97.45	22.41	2.09
1500	96.18	22.50	97.15	22.76	2.09
2000	95.80	22.43	96.84	23.02	2.10
2500	95.58	22.39	96.68	23.17	2.10
		CORE 53 - Winfield □			
0	100.00	16.80	100.00	36.41	2.02
100	99.38	16.66	99.17	38.34	2.03
200	98.76	16.57	98.67	38.70	2.03
500	97.98	16.46	97.98	39.43	2.04
1000	97.31	16.37	97.44	40.42	2.04
1500	96.86	16.31	97.08	41.33	2.05
2000	96.59	16.27	96.85	41.65	2.05
2500	96.36	16.24	96.67	42.02	2.06

Table 6 - Walters A#1

PORE VOLUME POROSITY COMPRESSIBILITY AND m UNDER CONFINING STRESS

Confining Pressure (PSI)	Percent Ambient Pore Vol. (%)	Porosity (%)	Percent of Ambient Porosity (%)	Formation Resistivity Factor (F)	Archie Parameter (m)
CORE 89 - Towanda △					
0	100.00	19.25	100.00	27.13	2.00
100	99.27	19.16	99.53	27.65	2.01
200	98.53	19.05	98.96	28.19	2.01
500	97.54	18.90	98.18	19.11	2.02
1000	96.88	18.80	97.66	29.82	2.03
1500	96.42	18.72	97.25	30.22	2.03
2000	95.96	18.65	96.88	30.60	2.04
2500	95.69	18.61	96.68	30.82	2.04
CORE 93 - Towanda ◇					
0	100.00	15.97	100.00	39.21	2.00
100	99.57	15.95	99.87	41.17	2.03
200	99.14	15.89	99.50	41.72	2.03
500	98.54	15.81	99.00	42.86	2.04
1000	97.85	15.72	98.43	44.11	2.05
1500	97.42	15.66	98.06	44.86	2.05
2000	97.10	15.62	97.81	45.68	2.06
2500	96.88	15.59	97.62	46.50	2.07
CORE 106 - Fort Riley ○					
0	100.00	19.34	100.00	25.28	1.99
100	99.00	19.12	98.86	25.62	1.98*
200	97.99	18.96	98.04	26.39	1.97
500	97.31	18.85	97.47	26.96	1.97
1000	97.11	18.82	97.31	27.70	1.99
1500	97.03	18.81	97.26	28.17	2.00
2000	96.97	18.80	97.21	28.62	2.01
2500	96.93	18.79	97.16	28.91	2.01

*See text for discussion

Table 7
Walter A#1
CORE LITHOLOGIC DESCRIPTION

Core I.D. Number	Depth (ft)	Description Herrington
6	2555-2556	Ss: Dol,vf gr,sbrndd,sbang,tan-gry,IG-BC Ø, v sl calc,sl lam
7	2556-2557	Ss: Dol, mottled tan-gry,anh incl,vf gr,sbrndd sbang,sl calc
8	2557-2558	Ss: Dol,vf xln,tan,IG-BC Ø
9	2558-2559	Ss: Dol-ext qtz,tan,IG-BC Ø,sbrndd,sbang
12	2561-2562	Ss: Dol,tan-lt gry, f Bdg, IG-BC Ø
13	2562-2563	Dol: Ext f anhy Xl,arg,ti Ø,BC Ø
16	2580-2581	Dol: Dk gry,strk,sh lam,hi arg,MO Ø
19	2583-2584	Dol: Tan-gry,gry spots,MO-BP Ø
22	2587-2588	Dol: Tan-gry,gry spots,MO-BP Ø
23	2589-2590	Dol: Tan-gry,gry spots,MO-BP Ø
29	2595-2596	Dol: Tan-gry,gry spots,MO-BP Ø,dk gry,less apparent Ø
31	2597-2598	Dol: Dk tn-gry,extensive MO Ø,some anh infill
33	2599-2600	Dol: Dk gry,extensive MO Ø,some anh infill
38	2604-2605	Dol: Dk gry,extensive MO Ø, some anh infill
44	2641-2642	Dol: Lt tan,ext MO Ø,20% lg anhyd xls
45	2642-2643	Ls: Tn,sn lam,arg,anh xl,MO Ø
47	2644-2645	Ls: Dk tn-gry,foss,arg clasts-lam,lg areas calc cmt,MO Ø
53	2650-2651	Ls: Tn-gry,extensive discontinuous dk gry,argic clast evenly distributed,Pack-wackestone
54	2651-2652	Dol: F grn xln,MO-BP Ø,anh incl,tn gry, Pack-wackestone
59	2656-2657	Ls: Lt tn,Packestone,anh incl,MO-BP Ø, unlike 54,61
61	2658-2659	Ls: Mottled tn-gry,ti,anh incl,BP Ø
83	2711-2712	Ls: Tn-gry brn,anh frac-pore filling,some sh lam,MO-BP Ø, unlike 84
84	2712-2713	Ls: tn-gry,anh pore fill,Packestone,MO-BP Ø,wp
89	2717-2718	Ls: Mottled tn-gry,ext crs anhy incl,arg,MO Ø

Table 7
Walter A#1
CORE LITHOLOGIC DESCRIPTION

Core I.D. Number	Depth (ft)	Description Herrington
93	2721-2722	Dol: Gry tn,anhy incl pore fill,BP-MO Ø
97	2725-2726	Dol: Dk gry, well cmt,arg,BC-BP Ø, low Ø
102	2730-2731	Dol: Dk gry,well cmt,arg,BC-BP Ø,low Ø,sl lam
106	2751-2752	Ls: Tn,Packstone,anh xlrz,MO-BP Ø,not as arg as 97,102
109	2754-2755	Ls: Dol, dk tn-gry,mottled w/ dk gry gr,ti BP Ø, anh incl
115	2760-2761	Ls: Dol, dk tn-gry,mottled w/ dk gry gr,ti BP Ø, anh incl,more arg,anh pore-vug filling
119	2764-2765	Ls: Dol, dk tn-gry,foss,BP-WP Ø,arg,pore-vug fill
121	2771-2772	Ls: Dol, dk tn-gry,foss,BP-WP Ø,arg,pore-vug fill

Table 8
Nordline A#1
CORE LITHOLOGIC DESCRIPTION

Core I.D. Number	Depth (ft)	Description
		Herrington
3	2566-2567	Ss: Vf gr,subrndd,sbang,tn-gry,IG Ø, 30% calc-dol,v sl lam
4	2567-2568	Dol:Increased indication of lam
8	2573-2574	Dol: More mottled app, not lam
14	2583-2584	Ss: Vf gr,sbrndd,sbang,gry-dkgry,IGØ,Rpl lam
		Krider
26	2607-2608	Dol: Tn-gry,VU,MO,BC,sl anhy,ext Ø
29	2610-2611	Dol: Tn-gry,VU,MO,BC,sl anhy,ext Ø
30	2611-2612	Dol: Mottled dk gry-tn,anhy incl,VU,MO,BC,ext Ø
33	2614-2615	Dol: Mottled dk gry-tn,anhy incl,VU,MO,BC,ext Ø
37	2621-2622	Dol: Tn,vf gr,calc,BC w/ some MO Ø,hi BC Ø, mottled sh clasts
38	2622-2623	Dol: Tn,vf gr,calc,BC w/ increased MO Ø, hi BC Ø, mottled sh clasts
40	2624-2625	Dol: Tn,less calc
		Winfield
50	2653-2654	Ls: Lt tn,extensive shell clasts,MO,BO,anhy
52	2655-2656	Dol: Dk gry,lge anhy gr,MO,BC Ø,arg,wackestone
57	2662-2663	Ls: Tn,boundstone,MO Ø
59	2665-2666	Ls: Mottled,tn -gry,ti,MO-BP Ø,wackestone
		Towanda
71	2712-2713	Ls: Dk,gry,f gr,BP-BC Ø,arg
87	2738-2739	Ls: Mottled,tn-gry,lge anhy incl (30%),shell frac,MO-BP Ø
90	2741-2742	Dol: Tn,sli mottled,vf gr,BC Ø,mottled sections w cmt anhy
92	2743-2744	Ls: Dol,dk gry,strk,arg lam,Packstone,BP Ø

Table 8

Nordling A#1

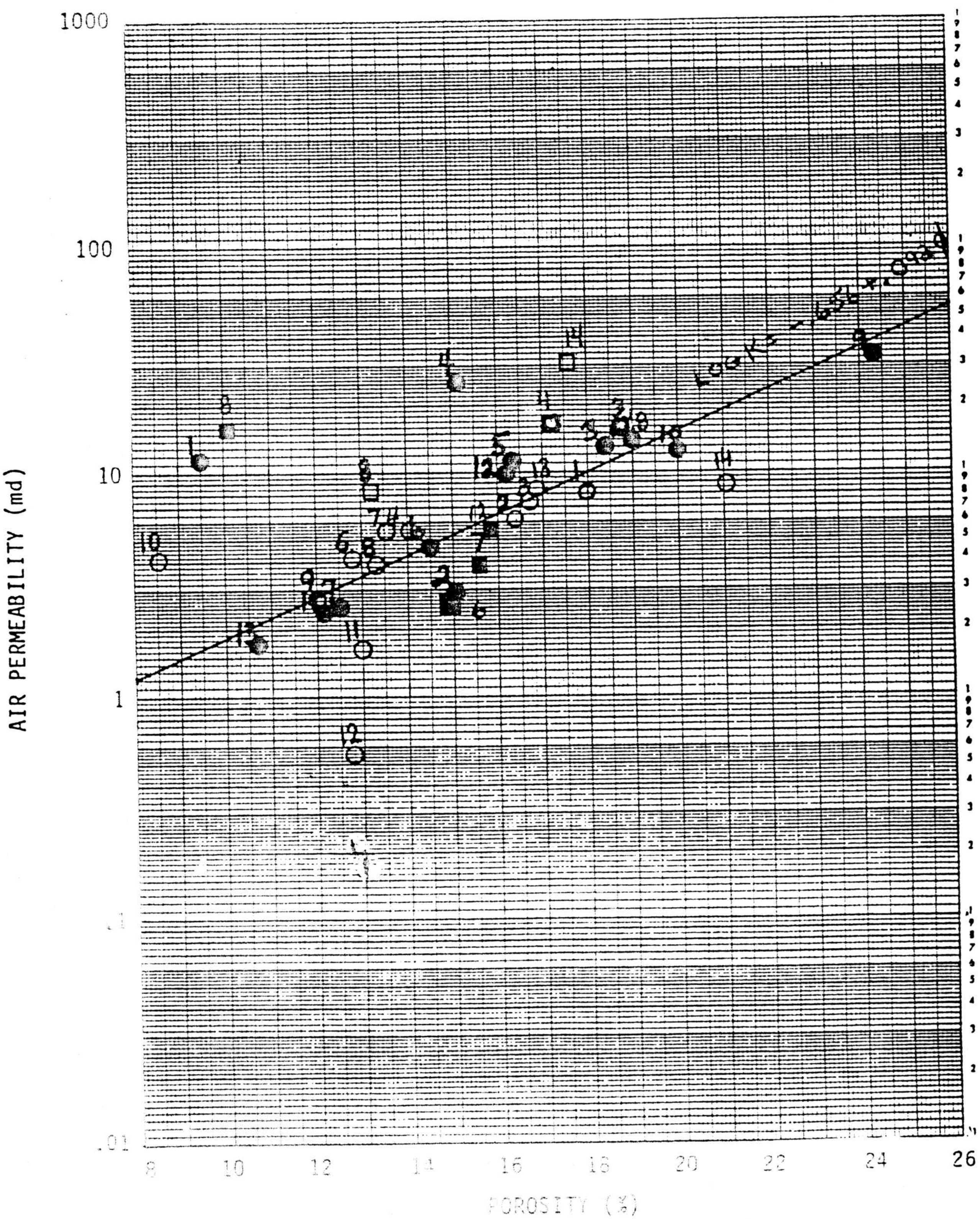
CORE LITHOLOGIC DESCRIPTION

Core I.D. Number	Depth (ft)	Description
		Fort Riley
104	2765-2766	Ls: Tn-gry,wackestone,15% anhy,stylolite, MO-BP Ø
110	2771-2772	Ls: Mottled,gry & tn,20% anhy,BP Ø
115	2776-2777	Ls: Mottled dk gry flecks,lge incl anhy,varied xln secions
121	2782-2783	Ls: Strk tn-gry,arg,f gr,anhy incl,BP Ø

ESSO CONTINENTAL LABORATORIES

Figure 1 - Herrington

PERMEABILITY VS POROSITY



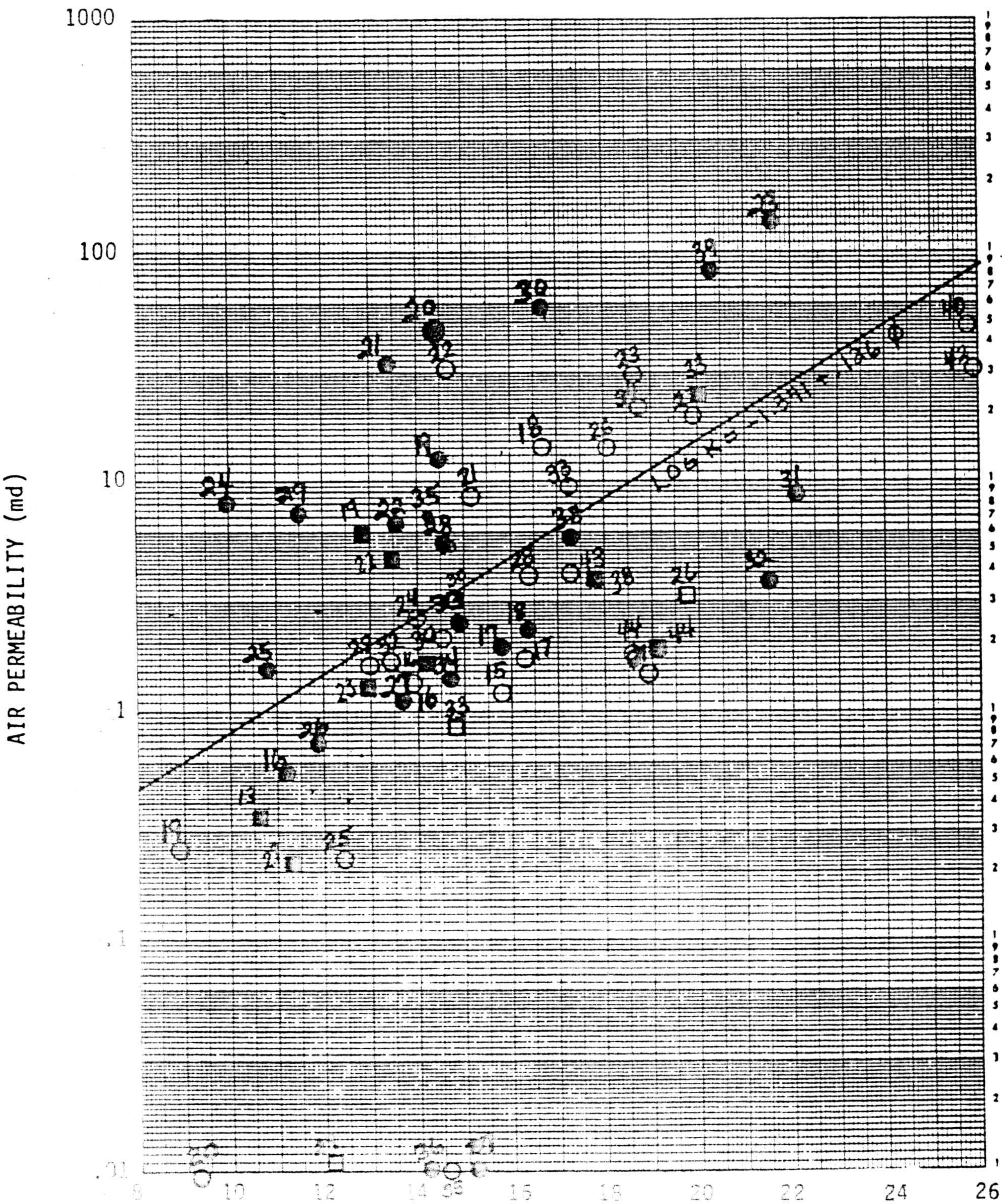
COMPANY Anadarko Production Co. WELL Walters A#1 and Nordling A#1

LOCATION Stevens County, Kansas

FILE NUMBER DS109 - Miazaki

Figure 2 - Krider

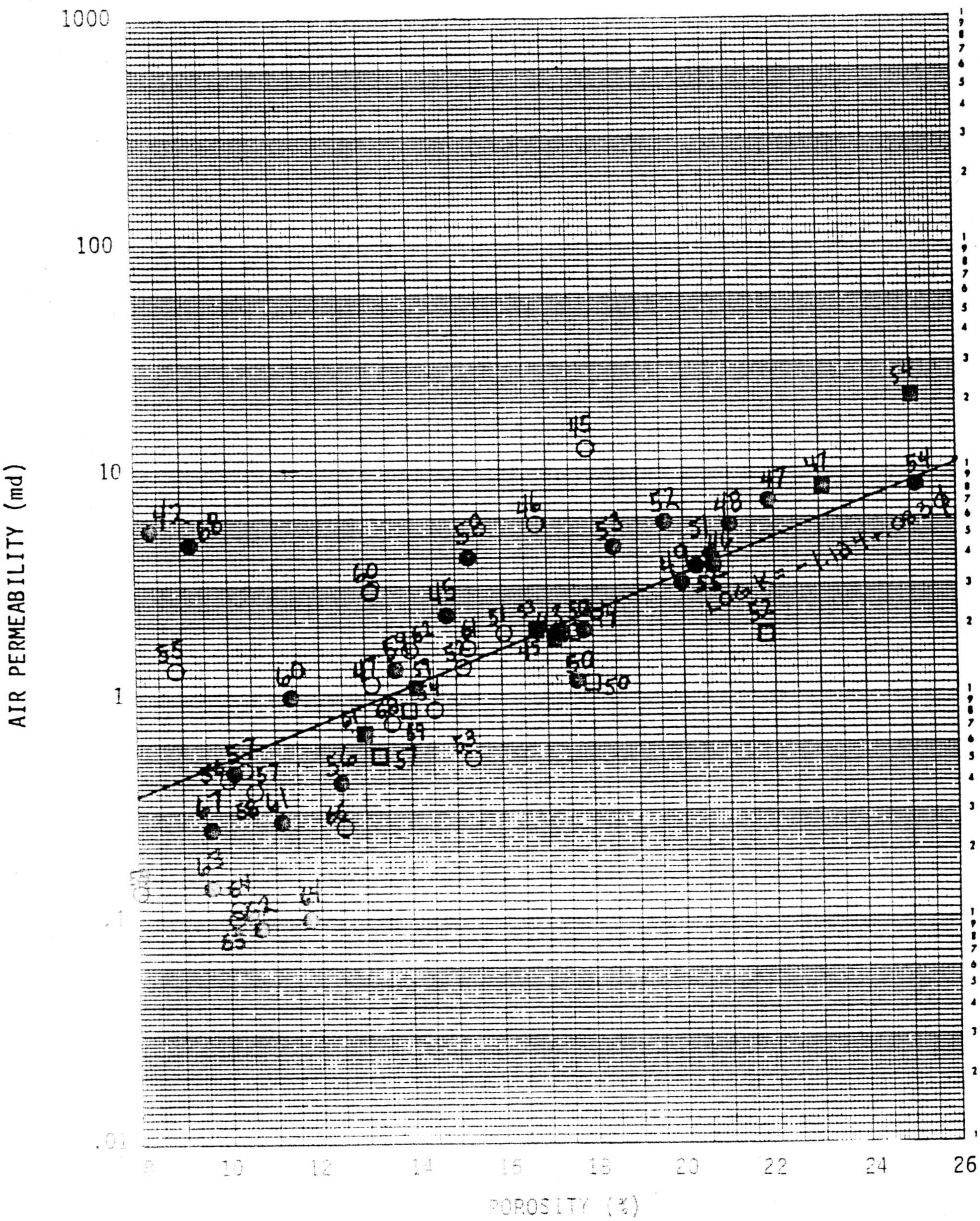
PERMEABILITY VS POROSITY



COMPANY Anadarko Production Co. WELL Walters A#1 and Nordling A#1
LOCATION Stevens County, Kansas
FILE NUMBER DS109 - Miazaki

Figure 3 - Winfield

PERMEABILITY VS POROSITY



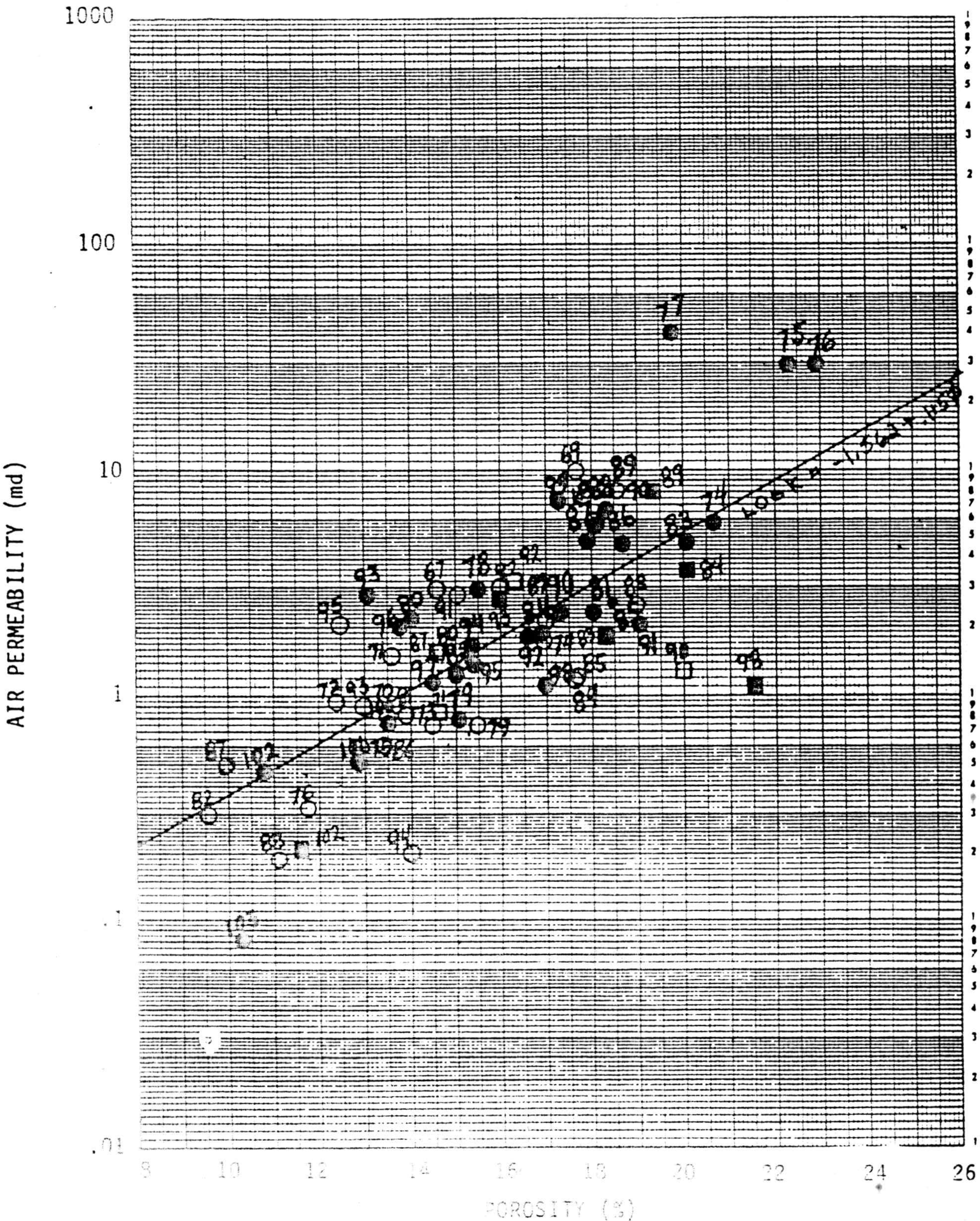
COMPANY Anadarko Production Co. WELL Walters A#1 and Nordling A#1

LOCATION Stevens County, Kansas

FILE NUMBER DS109 - Miazaki

Figure 4 - Towanda

PERMEABILITY VS POROSITY



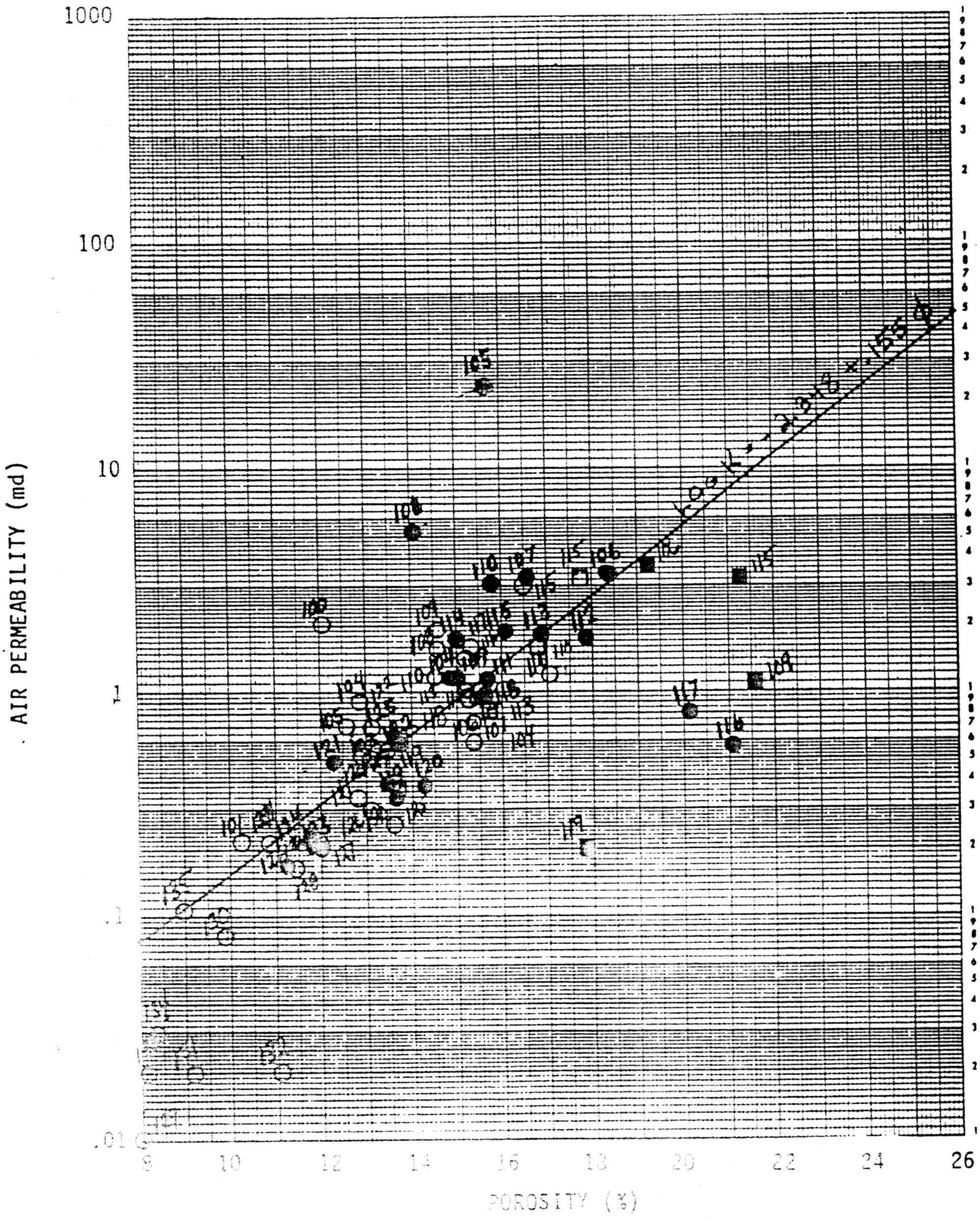
COMPANY Anadarko Production Co. WELL Walters A#1 and Nordling A#1

LOCATION Stevens County, Kansas

FILE NUMBER DS109 - Miazaki

Figure 5 - Ft. Riley

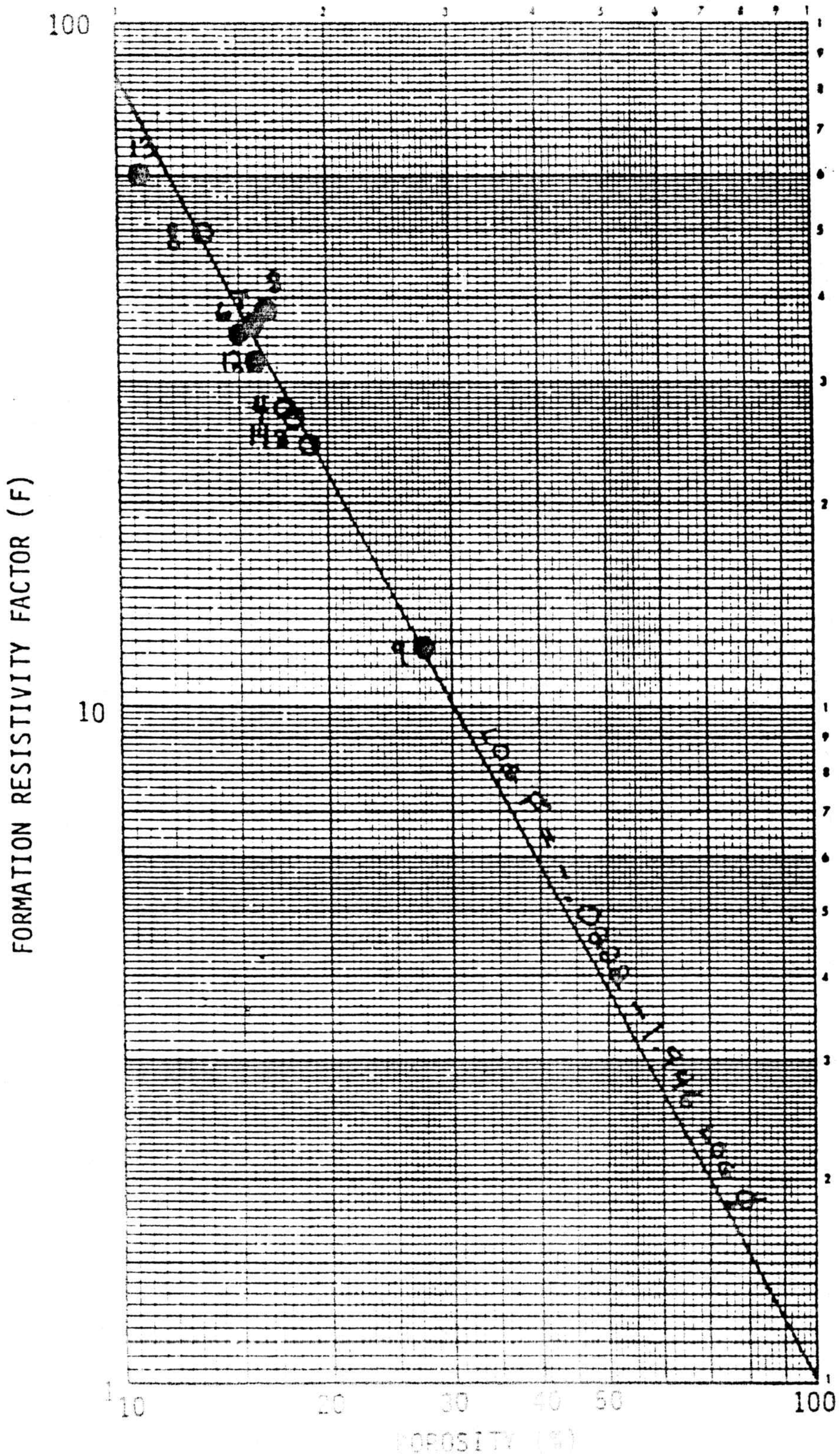
PERMEABILITY VS POROSITY



COMPANY Anadarko Production Co. WELL Walters A#1 and Nordling A#1
LOCATION Stevens County, Kansas
FILE NUMBER DS109 - Miazaki

6 - Herrington

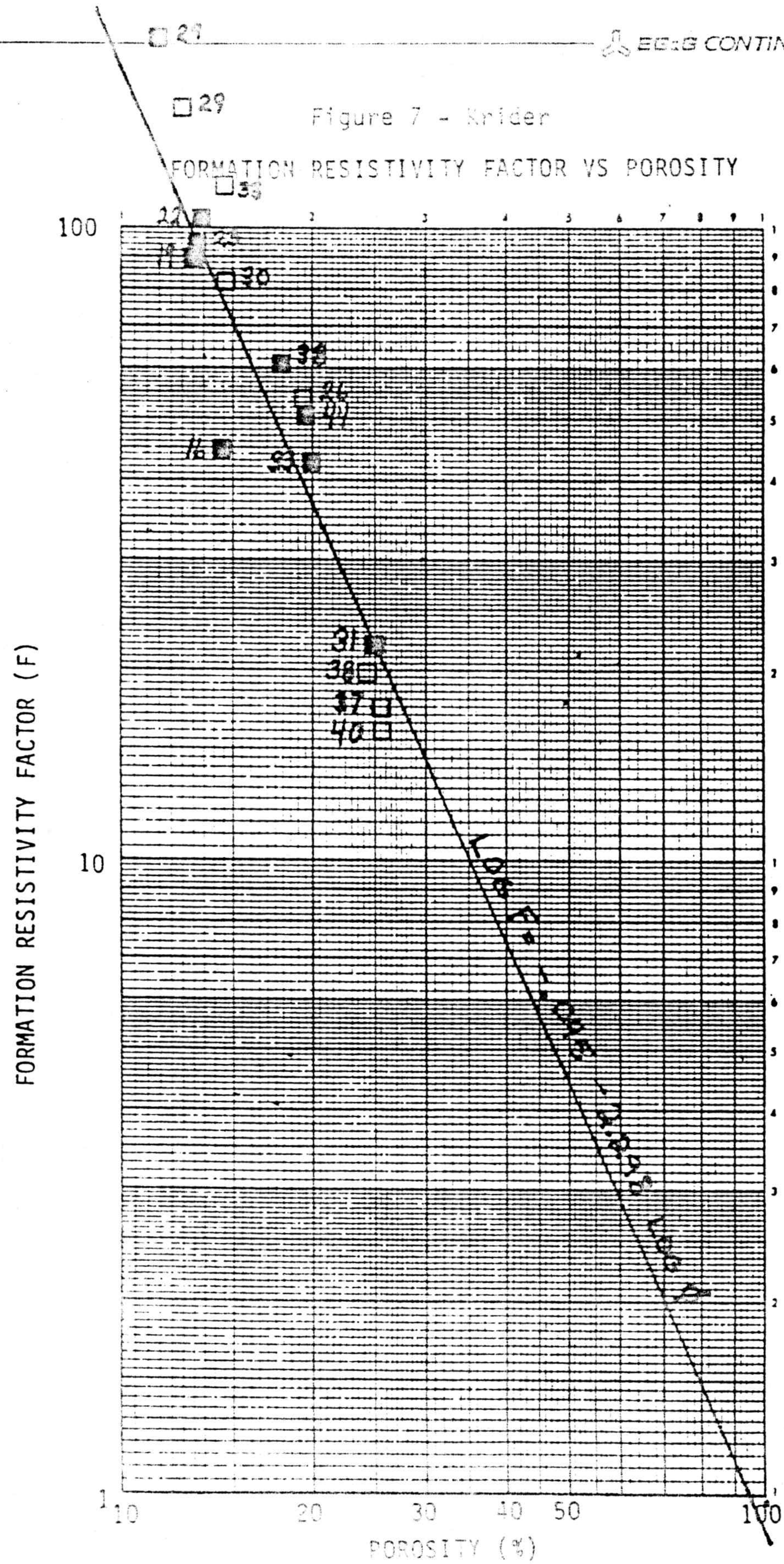
FORMATION RESISTIVITY FACTOR VS POROSITY



COMPANY Anadarko Production Co. WELL Walters A#1 and Nordling A#1
LOCATION Stevens County, Kansas
FILE NUMBER DS109 - Miazaki

Figure 7 - Krider

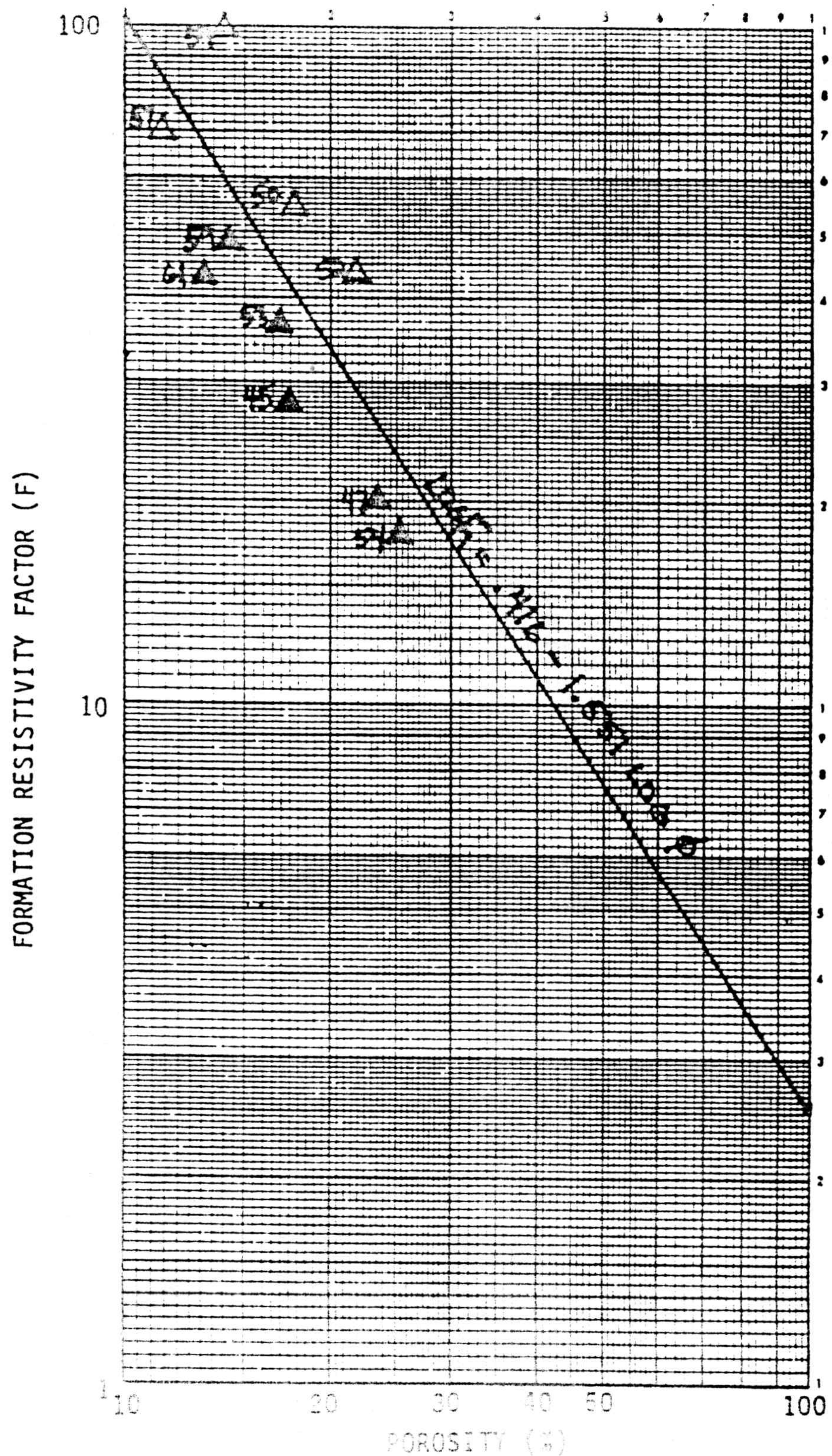
FORMATION RESISTIVITY FACTOR VS POROSITY



COMPANY Anadarko Production Co. WELL Walters A#1 and Nordling A#1
LOCATION Stevens County, Kansas
FILE NUMBER DS109 - Miazaki

Figure 8 - Winfield

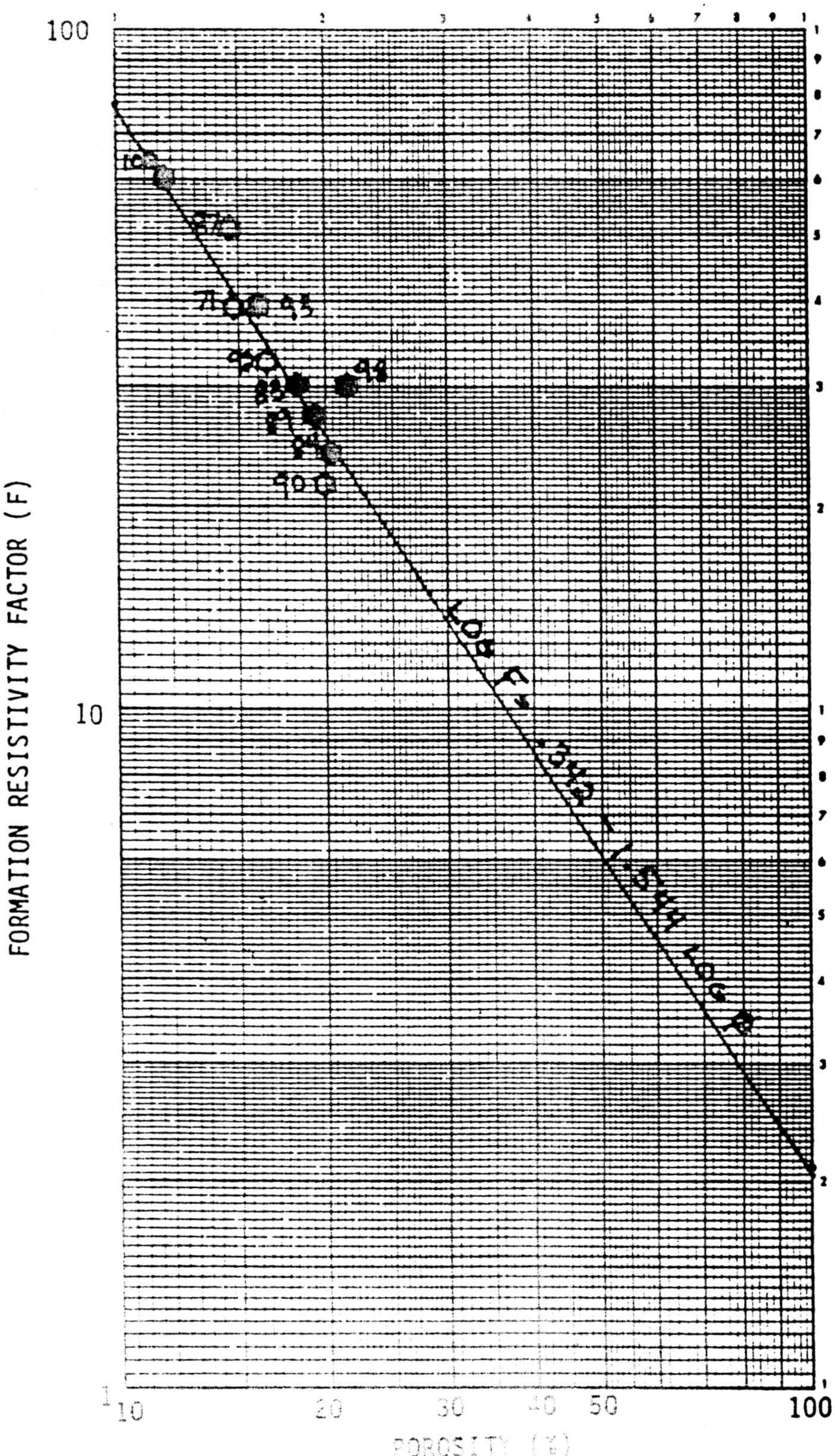
FORMATION RESISTIVITY FACTOR VS POROSITY



COMPANY Anadarko Production Co. WELL Walters A#1 and Nordling A#1
LOCATION Stevens County, Kansas
FILE NUMBER DS109 - Miazaki

Figure 8 - Towanda

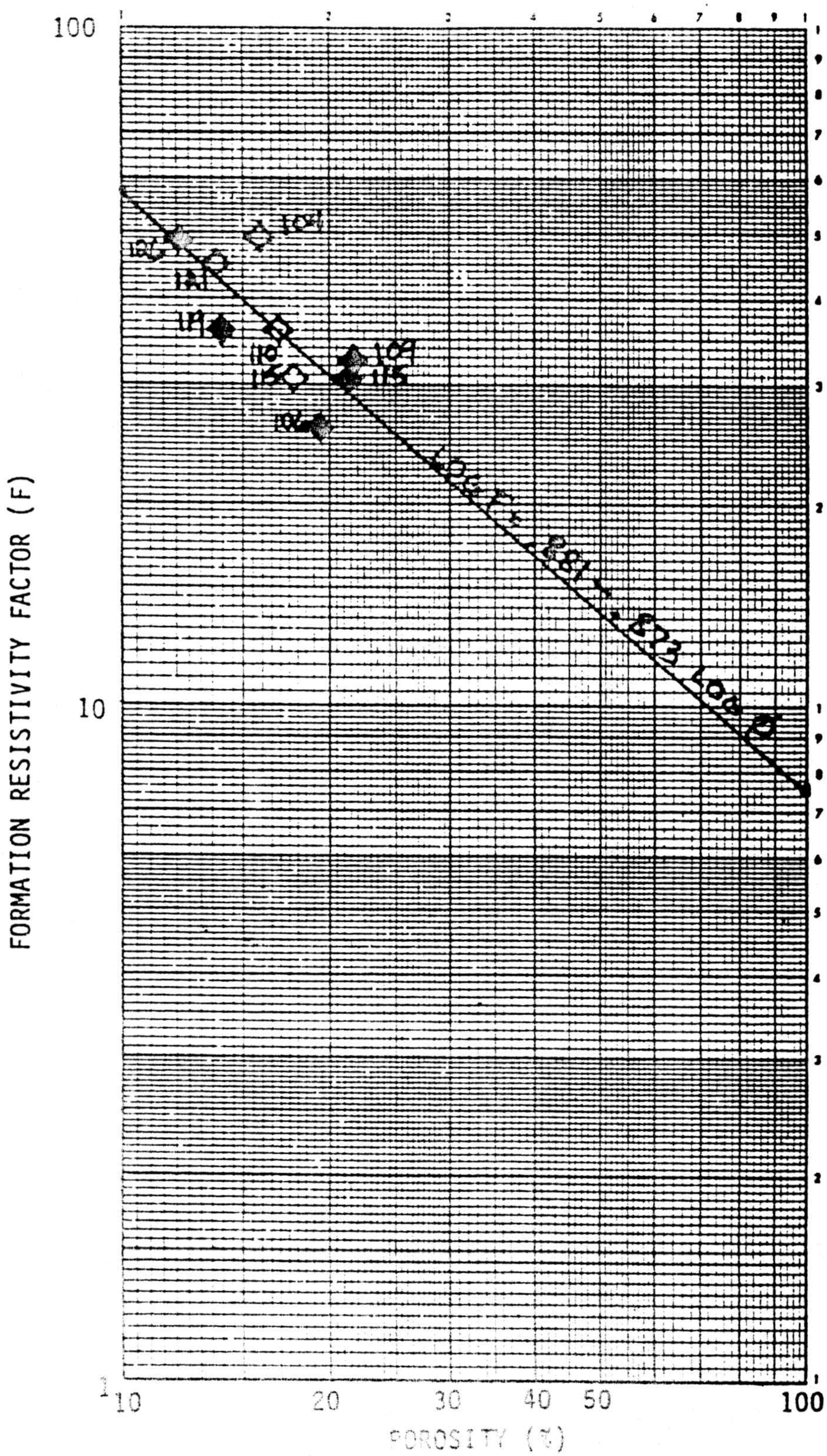
FORMATION RESISTIVITY FACTOR VS POROSITY



COMPANY Anadarko Production Co. WELL Walters A#1 and Nordling A#1
LOCATION Stevens County, Kansas
FILE NUMBER DS109 - Miazaki

Figure [illegible] - Ft. Riley

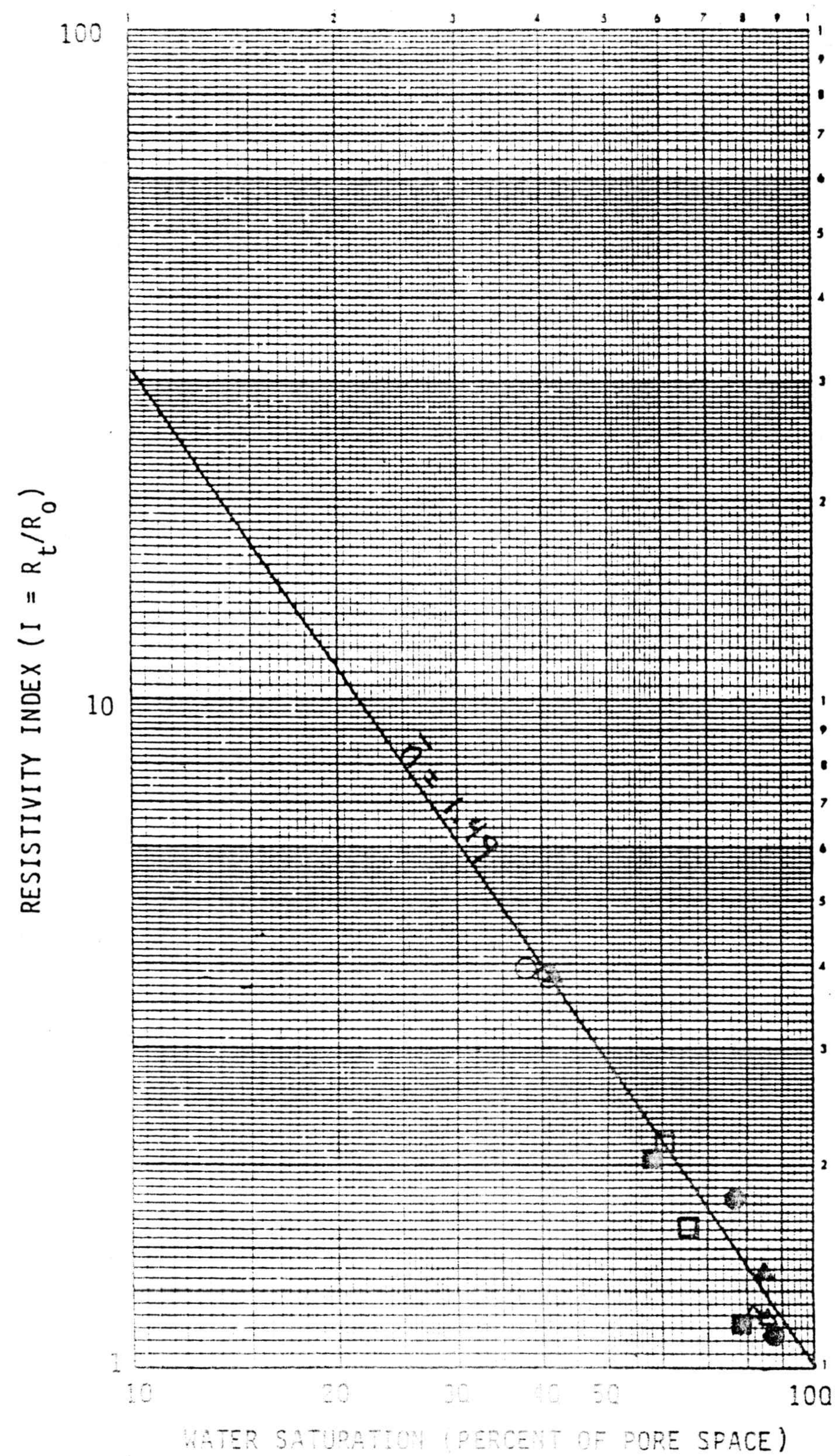
FORMATION RESISTIVITY FACTOR VS POROSITY



COMPANY Anadarko Production Co. WELL Walters A#1 and Nordling A#1
LOCATION Stevens County, Kansas
FILE NUMBER DS109 - Miazaki

Figure 11 - Walters/Herrington

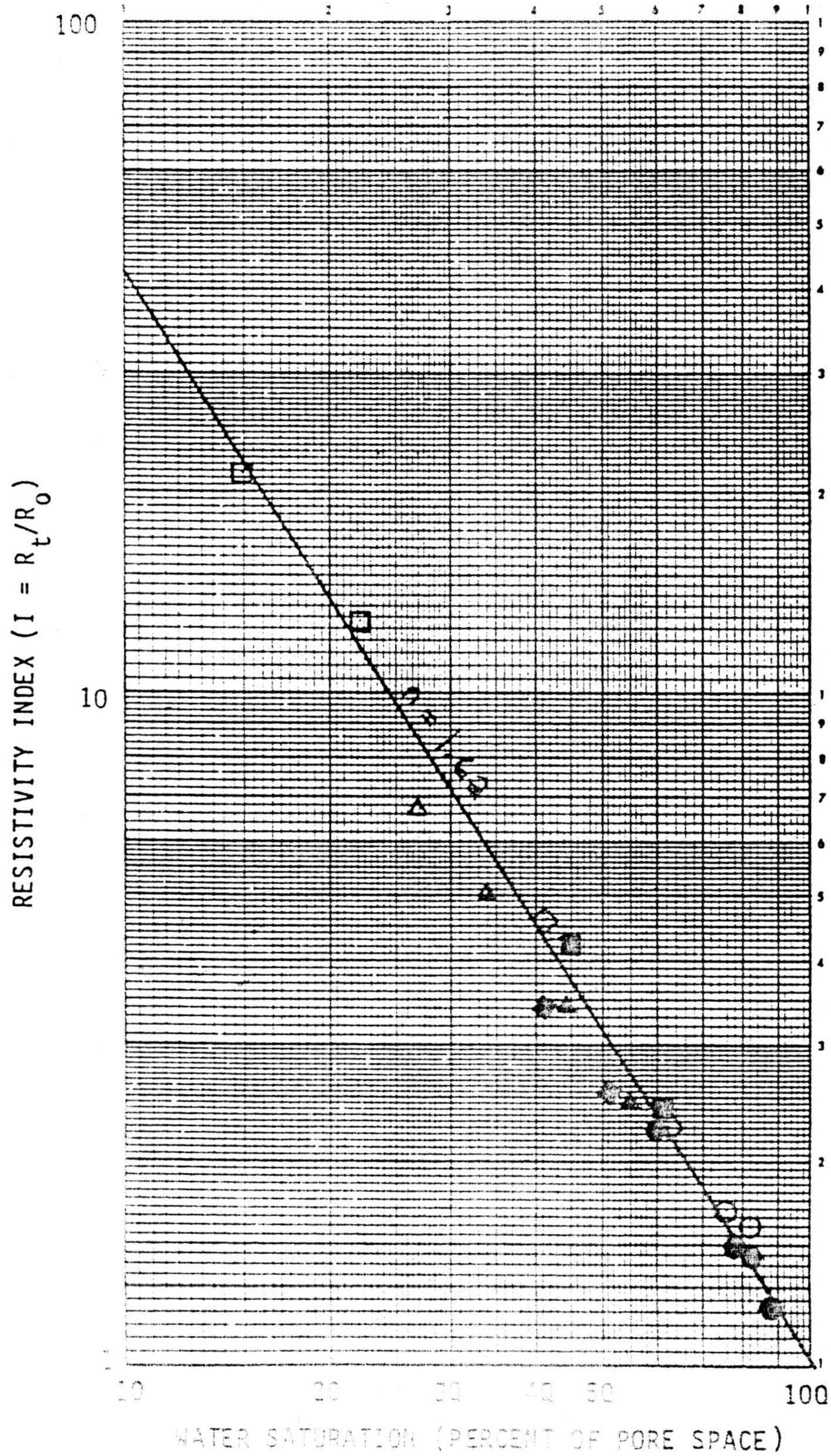
RESISTIVITY INDEX VS WATER SATURATION



COMPANY Anadarko Production Co. WELL Walters A#1 and Nordling A#1
LOCATION Stevens County, Kansas
FILE NUMBER DS109 - Miazaki

Figure 12 - Walters/ Krider

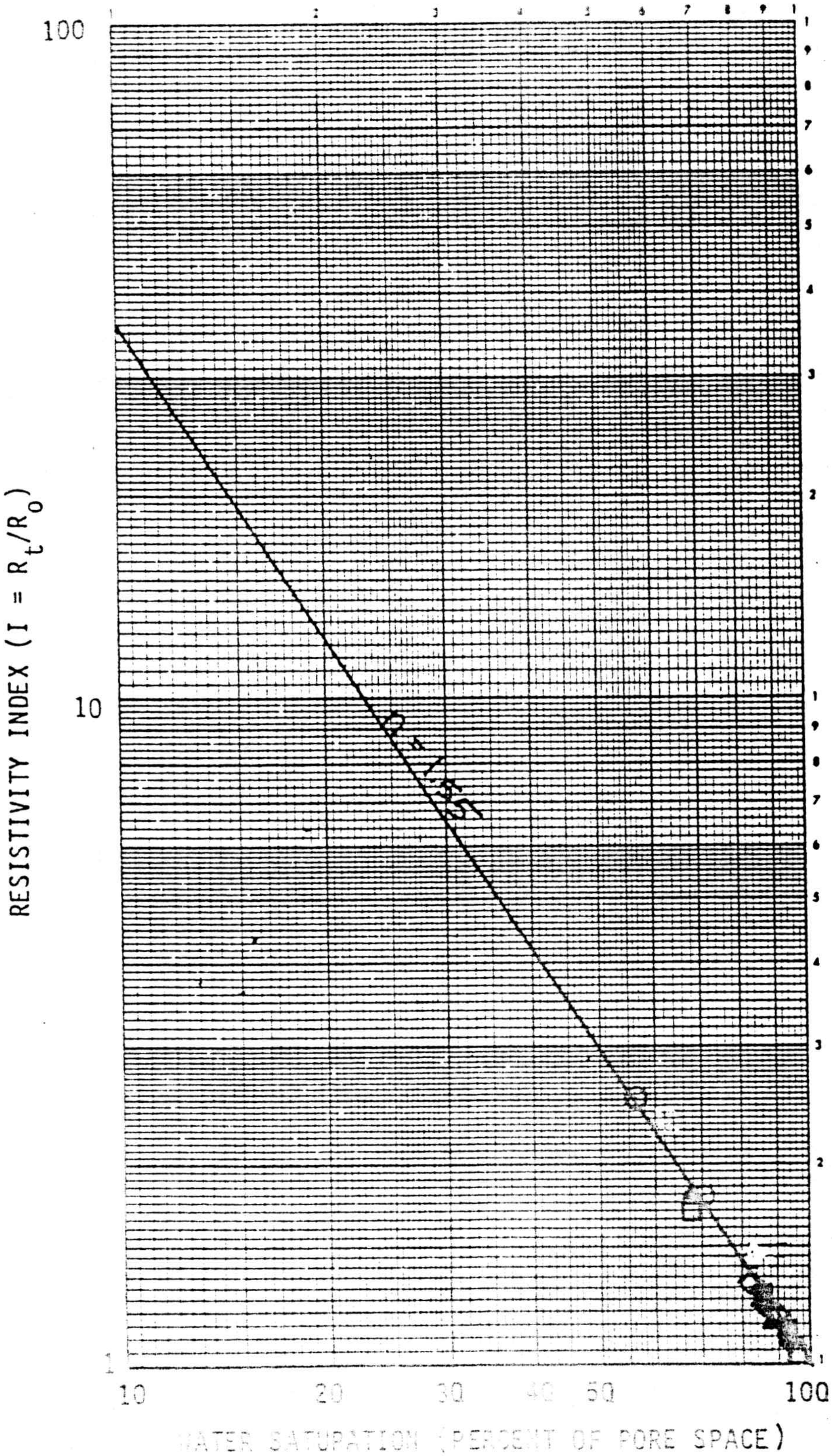
RESISTIVITY INDEX VS WATER SATURATION



COMPANY Anadarko Production Co. WELL Walters A#1 and Nordling A#1
LOCATION Stevens County, Kansas
FILE NUMBER DS109 - Miazaki

Figure 13 - Walters/Winfield

RESISTIVITY INDEX VS WATER SATURATION



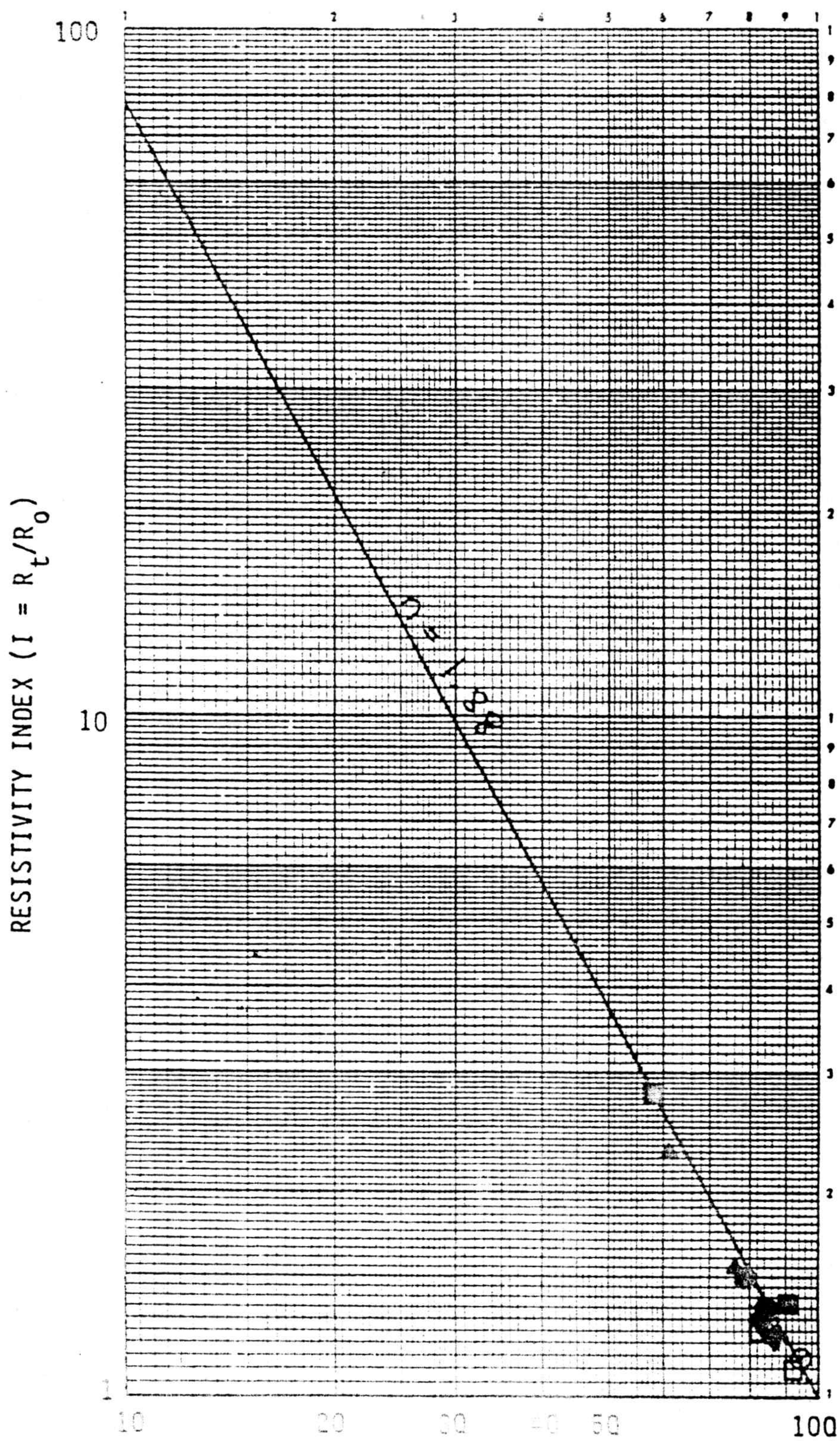
COMPANY Anadarko Production Co. WELL Walters A#1 and Nordling A#1

LOCATION Stevens County, Kansas

FILE NUMBER DS109 - Miazaki

Figure 14 - Walters/Towanda

RESISTIVITY INDEX VS WATER SATURATION



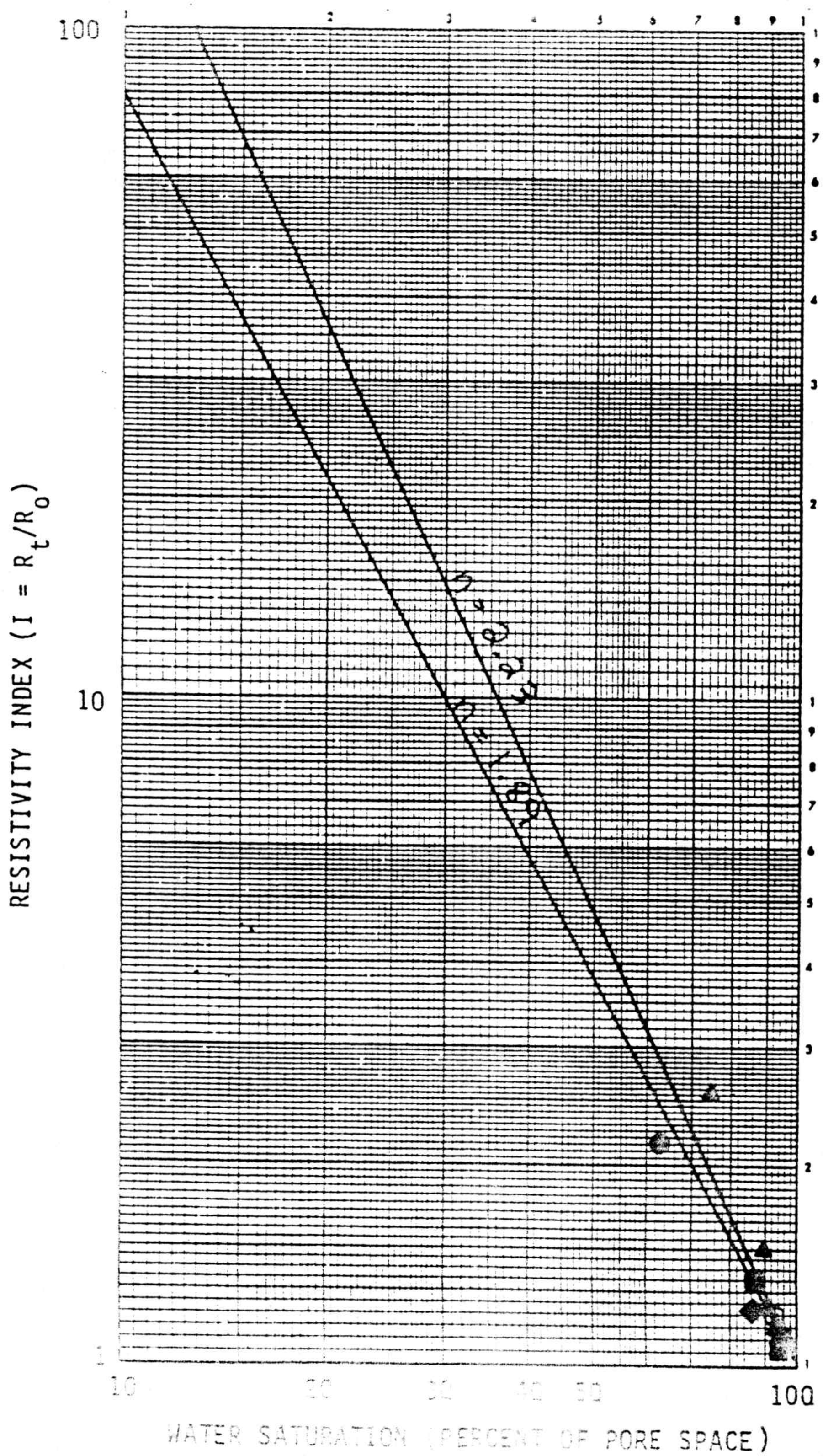
COMPANY Anadarko Production Co. WELL Walters A#1 and Nordling A#1

LOCATION Stevens County, Kansas

FILE NUMBER DS109 - Miazaki

Figure 15 - Walters/ Ft. Riley

RESISTIVITY INDEX VS WATER SATURATION



COMPANY Anadarko Production Co. WELL Walters A#1 and Nordling A#1
LOCATION Stevens County, Kansas
FILE NUMBER DS109 - Miazaki

Figure 15 - Nordling/Harrington

RESISTIVITY INDEX VS WATER SATURATION

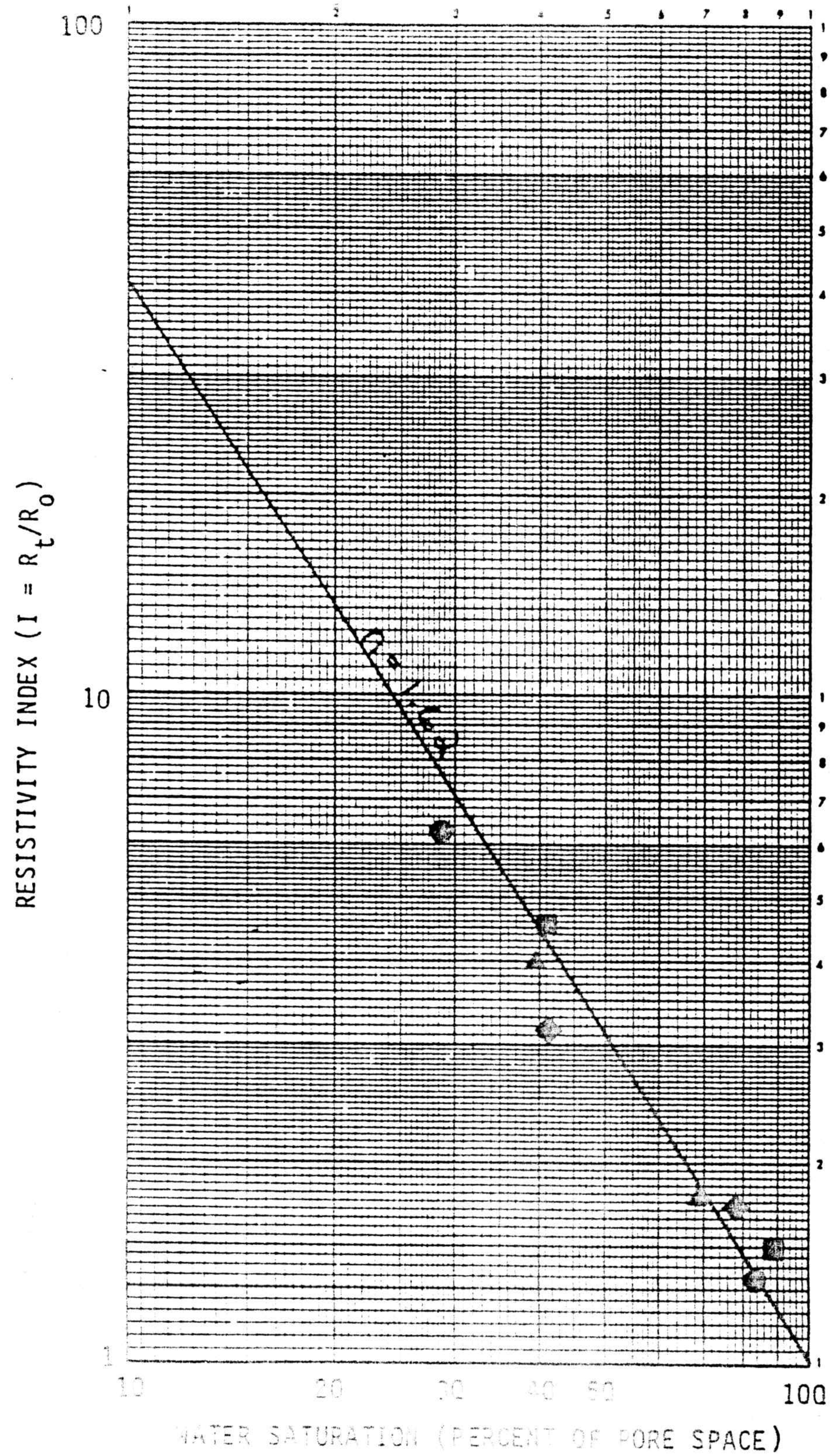
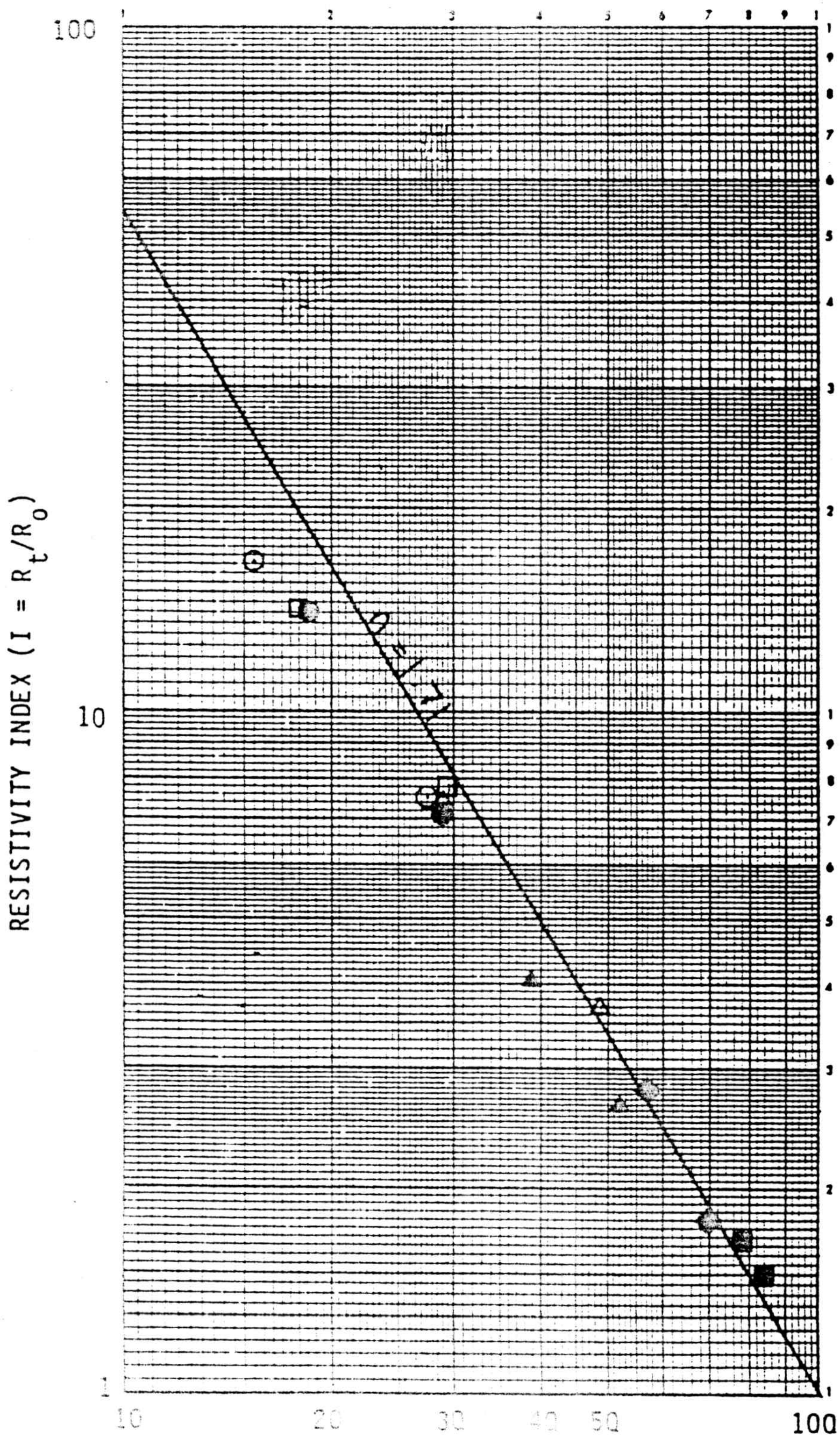


Figure 17 - Nordling/Krider

RESISTIVITY INDEX VS WATER SATURATION



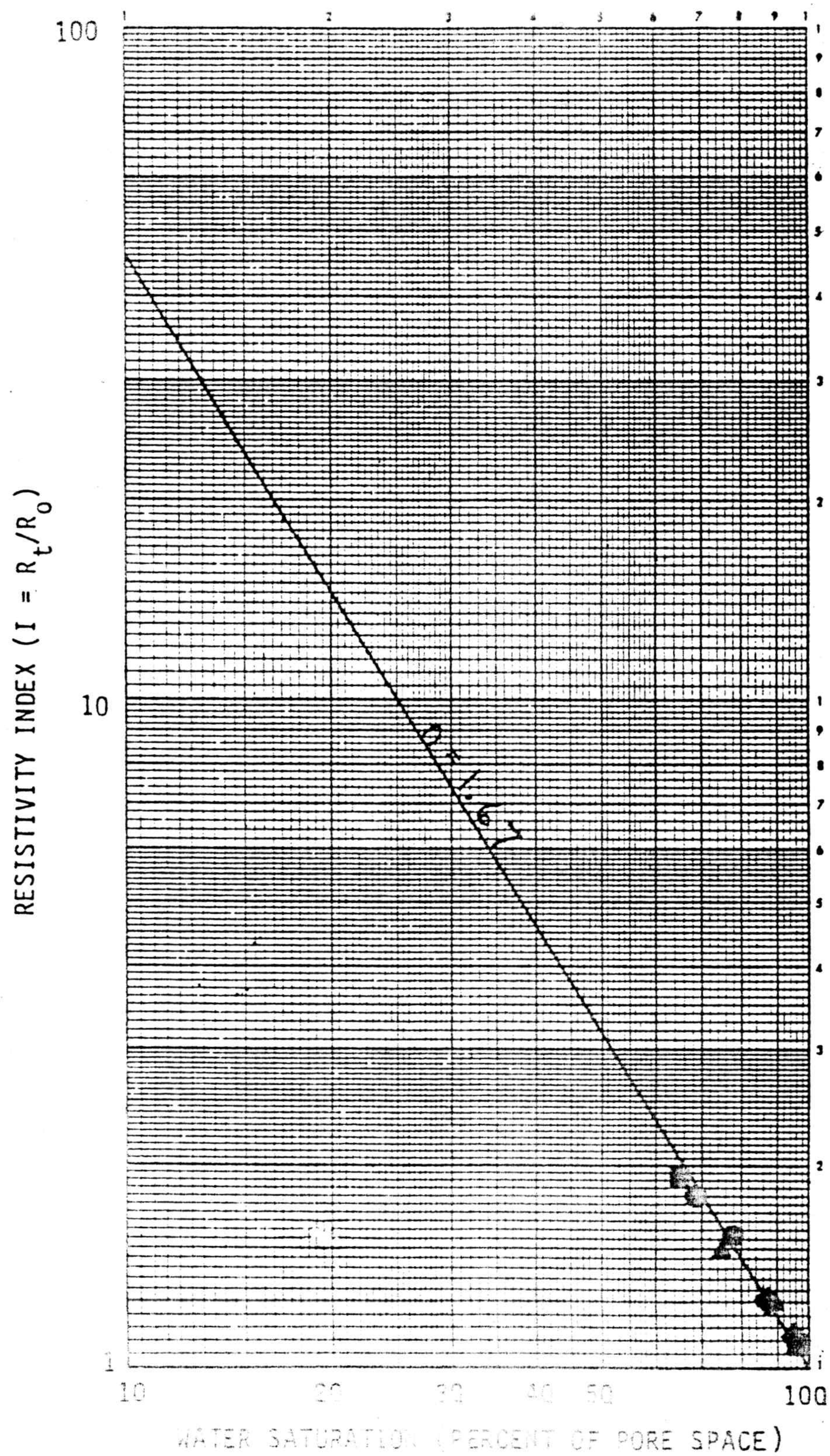
COMPANY Anadarko Production Co. WELL Walters A#1 and Nordling A#1

LOCATION Stevens County, Kansas

FILE NUMBER DS109 - Miazaki

Figure 15 - Nordling/Winfield

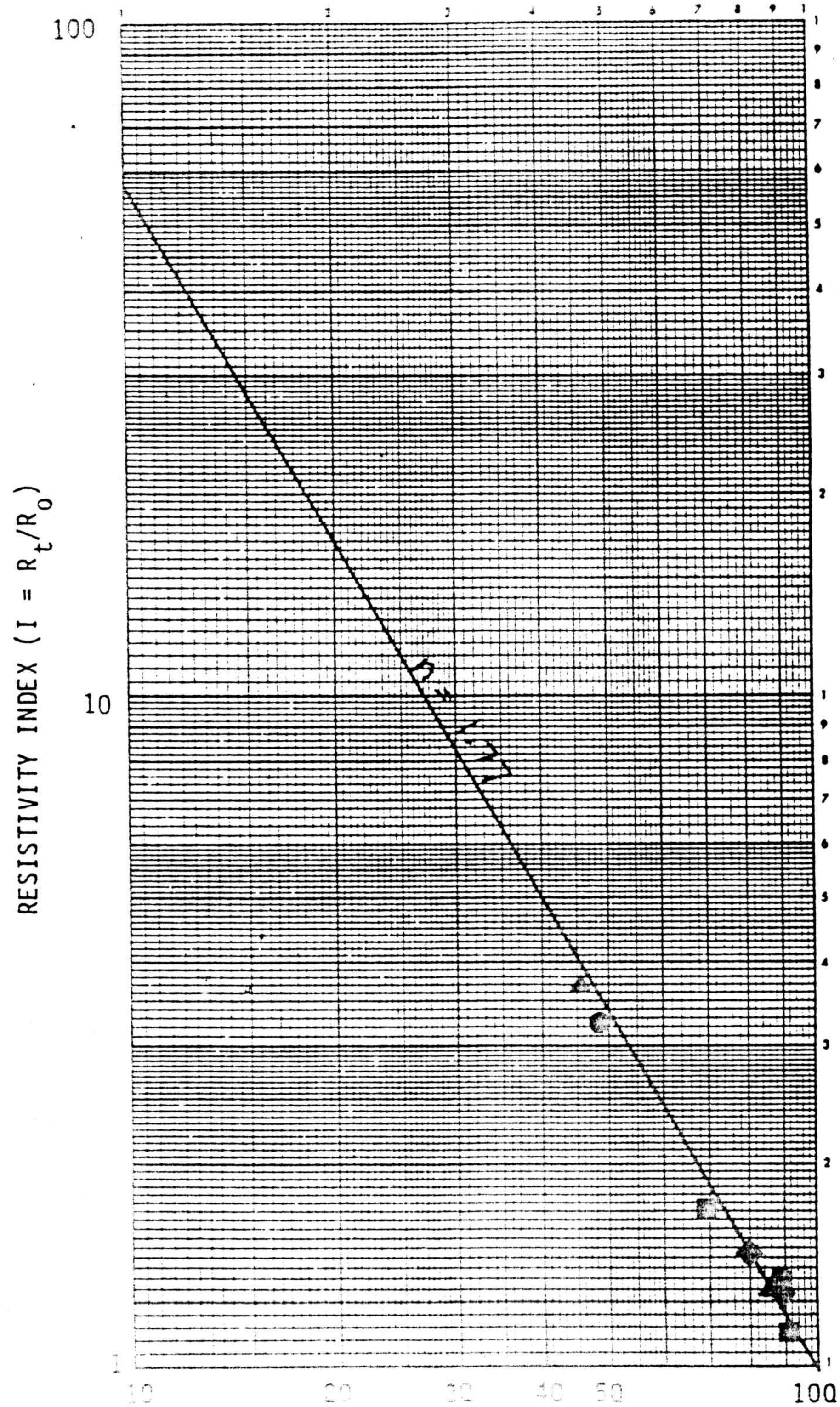
RESISTIVITY INDEX VS WATER SATURATION



COMPANY Anadarko Production Co. WELL Walters A#1 and Nordling A#1
LOCATION Stevens County, Kansas
FILE NUMBER DS109 - Miazaki

Figure 13 - Nordling/Towanda

RESISTIVITY INDEX VS WATER SATURATION



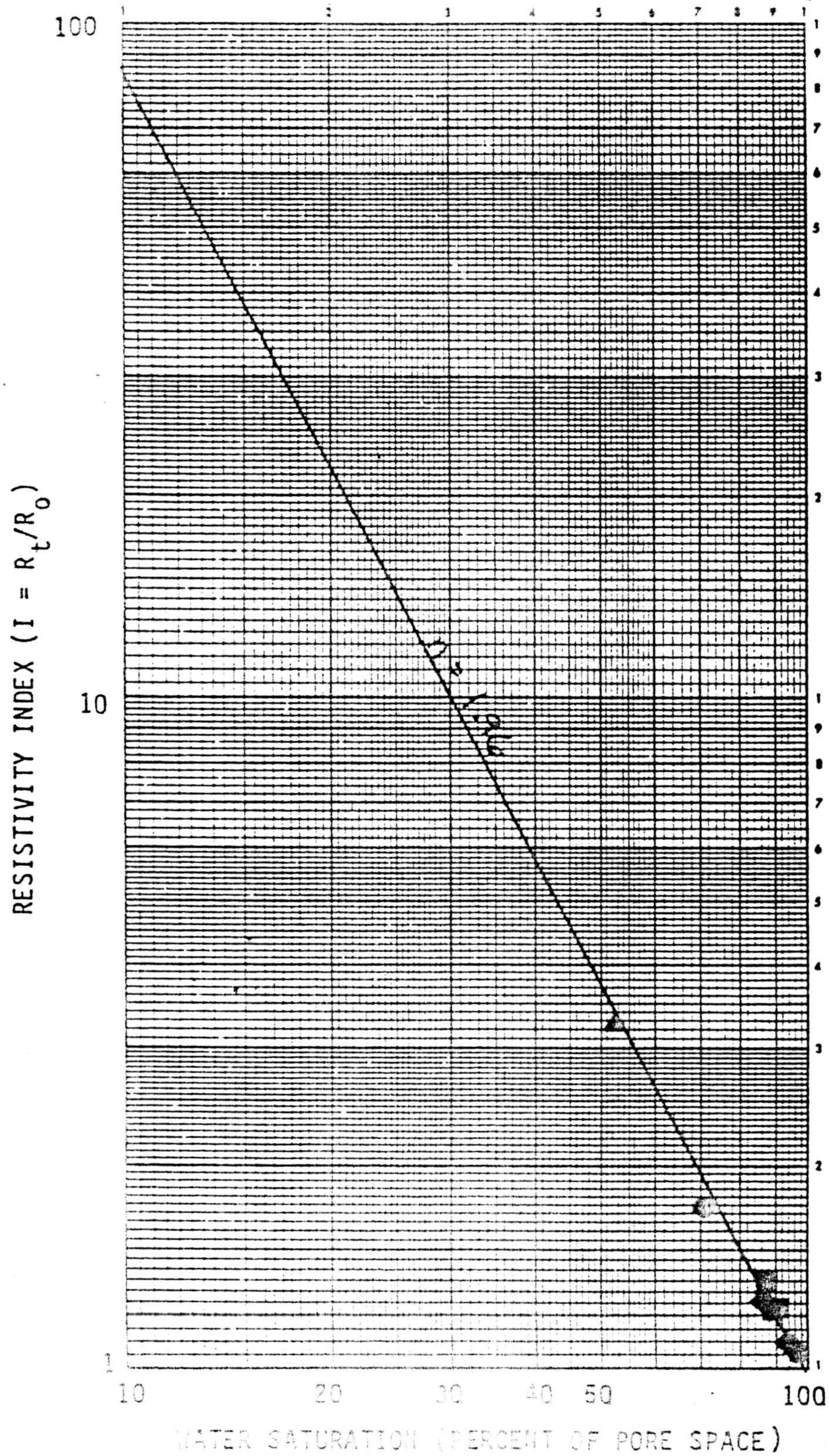
COMPANY Anadarko Production Co. WELL Walters A#1 and Nordling A#1

LOCATION Stevens County, Kansas

FILE NUMBER DS109 - Miazaki

Figure 20 - Nordling/Ft. Riley

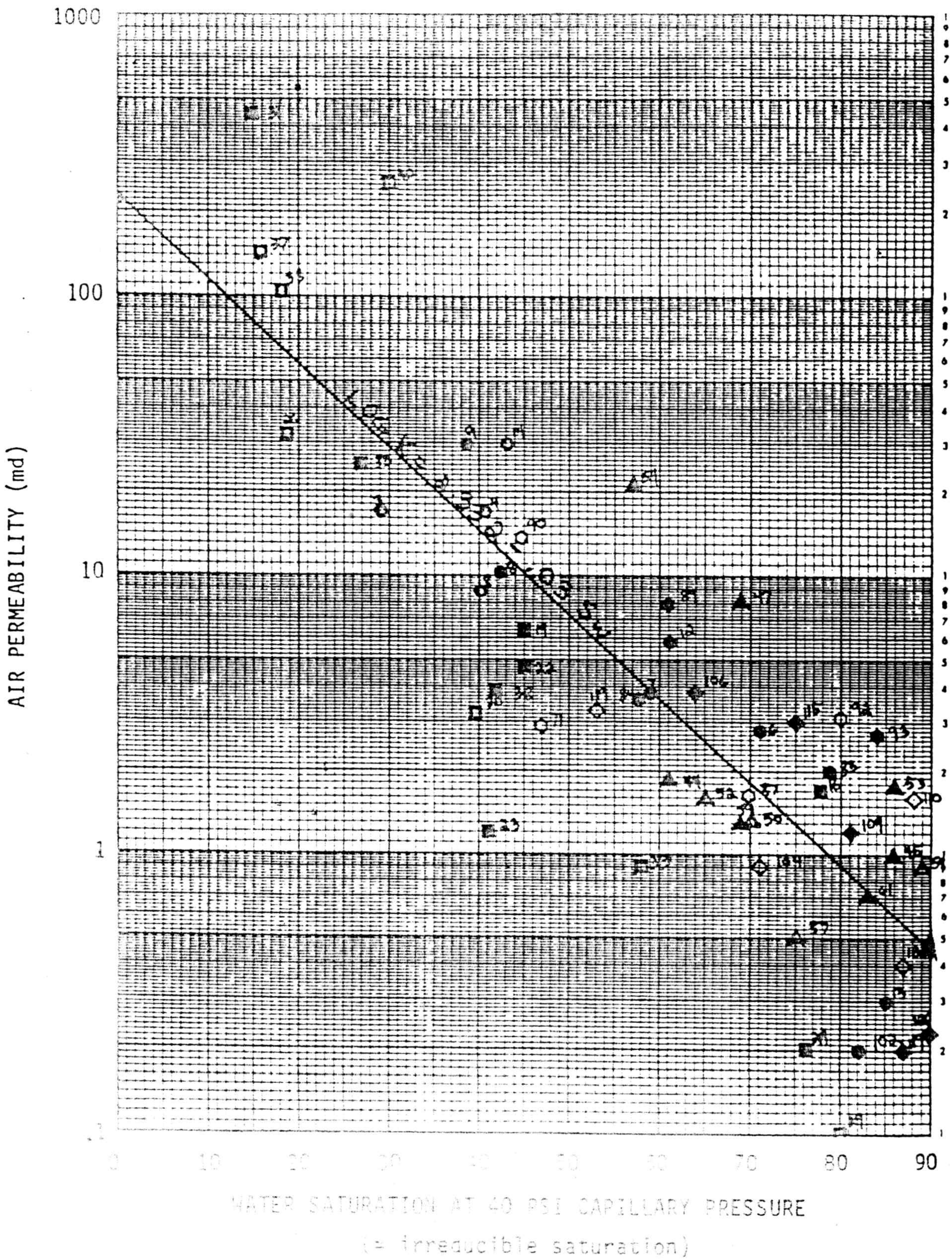
RESISTIVITY INDEX VS WATER SATURATION



COMPANY Anadarko Production Co. WELL Walters A#1 and Nordling A#1
LOCATION Stevens County, Kansas
FILE NUMBER DS109 - Miazaki

Figure 21

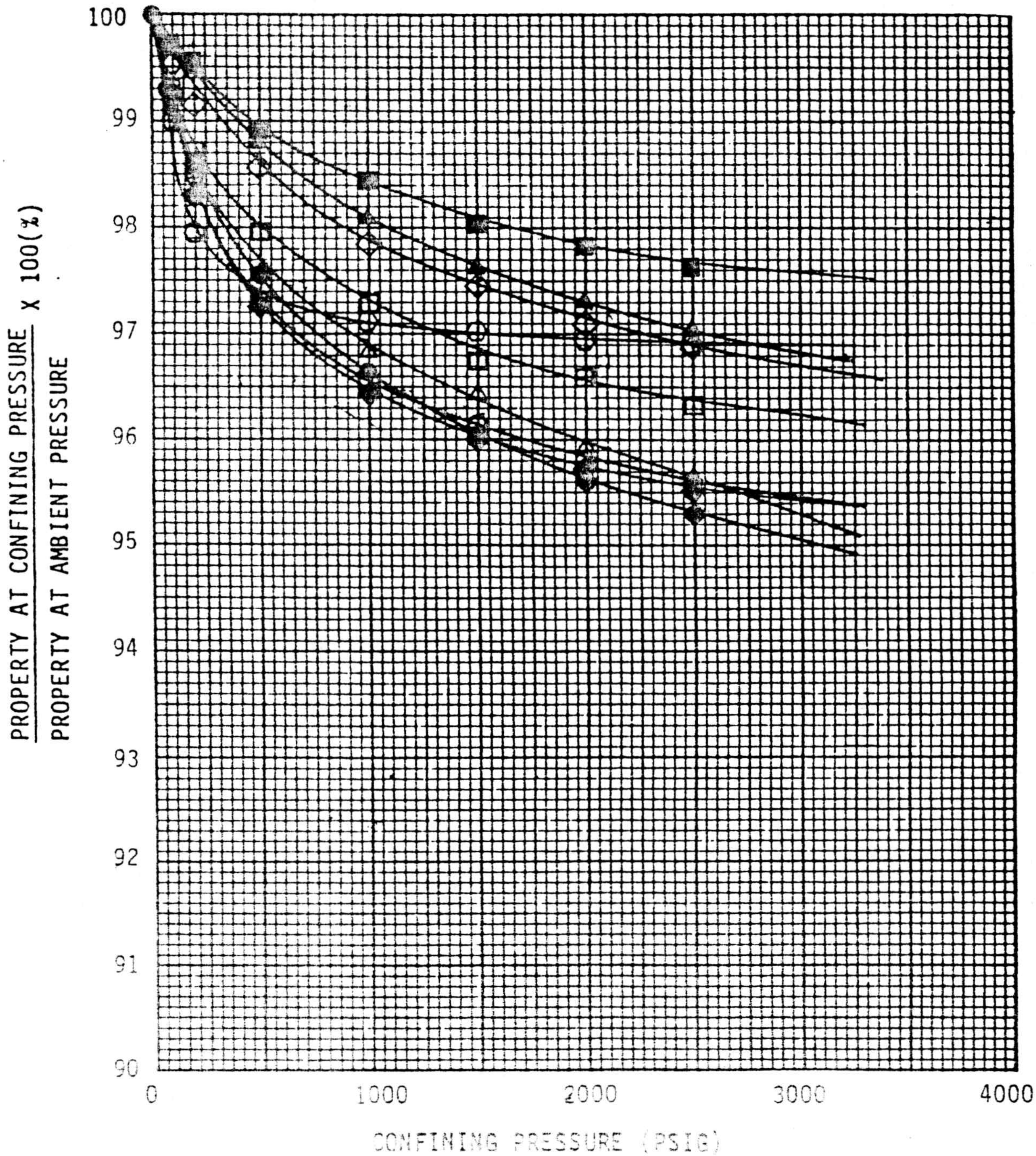
AIR PERMEABILITY VERSUS WATER SATURATION



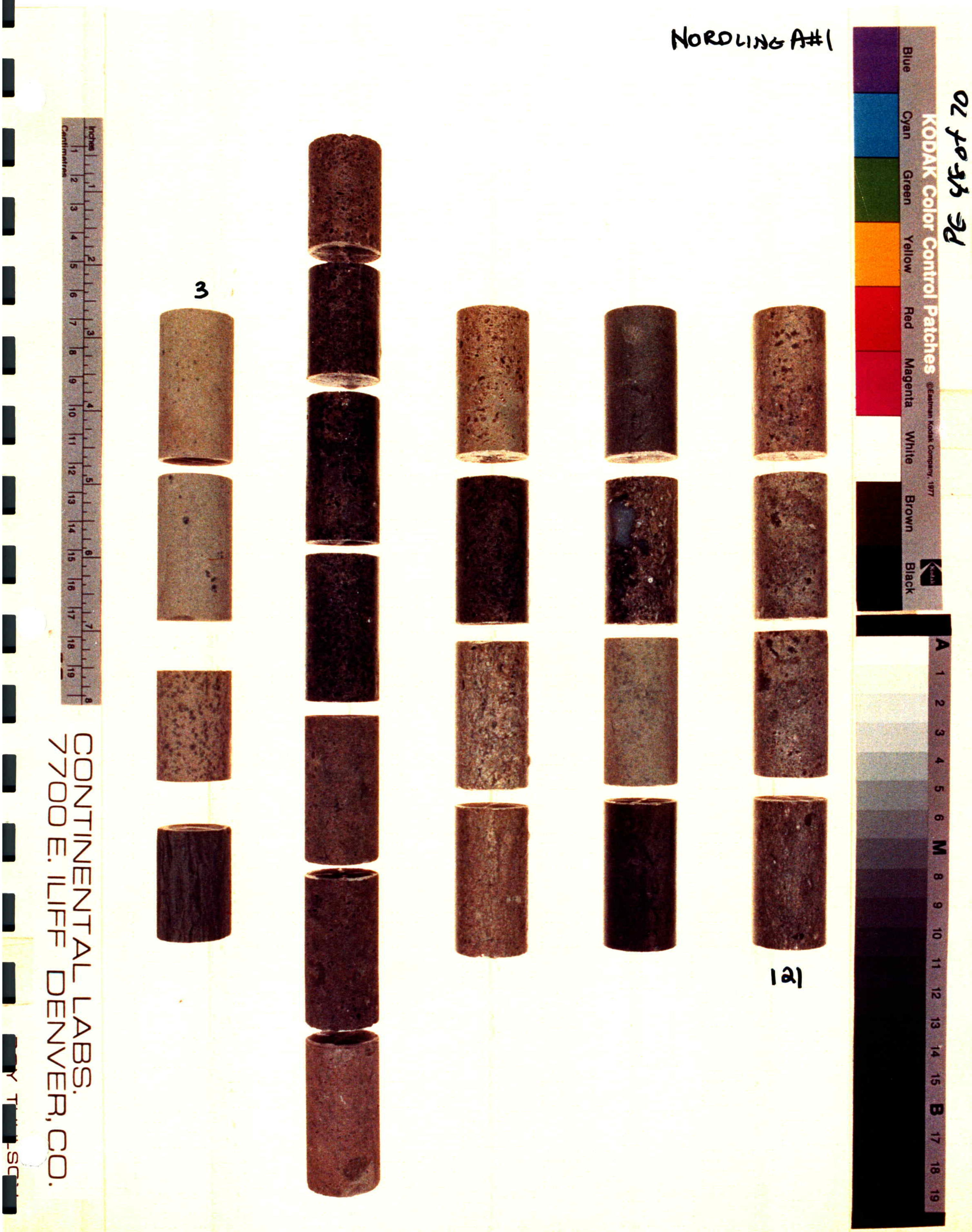
COMPANY Anadarko Production Co. WELL Walters A#1 and Nordling A#1
LOCATION Stevens County, Kansas
FILE NUMBER DS109 - Miazaki

Figure 22

PORE VOLUME COMPRESSIBILITY



COMPANY Anadarko Production Co. WELL Walters A#1 and Nordling A#1
LOCATION Stevens County, Kansas
FILE NUMBER DS109 - Miazaki



NORDLING A#1
PE903070
3
121
KODAK Color Control Patches
©Eastman Kodak Company, 1977
Blue
Cyan
Green
Yellow
Red
Magenta
White
Brown
Black
Inches
Centimetres
CONTINENTAL LABS.
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WALTERS A#1

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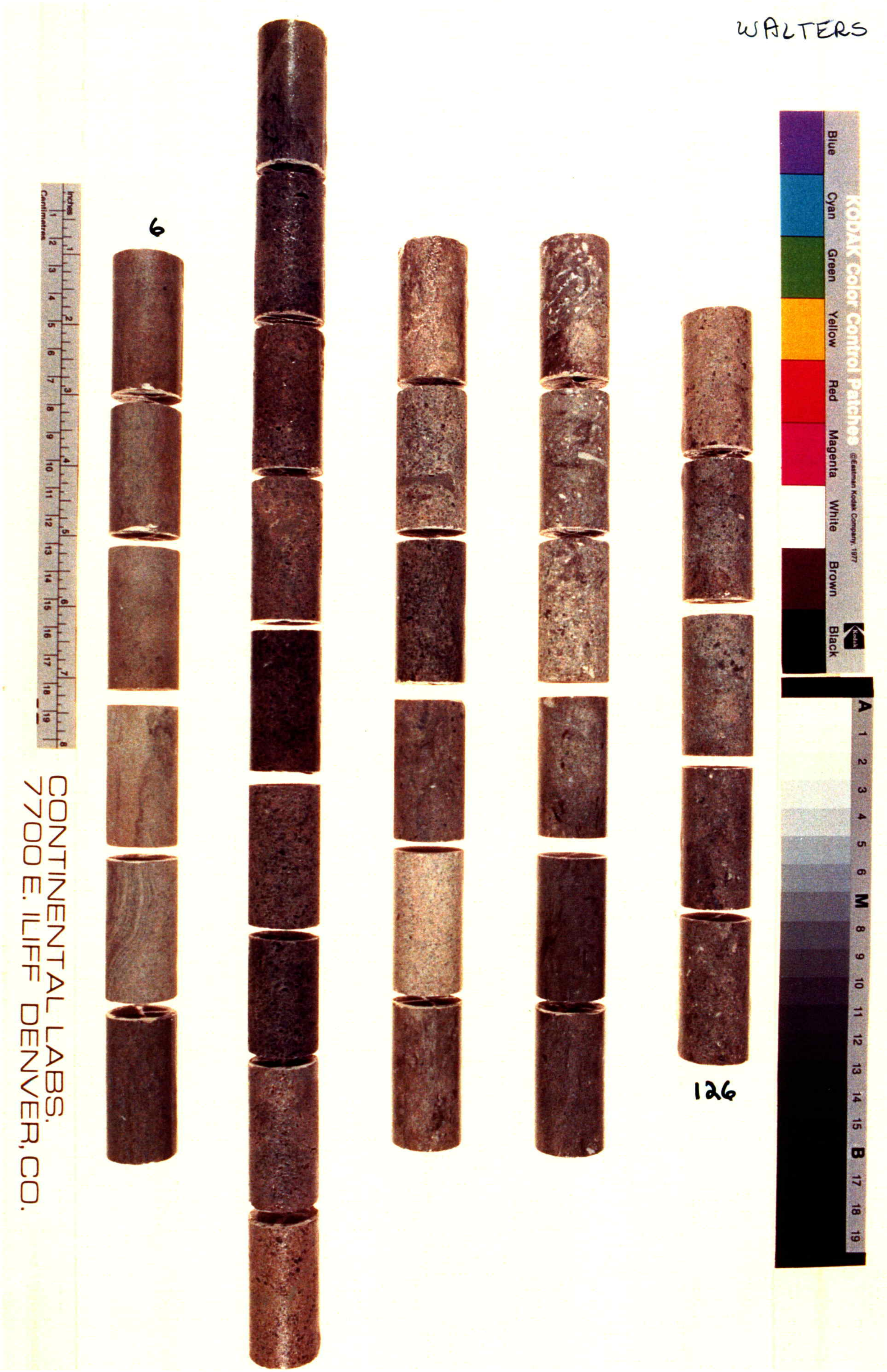

APPENDIX A

WHOLE CORE DATA

ANADARKO
WELL: WALTERS A#1

SAMPLE NO.	SAMPLE DEPTH	POROSITY	SATURATION WATER	SATURATION OIL	PERMEABILITY K-MAX	PERMEABILITY K-MIN	GRAIN DENSITY	LITHOLOGY
1	2550-51	9.5	97.2	0	11.29	7.97	2.74	DOL DK GY MIC XL V CALC SH STRGR SLTY
2	2251-52	15.1	54.7	0	2.82	2.80	2.76	DOL LT GY MIC XL CALC CHKY SH LAM SLTY
3	2552-53	18.4	58.1	0	13.01	12.55	2.74	DOL LT GY MIC XL SUC XL CALC XLN CHKY MIC ABD GYP NOD SL SIL SH STRGR
4	2553-54	15.1	66.2	0	25.44	5.99	2.73	DOL LT GY F XL SUC SL CALC CHKY V SLTY MIC GYP NOD SL SIL SH STRGR
5	2554-55	16.3	78.5	0	11.30	9.14	2.74	DOL M GY F XL SUC SL CALC ARG MIC ABD GYP NOD SL SIL INTBD SH
6	2555-56	14.5	73.4	0	4.67	3.25	2.73	DOL M GY F XL SUC XL CALC ARG MIC ANHY & GYP SIL I.P. SH SRTGR
7	2556-57	12.5	70.8	0	2.53	2.42	2.74	DOL M GY MIC XL SUC SL CALC CHKY V MIC ANHY SH LAM SL SIL
8	2557-58	19.0	77.0	0	13.96	12.47	2.76	DOL M GY F XL SUC SL CALC V MIC ANHY SH I.P. SL SIL
9	2558-59	24.3	55.0	0	33.33	28.33	2.70	DOL LT GY F XL SUC V CALC V MIC ANHY & GYP SH I.P. SL SIL
10	2559-60	20.0	71.1	0	12.47	12.42	2.74	DOL LT GY F XL SUC V CALC V CALC V MIC ANHY & GYP SH I.P. SL SIL
11	2560-61	12.2	68.6	0	2.42	2.26	2.80	DOL LT GY MIC XL SUC CALC ARG V MIC EVAP
12	2561-62	16.2	71.6	0	9.98	9.26	2.77	DOL LT-M GY F XL SUC CALC/CALC SL ARG V MIC EVAP
13	2562-63	10.7	74.0	0	1.71	.78	2.78	DOL LT-M GY F XL SUC CALC/CALC SL ARG V MIC EVAP
14	2578-79	5.0	65.5	0	.03	.03	2.83	DOL M GY VF XL SUC CALC ARG V MIC V ANHY
15	2579-80	6.9	82.6	0	2.44	.32	2.80	DOL M GY VF XL SUC CALC ARG V MIC V ANHY

ANADARKO
WELL: WALTERS A#1

SAMPLE NO.	SAMPLE DEPTH	POROSITY	SATURATION WATER	SATURATION OIL	PERMEABILITY K-MAX	PERMEABILITY K-MIN	GRAIN DENSITY	LITHOLOGY
16	2580-81	11.2	55.8	0	.55	.46	2.84	DOL M-DK GY VF XL SUC CALC MIC SH LAM
17	2581-82	15.8	45.9	0	1.88	1.65	2.84	DOL M GY VF XL SUC CALC ARG V MIC VUG
18	2582-83	16.4	50.3	0	2.27	2.12	2.86	DOL M-DK GY F XL SUC CALC MIC SH LAM VUG
19	2583-84	14.5	59.2	0	12.44	8.60	2.84	DOL CRM-M GY F-M XL SUC CALC ARG MIC ANHY VUG
20	2584-85	14.4	34.4	0	46.57	21.44	2.80	DOL CRM-M GY F-M XL SUC CALC V VUG
21	2586-87	13.4	51.3	0	32.72	9.96	2.83	DOL M GY F-M XL CALC XL SUC CALC MIC ANHY SH LAM VUG
22	2587-88	13.6	33.3	0	6.64	5.61	2.83	DOL BU-M GY M XL XLN VUG CALC INTBD SH SLT TR EVAP
23	2589-90	21.6	58.2	0	135.50	130.61	2.82	DOL CRM GY M XL XLN VUG CALC SLTY
24	2590-91	10.0	60.5	0	7.97	3.76	2.85	DOL CRM-M GY F XL XLN VUG CALC CHKY EVAP
25	2591-92	10.8	37.5	0	1.53	.62	2.83	DOL CRM-MGY FXL XLN VUG CALC CHKY EVAP
26	2592-93	11.9	35.6	0	.72	.49	2.85	DOL BU-DK GY M XL XLN VUG CALC EVAP
27	2593-94	13.7	35.2	0	1.11	1.10	2.83	DOL BU-DK GY M XL XLN VUG CALC EVAP
28	2594-95	14.6	42.2	0	5.37	0	2.82	DOL BU-DK GY M XL XLN VUG CALC EVAP
29	2595-96	11.5	45.7	0	7.31	.57	2.84	DOL CRM-DK GY M XL XLN VUG CLC CHKY EVAP
30	2596-97	16.7	54.0	0	57.93	35.12	2.85	DOL CRM-DK GY M XL XLN VUG CALC CHKY EVAP

COMPANY Anadarko Production Co. WELL Walters A#1 and Nordling A#1
LOCATION Stevens County, Kansas
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ANADARKO
WELL: WALTERS A#1

SAMPLE NO.	SAMPLE DEPTH	POROSITY	SATURATION WATER	SATURATION OIL	PERMEABILITY K-MAX	PERMEABILITY K-MIN	GRAIN DENSITY	LITHOLOGY
31	2597-98	22.1	43.9	0	8.81	8.78	2.85	DOL DRM-DK GY M XL XLN VUG CALC CHKY EVAP
32	2598-99	21.5	48.2	0	3.70	2.97	2.85	DOL M BRN-M GY F XL XLN CALC ARG CHKY EVAP VUG
33	2599-00	14.9	44.4	0	2.48	1.99	2.86	DOL M-DK GY M XL XLN VUG CALC CHKY EVAP SH I.P.
34	2600-01	14.7	46.6	0	1.38	1.34	2.86	DOL M-DK GY M XL XLN VUG CALC CHKY EVAP SH I.P.
35	2601-02	14.2	41.2	0	5.97	5.23	2.86	DOL M-DK GY M XL XLN VUG CALC CHKY EVAP SH I.P.
36	2602-03	14.2	55.0	0	0	.03	2.85	DOL M-DK GY M XL XLN VUG CALC CHKY EVAP SH I.P.
37	2603-04	15.2	55.5	0	0	0.25	2.86	DOL M-DK GY M XL XLN VUG CALC CHKY EVAP SH I.P.
38	2604-05	17.3	26.1	0	5.73	5.16	2.86	DOL M-DK GY M XL XLN VUG CALC CHKY EVAP SH I.P. GLAUC
39	2605-06	20.3	43.9	0	82.14	46.82	2.86	DOL RDSH BRN-M GY F-M XL XLN VUG CALC CHKY EVAP SH LAM & STRGR GLAUC CLOSED VERT FRAC
40	2606-07	26.7	77.1	0	0	.07	2.86	DOL M BRN-M GY F XL SUC VUG CALC CALC XL ARG MIC ANHY GYP SL SIL
41	2629-30	7.3	90.4	0	2.25	.26	2.66	DOL M BRN-M GY F XL SUC CALC CALC XL ARG MIC ANHY GYP SL SIL CHLOR
42	2637-38	8.3	93.7	0	5.70	2.88	2.67	LS DK GY VF XL SUC CALC ARG MIC INTBD SH SL SIL
43	2640-41	17.3	54.9	0	1.85	1.62	2.83	DOL M-DK GY MKC XL SUC V CALC SH I.P.
44	2641-42	17.8	44.8	0	1.88	1.84	2.85	DOL CRM-LT GY F-M XL SUC VUG V CALC MIC SH I.P.
45	2642-43	14.8	88.2	0	0	2.2	2.67	LS WH-LT GY M XL SUC VUG CALC NOD OOL SH

ANADARKO
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SAMPLE NO.	SAMPLE DEPTH	POROSITY	SATURATION WATER	SATURATION OIL	PERMEABILITY K-MAX	PERMEABILITY K-MIN	GRAIN DENSITY	LITHOLOGY
46	2643-44	20.7	57.5	0	3.70	3.30	2.72	LS WH-LT-M GY VF XL VUG CALC NOD V DOL OOL SH LAM
47	2644-45	21.9	63.2	0	7.28	5.49	2.78	LS LT-M GY F XL SUC VUG CALC NOD V DOL OOL SH EVAP
48	2645-46	21.0	84.3	0	5.75	3.41	2.82	LS LT-M-DK GY F XL SUC VUG CALC NOD V DOL SH I.P. EVAP
49	2646-47	20.0	82.3	0	3.10	2.08	2.85	LS M-DK GY F XL SUC VUG V DOL SH I.P. EVAP FE MNRL
50	2647-48	17.6	45.5	0	1.19	.86	2.85	LS M-DK GY F XL SUC VUG V DOL SH I.P. EVAP FE MNRL
51	2648-49	20.6	57.6	0	4.05	3.86	2.85	LS M-DK GY F XL SUC VUG CALC NOD V DOL SH I.P. FOSS PE MNRL
52	2649-50	19.6	57.1	0	5.84	5.48	2.84	LS M-DK GY F XL SUC VUG CALC NOD V DOL SH I.P. FOSS PE MNRL
53	2650-51	18.5	54.2	0	4.05	3.66	2.85	LS M-DK GY F XL SUC VUG V DOL SH I.P. FOSS
54	2651-52	25.2	46.5	0	8.40	8.30	2.85	LS M-DK GY F XL SUC VUG V DOL SH I.P.
55	2652-53	20.3	63.2	0	3.76	3.60	2.84	DOL M GY CRPXLN CALC V DOL SH I.P. FE MNRL
56	2653-54	12.5	56.1	0	.40	.39	2.77	LS M GY CRPXLN CALC NOD INTBD SH
57	2654-55	10.1	59.7	0	.46	.37	2.72	LS M GY CRPXLN CALC NOD INTBD SH
58	2655-56	15.3	54.2	0	4.19	4.17	2.71	LS LT GY CRP-VFXLN CALC NOD OOL FE MNRL
59	2656-57	13.7	57.5	0	1.27	1.17	2.72	LS LT GY M XL ABNDT CALC XL EVAP FE MNRL
60	2657-58	11.4	53.0	0	.99	.97	2.73	LS CRM-LT GY F XL CALC XL EVAP FE MNRL

COMPANY Anadarko Production Co. WELL Walters A#1 and Nordling A#1
LOCATION Stevens County, Kansas
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ANADARKO
WELL: WALTERS A#1

SAMPLE NO.	SAMPLE DEPTH	POROSITY	SATURATION WATER	SATURATION OIL	PERMEABILITY K-MAX	PERMEABILITY K-MIN	GRAIN DENSITY	LITHOLOGY
61	2658-59	11.1	48.0	0	.27	.22	2.78	LS CRM-LT GY F XL CALC EVAP FE MNRL FOSS
62	2659-60	10.7	52.4	0	.09	.08	2.76	LS M-DK BRN F XL ABNDT CALC XL ARG EVAP FOSS
63	2660-61	9.6	46.5	0	.14	.02	2.75	LS M-DK BRN F XL ABNDT CALC XL ARG EVAP FOSS
64	2661-62	11.7	63.2	0	.10	.09	2.78	LS LT-M GY F XL CALC EVAP SH LAM FOSS
65	2662-63	3.8	97.3	0	4.10	3.10	2.71	LS DK GY F XL CALC ARG EVAP FE MNRL OOL SH I.P.
66	2663-64	5.6	59.0	0	.02	.01	2.71	LS M BRN-DK GY F XL CALC EVAP SH/CL I.P. OOL
67	2664-65	9.6	80.4	0	.25	.19	2.75	LS M-DK GY VF XL INTBD SH/CL LAM EVAP INCLU VERT FRAC
68	2665-66	9.2	97.2	0	4.64	3.84	2.70	LS M-DK GY VF XL INTBD SH/CL LAM SIL I.P.
69	2667-68	5.6	94.8	0	0	.04	2.71	LS M-DK GY VF XL MIC ANHY SH/CL I.P. SIL I.P.
70	2668-69	4.4	95.9	0	0	25.2	2.70	LS DK GY CRPXLN SH I.P. TR EVAP SLT
71	2669-70	12.0	93.6	0	0.	22.9	2.79	LS RD-BRN-GY CRPXLN ANHY GRAD SH
72	2670-71	11.5	99.8	0	0	2.8	2.63	SH RD BRN CHKY V CALC ANHY SLTY
73	2673-74	10.2	99.8	0	0	< .01	2.72	SH RD BRN CHKY V CALC ANHY SLTY
74	2690-91	20.7	16.9	0	5.09	5.07	2.72	DOL LT GY MIC XL SUC CALC CHKY ANHY GYP SH I.P.
75	2691-92	22.3	48.0	0	29.44	23.54	2.71	DOL LT GY MIC XL SUC CALC CHKY ANHY GYP SH I.P.

ANADARKO
WELL: WALTERS A#1

SAMPLE NO.	SAMPLE DEPTH	POROSITY	SATURATION WATER	SATURATION OIL	PERMEABILITY K-MAX	PERMEABILITY K-MIN	GRAIN DENSITY	LITHOLOGY
76	2692-93	23.0	50.4	0	29.57	23.27	2.69	DOL LT GY VF XL SUC CALC MIC EVAP FE MNRL
77	2693.8-94.6	19.4	76.9	0	0	35.0	2.70	DOL LT GY VF XL SUC CALC MIC EVAP FE MNRL
78	2694.6-95.3	15.5	49.9	0	0	3.0	2.72	LS LT-M GY VF XL SUC MIC EVAP FE MNRL
79	2696.4-97	15.1	93.4	0	0	.80	2.74	LS LT-M GY VF XL SUC MIC EVAP FE MNRL
80	2697-98	14.0	96.4	0	2.24	2.20	2.71	LS LT GY F XL SUC MIC EVAP CHK INCLU FOSS
81	2698-99	18.1	60.5	0	2.07	1.98	2.74	LS LT GY F XL SUC MIC EVAP CHK INCLU FOSS
82	2699-00	15.1	79.6	0	1.22	1.01	2.73	LS LT GY F XL SUC MIC EVAP CHK INCLU FOSS
83	2711.2-12	20.1	60.9	0	4.90	3.37	2.78	LS LT GY F XL SUC MIC EVAP CHK INCLU FOSS FE MNRL
84	2712-13	16.9	49.1	0	1.80	1.65	2.79	LS LT GY F-M XL SUC MIC EVAP CHK FOSS OOL GRNST SH SH LAM
85	2713-14	18.4	56.6	0	2.63	2.25	2.78	LS LT GY F-M XL SUC VUG EVAP CHK FOSS
86	2714-15	18.7	64.4	0	4.74	.46	2.77	LS LT GY M-CRS XL ARG EVAP CHK OOL GRNST
87	2715-16	17.9	66.8	0	4.09	4.07	2.74	LS LT-M GY F-M XL XLN ARG EVAP CHK FOSS
88	2716-17	18.1	65.7	0	5.54	5.41	2.75	LS LT-M GY F-M XL XLN ARG EVAP CHK FOSS
89	2717-18	18.4	67.6	0	6.06	6.04	2.74	LS LT-M GY F-M XL XLN ARG EVAP CHK FOSS
90	2718-19	17.3	63.5	0	2.60	2.44	2.76	LS LT-M GY F-M XL XLN ARG EVAP CHK FOSS

COMPANY Anadarko Production Co. WELL Walters A#1 and Nordling A#1
LOCATION Stevens County, Kansas
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ANADARKO
WELL: WALTERS A#1

SAMPLE NO.	SAMPLE DEPTH	POROSITY	SATURATION WATER	SATURATION OIL	PERMEABILITY K-MAX	PERMEABILITY K-MIN	GRAIN DENSITY	LITHOLOGY
91	2719-20	19.1	49.6	0	2.13	2.07	2.74	LS LT-M GY F-M XL XLN ARG EVAP CHK FOSS
92	2720-21	16.6	56.2	0	1.88	1.87	2.76	LS LT-M GY V-F XL CALC NOD ARG CHK FOSS OOL GRNST FE MNRL
93	2721-22	13.1	57.7	0	2.08	1.87	2.75	LS M-DK GY F XL XL ARG CHK FOSS OOL
94	2722-23	15.3	57.5	0	1.71	1.55	2.74	LS M-DK GY F XL XL ARG CHK FOSS OOL
95	2723-24	15.4	51.0	0	1.43	1.33	2.76	LS M-DK GY F XL XL ARG CHK FOSS OOL
96	2724-25	13.9	32.5	0	2.11	1.82	2.78	LS M-DK GY F XL XL ARG CHK FOSS OOL
97	2725-26	14.5	42.2	0	1.32	1.14	2.77	LS M BRN LT-M GY VF-F XL SUC CHK FOSS OOL GRNST
98	2726-27	17.0	42.6	0	1.12	1.04	2.77	LS M-DK GY VF XL SUC MIC EVAP FOSS FE MNRL
99	2727-28	17.3	46.6	0	7.16	6.32	2.72	DOL M-DK GY F XL SUC CALC MIC EVAP FOSS SH I.P.
100	2728-29	13.5	53.3	0	.76	.69	2.74	DOL M-DK GY F XL SUC CALC MIC EVAP FOSS SH I.P.
101	2729-30	12.9	52.4	0	.52	.17	2.75	DOL M-DK GY F XL SUC CALC MIC EVAP FOSS SH I.P.
102	2730-31	10.8	44.9	0	.47	.14	2.72	LS M-DK GY F XL XL SUC MIC EVAP FOSS SH I.P.
103	2731-32	10.3	73.3	0	.08	.07	2.72	LS M-DK GY F XL XL SUC MIC EVAP FOSS SH I.P.
104	2749-50	14.9	45.1	0	1.15	1.12	2.72	LS M-DK GY F XL XL SUC MIC EVAP FOSS SH I.P.
105	2750-52	15.7	41.1	0	20.07	2.53	2.75	LS LT GY-M BRN F XL XL SUC MIC EVAP FOSS SH I.P.

ANADARKO
WELL: WALTERS A#1

SAMPLE NO.	SAMPLE DEPTH	POROSITY	SATURATION WATER	SATURATION OIL	PERMEABILITY K-MAX	PERMEABILITY K-MIN	GRAIN DENSITY	LITHOLOGY
106	2751-52	18.4	46.7	0	3.35	3.11	2.73	LS LT GY-M BRN F XL XL SUC MIC EVAP FOSS SH I.P.
107	2752-53	16.6	43.4	0	3.39	2.99	2.73	LS LT GY-M BRN M XL XL CALC NOD MIC EVAP FOSS SH I.P.
108	2753-54	14.1	49.0	0	5.31	4.34	2.72	LS LT GY-M BRN M XL XL CALC NOD MIC EVAP FOSS SH I.P.
109	2754-55	15.0	63.3	0	1.34	1.34	2.75	LS LT BRN-M GY M XL XL CALC NOD MIC EVAP FOSS SH I.P. FE MNRL VERT FRAC & LGE INCLU
110	2755-56	15.8	53.9	0	1.31	1.29	2.74	LS LT BRN-M GY M XL XL CALC NOD MIC EVAP FOSS SH I.P. FE MNRL VERT FRAC & LGE INCLU
111	2756-57	15.7	55.3	0	1.24	1.24	2.74	LS LT BRN-M GY M XL XL CALC NOD MIC EVAP FOSS SH I.P. FE MNRL VERT FRAC & LGE INCLU
112	2757-58	17.8	53.9	0	1.81	1.78	2.75	LS LT BRN-M GY M XL XL CALC NOD MIC EVAP FOSS SH I.P. FE MNRL VERT FRAC & LGE INCLU
113	2758-59	16.9	52.7	0	1.57	1.54	2.74	LS LT BRN-M GY M XL XL CALC NOD MIC EVAP FOSS SH I.P. FE MNRL VERT FRAC & LGE INCLU
114	2759-60	15.0	60.0	0	1.77	1.65	2.76	LS LT BRN-LT-M GY F XL XL CALC NOD EVAP FOSS OOL SH I.P. FE MNRL
115	2760-61	16.1	60.1	0	1.88	1.70	2.75	LS LT BRN-LT-M GY F XL XL CALC NOD EVAP FOSS OOL SH I.P. FE MNRL
116	2761-62	21.1	69.9	0	.69	.57	2.80	LS LT BRN-LT-M GY F XL XL CALC NOD EVAP FOSS OOL SH I.P. FE MNRL
117	2762-63	20.1	53.9	0	.85	.82	2.71	LS M-DK GY F-M XL XL CALC NOD MI8C EVAP FOSS OOL SH I.P. FE MNRL
118	2763-64	15.6	54.3	0	.97	.96	2.75	LS M-DK GY F-M XL XL CALC NOD MIC EVAP FOSS OOL SH I.P. FE MNRL
119	2764-65	13.7	47.6	0	.34	.33	2.77	LS M-DK GY F-M XL XL CALC NOD MIC EVAP FOSS OOL SH I.P. FE MNRL
120	2765-66	14.3	38.1	0	.38	.36	2.76	LS M-DK GY F-M XL XL CALC NOD MIC EVAP FOSS OOL SH I.P. FE MNRL

ANADARKO
WELL: WALTERS A#1

SAMPLE NO.	SAMPLE DEPTH	POROSITY	SATURATION WATER	SATURATION OIL	PERMEABILITY K-MAX	PERMEABILITY K-MIN	GRAIN DENSITY	LITHOLOGY
121	2766-67	12.3	92.8	0	.48	.47	2.71	LS M-DK GY F-M XL XL CALC NOD MIC EVAP FOSS OOL SH I.P. FE MNRL
122	2767-68	13.8	56.0	0	.59	.57	2.73	LS M-DK GY F-M XL XL CALC NOD MIC EVAP FOSS OOL SH I.P. FE MNRL
123	2768-69	12.0	55.2	0	.21	.20	2.73	LS M-DK GY F-M XL XL CALC NOD MIC EVAP FOSS OOL SH I.P. FE MNRL
124	2769-70	11.9	52.6	0	.23	.22	2.73	LS M-DK GY F-M XL XL CALC NOD MIC EVAP FOSS OOL SH I.P. FE MNRL
125	2770-71	13.6	59.2	0	.65	.23	2.71	LS M-DK GY F-M XL XL CALC NOD MIC EVAP FOSS OOL SH I.P. FE MNRL
126	2771-72	11.2	53.3	0	.17	.17	2.72	LS M-DK GY F-M XL XL CALC NOD MIC EVAP FOSS OOL SH I.P. FE MNRL
127	2772-73	13.5	48.9	0	.40	.39	2.75	LS M-DK GY F-M XL XL CALC NOD MIC EVAP FOSS OOL SH I.P. FE MNRL
128	2773-74	2.8	66.9	0	.07	.07	2.71	LS LT-M GY F-M XL XL CALC NOD MIC EVAP FOSS OOL SH I.P. FE MNRL
129	2802-03	4.2	95.8	0	0	.03	2.71	LS M-DK GY F-M XL XL CALC NOD MIC EVAP FOSS OOL SH I.P. FE MNRL
130	2803-04	8.9	60.2	0	0	.25	2.71	LS M-DK GY F-M XL XL CALC NOD MIC EVAP FOSS OOL SH I.P. FE MNRL
131	2804-05	8.0	51.1	0	.24	.15	2.73	LS M-DK GY F-M XL XL CALC NOD MIC EVAP FOSS OOL SH I.P. FE MNRL
132	2805-06	9.1	34.5	0	.03	.03	2.70	LS M-DK GY F-M XL XL CALC NOD MIC EVAP FOSS OOL SH I.P. FE MNRL STYL
133	2806-07	10.5	29.3	0	0	.07	2.69	LS M-DK GY F-M XL XL CALC NOD MIC EVAP FOSS OOL SH I.P. FE MNRL STYL
134	2807-08	7.8	51.9	0	0	.03	2.68	LS M-DK GY F-M XL XL CALC NOD MIC EVAP FOSS OOL SH I.P. FE MNRL
135	2808-09	10.0	55.8	0	.18	.18	2.68	LS M-DK GY F-M XL XL CALC NOD MIC EVAP FOSS OOL SH I.P. FE MNRL

ANADARKO
WELL: WALTERS A#1

SAMPLE NO.	SAMPLE DEPTH	POROSITY	SATURATION WATER	SATURATION OIL	PERMEABILITY K-MAX	PERMEABILITY K-MIN	GRAIN DENSITY	LITHOLOGY
136	2809-10	11.3	53.0	0	.52	.49	2.67	LS M-DK GY F-M XL XL CALC NOD MIC EVAP FOSS OOL SH I.P. FE MNRL
137	2810-11	11.2	59.8	0	.21	.21	2.68	LS M-DK GY F-M XL XL CALC NOD MIC EVAP FOSS OOL SH I.P. FE MNRL
138	2834-35	2.4	98.8	0	0	.03	2.68	LS M-DK GY F-M XL XL CALC NOD MIC EVAP FOSS OOL SH I.P. FE MNRL
139	2835-36	4.4	83.1	0	0	.08	2.69	LS M-DK GY F-M XL XL CALC NOD MIC EVAP FOSS OOL SH I.P. FE MNRL
140	2836-37	6.7	69.4	0	0	.09	2.70	LS M-DK GY F-M XL XL CALC NOD MIC EVAP FOSS OOL SH I.P. FE MNRL
141	2837-38	7.8	92.5	0	0	.09	2.71	LS M-DK GY F-M XL XL CALC NOD MIC EVAP FOSS OOL SH I.P. FE MNRL
142	2838-39	5.2	93.0	0	0	.04	2.70	LS LT-M GY F-M XL MIC CALC NOD CHK EVAP FOSS SH I.P. FRAC
143	2839-40	8.0	66.0	0	0	.15	2.71	LS LT-M GY F-M XL MIC CALC NOD CHK EVAP FOSS SH I.P. CLOSED VERT FRAC
144	2840-41	9.8	61.9	0	0	.02	2.73	LS LT-M GY F-M XL NIC CALC NOD CHK EVAP FOSS SH I.P. HORZ & VERT CLOSED FRAC
145	2841-42	9.3	62.1	0	0	.62	2.75	LS LT-M GY F-M XL MIC CALC NOD CHK EVAP FOSS SH I.P. FRAC
146	2842-43	8.9	56.1	0	.29	.28	2.73	LS LT-M GY F-M XL MIC CALC NOD CHK EVAP FOSS SH I.P.
147	2851-52	4.9	95.5	0	.04	.03	2.69	LS LT-M GY F-M XL MIC CALC NOD CHK EVAP FOSS SH I.P. SH & CL LAM
148	2852-53	10.4	61.1	0	.23	.21	2.74	LS LT-M GY F-M XL MIC CALC NOD CHK V FOSS SH I.P. SH STRGR
149	2853-54	12.3	54.5	0	1.19	1.12	2.73	LS LT-M GY F-M XL MIC ANHY INCLU V FOSS SH I.P.
150	2854-55	10.2	57.1	0	.57	.55	2.75	LS LT-M GY F-M XL MIC ANHY INCLU V FOSS SH I.P.

COMPANY Anadarko Production Co. WELL Walters A#1 and Nordling A#1
LOCATION Stevens County, Kansas
FILE NUMBER DS109 - Miazaki

ANADARKO
WELL: WALTERS A#1

SAMPLE NO.	SAMPLE DEPTH	POROSITY	SATURATION WATER	SATURATION OIL	PERMEABILITY K-MAX	PERMEABILITY K-MIN	GRAIN DENSITY	LITHOLOGY
151	2855-56	12.3	58.3	0	.85	.83	2.74	LS LT-M GY F-M XL MIC ANHY INCLU V POSS SH I.P.
152	2856-57	12.4	52.1	0	.85	.82	2.72	LS LT-M GY F-M XL MIC ANHY INCLU V FOSS SH I.P.
153	2857-58	12.7	60.5	0	.88	.84	2.71	LS LT-M GY F-M XL MIC ANHY INCLU V FOSS SH I.P.
154	2858-59	10.2	60.2	0	.40	.38	2.69	LS LT-M GY F-M XL MIC ANHY INCLU V FOSS SH I.P.
155	2859-60	7.3	81.7	0	.06	.05	2.73	LS LT-M GY F-M XL MIC V FOSS CHK SH I.P.

ANADARKO PRODUCTION CO
WELL: NORDLING A #1

SAMPLE NO.	SAMPLE DEPTH	POROSITY	SATURATION WATER	SATURATION OIL	PERMEABILITY K-MAX	PERMEABILITY K-MIN	GRAIN DENSITY	LITHOLOGY
1	2564-65	18.0	65.9	0	8.17	7.05	2.71	DOL WH-LT GY VFXLN SUC QTZTC V CALC SH STRGR SLTY MIC CHKY GRAD FROM SH TO DOL
2	2565-66	16.4	82.1	0	8.18	6.49	2.72	DOL LT GY-TN VFXLN SUC QTZTC V CALC MIC CHKY SH STRGR SLTY ANHY INCLU
3	2566-67	16.7	81.2	0	7.44	7.17	2.71	DOL LT GY-TN VFXLN SUC QTZTC V CALC V MIC CHKY ANHY STRGR
4	2567-68	14.1	74.7	0	5.39	5.32	2.73	DOL LT GY-TN VF XLN SUC QTZTC V CALC MIC CHKY ANHY IN PART
5	2568-69	3.1	69.4	0	.11	.09	2.79	DOL LT-M GY VF XLN SUC QTZTC CALC MIC CHKY ANHY IN PART ARG
6	2571-72	12.8	67.4	0	4.19	3.77	2.76	DOL LT GY-LT TN FXLN SUC QTZTC CALC MIC CHKY ABDNT AHHY INCLU & STRGR V ARG
7	2572-73	13.6	66.6	0	5.61	5.44	2.77	DOL LT BRN-LT-M GY F XLN SUC QTZTC CALC MIC CHKY ANHY IN FILL SH STRGR V ARG
8	2573-74	13.3	67.3	0	3.09	3.06	2.76	DOL TN-LT-M GY VFXLN SUC QTZTC CALC MIC V CHKY ANHY INFILL SH STRGR SLTY SALINE XL
9	2574-75	12.1	58.0	0	2.76	2.40	2.78	DOL TN-LT GY VF XLN SUC QTZTC CALC MIC CHKY ANHY IN FILL/SH STRGR SALINE XLN
10	2575-76	8.6	62.6	0	4.23	2.67	2.79	DOL M-DK GY VFXLN SUC CALC MIC V CHKY ABDNT AN-HY INCLU/SH STRGR GRAD-SH
11	2576-77	13.0	61.7	0	1.64	1.10	2.76	DOL M-DK GY VF-FXLN SL CALC ABDNT ANHY INCLU MIC SH&SLTY I.P./OCC QTZ GR
12	2581-82	12.8	68.7	0	.54	.47	2.78	DOL M-DK GY VF-FXLN CALC ABDNT ANHY INCLU MIC SLTY TR CL
13	2582-83	16.9	76.4	0	8.23	7.21	2.73	DOL M-DK GY VF-FXLN CALC MIC ANHY INFILL SH I.P.
14	2583-84	21.1	73.3	0	8.85	7.62	2.72	DOL M-DK GY VF-F XLN SL CALC MTC ANHY/CL IN SH STRGRS
15	2595-96	15.8	42.4	0	1.27	1.19	2.87	DOL M-DK GY F XLN VUG CALC ANHY CL &SH I.P./QTZ GR SOLUTION PASSAGES

COMPANY Anadarko Production Co. WELL Walters A#1 and Nordling A#1
LOCATION Stevens County, Kansas
FILE NUMBER DS109 - Miazaki

ANADARKO PRODUCTION CO
WELL: NORDLING A #1

SAMPLE NO.	SAMPLE DEPTH	POROSITY	SATURATION WATER	SATURATION OIL	PERMEABILITY K-MAX	PERMEABILITY K-MIN	GRAIN DENSITY	LITHOLOGY
16	2596-97	13.9	42.2	0	1.45	1.15	2.88	DOL M BRN-M-DK GY VF XLN V VUG V CALC LGE ANHY INCLU SH&CL FILLED & I.P. SOLUTION PASSAGES
17	2597-98	16.4	71.6	0	1.72	1.26	2.88	DOL M BRN-DK GY VFXLN V VUG CALC/CALC XL ANHY INCLU CL&SH I.P. SOLUTION PASSAGES
18	2598-99	16.7	63.0	0	14.04	7.72	2.87	DOL LT GY FXL V VUG CALC XL & IN VUG LGE ANHY INCLU CL&ANHY INFILL OPEN VER FRAC SOLUTION PASS
19	2599-2600	8.9	47.9	0	.25	.18	2.83	DOL M GY FXLN V VUG CALC XL & INVUGS LGE ANHY INCLU CL&SH/ANHY INFILL & FRAC SOLUTION PASSAGES
20	2600-01	9.3	28.6	0	.01	<.01	2.86	DOL M GY FXL V VUG CALC XL & IN VUG ANHY/CL & SH IN FILL SOLUTION PASSAGE
21	2601-02	15.2	48.1	0	8.51	8.21	2.85	DOL M GY FXL CALC XL V VUG ANHY & CL INFILL OP-EN VERT FRAC SOLUTION PASSAGE
22	2603-04	14.7	33.5	0	31.15	9.48	2.86	DOL M GY F XL CALC XL V VUG ANHY/CL IN FILL OPEN VERT FRAC & CLOSED HOR FRAC SOLUTION PAS-SAGES
23	2604-05	18.7	41.6	0	29.77	21.22	2.85	DOL M GY FXL CALC XL V VUG ANHY/CL & SH INFILL OPEN VERT FRAC SOLUTION PASSAGE
24	2605-06	14.0	27.3	0	2.64	.88	2.86	DOL M GY FXL CALC XL V VUG ANHY/CL INFILL SOLUTION PASSAGE
25	2606-07	12.4	28.7	0	.23	.18	2.86	DOL M-DK GY F XL CALC XL V VUG ANHY /CL&SH IN FILL SOLUTION PASSAGES
26	2607-08	18.1	39.9	0	14.83	14.60	2.86	DOL M-DK GY F XL CALC XL V VUG ANHY/CL&SH IN FILL ANHY FILLED FRAC SOLUTION PASSAGES
27	2608-09	19.9	42.6	0	19.33	13.20	2.86	DOL M-DK GY F XL CALC XL V VUG ANHY/CL IN FILL OPEN VERT FRAC SOLUTION PASSAGES
28	2609-10	16.4	30.9	0	3.93	2.67	2.86	DOL M-DK GY FXL CALC XL V VUG ANHY/CL & SH IN-FILL FOSS SOLUTION PASSAGE
29	2610-11	13.0	38.6	0	1.66	1.17	2.85	DOL M-DK GY FXL CALC XL V VUG ANHY/CL & SH IN-FILL FOSS GRAD-MORE SHLY MATERIAL SOLUTION PASS.
30	2611-12	14.6	34.2	0	2.13	1.19	2.87	DOL M-DK GY FXL CALC XL V VUG ANHY/CL & SH IN-FILL FOSS GRAD-MORE SHLY MATERIAL SOLUTION PASS.

ANADARKO PRODUCTION CO
WELL: NORDLING A #1

SAMPLE NO.	SAMPLE DEPTH	POROSITY	SATURATION WATER	SATURATION OIL	PERMEABILITY K-MAX	PERMEABILITY K-MIN	GRAIN DENSITY	LITHOLOGY
31	2612-13	18.9	33.9	0	1.48	.56	2.87	DOL M-DK GY F XL CALC XL V VUG ANHY/CL&SH IN FILL FOS GRAD-MORE SHLY MATERIAL SOLUTION PASSAGES
32	2613-14	13.4	36.6	0	1.17	1.04	2.87	DOL M-DK GY F XL CALC XL V VUG ANHY/CL&SH IN FILL FOS GRAD-MORE SHLY MATERIAL SOLUTION PASSAGES
33	2614-15	17.3	37.6	0	9.33	8.43	2.86	DOL M-DK GY F XL CALC XL V VUG ANHY/CL&SH IN PART FOS GRAD-MORE SHLY MATERIAL SOLUTION PASSAGES
34	2616-17	18.8	48.6	0	21.62	.25	2.86	DOL M-DK GY F XL CALC XL V VUG ANHY/CL&SH IN FILL FOS GRAD-MORE SHLY MATERIAL SOLUTION PASSAGES
35	2617-18	14.7	47.4	0	.10	<.01	2.86	DOL M-DK GY F XL CALC XL V VUG ANHY/CL&SH IN FILL SOLUTION PASSAGES
36	2620-21	25.3	69.7	0	105.99	22.91	2.87	DOL M-DK GY F XL CALC XL V VUG ANHY/CL&SH IN FILL SOLUTION PASSAGES
37	2621-22	27.0	70.4	0	92.03	72.04	2.87	DOL M-DK GY F XL CALC XL V VUG ANHY/CL&SH IN FILL SOLUTION PASSAGES
38	2622-23	26.0	64.4	0	73.62	68.95	2.87	DOL M-DK GY VF-FXLN CALC XL V VUG ANHY/CL IN-FILL
39	2623-24	27.2	50.1	0	78.41	4.90	2.87	DOL M-DK GY VF-FXLN CALC XL V VUG ANHY/CL IN-FILL OPEN VERT FRAC
40	2624-25	23.8	53.3	0	47.69	43.38	2.87	DOL M GY VFXLN CALC XL V VUG ANHY/CL FILL & LGE INCLU
41	2625-26	24.6	66.0	0	40.82	39.21	2.87	DOL M GY VFXLN CALC XL V VUG ANHY/CL FILL & LGE INCLU
42	2626-27	24.1	57.1	0	33.75	25.71	2.86	DOL M GY VFXLN CALC XL V VUG ANHY/CL INFILL
43	2627-28	17.3	52.0	0	4.05	4.00	2.87	DOL M GY VFXLN CALC XL V VUG ANHY/CL INFILL & LGE INCLU SH STRGR
44	2628-29	18.7	54.4	0	1.80	1.80	2.85	DOL M-DK GY FXLN CALC XL VUG ANHY/CL INFILL & INCLU SH I.P.
45	2643-44	17.9	57.5	0	12.95	9.69	2.70	DOL M-DK GY F XL SL VUG LGE ANHY IN CLU/SH I.P. GRAD TO TIGHT CL/CL DOL

COMPANY Anadarko Production Co. WELL Walters A#1 and Nordling A#1
LOCATION Stevens County, Kansas
FILE NUMBER DS109 - Miazaki

ANADARKO PRODUCTION CO
WELL: NORDLING A #1

SAMPLE NO.	SAMPLE DEPTH	POROSITY	SATURATION WATER	SATURATION OIL	PERMEABILITY K-MAX	PERMEABILITY K-MIN	GRAIN DENSITY	LITHOLOGY
46	2644-45	16.8	53.9	0	5.53	5.29	2.71	DOL M-DK GY VFXLN SL VUG TR ANHY INCLU CL&SH I.P.
47	2645-46	13.2	66.6	0	1.13	.81	2.72	LS M GY-RDDSH BRN CRYPTOXLN SUC V ARG MIC SL SIL OPEN HOR & CLOSED VERT FRAC
48	2646-47	7.2	75.1	0	.24	.05	2.69	LS RDDSH-BRN VF XL SUC V ARG MIC SALINE XLN
49	2647-48	4.4	64.6	0	<.01	<.01	2.69	LS RDDSH BRN F XLN SUC V ARG MIC V SIL
50	2653-54	17.7	37.9	0	1.92	1.76	2.84	LS DK RDDSH BRN-DK GY VFXLN SUC V ARG MIC SIL ANHY/SH I.P.
51	2654-55	16.1	40.4	0	1.86	1.79	2.86	LS M-DK GY VF XL SUC V ARG MIC SIL ANHY INCLU CL/SH STRGRS & I.P.
52	2655-56	15.2	42.8	0	1.37	1.36	2.86	DOL CRM-LT GY VF XL CALC XL V VUG CALC/CL ANHY&SH IN FILL ANHY INCLU
53	2656-57	15.4	49.8	0	.52	.43	2.84	DOL M-DK Y VF XL CALC XL ANHY CL&SH FILLED VUGS
54	2657-58	14.6	51.5	0	.87	.86	2.78	DOL M-DK GY VFXLN CALC XL ANHY/ CL & SH INFILL VUG CL INCLU ANHY INCLU FOSS SALINE XL
55	2658-59	8.9	59.2	0	1.30	.37	2.70	DOL M-DK GY VFXLN CALC XL ANHY/ CL & SH IN VUG REXL FOSS SH STRGR SALINE XL
56	2659-60	10.1	43.9	0	.41	.22	2.71	DOL CRM-LT GY FXL V CALC VUG ANHY/CL & SH IN VUG REXL FOSS SH STRGR SALINE XL
57	2662-63	10.4	36.8	0	.46	.45	2.71	LS CRM-LT GY FXLN CALC NOD VUG ANHY INCLU CL/SH INFILL SH STRGR REXL FOSS
58	2663-64	10.6	41.2	0	.39	.38	2.71	LS CRM-LT GY FXLN CALC NOD CL/SH INFILL SH STRGR REXL FOSS STYL
59	2665-66	8.1	50.4	0	.13	.10	2.73	LS CRM-LT GY FXLN CALC XL VUG CALC MATERIAL/CL & SH IN VUG SALINE XL FOSS
60	2666-67	13.2	62.2	0	2.09	2.05	2.73	LS CRM-LT GY FXLN CALC XL VUG CALC MATERIAL/CL & SH INFILL SH STRGR

COMPANY Anadarko Production Co. WELL Walters A#1 and Nordling A#1
LOCATION Stevens County, Kansas
FILE NUMBER DS109 - Miazaki

SAMPLE NO.	SAMPLE DEPTH	POROSITY	SATURATION WATER	SATURATION OIL	PERMEABILITY K-MAX	PERMEABILITY K-MIN	GRAIN DENSITY	LITHOLOGY
61	2667-68	15.3	52.2	0	1.68	1.32	2.73	LS CRM-LT GY VF XL CALC XY VUG CALC MATERIAL/CL&SH IN FILL SALINE SH STRGR STY
62	2668-69	14.0	49.5	0	1.59	.59	2.76	LS CRM-LT GY VF XL CALC XL VUG CALC MATERIAL/CL&SH IN FILL SALINE SH STRGR OPEN VERT FRAC
63	2669-70	13.6	64.2	0	.76	.61	2.76	LS M-DK GY VF XL CALC XL V VUG LGE ANHY/CL&SH INCLU OPEN VERT FRAC GRAD-V XLN ANHY
64	2670-71	10.2	44.1	0	.11	.08	2.75	LS LT-M-DK GY F XL CALC XL&NOD ANHY ICNLU SH STRGR REXL FOSS STYL
65	2671-72	10.2	53.3	0	.10	.09	2.77	LS M-DK GY F XL ANHY INCLU SH I.P. FOSS V SALINE CHK
66	2672-73	12.6	52.9	0	.26	.25	2.78	LS M-DK GY VF XL ANHY INCLU CL/SH INFILL SH STRGRS
67	2705-06	14.6	59.3	0	2.96	2.80	2.71	LS LT GY VF XL CL&SH LAM INTBD/ANHY & SALINE MATERIAL
68	2706-07	18.1	72.0	0	5.52	2.76	2.69	LS LT GY CRYPTOXL VUG CL&ANHY IN FILGRAD-SH
69	2707-08	17.7	75.9	0	10.36	5.20	2.69	LS M-DK GY CRYPTOXL CL SH ANHY GRAD BACK TO CL ANHY & SALINE IN FILL
70	2711-12	13.6	71.6	0	.86	.32	2.70	LS M-DK GY CRYPTOXL SIL LGE ANHY/CL INCLU CL ANHY & SH IN FILL SALINE XL
71	2712-13	13.6	61.9	0	1.53	1.42	2.70	LS M-DK GY CRYPTOXL SIL ANHY&CL/SH I.P. SALINE XLN
72	2713-14	12.4	62.9	0	.95	.69	2.70	LS M-DK GY CRYPTOXL SIL ANHY&CL/SH I.P. SALINE XLN
73	2714-15	14.5	62.6	0	.77	.32	2.70	LS M-DK GY CRYPTOXL SIL V LGE ANHY/ CL INCLU SH I.P.& STRGRS OPEN HORZ FRAC
74	2715-16	16.9	76.4	0	1.00	.98	2.70	LS M-DK GY CRYPTOXL SIL V LGE ANHY/ CL INCLU SH I.P.& STRGRS
75	2717-18	12.9	66.3	0	.62	.40	2.70	LS M-DK GY CRYPTOXLN SIL V LGE ANHY INCLU CL/CH IN FL SH STRGRS REXL FOSS

COMPANY Anadarko Production Co. WELL Walters A#1 and Nordling A#1
LOCATION Stevens County, Kansas
FILE NUMBER DS109 - Miazaki

SAMPLE NO.	SAMPLE DEPTH	POROSITY	SATURATION WATER	SATURATION OIL	PERMEABILITY K-MAX	PERMEABILITY K-MIN	GRAIN DENSITY	LITHOLOGY
76	2718-19	11.7	60.0	0	.31	.23	2.71	LS M-DK GY CRYPTOXLN SIL V LGE ANHY INCLU CL/SH IN FL SH STRGRS REXL FOSS
77	2719-20	3.9	89.9	0	.10	.09	2.78	LS CRM-LT-M-DK GY VF XLN ANHY/CL&SH IN FILL SH STRGRS GRAD-V CLEAN LS ANHY I.P.
78	2720-21	3.9	60.8	0	.13	.11	2.85	LS CRM-LT-M-DK GY VF XL ANHY/CL&SH IN FILL SH STRGRS GRAD-V CLEAN LS ANHY I.P.
79	2722-23	15.5	54.9	0	.77	.75	2.75	LS WH-LT GY CRYPTOXLN CALC NOD V ARGREXL FOSS ANHY INCLU & IN FILL/CL
80	2723-24	15.3	70.5	0	1.56	1.42	2.70	LS WH-LT GY CRYPTOXLN CALC NOD V ARGREXL FOSS ANHY INCLU&IN FILL/CL
81	2724-25	13.9	61.8	0	.85	.81	2.72	LS WH-LT GY F XLN OOL GRNST CL&SH INFILL REXL FOSS SH STRGRS STYL
82	2725-26	9.6	61.6	0	.30	.10	2.75	LS M-DK GY CRYPTOXLN CL ANHY & SH INFILL V FOSS INTBD CL&SH STRGRS
83	2726-27	19.0	51.3	0	1.25	1.25	2.79	LS M-DK GY CRYPTOXLN CALC XL CL ANHY& SH IN FILL V POSS SALINE XLN
84	2727-28	17.7	54.6	0	1.20	1.14	2.77	LS M-DK GY CRYPTOXLN CALC XL CL ANHY&SH IN FIL V POSS SALINE XLN
85	2728-29	17.7	58.9	0	1.22	1.17	2.77	LS M-DK GY CRYPTOXLN CALC XL ANHY & SH IN FILL V FOSS SALINE XLN
86	2737-38	13.4	53.7	0	.66	.66	2.72	LS M-DK GY CRYPTOXLN CALC XL ANHY & SH IN FILL V POSS SALINE XLN
87	2738-39	10.0	50.8	0	.50	.42	2.79	LS M-DK GY F XL CALC NOD LGE ANHY INCLU CL&SH IN FILL V FOSS
88	2739-40	11.1	57.0	0	.19	.17	2.76	LS M-DK GY F XL CALC NOD LGE ANHY INCLU CL&SH IN FILL V FOSS
89	2740-41	17.0	55.5	0	2.44	1.30	2.72	LS LT-M GY CRYPTOXLN SUC QTZTC MIC CALC XLN CL/SH IN FILL ANHY INCLU
90	2741-42	18.6	54.8	0	8.15	4.17	2.70	LS LT-M GY CRYPTOXLN SUC QTZTC MIC CALC XLN ANHY IN FILL CL/SH STRGRS

COMPANY Anadarko Production Co. WELL Walters A#1 and Nordling A#1
LOCATION Stevens County, Kansas
FILE NUMBER DS109 - Miazaki

SAMPLE NO.	SAMPLE DEPTH	POROSITY	SATURATION WATER	SATURATION OIL	PERMEABILITY K-MAX	PERMEABILITY K-MIN	GRAIN DENSITY	LITHOLOGY
91	2742-43	15.1	60.7	0	2.75	2.06	2.72	LS M-DK GY CRYPTOXLN SUC MIC SL SIL ANHY INCLU & IN PILL/CL SH LAM GRAD-SH
92	2743-44	15.9	54.1	0	2.99	2.83	2.75	LS M-DK GY CRYPTOXLN SUC MIC SL SIL ANHY INCLU & IN FL /CL SH LAM GRAD-SH
93	2744-45	13.0	63.1	0	.91	.84	2.72	LS M-DK GY CRYPTOXLN SUC MIC SL SIL ANHY INCLU&IN FIL /CL SH LAM GRAD-SH
94	2745-46	14.0	67.2	0	.21	.19	2.73	LS M-DK GY CRYPTOXLN MIC LGE ANHY/CLINCLU SH I.P.
95	2746-47	12.5	58.1	0	2.12	.51	2.72	LS M-DK GY CRYPTOXLN MIC LGE ANHY/CLINCLU OPEN FRACT AROUND INCLU SH I.P. STYL FOSS
96	2747-48	5.8	90.4	0	.01	.01	2.69	LS DK GY CRYPTOXLN CALC XL ANHY/CL& SH I.P. REXL FOSS
97	2748-49	5.8	90.6	0	.01	.01	2.68	LS DK GY CRYPTOXLN CALC XL ANHY/CL &SH I.P. REXL FOSS GRAD-DENSE LS SL SIL/SH STRGRS
98	2749-50	7.1	89.8	0	.01	.01	2.67	LS LT-M GY CRYPTOXLN SUC SIL SH STRGRS V SLTY
99	2750-51	7.4	100.4	0	.03	.01	2.73	SH M-DK GY V CALC MIC ANHY INCLU SIL
100	2757-58	12.1	94.6	0	1.22	.26	2.71	SH M-DK GY V CALC MIC ANHY INCLU SIL
101	2758-59	10.3	95.4	0	.22	.14	2.69	SH M-DK GY V CALC MIC ANHY INCLU SIL
102	2759-60	7.2	95.1	0	.06	.06	2.70	SH M-DK GY V CALC MIC ABDNT ANHY INCLU&FILL SIL CL/ STRGRS
103	2764-65	* 13.2	57.1	0	.50	.48	2.72	LS CRM-LT GY F XL CALC XL OOL ANHY INCLU SALINE XLN
104	2765-66	12.9	59.4	0	.89	.87	2.70	LS CRM-LT GY F XL CALC XL OOL ANHY INCLU SALINE XLN SH STRGRS FOSS STYL
105	2766-67	12.6	66.9	0	.69	.65	2.69	LS LT-M GY F XL CALC XL VUG OOL ANHYINCLU CL/SH IN FL

COMPANY Anadarko Production Co. WELL Walters A#1 and Nordling A#1
LOCATION Stevens County, Kansas
FILE NUMBER DS109 - Miazaki

SAMPLE NO.	SAMPLE DEPTH	POROSITY	SATURATION WATER	SATURATION OIL	PERMEABILITY K-MAX	PERMEABILITY K-MIN	GRAIN DENSITY	LITHOLOGY
106	2767-68	15.4	60.8	0	.58	.56	2.74	LS LT-M GY F XL CALC XL VUG OOL ANHYINCLU CL/SH IN FL
107	2768-69	15.4	65.2	0	.77	.65	2.74	LS LT-M GY F XL CALC XL VUG OOL ANHYINCLU CL/SH IN FL STRGRS
108	2769-70	14.6	73.9	0	1.59	1.48	2.72	LS LT-M GY F XL CALC XL VUG OOL ANHYINCLU CL/SH IN FL SH STRGRS FOSS
109	2770-71	14.6	73.4	0	.95	.93	2.72	LS LT-M GY F XL CALC XL VUG OOL ANHYINCLU CL/SH IN FL SH STRGRS FOSS
110	2771-72	15.1	72.1	0	1.28	1.23	2.72	LS LT-M GY F XL CALC XL VUG OOL ANHYINCLU CL/SH IN FL SH STRGRS FOSS
111	2772-73	17.1	65.7	0	1.19	1.06	2.74	LS LT-M GY F XL CALC XL VUG OOL ANHYINCLU CL/SH IN FL SH STRGRS FOSS STYL
112	2773-74	15.6	62.9	0	1.17	.95	2.73	LS LT-M GY F XL CALC XL VUG OOL ANHYINCLU CL/SH IN FL SH STRGRS FOSS STYL
113	2774-75	16.2	61.4	0	1.09	1.07	2.74	LS M-DK GY F XL CALC XL VUG ANHY/CL & SH IN FILL FOSS
114	2775-76	15.6	71.0	0	.94	.92	2.75	LS M-DK GY F XL ANHY INCLU CL/SH IN FILL SH STRGRS FOSS
115	2776-77	16.5	71.2	0	2.90	2.90	2.75	LS M-DK GY F XL ANHY INCLU CL/SH IN FILL SH STRGRS FOSS
116	2777-78	15.3	70.8	0	1.44	1.30	2.76	LS M-DK GY F XL ANHY INCLU CL/SH IN FILL SH STRGRS FOSS
117	2778-79	15.4	66.7	0	1.53	1.52	2.74	LS M-DK GY F XL ANHY INCLU CL/SH INFILL SH STRGRS FOSS
118	2779-80	15.3	59.3	0	.89	.88	2.74	LS M-DK GY F XL ANHY INCLU CL/SH IN FILL SH STRGRS FOSS
119	2780-81	13.5	63.0	0	.56	.53	2.75	LS M-DK GY CRYPTOXLN ANHY INCLU CL/ SH IN FILL SALINE XLN FOSS
120	2781-82	13.7	58.9	0	.31	.30	2.75	LS M-DK GY CRYPTOXLN ANHY INCLU CL/ SH IN FILL SALINE XLN FOSS

COMPANY Anadarko Production Co. WELL Walters A#1 and Nordling A#1
LOCATION Stevens County, Kansas
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ANADARKO PRODUCTION CO
WELL: NORDLING A #1

SAMPLE NO.	SAMPLE DEPTH	POROSITY	SATURATION WATER	SATURATION OIL	PERMEABILITY K-MAX	PERMEABILITY K-MIN	GRAIN DENSITY	LITHOLOGY
121	2782-83	12.4	61.6	0	.34	.33	2.72	LS M-DK GY CRYPTOXLN ANHY INCL CLAY/SHALE INFILL SALINE XLN FOSS
122	2783-84	13.2	63.0	0	.70	.69	2.75	LS M-DK GY CRYPTOXLN ANHY INCL CLAY/SHALE INFILL SALINE XLN FOSS
123	2784-85	12.9	52.3	0	.57	.53	2.71	LS M-DK GY CRYPTOXLN ANHY INCL CLAY/SHALE INFILL SALINE XLN FOSS
124	2785-86	10.9	42.1	0	.24	.21	2.72	LS M-DK GY CRYPTOXLN ANHY INCL CLAY/SHALE INFILL SALINE XLN FOSS
125	2786-87	13.6	54.5	0	.40	.38	2.74	LS M-DK GY CRYPTOXLN ANHY INCL CLAY/SHALE INFILL SALINE XLN FOSS
126	2787-88	13.1	57.5	0	.32	.29	2.73	LS M-DK GY CRYPTOXLN ANHY INCLU CL/ SH IN FILL SALINE XLN FOSS
127	2788-89	12.1	55.8	0	.23	.22	2.71	LS M-DK GY CRYPTOXLN ANHY INCLU CL/ SH IN FILL SALINE XLN FOSS
128	2789-90	11.5	57.4	0	.17	.17	2.73	LS M-DK GY VF XLN ABDNT ANHY INCLU &FILL/CL&SH FOSS
129	2790-91	8.0	70.3	0	.01	.01	2.71	LS M-DK GY VF XLN ABDNT ANHY INCLU &FILL/CL&SH FOSS
130	2791-92	9.9	67.7	0	.08	.07	2.72	LS M-DK GY VF XLN ABDNT ANHY INCLU &FILL/CL&SH FOSS
131	2792-93	9.2	76.8	.0	.02	.02	2.71	LS M-DK GY VF XLN ABDNT ANHY INCLU &FILL/CL&SH FOSS
132	2793-94	11.1	69.8	0	.20	.14	2.72	LS M-DK GY VF XLN ABDNT ANHY INCLU &FILL/CL&SH FOSS
133	2794-95	8.2	64.6	0	.02	.02	2.69	LS M-DK GY VF XLN ABDNT ANHY INCLU &FILL/CL&SH FOSS
134	2795-96	8.4	86.7	0	.03	.03	2.66	LS M-DK GY VF XLN ABDNT ANHY INCLU &FILL/CL&SH FOSS
135	2796-97	9.0	91.8	0	.11	.08	2.66	LS M-DK GY VF XLN ABDNT ANHY INCLU &FILL/CL&SH FOSS

ANADARKO PRODUCTION CO
WELL: NORDLING A #1

SAMPLE NO.	SAMPLE DEPTH	POROSITY	SATURATION WATER	SATURATION OIL	PERMEABILITY K-MAX	PERMEABILITY K-MIN	GRAIN DENSITY	LITHOLOGY
136	2815-16	5.4	101.1	0	9.46	5.01	2.70	LS M-DK GY CRYPTOXLN CALC XL LGE ANHY INCLU CL/SH IN PILL REXL FOSS
137	2821-22	3.3	64.7	0	.04	.01	2.79	LS M-DK GY CRYPTOXLN CALC XL LGE ANHY INCLU CL&SH IN PILL REXL FOSS
138	2826-27	9.3	68.5	0	.10	.08	2.68	LS M-DK GY CRYPTOXLN SL QTZTC ABDNT SH STRGRS GRAD-SH
139	2727-28	8.3	92.1	0	6.68	6.08	2.69	LS M-DK GY CRYPTOXLN QTZTC ALTERNAT-ING LS&SH IN V ABDNT SH/CL STRGRS GRAD OUT OF SH
140	2828-29	33.1	14.4	0	9.95	9.95	3.73	LS M-DK GY CRYPTOXLN QTZTC ANHY INCLSH I.P. & STRGRS
141	2829-30	NN	NN	0	.01	.01	2.30	LS M-DK GY CRYPTOXLN QTZTC ANHY INCLSH I.P. & STRGRS
142	3830-31	4.8	98.4	0	.01	.01	2.62	LS M-DK GY CRYPTOXLN QTZTC ANHY INCLSH I.P. & STRGRS
143	2831-32	16.8	26.9	0	.01	.01	3.02	LS M GY CRYPTOXLN QTZTC ANHY INCLU SH I.P. & STRGRS
144	2856-57	10.2	58.5	0	.26	0	2.71	LS L-M GY F XLN CALC XL QTZTC ANHY INCLU SH&CL IN FL SALINE XLN
145	2857-58	NN	NN	0	.33	.19	2.71	LS LT-M GY F XLN CALC XL QTZTC LGE ANHY & CL INCLU SLAINE XLN
146	2858-59	2.7	117.7	0	.09	.03	2.66	LS LT-M-DK GY VF-F XLN LGE ANHY/CL INCLU SH STRGRS GRAD-SH FOSS

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