Core Lab
RESERVOIR OPTIMIZATION

Petroleum Services Division
6316 Windfern
Houston, Texas 77040 USA
Tel: 713-328-2565
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South Florida Water Management

EXPM - 1
Lake Okeechobee ASR Pilot Project
Martin County, Florida

CONVENTIONAL CORE ANALYSIS
FINAL REPORT
CL File No.: HOU-030903

November 24, 2004

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South Florida Water Management
P.O. Box 24682
West Palm Beach, FL 33416
Attn: Mr. Michael Bennett

Final Core Analysis Report
EXPM-1 Well
Lake Okeechobee ASR Pilot Project
Martin County, Florida
Core Lab File No. HOU-030903

Dear Mr. Bennett,

Conventional cores from the subject well were delivered to Core Laboratories' Houston, Texas facility via motor freight. Analysis was performed as directed by representatives of South Florida Water Management.

The following documentation includes procedures for sample preparation, petrophysical measurements, and the resultant data reported in tabular, digital, and graphical formats.

We appreciate this opportunity to be of service. If we can be of further assistance, please do not hesitate to contact us.

Sincerely,

CORE LABORATORIES

Michael R. Long
Laboratory Supervisor

SAMPLE PREPARATION & PETROPHYSICAL MEASUREMENTS

CORE LAYOUT: Upon arrival at the lab, the core was placed on a layout table and fitted together. Depth marks and orientation stripes were then placed on the core.

TOTAL CORE GAMMA: The natural gamma radiation count of the core was recorded as a function of depth. Results were recorded in API units of gamma activity. The instrument was calibrated against API standards and adjusted for background radiation.

CORE PHOTOGRAPHY: The core was photographed under white light conditions. An overview format was used.

PLUG DRILLING and TRIMMING: Plug samples were drilled at points designated by South Florida Water Management representatives. The 1.5-inch diameter plugs were drilled and clipped using nitrogen mist as the drilling and trimming lubricant. The plugs were faced with a diamond facing tool to provide right circular cylinders. Trimmed ends were catalogued and stored.

SAMPLE DRYING: All samples were dried in a convection oven at 240 degrees F. until weight stabilization was achieved.

GRAIN VOLUME: Direct grain volume measurements were made using an automated helium porosimeter. This instrument utilizes the principle of gas expansion as described by Boyle's Law. The instrument was calibrated daily and test standards were run to verify instrument accuracy.

GRAIN DENSITY: Calculated grain densities were obtained utilizing grain volume measurements and clean, dry sample weights. Grain densities were checked against lithology standards.

PLUG DIMENSIONS: Sample lengths and diameters were measured using digital metric calipers.

CMS-300 PLUG ANALYSIS:

A. PERMEABILITY "k": Permeability was measured by flowing helium from a reference cell of known volume through the plug samples. The downstream end of the plug was maintained at atmospheric pressure. The upstream pressure was initially at 240 psig and was allowed to decay through the sample. The pressure decay vs. time was monitored and recorded digitally. The net confining stress used for this project was 800 psig.

I. K-Klinkenberg: Unsteady state equations were used with time/pressure decay data to calculate the Klinkenberg slip corrected permeability at the designated net confining stress.

II. K-air: Permeability to air at the designated net confining stress was calculated from time/pressure decay data.

B. POROSITY: A reference cell of known volume was initially pressurized with helium to approximately 240 psig. As the pressure was allowed to expand into the core sample, pressure decay was monitored. At pressure equilibrium, Boyle's Law was used to compute pore volume. Pore volumes were measured at the designated net confining stress. Porosities were then calculated by using the pore volumes from the CMS-300 and the grain volumes from the automated porosimeter.

FULL DIAMETER SAMPLING: Twenty four (24) core segments were designated for full diameter analysis by South Florida Water Management representatives. The segments were shipped to Core Laboratories' Midland, Texas facility for analysis.

FULL DIAMETER GRAIN VOLUME: Direct grain volume measurements were made using a full diameter matrix cup and a calibrated Heise gauge porosimeter. This instrument utilizes the principle of gas expansion as described by Boyle's Law. Helium was used as the test gas. The instrument was calibrated daily and test standards were run.

FULL DIAMETER GRAIN DENSITY: Calculated grain densities were obtained utilizing direct grain volume measurement and clean, dry sample weight. Grain densities were checked against lithology standards.

FULL DIAMETER POROSITY: The bulk volume of each sample was determined using the full diameter DEB unit. The device uses Archimedes' principle of buoyancy to determine the bulk volume of large samples. Porosities were calculated using the bulk volume from the full diameter DEB and the grain volume from the matrix cup.

FULL DIAMETER SAMPLE DIMENSIONS: Sample length and diameter were measured using metric calipers.

FULL DIAMETER HORIZONTAL AND VERTICAL PERMEABILITIES: Each sample was placed in a full diameter Hassler cell. The confining pressure used was 400 psig. The permeability was measured by flowing air through the sample and measuring the flow rate and pressure drop across the sample with an air permeameter. The permeameter was calibrated before measurements were made and all applicable leak checks were performed.

THIN SECTION SAMPLES: Twenty four (24) thin sections samples were prepared using material from the full diameter samples. The completed thin sections were shipped to Dr. Hughbert Collier at Collier Consulting, Inc., 741 West College Street, Stephenville, TX, 76401.

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CL File No.: HOU-030903
Date: 11/14/03
Analyst(s): TW, LA, JH

CMS-300 CONVENTIONAL PLUG ANALYSIS

Sample Number	Depth	Net Confining Stress	Porosity	Permeability		b(He)	Beta	Alpha	Grain Density	Footnote
				Klinkenberg	Kair					
	ft	psig	%	mD	mD	psi	ft(-1)	microns	g/cm3	
A	926.60	800	41.37	211	235	5.39	1.66E+07	1.13E+01	2.706	
B	1060.00	800	16.94	4.62	5.26	7.87	3.90E+11	5.81E+03	2.704	
C	927.60	800	40.13	200	236	8.51	4.10E+07	2.64E+01	2.683	

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August 26, 2004

FULL DIAMETER CORE ANALYSIS

Sample Number	Depth Span (ft)	Permeability			Porosity (Helium) (%)	Grain Density (g/cm3)	Description
		(Maximum) Kair (mD)	(90 Deg) Kair (mD)	(Vertical) Kair (mD)			
1	916.3 - 16.9	3652	3089	1589	37.1	2.71	Lim, foss, sli moldic, chalk
2	917.7 - 17.7	499	469	361	46.1	2.70	Lim, foss, chalk
3	920.0 - 20.4	115	115	76.6	41.7	2.70	Lim, foss, chalk
4	925.7 - 26.2	228	228	228	41.6	2.71	Lim, foss, chalk
5	927.9 - 28.3	693	499	189	23.6	2.70	Lim, foss, sli chalk
6	931.3 - 31.7	33.9	31.7	3.12	40.1	2.70	Lim, foss, chalk
7	932.2 - 32.8	302	208	5.89	26.4	2.73	Lim, foss, rootlet, chalk
8	934.0 - 34.4	4.34	3.84	8.98	22.9	2.72	Lim, foss, sli chalk
9	1056.4 - 56.8	1557	1397	284	41.0	2.70	Lim, foss, chalk
10	1057.6 - 58.1	1052	989	286	45.7	2.70	Lim, foss, chalk
11	1059.7 - 60.1	124	81.3	19.1	40.4	2.68	Lim, foss, chalk, sli kerogen
12	1060.3 - 60.7	272	258	36.1	43.1	2.70	Lim, foss, chalk, sli kerogen
13	1064.0 - 64.3	3182	2175	16.2	40.2	2.71	Lim, foss, ool
14	1065.4 - 65.8	1337	1313	305	40.5	2.71	Lim, foss, ool
*15	1350.5 - 50.9		382	437	42.1	2.72	Lim, foss, ool
16	1352.7 - 53.1	579	384	16.7	42.3	2.68	Lim, foss, chalk, sli kerogen
17	1354.0 - 54.4	251	206	26.4	39.1	2.68	Lim, foss, chalk, tr kerogen
18	637.4 - 37.8	617	320	25.9	37.6	2.65	Lim, sli foss, clay, dessication frac
19	638.7 - 39.3	199	10.0	2.03	41.3	2.55	Mudstone, lmy, dessication frac
20	640.2 - 41.2	3010	204	< 0.01	46.3	2.46	Mudstone, lmy, dessication frac
21	641.2 - 42.0	0.05	< 0.01	< 0.01	50.9	2.40	Mudstone, lmy, dessication frac
22	642.0 - 42.9	3.18	2.7	< 0.01	49.1	2.48	Mudstone, lmy, dessication frac
23	643.9 - 44.4	0.86	0.75	< 0.01	41.5	2.60	Lim, clay, dessication frac
24	644.4 - 44.8	0.44	0.44	0.59	40.0	2.59	Lim, clay, dessication frac

* Indicates plug analysis.

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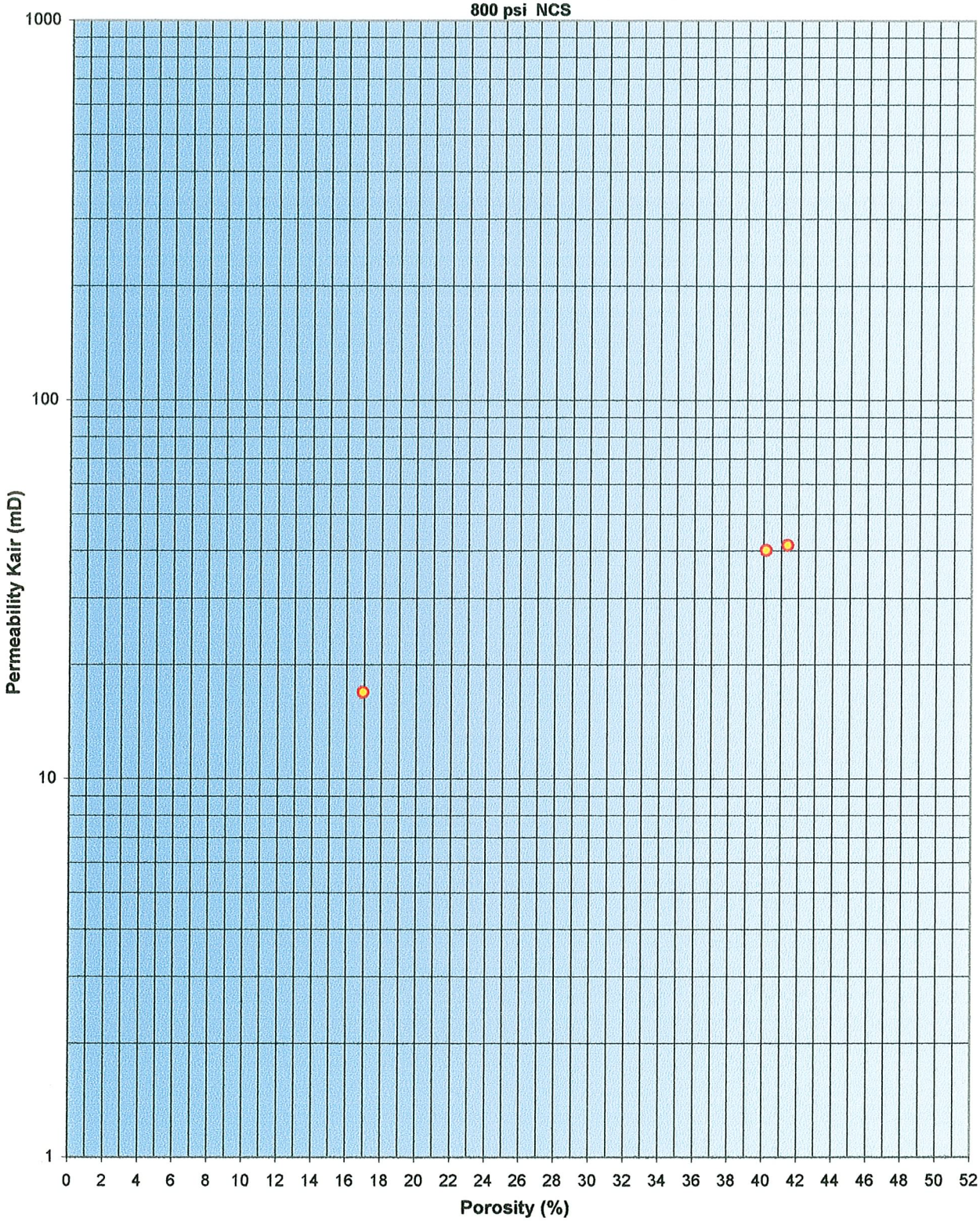
Permeability vs Porosity (Plug)

800 psi NCS



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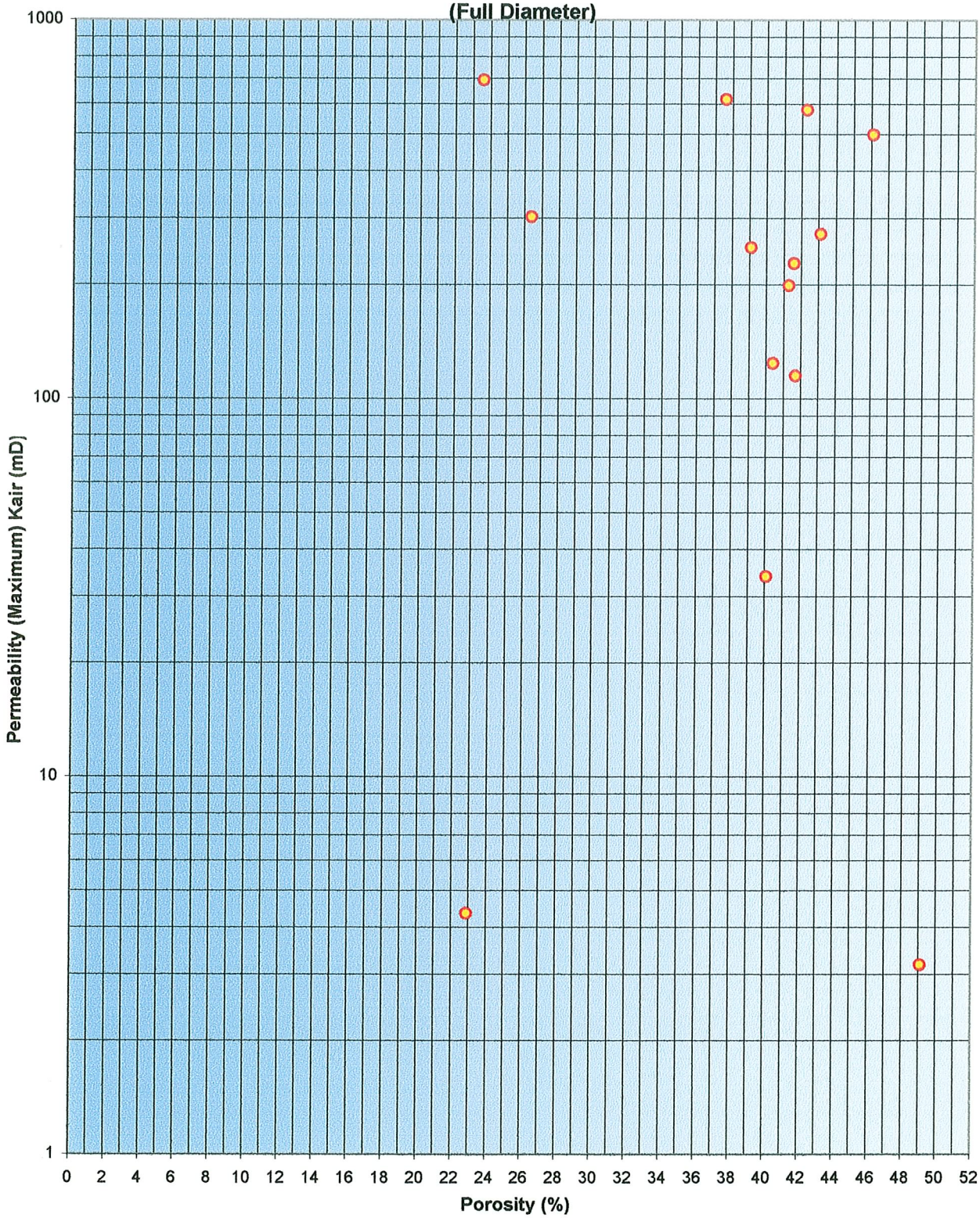
Permeability vs Porosity
(Full Diameter)



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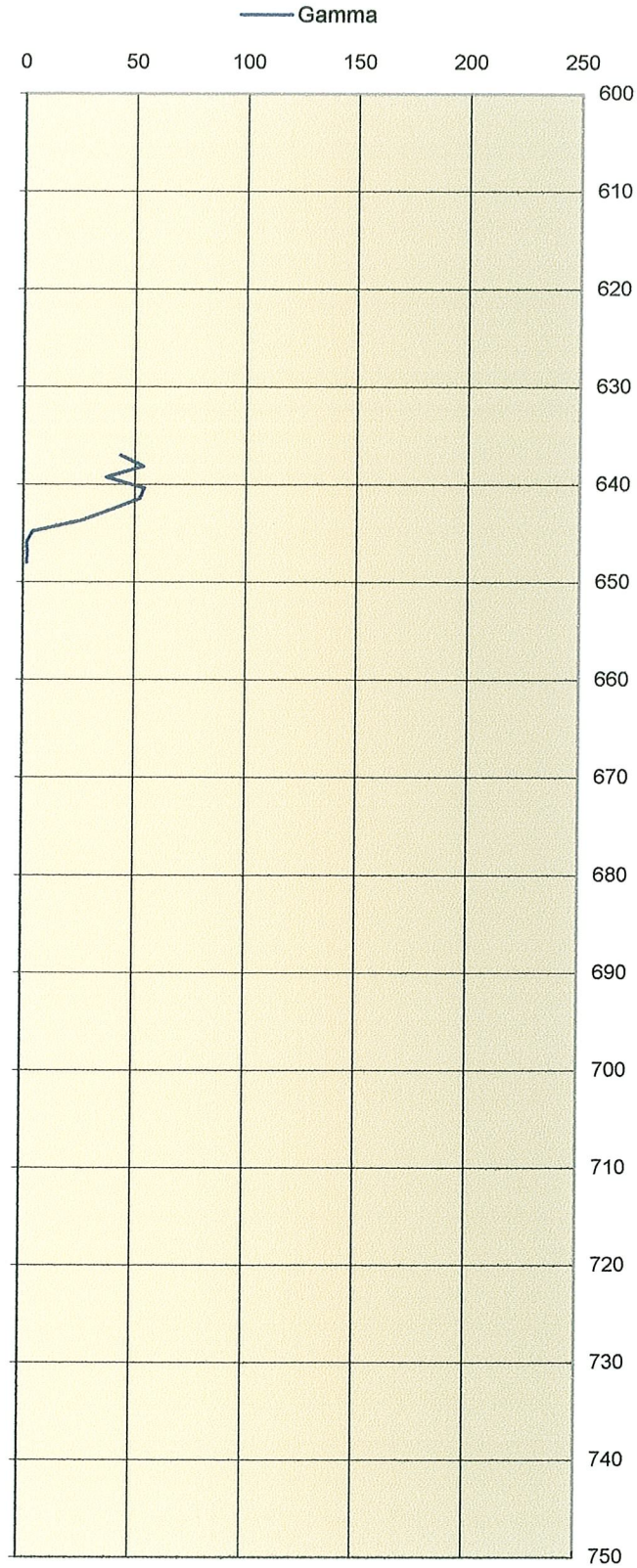
Core Gamma Log
(5" = 100')



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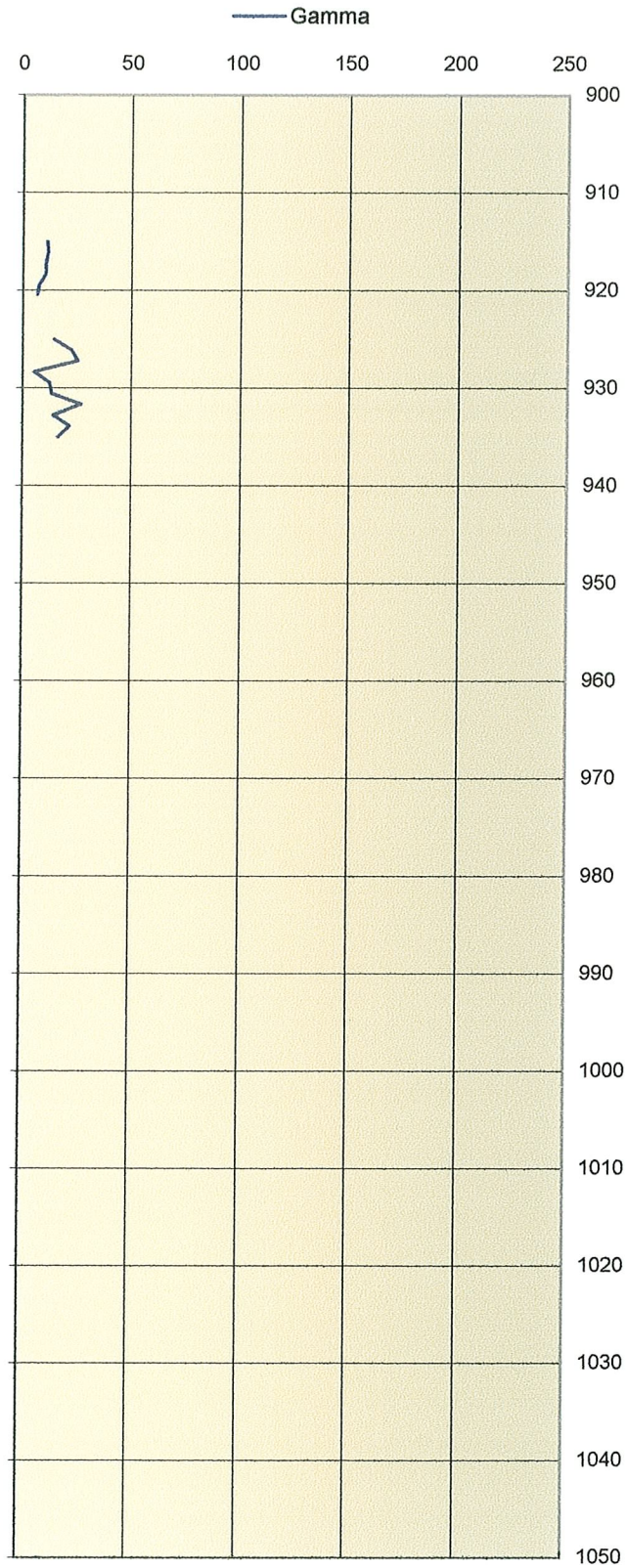

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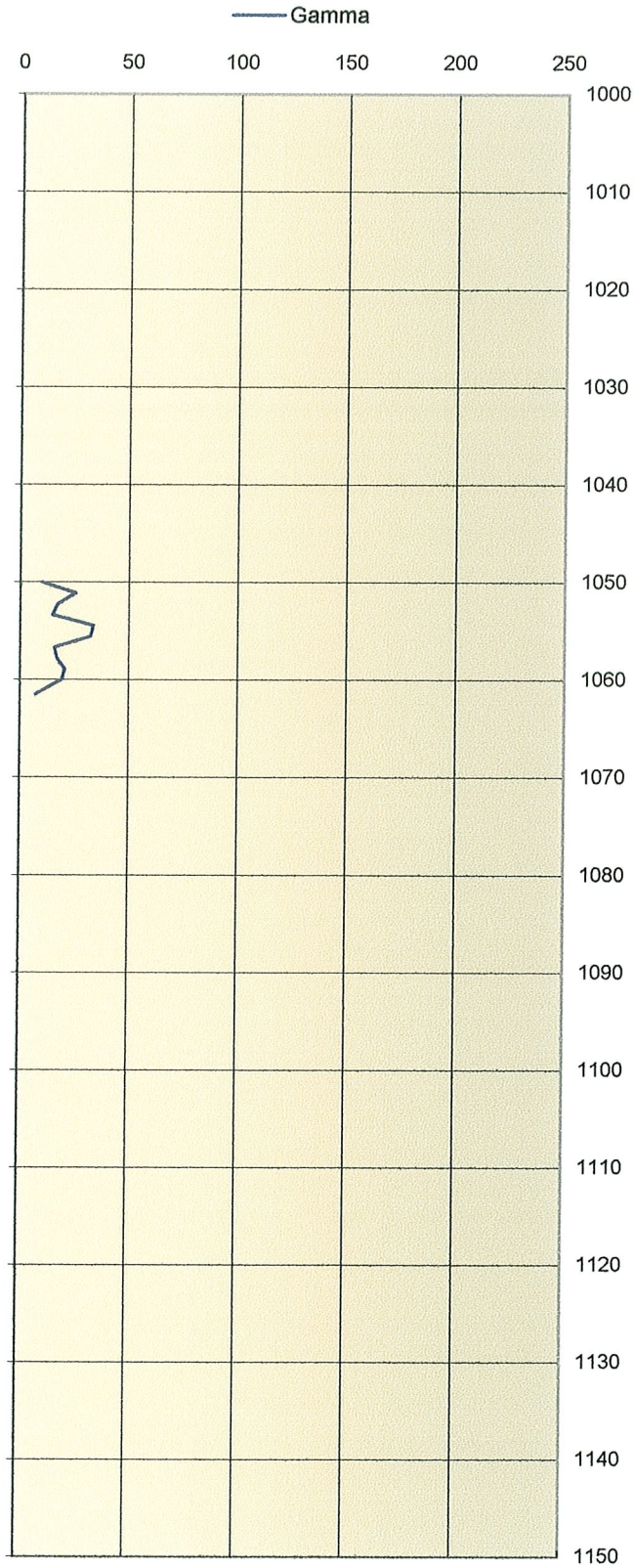

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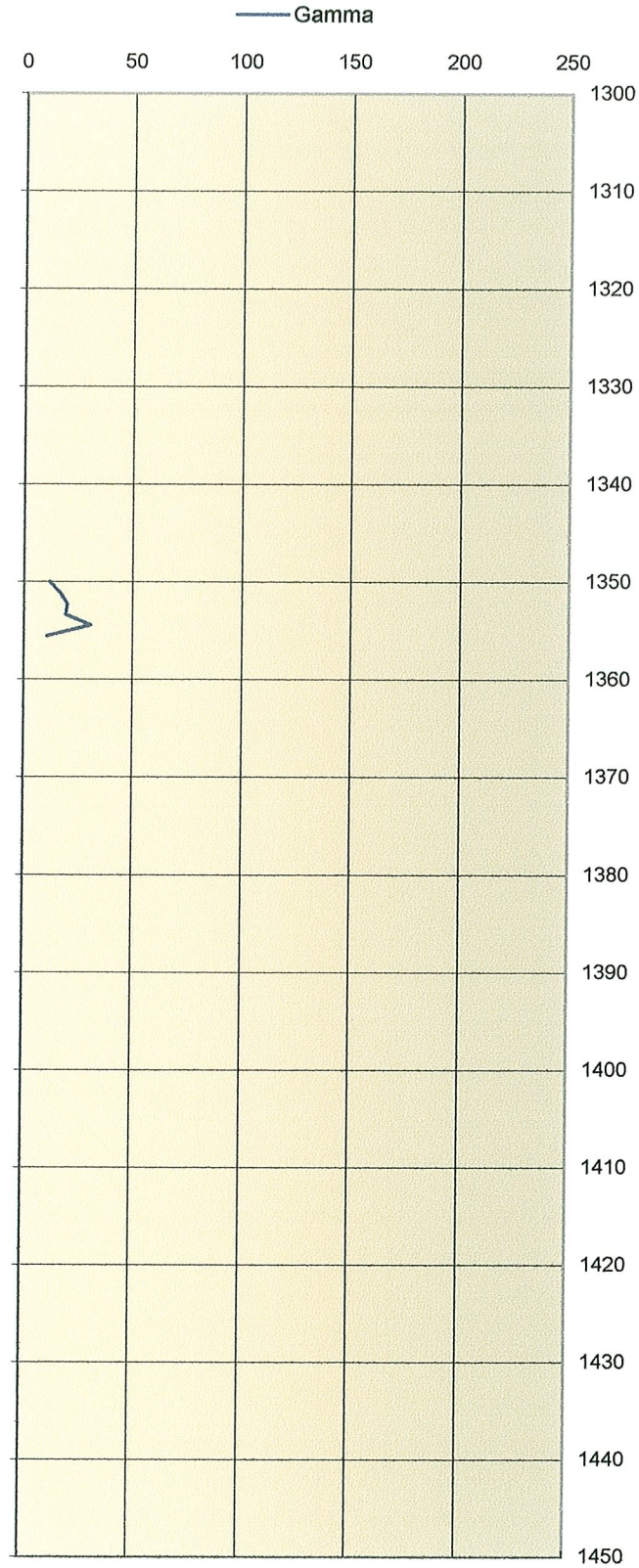

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APPENDIX A: EXPLANATION OF CMS-300 TERMS "b", "Beta, and "Alpha"

K_∞	=	Equivalent non-reactive liquid permeability, corrected for gas slippage, mD
K_{air}	=	Permeability to Air, calculated using K_∞ and b, mD
b	=	Klinkenberg slip factor, psi
β (Beta)	=	Forcheimer inertial resistance factor, ft^{-1}
α (Alpha)	=	A factor equal to the product of Beta and K_∞. This factor is employed in determining the pore level heterogeneity index, H_i.
H_i	=	$\log_{10}(\alpha\phi/RQI)$ α, microns = $3.238E^{-9}\ \beta K_\infty$
Ø	=	Porosity, fraction
RQI	=	Reservoir Quality Index, microns
RQI	=	$0.0314(K/\phi)^{0.5}$

For further information please refer to:

Jones, S.C.: "Two-Point Determination of Permeability and PV vs. Net Confining Stress" SPE Formation Evaluation (March 1988) 235-241.

Jones S.C.: "A Rapid Accurate Unsteady-State Klinkenberg Permeameter," Soc. Pet. Eng. J. (Oct. 1972) 383-397.

Jones, S.C.: "Using the Inertial Coefficient, β, To Characterize Heterogeneity in Reservoir Rock: SPE 16949 (September 1987).

Amaefule, J.O.; Kersey, D.G.; Marschall, D.M.; Powell, J.D.; Valencia, L.E.; Keelan, D.K.: "Reservoir Description: A Practical Synergistic Engineering and Geological Approach Based on Analysis of Core Data,: SPE Technical Conference (Oct. 1988) SPE 18167.

FINAL REPORT DISTRIBUTION

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1 copy to:

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West Palm Beach, FL 33416

1 copy to:

Mr. Hughbert Collier
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741 West College Street
Stephenville, TX 76401