20-33-33W
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CORE LABORATORIES

ANADARKO PETROLEUM CORPORATION
THOMPSON F-1H WELL
HUGOTON FIELD
SEWARD COUNTY, KANSAS

CL FILE NO. 57151-18061
FINAL REPORT

20-33-33W

CORELAB

PETROLEUM SERVICES

December 8, 1994

Anadarko Petroleum Corporation
17001 Northchase
Houston, Texas 77060
Attn: Mr. Ray Sorenson

Re: Core Analysis Report
Thompson F-1H
Hugoton Field
Seward County, Kansas
CL File No. 57151-18061

Dear Mr. Sorenson:

Cores from the subject well were retrieved at the wellsite by Core Laboratories' personnel and transported to the Hollister Road facility in Houston. Analysis was performed as directed by representatives of Anadarko Petroleum Corporation.

The following documentation includes: procedures for sample preparation and petrophysical measurements; a list of Houston laboratory personnel involved in this project; and the resultant data reported in tabular and graphical format. The type of equipment used in each procedure is also specified.

Upon completion of analysis, all core material was shipped to C & M Storage in Schulenburg, Texas, for permanent storage.

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

Core Laboratories, Inc.
5295 Hollister Road, Houston, Texas 77040, (713) 460-9600, Fax (713) 460-8275

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WELLSITE SERVICES

Personnel from Core Laboratories' Houston facility retrieved the core at the wellsite. The aluminum core barrel liner was wiped to remove drilling mud and marked with orientation lines and depth marks. An electric chop saw was used to cut the liner into 3 foot sections. All core material was then placed in a shipping crate and transported to the Hollister Road facility in Houston, where analysis was performed.

TOTAL CORE GAMMA

The core was removed from the aluminum liner, fitted together and depth labels were placed at one foot intervals. Orientation lines were also marked on the core surface. The natural total gamma radiation count of the core was then recorded as a function of depth. The instrument was calibrated against API standards and adjusted for background radiation.

CORE SLABBING

An automatic slab saw was used to cut the cores vertically into 1/3 - 2/3 sections. The core was oriented so that the slab face would expose the maximum bedding angle. Water was used as the blade coolant/lubricant.

PROFILE PERMEABILITY

The Pressure - Decay Profile Permeameter was used to measure permeabilities on the face of the one third portion of the slabbed core. Measurements were made at approximately 0.1 ft intervals. This device measures permeability by flowing nitrogen gas through a portion of the sample. The nitrogen flows from a selected reference volume into the sample through a probe which seats on the sample face using an o-ring seal. The permeability was calculated from the pressure decline data. Resultant data were used to select sample points for plug analysis.

SAMPLE PREPARATION

PLUG DRILLING and TRIMMING: Two (2) one-inch diameter plugs were drilled per foot of core, except in rubble intervals. A plug was taken in each foot at the 3 inch and 9 inch mark. All plugs were drilled in the same plane, parallel to maximum dip. The plugs were drilled and clipped using fresh water as the drilling and trimming lubricant. The plugs were faced with a diamond facing tool to provide right circular cylinders. Shale plugs were placed in lead sleeves with 60 mesh and 120 mesh stainless steel screens on each end. Trimmed ends for all plugs were catalogued and stored.

PLUG LEACHING: Samples were extracted of salts in a soxhlet extractor. Methanol was used as the leaching solvent. Extraction was continued until a test of the returning solvent with $AgNO_3$ solution yielded no precipitate. The methanol was maintained at approximately 150 degrees F. during the extraction process.

PLUG DRYING: Carbonate plugs were dried in a convection oven at 240 degrees F. Shale plugs were dried in a humidity oven at 140 degrees F. and 40% relative humidity. All plugs were dried until weight stabilization was achieved.

PETROPHYSICAL MEASUREMENTS

GRAIN VOLUME: Direct grain volume measurements were made using a small volume 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.

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

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

CMS-300 ANALYSIS:

A. PERMEABILITY "k": Permeability was measured by flowing helium from a reference cell at the selected pressure through the core. The size of the reference cell used is optimized during a pre-test flow through. The chambers available are approximately 2, 9, 56 and 315 cc's. The actual size of each cell is calculated during calibration procedures. The cell combination used varies with each sample. The downstream end of the core was maintained at atmospheric pressure. The upstream pressure decline was monitored in real time and recorded digitally. The difference between the confining stress and the mean pore pressure during flow is the net confining stress. The net confining stress used for this project was 800 psig.

   1. K-air: Permeability to air at 800 psig net confining stress was calculated from time pressure data.

   2. K-Klinkenberg: Unsteady state equations were used with time/pressure data to calculate the Klinkenberg slip corrected permeability at 800 psig net confining stress.

B. POROSITY: Pore volume was determined by expansion of helium into the core sample from a known volume source at approximately 240 psig. At pressure equilibrium, Boyle's Law was used to compute pore volume. Porosity was then calculated by using the pore volume from the CMS-300 and the grain volume from the Small Volume Porosimeter.

OTHER SERVICES

CORE PHOTOGRAPHY: The 1/3 section of the slabbed core was photographed under white light conditions. A "box" format, which displays an entire slab box in an 8 x 10 photo, was used. Two sets of the completed photographs were delivered to Mr. Ray Sorenson.

PETROLOGY: Selected samples were shipped to Core laboratories' Carrollton facility for SEM, XRD, thin section preparation, and detailed geologic descriptions. The results from these analyses were reported under separate cover.

CORE LABORATORIES

Company : ANADARKO PETROLEUM CORPORATION
Well : Thompson F-1H Well
Field : Hugoton Field
Country : Seward County, Kansas

CL File No : 57151-18061
Date : 19-Sept-1994
Analyst : MRL/MJK/JAW/MB

CMS-300 ANALYSIS

Sample Number	Depth ft	NOB Pressure psig	Pore Volume cc	Porosity %	Kinf md	Kair(est) md	b(He) psi	BETA ft(-1)	ALPHA microns	Grain Density g/cm3
				Core Number One 2645.0 - 2705.4 feet						
1	2645.25	800	3.08	16.2	2.466	3.162	16.67	2.41E+10	1.93E+02	2.84
2	2645.75	800	2.13	11.6	0.581	0.801	24.45	4.03E+11	7.60E+02	2.83
3	2646.25	800	2.82	15.1	1.592	2.091	19.06	4.56E+10	2.35E+02	2.83
4	2646.75	800	1.70	9.1	0.369	0.494	22.61	9.00E+11	1.08E+03	2.84
5	2647.25	800	3.36	19.4	6.551	8.241	14.39	4.39E+09	9.30E+01	2.82
6	2647.75	800	1.84	10.1	0.095	0.154	45.59	9.44E+12	2.90E+03	2.83
7	2648.25	800	2.17	12.9	2.195	2.626	11.70	7.47E+10	5.31E+02	2.84
8	2648.75	800	2.10	12.4	0.719	1.004	25.32	2.01E+11	4.68E+02	2.82
9	2649.25	800	2.08	12.4	0.869	1.148	20.31	1.71E+11	4.81E+02	2.83
10	2649.75	800	2.00	12.1	1.526	1.841	12.55	9.19E+10	4.54E+02	2.84
11	2650.25	800	1.89	11.9	0.399	0.557	26.31	1.14E+12	1.47E+03	2.83
12	2650.75	800	1.72	10.1	0.204	0.288	28.35	3.57E+12	2.36E+03	2.84
13	2651.25	800	1.30	9.1	0.274	0.306	7.85	1.93E+12	1.71E+03	2.83
14	2651.75	800	2.89	16.7	1.696	2.345	23.18	4.40E+10	2.42E+02	2.83
15	2652.25	800	2.73	15.1	3.760	4.533	11.85	1.48E+10	1.81E+02	2.84
16	2652.75	800	2.69	14.9	4.890	5.757	10.07	8.86E+09	1.40E+02	2.84
17	2653.25	800	2.61	14.6	1.672	2.205	19.29	4.17E+10	2.26E+02	2.84
18	2653.75	800	2.23	12.3	1.567	1.906	13.15	8.34E+10	4.23E+02	2.85

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CL File No : 57151-18061
Date : 19-Sept-1994
Analyst : MRL/MJK/JAW/MB

CMS-300 ANALYSIS

Sample Number	Depth ft	NOB Pressure psig	Pore Volume cc	Porosity %	Kinf md	Kair(est) md	b(He) psi	BETA ft(-1)	ALPHA microns	Grain Density g/cm3
19	2654.25	800	3.12	17.3	8.657	10.012	8.59	2.92E+09	8.18E+01	2.85
20	2654.75	800	2.90	15.7	17.049	18.886	5.69	2.43E+09	1.34E+02	2.85
21	2655.25	800	2.56	14.0	3.679	4.382	11.00	1.90E+10	2.27E+02	2.84
22	2655.75	800	2.06	11.1	4.396	4.824	5.56	5.29E+10	7.53E+02	2.83
23	2656.25	800	3.17	16.9	37.117	40.042	3.99	5.49E+08	6.60E+01	2.84
24	2656.75	800	3.09	16.7	5.387	6.550	12.19	5.18E+09	9.04E+01	2.84
25	2657.25	800	2.01	11.4	1.131	1.412	15.48	1.82E+11	6.68E+02	2.83
26	2657.75	800	3.01	16.1	14.389	16.040	6.12	1.56E+09	7.29E+01	2.84
27	2658.25	800	2.50	13.6	1.907	2.377	14.81	3.92E+10	2.42E+02	2.83
28	2658.75	800	1.37	7.8	0.028	0.050	63.05	6.09E+14	5.48E+04	2.82
29	2659.25	800	1.11	7.2	0.978	1.100	7.79	3.90E+11	1.23E+03	2.83
30	2659.75	800	2.31	10.6	0.975	1.251	17.78	3.57E+11	1.13E+03	2.83
31	2660.25	800	2.68	12.4	7.270	8.119	6.47	1.12E+10	2.63E+02	2.84
32	2660.75	800	3.27	15.0	17.033	18.471	4.46	5.03E+09	2.77E+02	2.84
33	2661.25	800	3.94	18.2	9.191	10.541	8.02	4.45E+09	1.32E+02	2.79
34	2661.75	800	2.35	10.8	0.320	0.512	40.53	2.88E+11	2.98E+02	2.80
35	2662.25	800	3.44	15.6	8.977	10.347	8.36	2.32E+09	6.75E+01	2.83
36	2662.75	800	2.77	12.7	2.014	2.527	15.25	2.68E+10	1.75E+02	2.83
37	2663.25	800	3.15	14.3	4.668	5.569	10.98	7.70E+09	1.16E+02	2.83
38	2663.75	800	4.71	22.1	25.062	28.221	6.52	8.16E+08	6.62E+01	2.73
39	2664.20	800	4.64	24.0	8.878	10.384	9.29	1.03E+09	2.95E+01	2.65

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CMS-300 ANALYSIS

Sample Number	Depth ft	NOB Pressure psig	Pore Volume cc	Porosity %	Kinf md	Kair(est) md	b(He) psi	BETA ft(-1)	ALPHA microns	Grain Density g/cm3
40	2664.65	800	2.31	11.4	1.402	1.729	14.26	1.18E+11	5.37E+02	2.83
41	2665.25	800	1.76	8.1	0.044	0.059	25.43	1.79E+15	2.57E+05	2.83
42	2665.65	800	3.60	16.5	0.335	0.484	29.73	9.37E+10	1.02E+02	2.72
43	2666.20	800	0.59	4.6	0.164	0.220	24.04	1.11E+11	5.86E+01	2.80
44	2666.75	800	2.26	10.4	1.303	1.647	16.19	6.36E+11	2.68E+03	2.84
45	2667.25	800	2.57	11.7	0.080	0.137	53.05	2.75E+13	7.13E+03	2.79
46	2667.75	800	2.37	10.9	3.865	4.458	8.83	1.59E+10	1.99E+02	2.84
47	2668.30	800	2.56	11.8	2.250	2.784	14.10	3.87E+10	2.82E+02	2.83
48	2668.75	800	1.36	10.1	0.339	0.471	26.19	1.65E+12	1.81E+03	2.84
49	2669.25	800	2.93	15.1	0.241	0.382	40.18	2.83E+12	2.21E+03	2.85
50	2669.75	800	3.32	15.3	3.380	3.935	9.53	3.02E+10	3.31E+02	2.84
51	2670.25	800	2.06	9.4	0.672	0.855	17.53	3.76E+11	8.18E+02	2.84
52	2670.75	800	4.06	18.5	23.358	25.910	5.67	4.24E+08	3.21E+01	2.83
53	2671.25	800	0.95	4.3	0.009	0.015	56.76	4.36E+15	1.28E+05	2.86
54	2671.75	800	2.75	12.5	1.133	1.424	15.95	1.40E+11	5.15E+02	2.84
55	2672.25	800	1.95	8.8	0.357	0.464	20.22	1.24E+12	1.43E+03	2.84
56	2672.80	800	2.64	12.2	2.241	2.681	11.69	2.69E+10	1.95E+02	2.85
57	2673.25	800	2.04	11.1	0.017	0.027	51.46	1.42E+15	7.70E+04	2.84
58	2673.75	800	0.95	4.3	0.005	0.010	88.04	1.59E+16	2.62E+05	2.84
59	2674.25	800	1.21	5.5	0.004	0.009	86.82	3.19E+14	4.56E+03	2.76
60	2674.75	800	1.43	6.5	0.004	0.009	103.79	7.91E+16	1.06E+06	2.75

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CMS-300 ANALYSIS

Sample Number	Depth ft	NOB Pressure psig	Pore Volume cc	Porosity %	Kinf md	Kair(est) md	b(He) psi	BETA ft(-1)	ALPHA microns	Grain Density g/cm3
61	2675.30	800	1.26	8.4	0.360	0.438	14.36	6.07E+11	7.08E+02	2.71
62	2675.75	800	1.25	6.1	0.014	0.029	86.18	2.10E+15	9.76E+04	2.78
63	2676.26		*3.00	*14.0						2.67
64	2678.40	800	1.78	8.1	0.008	0.015	87.67	1.19E+15	2.93E+04	2.79
65	2678.65	800	**.955	**4.3	<.001					2.81
66	2679.35	800	1.38	7.6	2.647	2.665	0.39	3.54E+10	3.04E+02	2.78
67	2679.75	800	1.50	6.7	2.441	2.600	3.95	0.00E+00	0.00E+00	2.78
68	2680.20	#								2.68
69	2680.70	800	1.57	7.8	3.014	3.171	3.11	2.44E+09	2.39E+01	2.74
70	2681.25	800	1.77	7.9	2.818	2.898	1.71	0.00E+00	0.00E+00	2.81
71	2681.75	800	1.64	10.0	3.622	3.778	2.49	0.00E+00	0.00E+00	2.76
72	2682.25	800	1.32	9.3	3.576	3.642	1.06	2.05E+10	2.37E+02	2.76
73	2682.70	#								2.72
74	2683.20		*1.741	*11.7						2.71
75	2683.75		*1.193	*8.1						2.71
76	2684.25	800	1.61	10.7	3.922	4.025	1.51	2.07E+10	2.62E+02	2.63
77	2684.55	800	2.12	10.8	3.885	4.157	4.02	1.43E+09	1.80E+01	2.71
78	2685.20	800	1.51	7.9	3.047	3.293	4.70	0.00E+00	0.00E+00	2.79
79	2685.75		*1.090	*7.9						2.58
80	2686.40		*1.239	*12.4						2.70
81	2686.70	800	1.28	5.8	0.034	0.046	28.24	1.34E+14	1.48E+04	2.83

CORE LABORATORIES

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CMS-300 ANALYSIS

Sample Number	Depth ft	NOB Pressure psig	Pore Volume cc	Porosity %	Kinf md	Kair(est) md	b(He) psi	BETA ft(-1)	ALPHA microns	Grain Density g/cm3
82	2687.30	800	1.62	7.3	0.004	0.008	115.86	1.11E+17	1.27E+06	2.83
83	2687.75	800	1.42	6.4	0.004	0.009	102.35	9.53E+16	1.29E+06	2.81
84	2688.25	800	1.75	8.9	3.917	4.024	1.62	8.09E+08	1.03E+01	2.76
85	2688.75	800	1.62	7.4	4.074	4.343	3.77	1.62E+09	2.13E+01	2.75
86	2689.40		*.924	*7.9						2.77
87	2689.75		*.491	*7.4						2.78
88	2690.25	800	**.798	**3.6	<.001					2.82
89	2690.75	800	1.41	6.5	0.018	0.028	40.54	8.02E+14	4.79E+04	2.83
90	2691.25	800	2.33	10.7	1.294	1.506	10.07	6.82E+10	2.86E+02	2.84
91	2691.75	800	1.23	5.7	0.004	0.009	105.67	3.22E+15	4.18E+04	2.83
92	2692.25	800	1.89	8.6	0.109	0.151	27.65	2.87E+12	1.01E+03	2.83
93	2692.75	800	1.35	6.1	0.002	0.005	116.20	2.07E+16	1.61E+05	2.83
94	2693.25	800	2.12	9.8	0.059	0.093	43.09	4.97E+13	9.52E+03	2.84
95	2693.75	800	1.43	6.5	0.010	0.013	26.61	5.94E+16	1.96E+06	2.82
96	2694.40	800	2.10	9.7	0.012	0.024	82.56	9.05E+15	3.59E+05	2.83
97	2694.75	800	1.07	6.7	0.006	0.012	97.87	2.07E+16	3.90E+05	2.83
98	2695.25	800	1.05	4.8	0.117	0.129	7.75	7.55E+12	2.85E+03	2.84
99	2695.75	800	0.89	5.9	0.002	0.004	132.06	6.62E+16	3.81E+05	2.84
100	2696.25	800	1.40	6.4	0.098	0.109	8.67	1.70E+12	5.37E+02	2.84
101	2696.25	800	**.798	**3.6	<.001					2.84
102	2697.20	800	1.89	13.5	5.623	6.451	8.28	2.67E+09	4.86E+01	2.83

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CMS-300 ANALYSIS

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103	2697.75	800	2.28	13.7	4.218	4.917	9.46	4.92E+10	6.72E+02	2.84
104	2698.20	800	2.30	10.6	1.464	1.788	13.47	9.40E+10	4.46E+02	2.83
105	2698.20	800	2.34	10.7	4.032	4.557	7.65	3.15E+10	4.12E+02	2.84
106	2699.25	800	1.95	9.0	0.581	0.708	14.15	7.80E+11	1.47E+03	2.86
107	2699.75	800	2.06	9.6	0.479	0.618	19.01	5.07E+11	7.86E+02	2.85
108	2700.25	800	2.25	10.4	1.537	1.783	9.72	1.65E+11	8.20E+02	2.86
109	2700.75	800	2.38	11.1	0.764	0.987	18.53	2.72E+11	6.73E+02	2.87
110	2701.25	800	1.97	9.0	0.264	0.348	21.81	1.17E+12	1.00E+03	2.85
111	2701.75	800	2.29	10.5	1.544	1.813	10.59	9.75E+10	4.87E+02	2.85
112	2702.25	800	2.61	12.0	5.971	6.586	5.77	1.80E+10	3.47E+02	2.84
113	2702.75	800	3.32	15.4	8.131	9.147	6.87	5.09E+09	1.34E+02	2.84
114	2703.25	800	3.93	18.3	5.969	7.161	11.18	4.35E+09	8.41E+01	2.84
115	2703.75	800	3.40	15.6	9.148	10.925	10.61	4.66E+09	1.38E+02	2.84
116	2704.25	800	1.85	14.9	2.511	2.946	10.23	9.78E+10	7.95E+02	2.85
117	2704.75	800	3.40	15.8	6.333	7.109	6.83	7.63E+09	1.56E+02	2.84
118	2705.25	800	2.69	12.5	3.037	3.463	8.17	4.19E+10	4.12E+02	2.83

* Unsuitable for CMS-300 analysis - Ambient data reported.
** Low permeability sample - Ambient Porosity and Pore Volume reported.
# Sample failed during testing.

CORRELATION COREGRAPH

ANADARKO PETROLEUM CORPORATION

Thompson F-1H Well

Hugoton Field

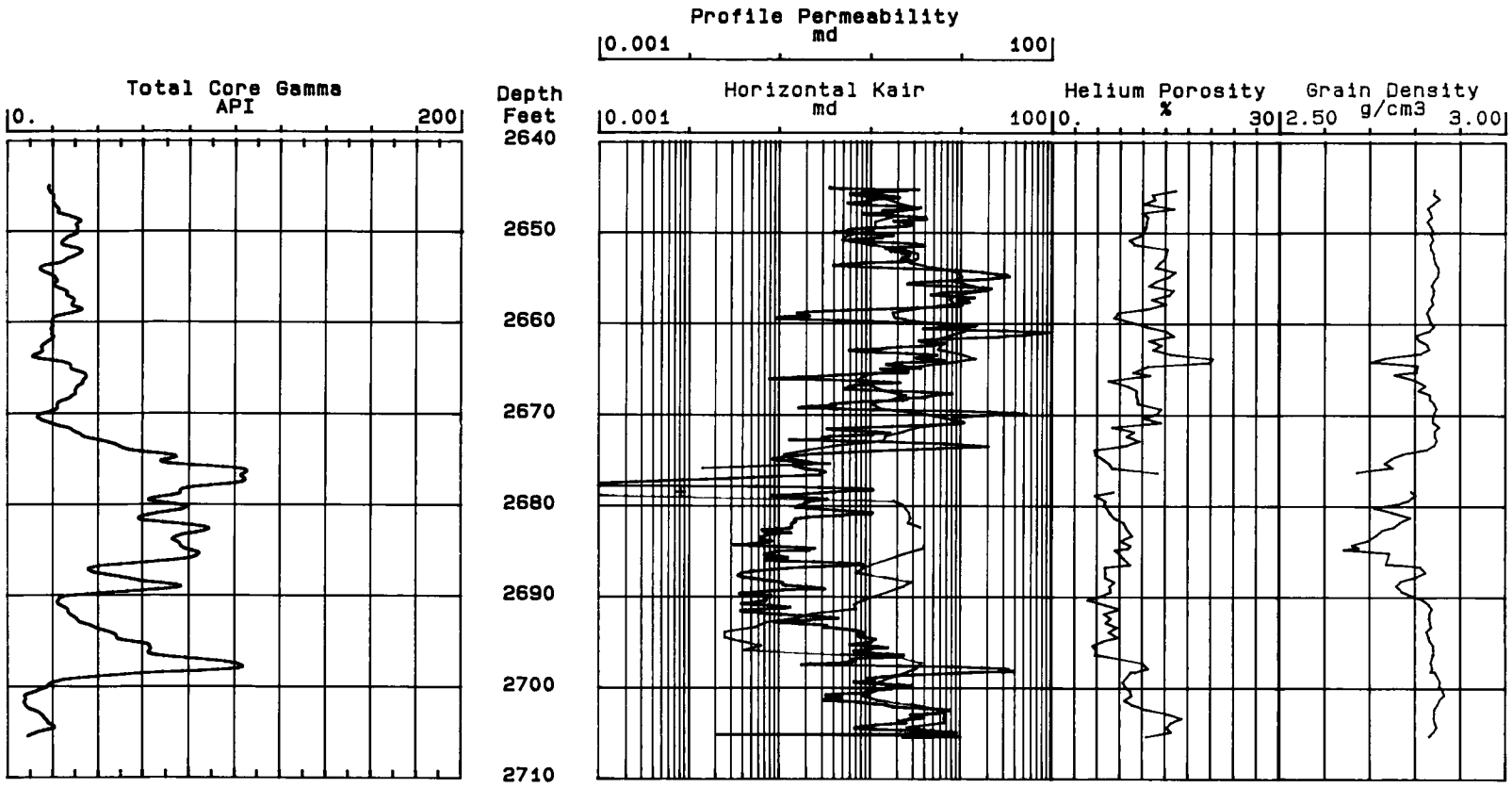
Seward County, Kansas

Core Number 1 2645.0 - 2705.4 ft

Core Laboratories File No. 57151-18061

09-Dec-1994

Vertical Scale
5.00 in = 100.0 ft



APPENDIX A: LIST OF PROJECT ANALYSTS and PERSONNEL

PETROLEUM SERVICES MANAGER	FEDERICA M. CURBY
LABORATORY SUPERVISOR	MICHAEL R. LONG
SENIOR PROJECT ANALYST	JOSEPH A. WEIR
PHOTOGRAPHY	THOMAS MURPHY
TECHNICAL SALES REPRESENTATIVE	DOUGLAS McELROY
CORE ANALYST	MIKE KOSTER
SECRETARIAL	JANET PUFFER

APPENDIX B: REPORT DISTRIBUTION

ANADARKO PETROLEUM CORPORATION
Thompson F-1H Well
Hugoton Field
Seward County, Kansas
CL File No. 57151-18061

4 cc Anadarko Petroleum Corporation
17001 Northchase
Houston, Texas 77060

Attn: Mr. Ray Sorenson