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CONVENTIONAL CORE ANALYSIS

Anadarko Petroleum Corporation
Youngren K No. 3A Well
Panoma Field
Stevens County, Kansas
SRS 1705/RSB 2810





RESERVOIRS, INC.

1151 BRITTMORE ROAD

HOUSTON, TEXAS 77043

GEOLOGICAL ANALYSIS • CLASTICS/CARBONATES
SINGLE WELL/FIELD/REGIONAL STUDIES
WELL COMPLETION/STIMULATION STUDIES
ROUTINE AND SPECIAL CORE ANALYSIS

(713) 932-7183

FAX (713) 932-0520

May 5, 1993

Mr. Donpaul Henderson
Anadarko Petroleum Corporation
17001 Northchase Drive
Houston, Texas 77060

Dear Mr. Henderson:

In a proposal dated March 11, 1993 which was addressed to Mr. Kirk Malinowsky (Anadarko Petroleum Corporation) wellsite services, conventional core analysis and geological services were described and offered to the Anadarko Petroleum Corporation. On April 17, 1993, Mr. Scott Morris of Reservoirs, Inc. was notified to proceed to the Anadarko Petroleum Corporation, Youngren K No. 3A Well, Panoma Field located in Stevens County, Kansas.

On April 19, 1993, Mr. Morris retrieved the first of three, sixty foot, full diameter cores from the above referenced well. The full diameter well core was preserved and packaged at the wellsite in anticipation of the transportation to the Special Core Analysis Laboratory of Reservoirs, Inc. in Houston, Texas. On April 20, 1993, the second and third, sixty foot cores were retrieved, preserved and packaged in the same manner as the first core.

Approximately one hundred and eighty five feet (185 ft.) of full diameter well core was received at the Special Core Analysis Laboratory of Reservoirs, Inc. in Houston, Texas on April 21, 1993. Immediately upon receipt, the core segments were removed from the preservation material, placed on a core layout table and oriented according to depth. The natural core gamma radiation was measured and recorded as a function of depth.

Following a telephone conversation between Mr. Paul Delacoe of Reservoirs, Inc. and Mr. Donpaul Henderson of Anadarko Petroleum Corporation on April 22, 1993, Dean-Stark analysis was requested to be performed on core plug samples to be obtained from the well cores. Each of the well cores was subsequently to be slabbled and boxed. One hundred and thirty three (133) core plug samples were drilled from the well cores, the saturations were obtained for these core plug samples by the Dean-Stark method, the basic rock properties together with a brief lithological description were also determined. The test results are presented in Tables 1 through 3

for core numbers 1 through 3, respectively. The relationships of permeability to gas - porosity and grain density - porosity are presented for each individual well core and also as composites.

Preliminary Dean-Stark conventional core analysis test results which included permeabilities to gas, porosity, grain density and fluid saturations were electronically transmitted to Mr. Donpaul Henderson at the Anadarko Petroleum Corporation offices in Houston, Texas on April 27 and 29, 1993.

This report presents the conventional core analysis test result obtained by the Dean-Stark method (Tables 1 through 3) together with a core log, which presents the natural core gamma radiation, permeabilities to gas, porosities and fluid saturations as a function of depth for the core plug samples obtained from the full diameter well core.

Core No. 1 was recovered from the depth interval of 2700.0 ft. to 2761.9 ft.. A total of fifty-six (56) core plug samples were obtained from this well core. Examination of the core analysis data (Table 1) indicates the permeabilities to gas ranged from <0.001 md to 11.5 md. However, ten (10) of the samples contained fractures and their respective permeabilities are probably anomalously high. A further eleven (11) of the core plug samples contained numerous fractures and therefore the permeabilities to gas were indeterminable for those samples. If the fractured samples are omitted from the data, then the range of permeabilities to gas becomes <0.001 md to 1.50 md, with an arithmetic average of 0.107 md. The porosities ranged from 0.2 to 12.1 percent of the bulk volume and the average porosity was 7.4 %BV. Grain densities varied from 2.58 g/cc to 2.77 g/cc for this depth interval. The water saturations were generally greater than 45 percent of the pore volume (range: 16.1 - 90.1 %PV), the arithmetic average was 48.0 %PV. No oil fluorescence was observed when the core was observed under an ultra violet light source, however, oil saturations ranging from 4.0 to 10.8 percent of the pore volume were determined for the depth interval of 2741.4 ft. to 2744.4 ft. It should be noted, however, that the permeabilities to gas (≤ 0.002 md) and the porosities (1.2 to 6.6 %BV) were very low in this zone.

Core No. 2 was recovered from the depth interval of 2762.0 ft. to 2823.0 ft. The test results indicates permeabilities to gas ranged from <0.001 md to 27.2 md, however, several of the samples contained fractures and their respective permeabilities to gas are probably anomalously high. If these fractured samples are omitted, then the range of permeabilities becomes <0.001 md to 1.42 md (average: 0.166 md). The porosities ranged from 1.4 to 11.0 %BV,

Mr. Donpaul Henderson
Anadarko Petroleum Corporation
Page 3

with an arithmetic average of 6.6 %BV. The grain densities ranged from 2.66 to 2.73 g/cc. No fluorescence was observed for this depth interval when viewed under an ultra violet light source. Water saturations ranged from 34.2 to 86.2 percent of the pore volume with an average water saturation of 59.2 %PV.

Core No. 3 was recovered from the depth interval of 2823.0 ft. to 2884.3 ft. The permeabilities to gas and the porosities were generally higher than determined for the other two (2) cores. The permeabilities to gas ranged from 0.001 md to 47.6 md, with an arithmetic average of 4.08 md (including the fractured samples). Porosities ranged from 2.4 to 23.0 percent of the bulk volume (average was 9.1 %BV). The water saturations determined for this interval were generally higher than the other two cores. The water saturations ranged from 42.1 to 90.8 percent of the pore volume with an average of 75.2 %PV. No oil saturation was determined during the analysis, however, there was a dull yellow fluorescence observed in the top four (4) feet of this core and also through the depth interval from 2844-2847 ft. When a few drops of trichloroethane were applied to these intervals, a faint "cut" fluorescence was observed. Similar faint "cut" was observed for the depth interval from 2870 ft, to the bottom of Core No. 3 particularly where the porosities were higher. The grain densities ranged from 2.61 to 2.87 g/cc

It has been a pleasure to be of service to you and the Anadarko Petroleum Corporation with the analyses performed on the well cores obtained from the Youngren K No. 3A Well. If you have any questions pertaining to these analyses, the laboratory procedures used to generate the test results or if we can be of any further service, please do not hesitate to contact Duane L. Archer (713) 932-6619 or me at (713) 932-9670.

Sincerely,

Paul Delacoe

Paul Delacoe
Manager
Special Core Analysis
RESERVOIRS, INC.

PD/lm

LABORATORY PROCEDURES

Natural Core Gamma Radiation Log:

The full-diameter well core was passed over a gamma radiation detection unit which was shielded from the natural background radiation. The relative magnitude of the radiation was recorded as a function of depth for comparison with the downhole logs. Five (5) inches of recorded log is equivalent to one hundred (100) feet of measured gamma response.

Sample Preparation:

One hundred and thirty-three (133) horizontally oriented core plug samples were drilled from the full-diameter well core using a diamond core drill and water as the core bit coolant and lubricant. The core plug samples were trimmed to form right cylinders using a diamond saw blade and water. Each core plug sample was marked with a sample identification and immediately placed in the Dean-Stark extraction/distillation apparatus.

Dean-Stark Analysis:

The extraction/distillation apparatus had been prepared by pre-boiling the toluene to remove any water present in the solvent. Each core plug sample was weighed and placed in individual extraction/distillation apparatuses. The temperature was increased to begin the distillation process. The distillation continued until no further production of water was noted for each core plug sample (≈ 18 hours). The water volumes were read to the nearest 0.01 ml.

The toluene solvent was replaced by methanol to remove any salts remaining in the core plug samples. After the core plug samples were leached for 12 hours, they were placed in a conventional oven and dried for 12 hours. The core plug samples were cooled in a desiccator prior to determining the basic rock properties of each core plug sample.

Basic Rock Properties:

The bulk volume of each core plug sample was determined by mercury immersion (Archimedes' principle) and confirmed by measuring the length and diameter of the core plug sample with calipers and calculating the bulk volume.

The porosity and grain density of each core plug sample was determined using the Boyle's law method and helium as the gaseous phase. The core plug sample was placed in a chamber (matrix cup) of known volume. Another chamber of known volume containing helium at a preselected pressure was connected to the matrix cup. The helium expanded into the matrix cup, and an equilibrium pressure was recorded. Using Boyle's law, the grain volume of the core plug sample being tested can be determined. The grain volume subtracted from the bulk volume of the core plug sample results in the pore volume of the core plug sample. Porosity is the pore volume expressed as a percent of the bulk volume.

The grain density is the weight of the core material per unit volume of the core material (grain volume). The weight of the core material is determined by weighing the clean and dry core plug sample on a pan-balance at ambient conditions. The grain volume is obtained from the Boyle's law calculation.

The specific permeability to gas was determined by placing each core plug sample in a Hassler-type core holder and applying a confining pressure of 400 psig to the system to prevent bypassing of the gas around the core plug sample. Nitrogen gas was injected into the core plug sample at a constant pressure until a constant flow rate of gas through the core plug sample was attained (steady-state conditions). The specific permeability to gas was calculated using the Darcy Equation.

The fluid saturations were determined from the gravimetric measurements before and after cleaning of the core plug samples and the volumes of water produced during the Dean-Stark extractions. The gas saturation was determined by subtraction of the water volume from the pore volume, and expressing the result as a percentage of the pore volume.

Table 1

CONVENTIONAL CORE ANALYSIS

Anadarko Petroleum Corporation
 Youngren K No. 3A Well
 Panoma Field
 Stevens County, Kansas
 SRS 1705/RSR 2810

Core No. 1

Sample	Depth (ft)	Perm. to Gas (md)	Porosity (%BV)	Grain Density (g/cc)	Saturation (%PV)			Lithological Description
					Water	Oil	Gas	
V 111	2700.5	0.007	4.8	2.74	50.4	0.0	49.6	LS GRY MICR SLTY FOSS NO FLU NO CUT
V 112	2701.5	0.007	6.5	2.72	55.1	0.0	44.9	LS GRY MICR SLTY FOSS NO FLU NO CUT
V 113	2702.5	0.007	6.7	2.72	60.5	0.0	39.5	LS GRY MICR SLTY FOSS NO FLU NO CUT
V 114	2703.5	0.004	6.3	2.74	62.4	0.0	37.6	LS GRY MICR SLTY FOSS NO FLU NO CUT
V 115	2704.6	0.115	10.8	2.69	65.7	0.0	34.3	LS GRY MICR SLTY FOSS NO FLU NO CUT
V 116	2705.4	0.162	10.0	2.73	59.0	0.0	41.0	LS GRY MICR SLTY FOSS NO FLU NO CUT
V 117	2706.5	0.039	7.3	2.72	60.4	0.0	39.6	LS GRY MICR SLTY FOSS NO FLU NO CUT
V 118	2707.5	0.297	9.5	2.70	51.2	0.0	48.8	LS GRY MICR W/CALC XL V FOSS NO FLU NO CUT
V 119	2708.7	0.283	10.1	2.72	50.7	0.0	49.3	LS GRY-DK GRY MICR W/CALC XL V FOSS NO FLU NO CUT
V 120	2709.4	0.305	9.4	2.73	53.9	0.0	46.1	LS GRY-DK GRY MICR W/CALC XL V FOSS NO FLU NO CUT
V 121	2710.4	1.50	9.6	2.71	52.8	0.0	47.2	LS GRY-DK GRY MICR W/CALC XL V FOSS NO FLU NO CUT
V 122	2711.5	0.008	8.4	2.75	55.0	0.0	45.0	LS DK GRY MICR V SLTY SLI FOSS NO FLU NO CUT
V 123	2712.6	0.005	6.1	2.73	60.1	0.0	39.9	LS DK GRY MICR V SLTY SLI FOSS NO FLU NO CUT
V 124	2713.3	**	8.5	2.73	44.6	0.0	55.4	LS BLK MICR V SLTY SLI FOSS NO FLU NO CUT
V 125	2714.6	0.615*	6.0	2.74	59.7	0.0	40.3	SH DK GRY SLTY CALC W/CALC INCL NO FLU NO CUT
V 126	2715.6	11.5**	7.9	2.74	42.0	0.0	58.0	SD RD BRN VFGR V SLTY LMY NO FLU NO CUT
V 127	2716.5	**	8.7	2.74	44.4	0.0	55.6	SD RD BRN VFGR V SLTY LMY NO FLU NO CUT
V 128	2717.6	**	8.2	2.73	46.5	0.0	53.5	SD RD BRN VFGR V SLTY LMY NO FLU NO CUT
V 129	2718.5	**	8.1	2.71	47.3	0.0	52.7	SD RD BRN VFGR V SLTY LMY NO FLU NO CUT
V 130	2719.5	**	9.7	2.73	41.6	0.0	58.4	SD RD BRN VFGR V SLTY LMY NO FLU NO CUT

* Denotes sample contains fracture, permeability to gas may be anomalously high.

** Denotes sample contains numerous fractures, permeability to gas indeterminable.

Table 1 (continued)

CONVENTIONAL CORE ANALYSIS

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Core No. 1

Sample	Depth (ft)	Perm. to Gas (md)	Porosity (%BV)	Grain Density (g/cc)	Saturation (%PV)			Lithological Description
					Water	Oil	Gas	
V 131	2720.3	0.784*	8.1	2.73	42.8	0.0	57.2	SD RD BRN VFGR V SLTY LMY NO FLU NO CUT
V 132	2721.7	**	10.6	2.73	41.6	0.0	58.4	LS GRY-RD MICR W/SH LAMS NO FLU NO CUT
V 133	2722.6	0.127	8.7	2.69	44.4	0.0	55.6	SD RD BRN VFGR SLTY W/SH INCLU LMY NO FLU NO CUT
V 135	2724.4	0.002	1.6	2.67	39.2	0.0	60.8	SD RD-BRN FGR LMY NO FLU NO CUT
V 136	2725.3	0.005	7.8	2.69	45.5	0.0	54.5	SD RD-BRN FGR SLTY W/SH INCLU LMY NO FLU NO CUT
V 137	2727.7	**	11.4	2.70	38.8	0.0	61.2	SD GRY FGR SLTY W/GYP INCLU LMY NO FLU NO CUT
V 138	2728.5	0.248*	10.1	2.69	46.4	0.0	53.6	SD RD SLTY W/GYP INCLU LMY NO FLU NO CUT
V 139	2729.5	0.023	9.6	2.69	54.3	0.0	45.7	SD RD SLTY W/GYP INCLU LMY NO FLU NO CUT
V 140	2730.5	0.030	9.8	2.69	51.4	0.0	48.6	SD RD SLTY W/GYP INCLU LMY NO FLU NO CUT
V 141	2731.5	0.035	9.9	2.70	49.6	0.0	50.4	SD RD SLTY W/GYP INCLU LMY NO FLU NO CUT
V 142	2732.5	0.037	9.8	2.69	47.9	0.0	52.1	SD RD VFGR SLTY W/GYP INCLU LMY NO FLU NO CUT
V 143	2733.3	**	11.7	2.70	35.2	0.0	64.8	SD RD VFGR SLTY W/GYP INCLU LMY NO FLU NO CUT
V 144	2735.5	0.066	10.4	2.71	40.0	0.0	60.0	SD RD VFGR SLTY W/GYP INCLU LMY NO FLU NO CUT
V 145	2736.5	0.012	7.6	2.71	41.0	0.0	59.0	SD RD VFGR SLTY W/GYP INCLU LMY NO FLU NO CUT
V 146	2737.5	**	12.1	2.71	34.2	0.0	65.8	SD RD VFGR SLTY W/GYP INCLU LMY NO FLU NO CUT
V 147	2739.5	1.18*	10.8	2.77	38.5	0.0	61.5	SD RD VFGR SLTY W/GYP INCLU LMY NO FLU NO CUT
V 148	2740.9	<0.001	3.6	2.73	56.4	0.0	43.6	LS LT GRY XLN SLI FOSS NO FLU NO CUT
V 149	2741.4	<0.001	2.2	2.70	18.4	10.8	70.8	LS LT GRY XLN SLI FOSS NO FLU FT CUT
V 150	2742.5	<0.001	1.6	2.71	23.8	10.2	66.0	LS LT GRY XLN SLI FOSS NO FLU FT CUT
V 151	2743.5	<0.001	1.2	2.74	20.0	8.0	72.0	LS LT GRY XLN SLI FOSS NO FLU FT CUT

* Denotes sample contains fracture, permeability to gas may be anomalously high.

** Denotes sample contains numerous fractures, permeability to gas indeterminable.

Table 1 (continued)

CONVENTIONAL CORE ANALYSIS

Anadarko Petroleum Corporation
 Youngren K No. 3A Well
 Panoma Field
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Core No. 1

Sample	Depth (ft)	Perm. to Gas (md)	Porosity (%BV)	Grain Density (g/cc)	Saturation (%PV)			Lithological Description
					Water	Oil	Gas	
V 152	2744.4	0.002	4.6	2.74	43.5	4.0	52.5	LS GRY MICR CALC IAM FOSS NO FLU NO CUT
V 153	2745.6	5.70*	7.6	2.73	61.1	0.0	38.9	SH BLK V CALC FOSS NO FLU NO CUT
V 154	2746.6	**	9.8	2.74	43.2	0.0	56.8	SH BLK V CALC FOSS NO FLU NO CUT
V 155	2747.6	**	10.8	2.75	45.3	0.0	54.7	SH BLK V CALC FOSS NO FLU NO CUT
V 156	2748.5	5.55*	9.6	2.72	47.4	0.0	52.6	SH BLK V CALC FOSS NO FLU NO CUT
V 157	2749.7	<0.001	0.7	2.70	16.1	0.0	83.9	LS LT GRY MICR FOSS NO FLU NO CUT
V 158	2750.4	<0.001	0.2	2.65	33.5	0.0	66.5	LS LT GRY MICROXLN FOSS NO FLU NO CUT
V 159	2751.5	0.359	6.5	2.69	47.2	0.0	52.8	LS DK GRY MICR SLTY FOSS NO FLU NO CUT
V 160	2752.5	5.21*	8.2	2.72	44.7	0.0	55.3	SH BLK V CALC FOSS NO FLU
V 161	2753.5	0.284	6.3	2.69	49.8	0.0	50.2	SD DK GRY VFGR SLTY SHY FOSS NO FLU NO CUT
V 162	2754.4	<0.001	0.2	2.58	89.5	0.0	10.5	CHT BLK CRPXLN SL LMY
V 163	2755.1	<0.001	0.4	2.67	90.1	0.0	9.9	LS LT GRY MICROXLN FOSS NO FLU NO CUT
V 164	2759.1	3.79*	8.1	2.68	46.2	0.0	53.8	LS DK GRY MICR SHY FOSS NO FLU NO CUT
V 165	2759.6	0.002	6.0	2.68	79.3	0.0	20.7	LS GRY MICR SLTY SHY FOSS NO FLU NO CUT
V 166	2760.5	0.003	6.8	2.69	34.3	0.0	65.7	LS GRY MICR SLTY SHY FOSS NO FLU NO CUT
V 166	2761.4	2.37*	9.4	2.70	42.5	0.0	57.5	SH BLK V CALC FOSS

* Denotes sample contains fracture, permeability to gas may be anomalously high.

** Denotes sample contains numerous fractures, permeability to gas indeterminable.

Figure 1
SPECIFIC PERMEABILITY TO GAS - POROSITY RELATIONSHIP

Anadarko Petroleum Corporation
Youngren K No. 3A Well
Panoma Field
Stevens County, Kansas
SRS 1705/RSH 2810

Core No. 1

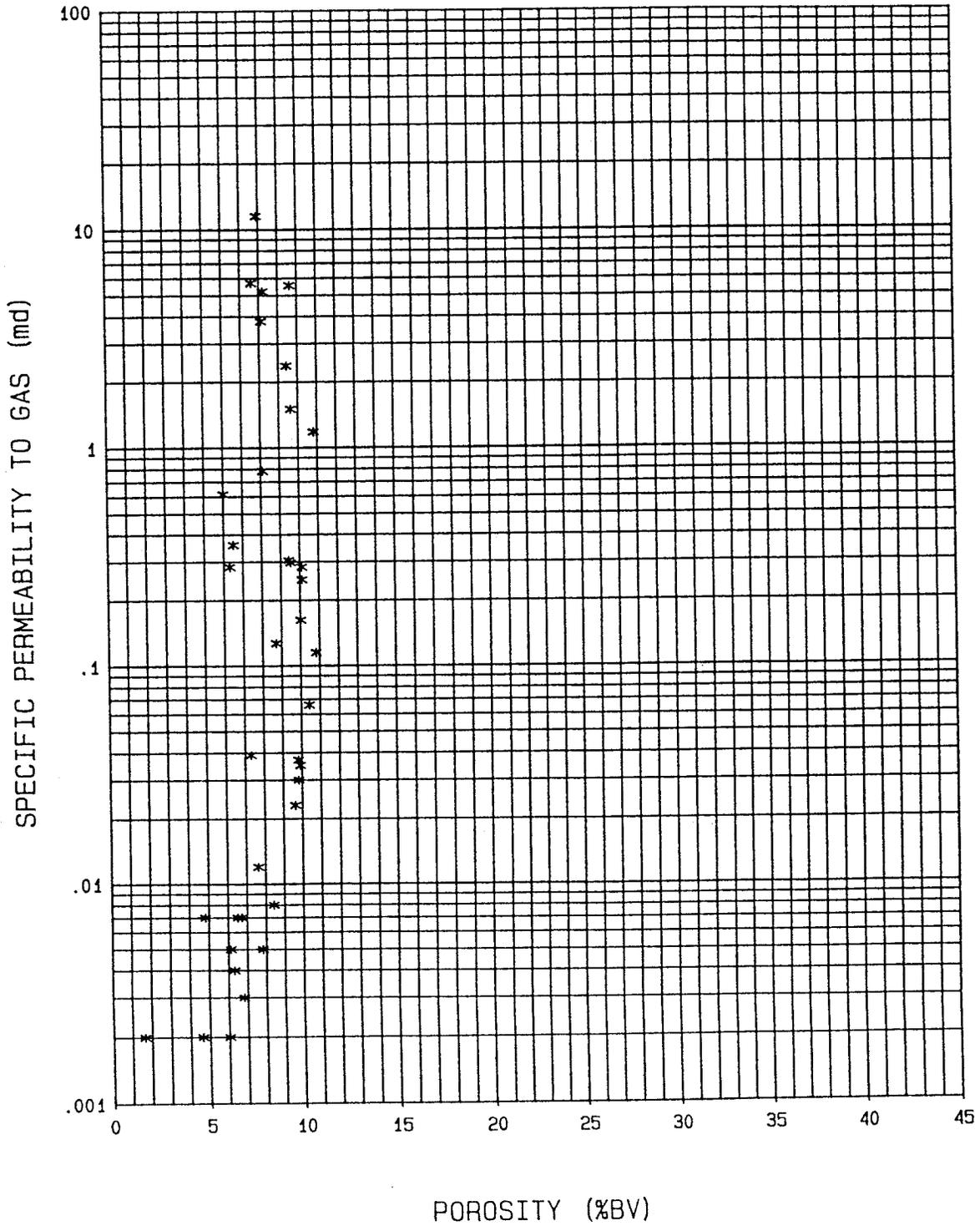


Figure 2

GRAIN DENSITY - POROSITY RELATIONSHIP

Anadarko Petroleum Corporation

Youngren K No. 3A Well

Panoma Field

Stevens County, Kansas

SRS 1705/RSB 2810

Core No. 1

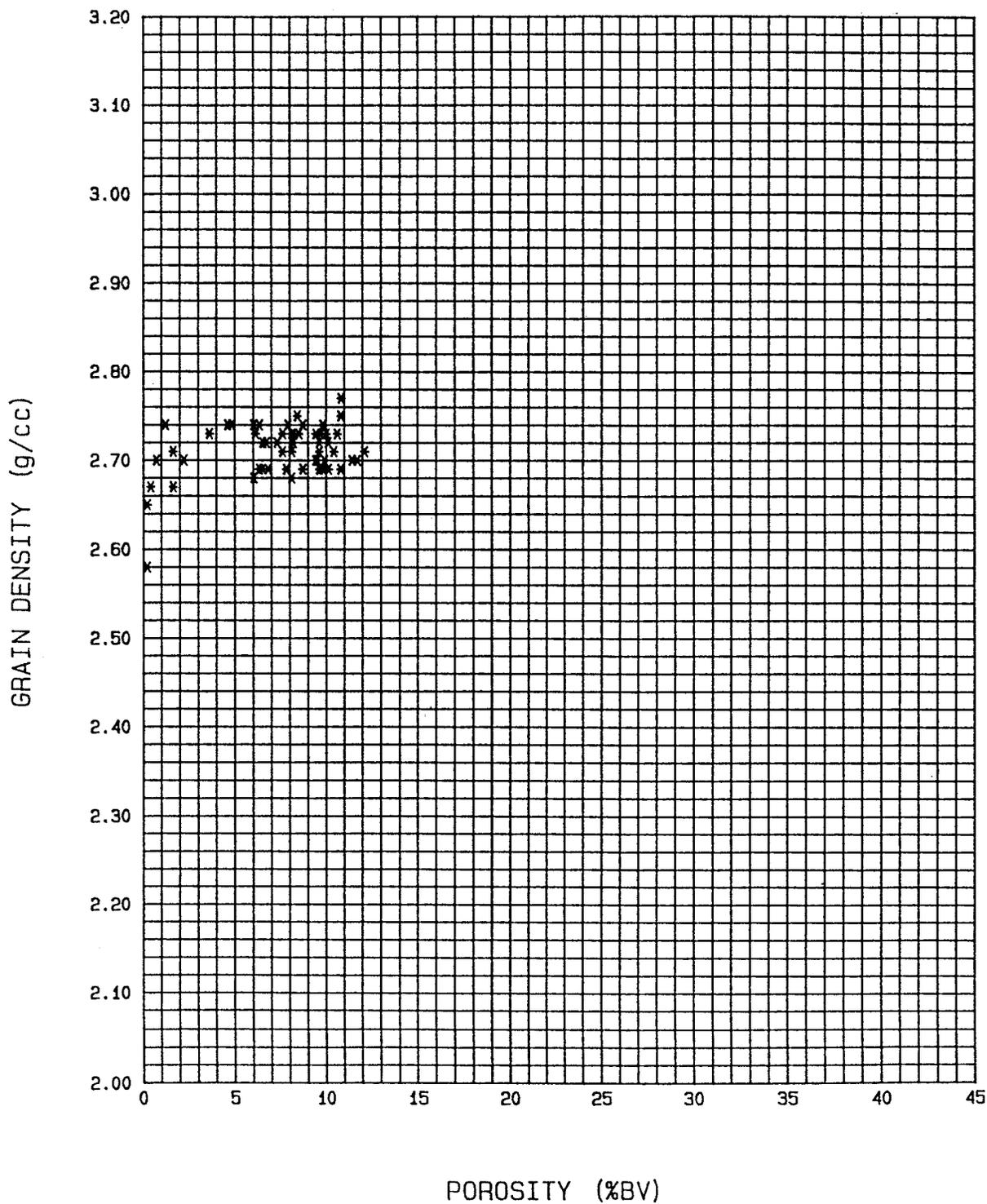


Table 2

CONVENTIONAL CORE ANALYSIS

Anadarko Petroleum Corporation
 Youngren K No. 3A Well
 Panoma Field
 Stevens County, Kansas
 SRS 1705/RSH 2810

Core No. 2

Sample	Depth (ft)	Perm. to Gas (md)	Porosity (%BV)	Grain Density (g/cc)	Saturation (%PV)			Lithological Description
					Water	Oil	Gas	
V 168	2762.4	7.35*	10.3	2.69	68.1	0.0	31.9	LS BLK MICR SHY FOSS NO FLU NO CUT
V 169	2763.5	0.024	9.5	2.67	39.6	0.0	60.4	LS DK GRY MICR SLTY FOSS NO FLU NO CUT
V 170	2764.5	27.2*	9.7	2.70	42.5	0.0	57.5	LS DK GRY MICR SLTY FOSS NO FLU NO CUT
V 171	2765.6	0.010	5.0	2.69	45.6	0.0	54.4	LS DK GRY MICR SLTY FOSS NO FLU NO CUT
V 172	2766.5	0.017	7.4	2.69	48.4	0.0	51.6	LS DK GRY MICR SLTY FOSS NO FLU NO CUT
V 173	2767.7	0.043	10.4	2.68	50.5	0.0	49.5	LS DK GRY MICR SLTY FOSS NO FLU NO CUT
V 174	2768.3	0.040	11.0	2.68	52.2	0.0	47.8	LS DK GRY MICR SLTY FOSS NO FLU NO CUT
V 175	2774.6	0.468	5.8	2.70	58.7	0.0	41.3	LS DK GRY MICR SLTY FOSS NO FLU NO CUT
V 176	2775.8	3.92*	4.6	2.70	58.9	0.0	41.1	LS DK GRY MICR XLN FOS NO FLU NO CUT
V 177	1776.6	0.002	3.1	2.70	36.6	0.0	63.4	LS DK GRY XLN FOSS NO FLU NO CUT
V 178	2777.3	<0.001	1.4	2.69	64.0	0.0	36.0	LS DK GRY XLN FOSS NO FLU NO CUT
V 179	2797.8	0.012	5.7	2.73	59.0	0.0	41.0	LS CRM MICROXLN DOL NO FLU NO CUT
V 180	2798.5	0.012	7.4	2.71	55.4	0.0	44.6	LS CRM MICROXLN NO FLU NO CUT
V 181	2799.4	0.026	4.8	2.72	79.4	0.0	20.6	LS CRM XLN W/CALC XL FOSS NO FLU NO CUT
V 182	2800.5	0.009	4.2	2.72	34.2	0.0	65.8	LS CRM XLN W/CALC XL FOSS NO FLU NO CUT
V 183	2801.1	0.010	1.7	2.70	59.7	0.0	40.3	LS CRM MICROXLN SLI FOS NO FLU NO CUT
V 184	2802.6	0.027	4.2	2.66	67.6	0.0	32.4	LS CRM MICROXLN SLI FOS NO FLU NO CUT
V 185	2803.5	0.160	8.9	2.67	60.4	0.0	39.6	LS CRM MICROXLN SLI FOSS NO FLU NO CUT
V 186	2804.3	0.029	5.2	2.71	62.0	0.0	38.0	LS CRM MICROXLN FOSS NO FLU NO CUT
V 187	2805.2	0.019	5.0	2.72	56.3	0.0	43.7	LS LT GRY XLN FOSS NO FLU NO CUT

* Denotes sample contains fracture, permeability to gas may be anomalously high.

Table 2 (continued)

CONVENTIONAL CORE ANALYSIS

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Core No. 2

Sample	Depth (ft)	Perm. to Gas (md)	Porosity (%BV)	Grain Density (g/cc)	Saturation (%PV)			Lithological Description
					Water	Oil	Gas	
V 188	2806.8	0.416	9.6	2.70	54.8	0.0	45.2	LS CRM MICR FOSS NO FLU NO CUT
V 189	2807.6	0.891	10.9	2.70	62.6	0.0	37.4	LS CRM MICR FOSS NO FLU NO CUT
V 190	2808.7	0.133	7.8	2.72	63.5	0.0	36.5	LS CRM MICR FOSS NO FLU NO CUT
V 191	2809.6	0.021	4.0	2.71	66.9	0.0	33.1	LS CRM XLN FOSS NO FLU NO CUT
V 192	2811.7	5.69*	11.0	2.70	71.0	0.0	29.0	SD RD SLTY LMY SLI FOSS NO FLU NO CUT
V 197	2812.5	1.55*	6.1	2.69	86.2	0.0	13.8	SD RD SLTY LMY NO FLU NO CUT
V 193	2818.6	1.25*	5.5	2.69	73.8	0.0	26.2	SD RD VFGR SLTY LMY SL FOSS NO FLU NO CUT
V 198	2819.7	3.38*	6.3	2.71	79.5	0.0	20.5	SD RD SLTY LMY NO FLU NO CUT
V 194	2820.6	4.83*	7.2	2.70	63.5	0.0	36.5	SL RD MICR SLTY SL FOSS NO FLU NO CUT
V 195	2821.8	0.029	4.9	2.70	62.4	0.0	37.6	LS LT GRY XLN FOSS NO FLU NO CUT
V 196	2822.6	1.42	7.4	2.70	52.3	0.0	47.7	LS CRM BIOSP NO FLU NO CUT

* Denotes sample contains fracture, permeability to gas may be anomalously high.

Figure 3

SPECIFIC PERMEABILITY TO GAS - POROSITY RELATIONSHIP

Anadarko Petroleum Corporation

Youngren K No. 3A Well

Panoma Field

Stevens County, Kansas

SAS 1705/RSR 2810

Core No. 2

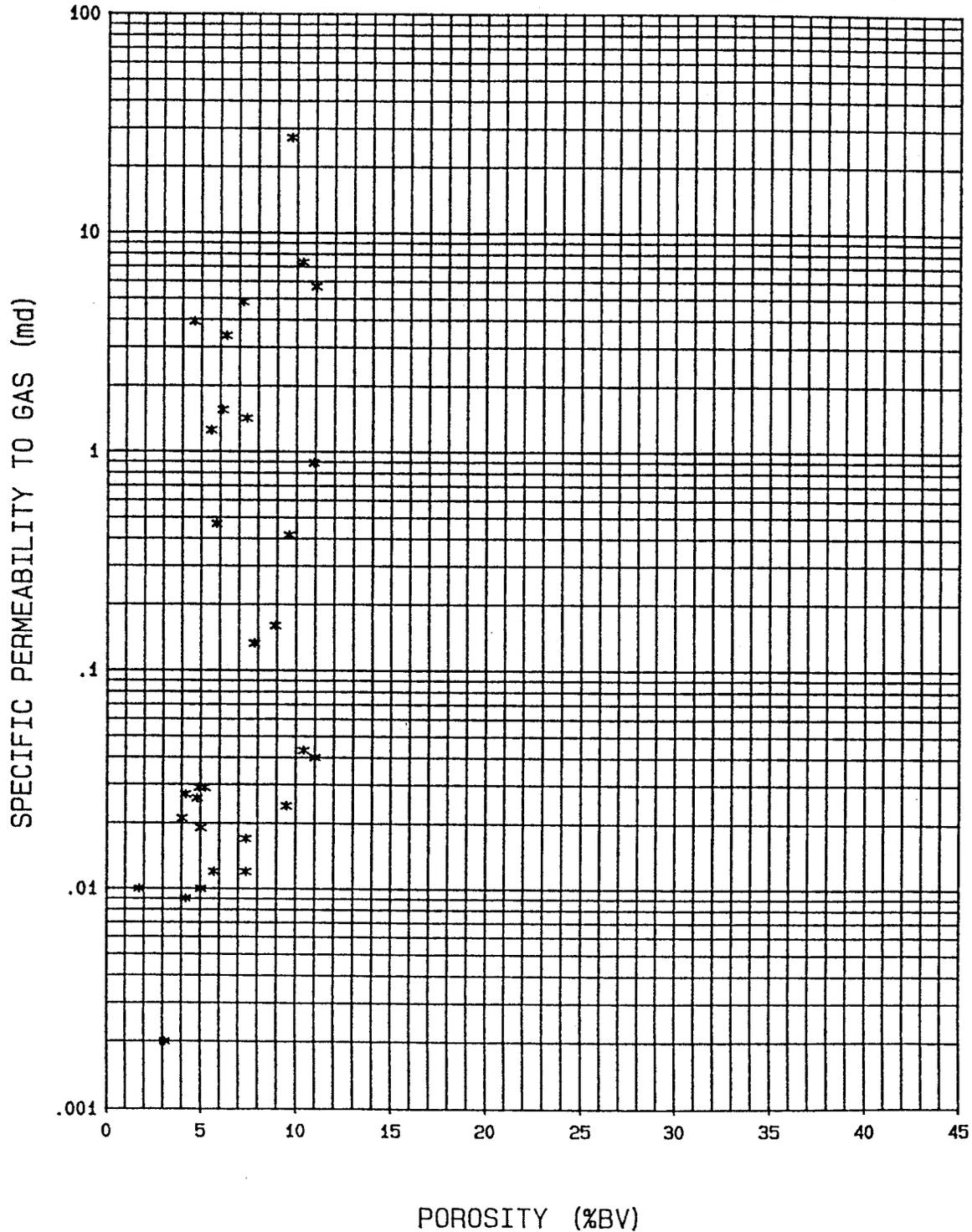


Figure 4

GRAIN DENSITY - POROSITY RELATIONSHIP

Anadarko Petroleum Corporation
Youngren K No. 3A Well
Panoma Field
Stevens County, Kansas
SRS 1705/RSH 2810

Core No. 2

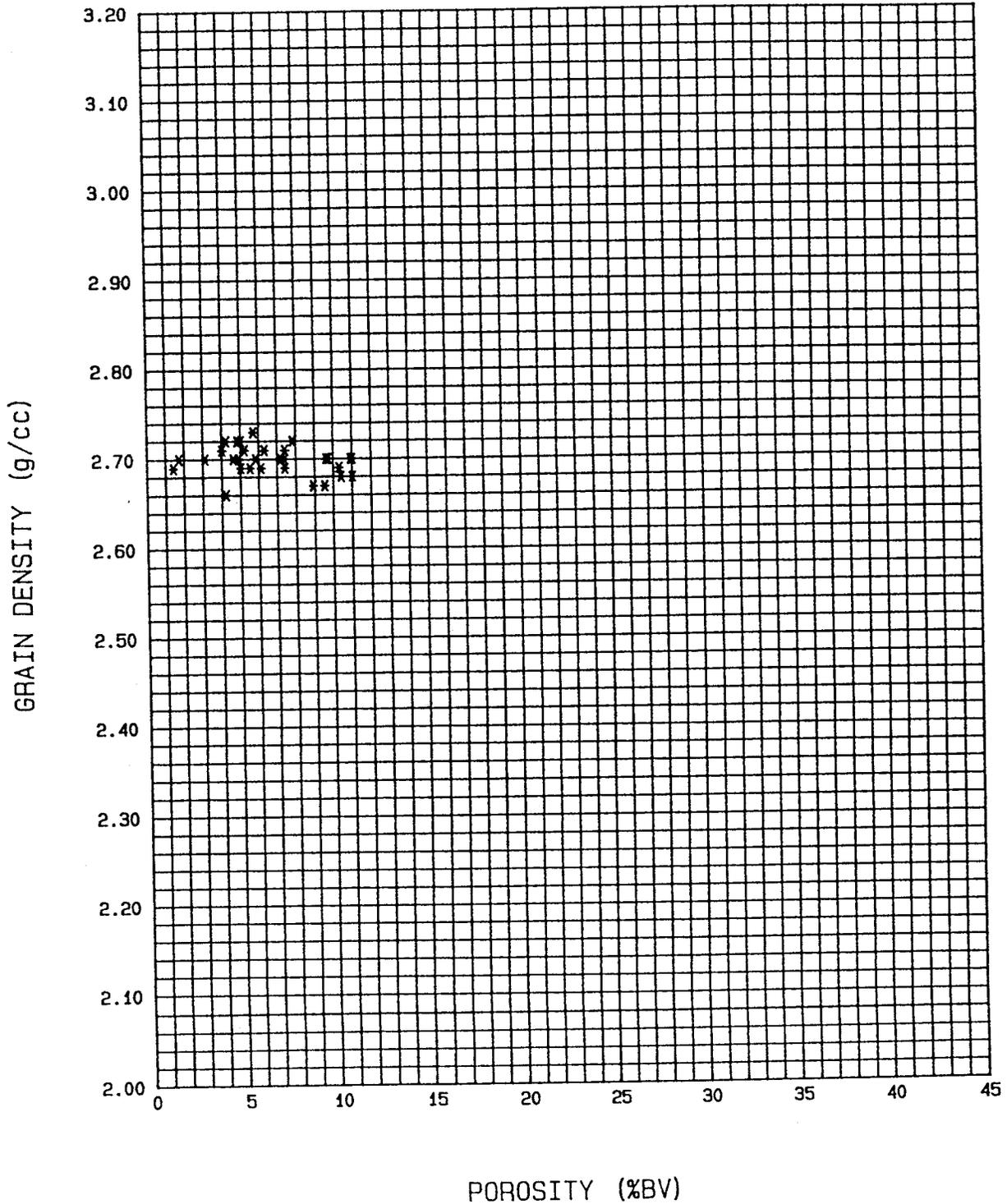


Table 3

CONVENTIONAL CORE ANALYSIS

Anadarko Petroleum Corporation
 Youngren K No. 3A Well
 Panoma Field
 Stevens County, Kansas
 SRS 1705/RSB 2810

Core No. 3

Sample	Depth (ft)	Perm. to Gas (md)	Porosity (%BV)	Grain Density (g/cc)	Saturation (%PV)			Lithological Description
					Water	Oil	Gas	
V 199	2823.5	23.4	14.5	2.71	60.3	0.0	39.7	LS CRM BIOSP W/ANHY INCLS NO FLU NO CUT
V 200	2824.5	12.8	14.7	2.73	73.6	0.0	26.4	LS CRM BIOSP W/ANHY INCLS DUL YEL FLU FT CUT
V 201	2825.6	23.4	16.0	2.70	53.4	0.0	46.6	LS CRM BIOSP W/ANHY INCLS DUL YEL FLU FT CUT
V 202	2826.5	1.56	14.0	2.70	51.5	0.0	48.5	LS CRM MICR FOSS DUL YEL FLU FT CUT
V 203	2827.5	5.82 *	7.1	2.61	42.1	0.0	57.9	CHT LT GRY W/FOSS INCL NO FLU NO CUT
V 204	2828.5	0.071	6.2	2.69	50.8	0.0	49.2	LS LT GRY MICR W/SLT LAMS SLI FOSS NO FLU NO CUT
V 205	2829.5	0.016	2.4	2.70	73.9	0.0	26.1	LS LT GRY MICR FOSS NO FLU NO CUT
V 206	2830.3	0.104	6.2	2.68	87.3	0.0	12.7	LS GRY MICR SLI FOSS NO FLU NO CUT
V 207	2834.3	24.9 *	9.0	2.70	90.8	0.0	9.2	SD RD-GRY SLTY LMY NO FLU NO CUT
V 208	2835.5	0.531 *	6.0	2.69	89.0	0.0	11.0	SD RD-WH VFG-SLTY W/LS INCLS MOTT NO FLU NO CUT
V 209	2836.5	35.7 *	7.2	2.68	86.4	0.0	13.6	SD RD SLTY SLI W/LS INCLS NO FLU NO CUT
V 210	2837.5	6.87 *	9.5	2.70	89.1	0.0	10.9	SD RD SLTY SLI W/LS INCLS NO FLU NO CUT
V 211	2839.5	0.058	8.1	2.68	81.3	0.0	18.7	SD RD VFG-SLTY W/LS INCLS NO FLU NO CUT
V 212	2840.5	0.061	7.9	2.70	71.9	0.0	28.1	SD RD VFG-SLTY W/LS INCLS NO FLU NO CUT
V 213	2841.6	0.028	6.9	2.70	80.9	0.0	19.1	SD RD VFG-SLTY W/LS INCLS NO FLU NO CUT
V 214	2844.5	0.037	7.9	2.70	59.0	0.0	41.0	LS CRM MICR DUL YEL FLU FT CUT
V 215	2845.5	0.751	9.4	2.72	46.9	0.0	53.1	LS CRM MICR FOSS DUL YEL FLU FT CUT
V 216	2846.5	0.062	6.7	2.71	74.2	0.0	25.8	LS CRM MICR FOSS DUL YEL FLU NO CUT
V 217	2847.5	0.016	3.6	2.71	58.3	0.0	41.7	LS LT GRY MICROXLN SLI FOSS NO FLU NO CUT
V 218	2849.5	0.496	6.0	2.68	88.0	0.0	12.0	SD RD-GRY SLTY LMY NO FLU NO CUT
V 219	2850.5	0.006	5.0	2.68	89.5	0.0	10.5	SD RD SLTY LMY NO FLU NO CUT
V 220	2851.6	0.309 *	5.3	2.68	82.5	0.0	17.5	SD RD SLTY LMY NO FLU NO CUT
V 221	2852.5	3.97 *	5.8	2.68	81.6	0.0	18.4	SD RD SLTY LMY NO FLU NO CUT

* Denotes core plug sample contains fractures. Permeability to gas may be anomalously high.

Table 3 (continued)

CONVENTIONAL CORE ANALYSIS

Anadarko Petroleum Corporation
 Youngren K No. 3A Well
 Panoma Field
 Stevens County, Kansas
 SRS 1705/RSH 2810

Core No. 3

Sample	Depth (ft)	Perm. to Gas (md)	Porosity (%BV)	Grain Density (g/cc)	Saturation (%PV)			Lithological Description
					Water	Oil	Gas	
V 222	2854.5	0.006	6.6	2.68	83.3	0.0	16.7	SD RD SLTY LMY NO FLU NO CUT
V 223	2855.5	0.022	12.1	2.75	79.1	0.0	20.9	SD RD SLTY SLI LMY NO FLU NO CUT
V 224	2856.5	0.005	7.9	2.68	87.5	0.0	12.5	SD RD SLTY LMY NO FLU NO CUT
V 225	2857.5	0.011	6.6	2.68	87.6	0.0	12.4	SD RD SLTY LMY NO FLU NO CUT
V 226	2860.5	0.003	4.4	2.70	77.4	0.0	22.6	LS LT GRY BIOSP XLN NO FLU NO CUT
V 227	2861.5	1.32	12.3	2.69	55.0	0.0	45.0	LS CRM MICR SLI FOSS NO FLU NO CUT
V 228	2862.3	0.301	10.6	2.69	64.0	0.0	36.0	LS CRM MICR SLI FOSS NO FLU NO CUT
V 229	2863.4	0.001	3.2	2.70	85.3	0.0	14.7	LS GRY MICR W/SLT LAMS SLI FOSS NO FLU NO CUT
V 230	2864.2	0.016	4.8	2.76	80.1	0.0	19.9	LS GRY MICR W/SLT LAMS SLI FOSS NO FLU NO CUT
V 231	2870.8	5.19 *	23.0	2.82	88.9	0.0	11.1	LS LT GRY MICR W/ANHY INCLS FOSS FT CUT
V 232	2871.9	0.012	4.5	2.74	80.0	0.0	20.0	LS CRM MICR W/CHLOR INCLS SLI FOSS NO FLU FT CUT
V 233	2872.9	0.845	12.1	2.72	73.7	0.0	26.3	LS CRM MICR W/CHLOR LAMS & INCL FOSS NO FLU NO CUT
V 234	2873.6	0.167	9.8	2.79	89.2	0.0	10.8	LS CRM MICR W/CHLOR INCLS NO FLU NO CUT
V 235	2874.6	1.04 *	11.6	2.77	88.3	0.0	11.7	LS CRM MICR W/CHLOR INCLS NO FLU NO CUT
V 236	2875.6	4.48 *	7.5	2.72	88.4	0.0	11.6	LS CRM MICR W/CHLOR INCLS NO FLU NO CUT
V 237	2876.8	0.408	10.7	2.72	85.3	0.0	14.7	LS CRM MICR W/CHLOR INCLS NO FLU FT CUT
V 238	2877.8	2.90	17.3	2.73	72.6	0.0	27.4	LS CRM MICR STYL SLI FOSS NO FLU FT CUT
V 239	2878.7	6.46	19.2	2.72	73.2	0.0	26.8	LS CRM MICR FOSS NO FLU FT CUT
V 240	2879.6	47.6	17.8	2.77	70.2	0.0	29.8	LS CRM MICR ANHY INCL FOSS NO FLU FT CUT
V 241	2880.7	22.9	20.9	2.77	70.3	0.0	29.7	LS CRM MICR ANHY INCL FOSS NO FLU FT CUT
V 242	2881.9	0.105	4.5	2.87	69.7	0.0	30.3	LS CRM-GRY MICR ANHY INCL W/FE STN NO FLU FT CUT
V 243	2882.6	0.807	4.1	2.79	66.8	0.0	33.2	LS CRM-GRY MICR ANHY INCL W/FE STN NO FLU FT CUT
V 244	2883.8	0.015	3.3	2.72	82.6	0.0	17.4	LS LT GRY MICR SLI FOSS NO CUT

* Denotes core plug sample contains fractures. Permeability to gas may be anomalously high.

Figure 5

SPECIFIC PERMEABILITY TO GAS - POROSITY RELATIONSHIP

Anadarko Petroleum Corporation
Youngren K No. 3A Well
Panoma Field
Stevens County, Kansas
SRS 1705/RSH 2810

Core No. 3

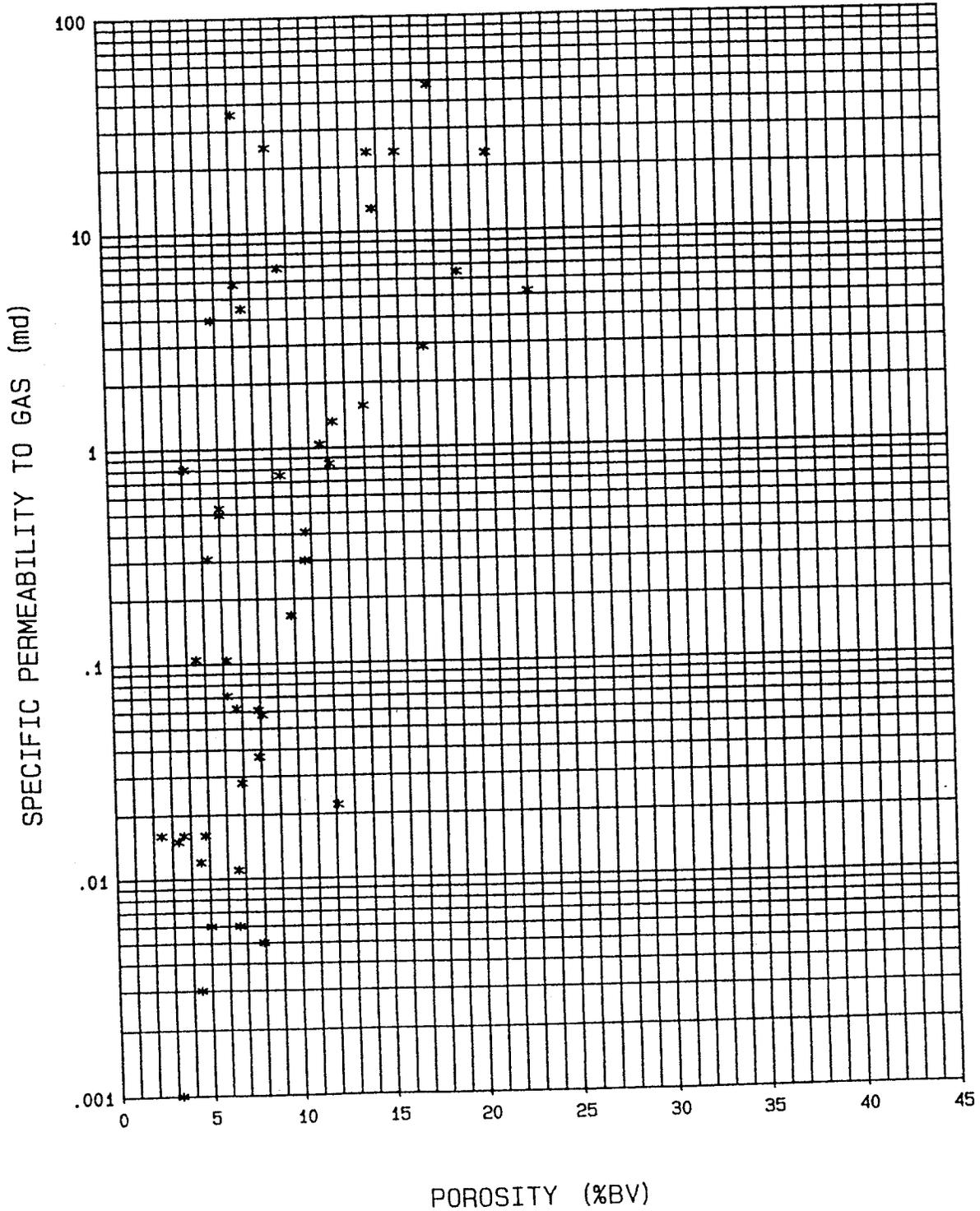


Figure 6

GRAIN DENSITY - POROSITY RELATIONSHIP

Anadarko Petroleum Corporation
Youngren K No. 3A Well
Panoma Field
Stevens County, Kansas
SRS 1705/RSR 2810

Core No. 3

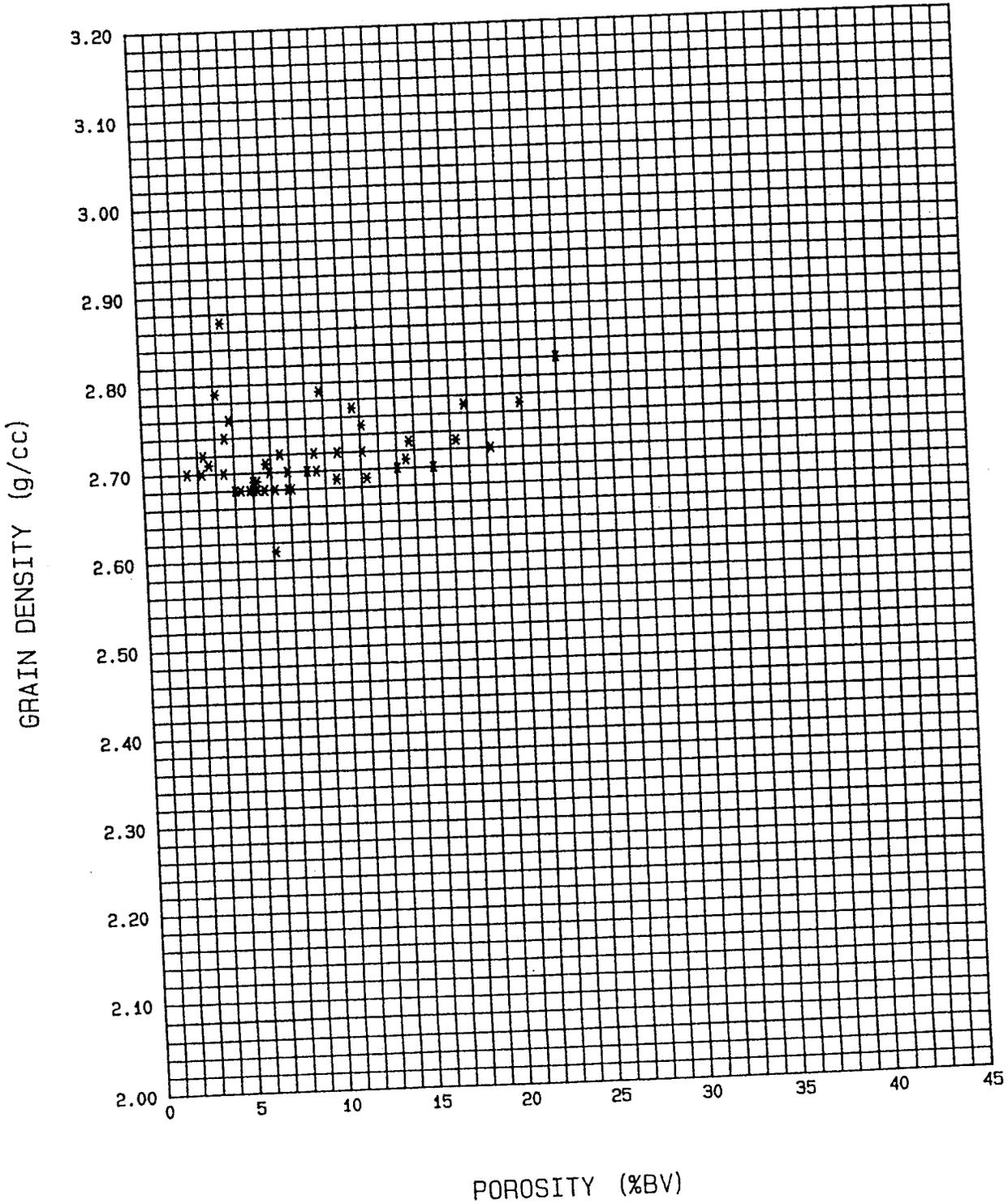


Figure 7

SPECIFIC PERMEABILITY TO GAS - POROSITY RELATIONSHIP

Anadarko Petroleum Corporation
Youngren K No. 3A Well
Panoma Field
Stevens County, Kansas
SRS 1705/RSR 2810

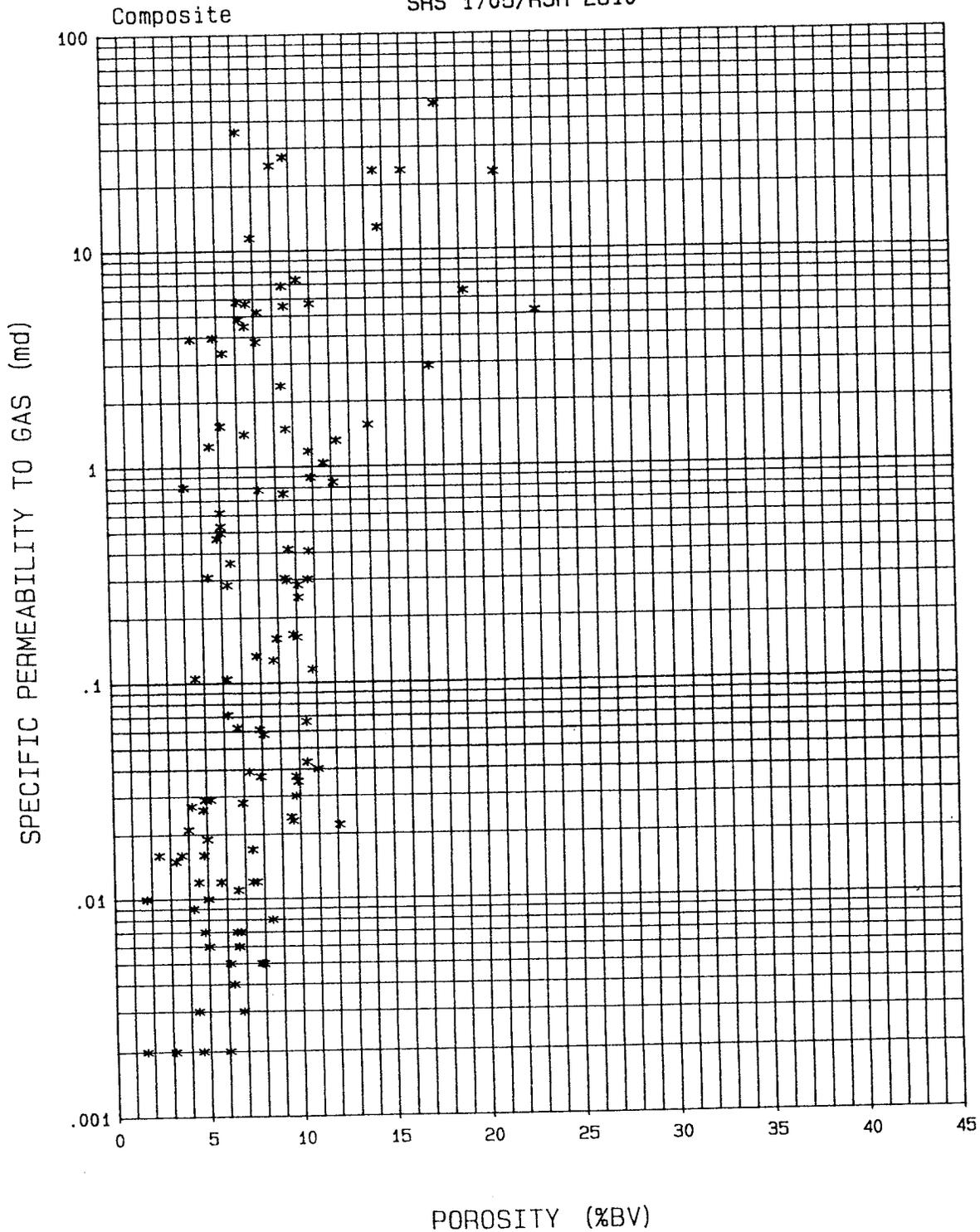
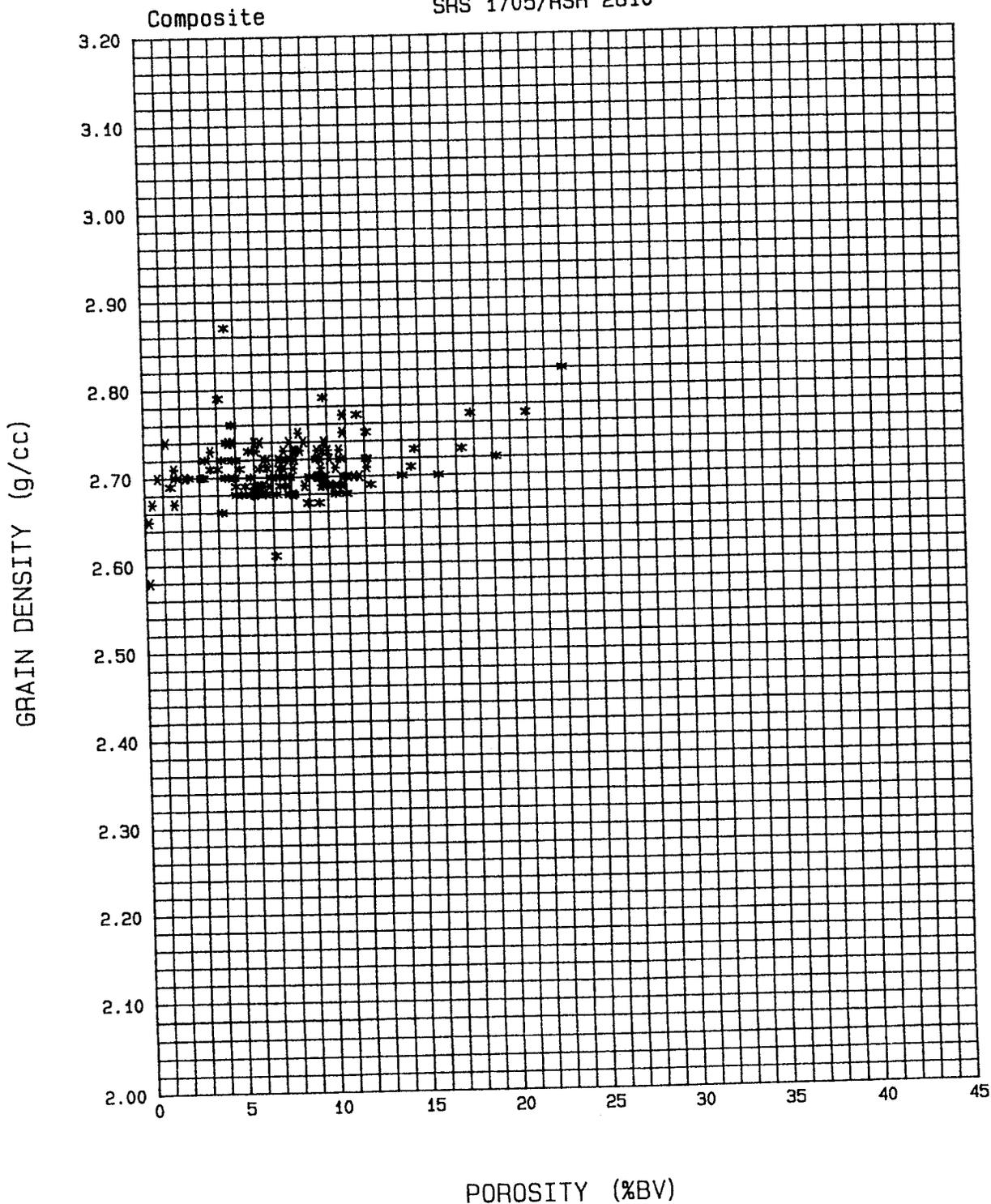


Figure 8

GRAIN DENSITY - POROSITY RELATIONSHIP

Anadarko Petroleum Corporation
Youngren K No. 3A Well
Panoma Field
Stevens County, Kansas
SRS 1705/RSR 2810



COMPANY ANADARKO PETROLEUM CORP. FIELD PANOMA FILE RSH 2810
 WELL YOUNGREN K NO. 3A COUNTY STEVENS ELEV. SRS 1705
 LOCATION _____ STATE KANSAS DATE _____

RESERVOIRS

Inc. CORE-GAMMA LOG

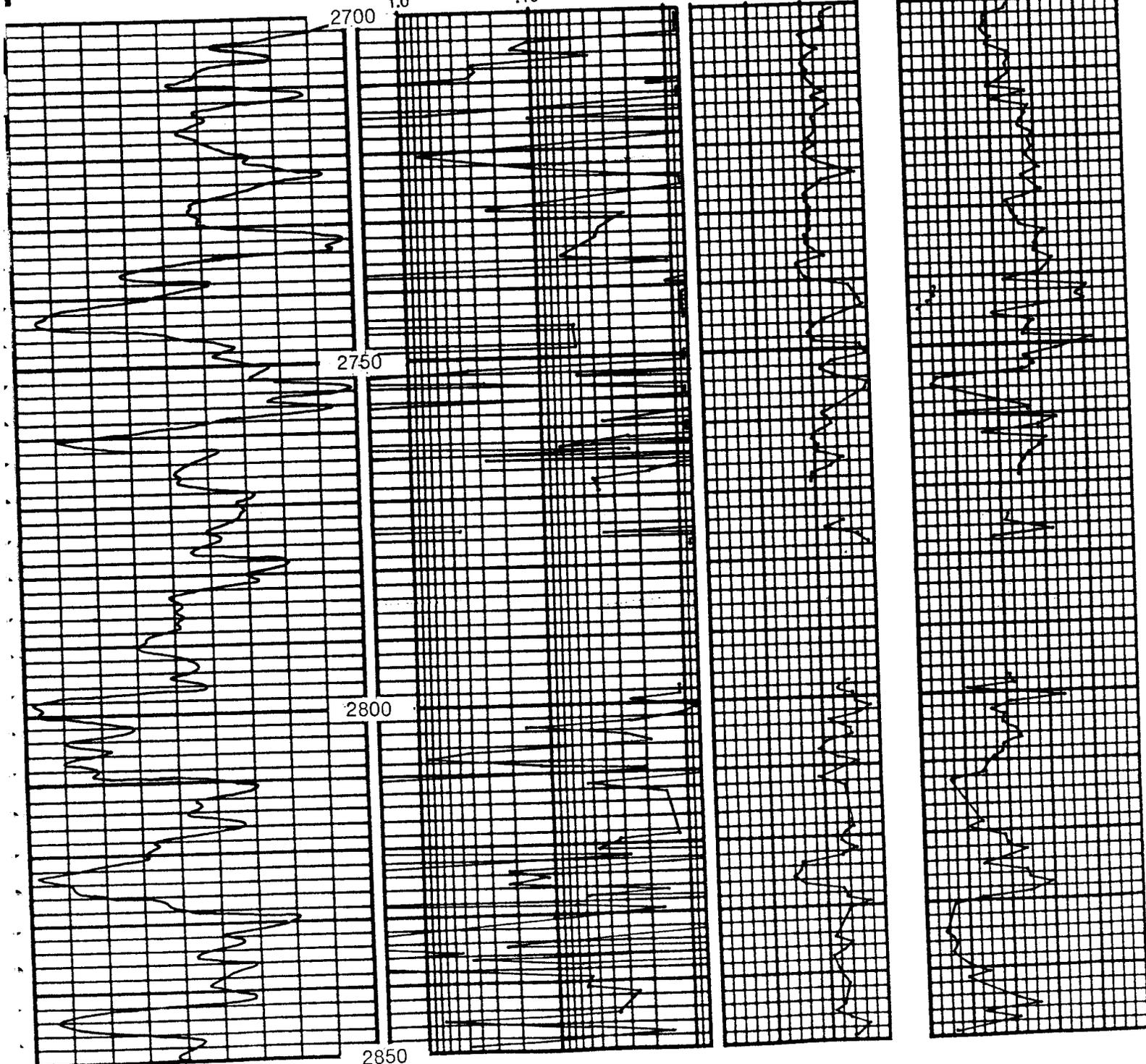
VERTICAL SCALE: 5" = 100'

TOTAL WATER
 PERCENT TOTAL WATER
 (—————)
 100 80 60 40 20 0
 OIL SATURATION
 PERCENT PORE SPACE
 (-----)
 0 20 40 60 80 100

GAMMA RAY
 RADIATION INCREASE
 →

PERMEABILITY
 MILLIDARCIES

POROSITY
 PERCENT



COMPANY ANADARKO PETROLEUM CORP. FIELD PANOMA FILE NON 2010
 WELL YOUNGREN K NO. 3A COUNTY STEVENS ELEV. SRS 1705
 LOCATION STATE KANSAS DATE _____

RESERVOIRS

Inc.
CORE-GAMMA LOG

VERTICAL SCALE: 5" = 100'

GAMMA RAY
 RADIATION INCREASE
 →

PERMEABILITY
 MILLIDARCIES

POROSITY
 PERCENT

TOTAL WATER
 PERCENT TOTAL WATER
 (—————)

100 80 60 40 20 0

OIL SATURATION
 PERCENT PORE SPACE
 (-----)

0 20 40 60 80 100

