

T. 23 N9C-31W SEC. 11

SHARON RESOURCES

#5 Sherman Well
Finney County, Kansas

TTCS File No. 86195

<u>Core No.</u>	<u>Interval</u>	<u>Formation</u>
1	4750-4798	Morrow

TerraTek

Geoscience Services

TerraTek Core Services

February 14, 1986

Sharon Resources
7100 E. Belleview, Suite 201
Englewood, CO 80111

ATTN: Mr. Jack Steinhauser

SUBJECT: Core Analysis Data; #5 Sherman Well;
Finney County, Kansas; TTCS File No. 86195

Gentlemen:

Diamond coring equipment and water base mud were used to obtain a 3.5-inch diameter core from the formation and interval shown on the preceding page in the subject well. A representative of Terra Tek Core Services received the core at the well-site where they were preserved in saran film and plastic polytubing and transported to our mobile laboratory in Denver for routine retort analysis. Porosity and permeability measurements were performed at our Salt Lake City laboratory on forty 1.0-inch diameter plug samples drilled from the core.

Fluid saturation, porosity, permeability and grain density data are plotted on the enclosed Teklog, a core gamma log was not requested.

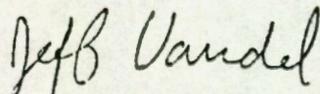
Residual fluid removal was accomplished by the controlled temperature retort extraction method on 100.0-gram crushed samples. Porosities were determined on the plug samples by using Boyle's law (helium) grain volumes and Archimedes (mercury) bulk volumes. Horizontal permeabilities to nitrogen were measured on these same plug samples in a hassler sleeve using an orifice-equipped pressure transducer to monitor downstream flow.

Data resulting from the above analysis are tabulated on the following pages. Following this analysis is a summary reflecting average data by zones based on permeability, porosity and fluid saturation variations.

The top 32.5 feet of the core was slabbed as instructed and the slabs and butt ends will be delivered to you at the above address.

We sincerely appreciate this opportunity to be of service.

Very truly yours,



Jeff Vandel
Data Evaluator

FINAL DISTRIBUTION LIST

Sharon Resources
#5 Sherman Well
Finney County, Kansas
TTCS File No. 86195

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TERRA TEK CORE SERVICES INC.

360 Wakara Way, SLC Utah 84108 (801) 584-2480

SHARON RESOURCES
#5 Sherman

Feb. 14, 1988
TTCS 86195

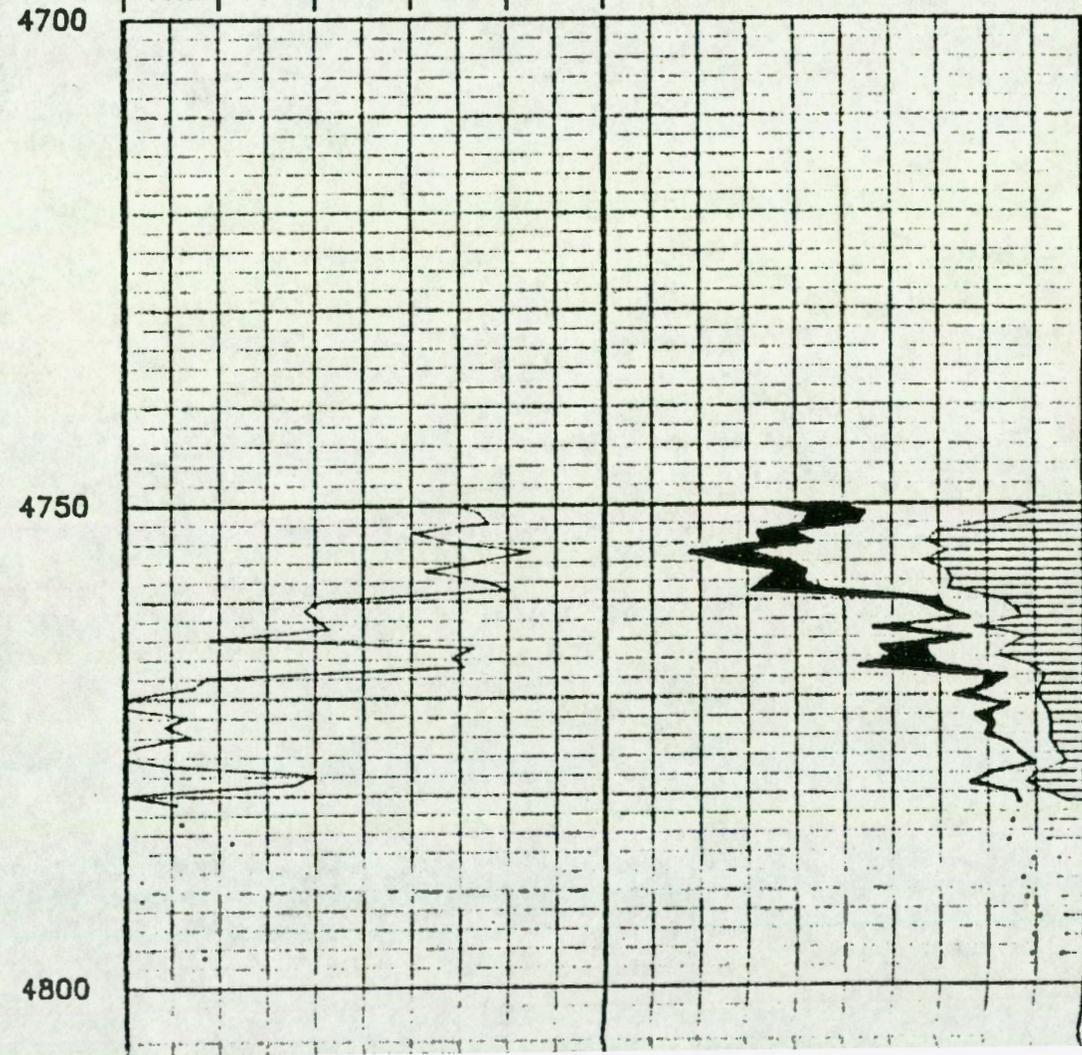
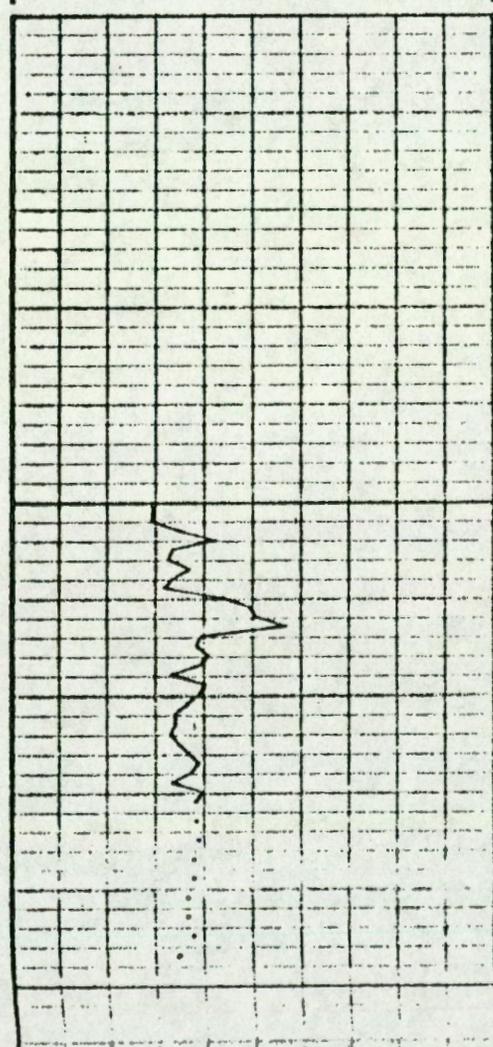
TEKLOG

Core ϕ %

GR CPM 0 500
Gd gm/cc 2.50 3.00

Fractional Fluids
Oil Void Water

Kh mD 0.010 1000



TerraTek Co. Services, Inc.®

University Research Park - 360 Wakara Way - Salt Lake City, Utah 84108 - (801) 584-2480 - TWX 910-925-5284

SHARON RESOURCES

Well: #5 Sherman
 Field: Stewart
 Drilling fluid: Chem/monpac

State: Kansas
 County: Finney
 Location: SEC.11-T23S-R31W

Date: 13-FEB-1986
 TTCS File #: 86195
 Elevation: 2881KB

RETORT ANALYSIS - BOYLE'S LAW POROSITY

Sample Number	Depth (feet)	Permeability		Porosity %	Saturation		Grain Density (gm/cc)	Lithology
		Horz (md)	Vert (md)		Oil %	H2O %		
Morrow Formation								
1	4750.0-51.0	27.		13.1	20.0	22.0	2.64	Sd,fg,slty lam
2	4751.0-52.0	48.		11.5	20.0	18.0	2.64	Sd,fg
3	4752.0-53.0	61.		11.8	19.3	34.1	2.64	Sd,fg,slty lam
4	4753.0-54.0	9.8		13.7	10.4	45.1	2.67	Sd,fg,sl/pyr
5	4754.0-55.0	23.		13.4	15.4	49.2	2.71	Sd,f-mg,pyr
6	4755.0-56.0	163		16.5	13.2	34.6	2.67	Sd,fg,sl/pyr
7	4756.0-57.0	49.		15.0	17.7	45.1	2.66	Sd,fg,sl/pyr
8	4757.0-58.0	13.		12.8	8.9	45.4	2.68	Sd,fg,sl/lmy,sl/pyr
9	4758.0-59.0	52.		13.5	12.3	40.9	2.67	Sd,fg,sl/lmy
10	4759.0-60.0	100		13.9	20.7	41.4	2.66	Sd,fg,sl/lmy
11	4760.0-61.0	1.0		7.2	15.5	48.3	3.72	Sd,fg,lmy,sl/pyr,fos
12	4761.0-62.0	.69		6.2	6.8	47.8	2.75	Cgl,f-mg ls,sl/slty,sl/pyr
13	4762.0-63.0	.94		5.1	4.6	50.2	2.75	Cgl,f-mg ls,sl/ool,sl/slty,sl/pyr
14	4763.0-64.0	1.2		8.9	8.8	52.7	2.78	Sd,fg,lmy,sl/slty,sl/pyr
15	4764.0-65.0	.07		5.3	9.1	45.6	2.69	Cgl,f-mg ls,fg sd,sl/slty
16	4765.0-66.0	43.		8.6	21.8	37.4	2.69	Ls,ool,sl/slty
17	4766.0-67.0	25.		8.1	19.9	45.5	2.70	Ls,ool,sl/slty
18	4767.0-68.0	34.		9.5	37.3	24.8	2.69	Ls,ool,sl/slty
19	4768.0-69.0	.07		4.1	20.0	40.1	2.66	Sd,fg,lmy
20	4769.0-70.0	.05		4.3	8.6	43.3	2.70	Ls,fxl,styl

SHERMAN NO. 5
SHARON RESOURCES, INC.

Detailed Core Description

<u>Depth</u>	<u>Description</u>
4750-51	Sandstone: brown, very-fine to fine grained (0.1mm to 0.2mm), well to moderately well-sorted, sub-rounded to sub-angular (qtz. overgrowths), fair inter-granular & inter-crystalline porosity (13% & 35md), Quartz arenite, thinly laminated to massive. Dipmeter, 2-4 degrees to East. Trace glauconite visible in sand, shale laminations contain abundant green mineral (glauconite), rounded, ductile. Good show oil staining.
4751-52	Sandstone: brown, lower very-fine grained (60 to 100um), very well sorted, sub-angular to sub-rounded (abundant subhedral and euhedral qtz.), fair inter-crystalline & inter-granular porosity (12% & 50md), quartz arenite, mostly massive to thinly laminated, mildly contorted with flame structures and small scale trough crossbeds, shale laminations thin & discontinuous, no visible glauconite. Good show oil staining.
4752-53	Sandstone: (upper 6 inches) brown, as above, sharp contact with lower sandstone separated by 0.5 to 1.0mm organic laminae, altered to pyrite. (Lower 6 inches) grey to light brown, mostly very fine to lower medium grained, moderately well-sorted, sub-rounded to rounded (abundant subhedral qtz.), fair inter-granular porosity with less inter-crystalline porosity (11.5% & 65md), quartz arenite to sublitharenite, thinly laminated, flame structure, small scale trough cross beds, organic shale laminations thin and discontinuous, slight increase in glauconite?, pyrite cement common. Fair show oil stain.
4753-54	Sandstone; grey to light brown, very fine to lower medium grained, moderately sorted to poorly sorted, sub-rounded to rounded, (rare subhedral qtz.), poor to fair inter-granular porosity, (13% & 9md), sublitharenite, thickly laminated with shales lenses (1.0 to 5.0mm), small scale trough crossbeds, pyritic, Poor show oil stain.
4754-55	Sandstone: (upper 4 inches) grey, very fine grained, well sorted, sub-angular (abundant subhedral and euhedral qtz.), fair inter-granular and inter-crystalline porosity, sublitharenite to quartz arenite, thinly laminated trough cross-statification with tangential basal contacts, cosets are form-discordant, organic laminae partially altered to pyrite with minor amounts of pyritic cement. (lower 8 inches) brown, fine to lower medium grained, moderately well to well sorted, sub-angular to sub-rounded, (abundant subhedral and euhedral qtz.), fair inter-granular and inter-crystalline porosity with scattered leached vugular porosity (13% & 25md), quartz arenite, thinly bedded unidirectional planar crossbeds, scattered fine to coarse organics, good show oil stain.

Sherman No. 5
Sec. 11-23s-31w

- 4755-56 Sandstone: brown, upper fine to lower medium grained, well to very well sorted, sub-angular to sub-rounded (abundant euhedral qtz.), fair to good inter-granular and inter-crystalline porosity with scattered vugular porosity (17% & 163md), quartz arenite, thickly laminated to thinly bedded, lenticular organic rich clay laminae within planar cross strata, abundant glauconite pellets, fine to lower medium grained, well rounded, spherical to elongated (overburden?), trace pyrite, good oil staining.
- 4756-57 Sandstone: brown, fine to lower medium grained, well to very well-sorted, sub-angular (abundant euhedral qtz.), fair inter-granular and inter-crystalline porosity (15% & 49md), quartz arenite, thickly laminated to thinly laminated, clay laminae organic rich, thin, partly altered to pyrite, continuous, parallel to bedding, continued planar cross-stratification (10-12 degrees) grading into lower angle planar strata continued thin lamination often convex up and discontinuous. Scattered fragments bituminous coal and minor glauconite pellets, fair to good oil staining.
- 4757-58 Sandstone: dark grey to brown, medium grained to very fine-grained with abundant mud, poorly sorted, sub-angular to sub-rounded (abundant subhedral qtz.), poor to fair inter-granular and inter-crystalline porosity (13% & 13md), sublitharenite to qtz. wacke, thinly laminated, clay laminae contain traces bituminous coal and abundant disseminated pyrite, small scale trough stratification and load structures, poor oil staining.
- 4758-59 Sandstone: (upper 8 inches) laminated grey & brown, fine grained, laminated with dark grey mudstone, moderately well-sorted, sub-angular (abundant subhedral qtz.), poor inter-granular & inter-crystalline porosity, glauconitic, silicic and pyritic cementation, partly limey (authigenic), thinly laminated, flat & parallel to small scale trough (load structures), poor to fair oil staining. (lower 4 inches) brown, lower medium to fine grained, well-sorted, sub-angular (abundant euhedral qtz.), fair to good inter-granular & inter-crystalline porosity with scattered leached vugular porosity, (14% & 52md), quartz arenite, slightly glauconitic with minor pyrite cement, thinly laminated to massive, good show oil staining.
- 4759-60 Sandstone: brown, very fine to lower coarse grained, moderately sorted, sub-rounded to sub-angular (abundant subhedral & euhedral qtz.), fair to good inter-granular & inter-crystalline porosity & scattered leached vugular porosity (14% & 100md), quartz arenite, slightly glauconitic, thinly laminated (upper) planar crossbeds roughly 10 degrees, (middle) small scale climbing ripples & (lower) massive to thinly laminated; good show oil staining.

- 4760-61 Conglomerate: (contact between sand & Congl. N/A lost at core lab), grey, lower-cobble to mostly pebble (largest: 75mm), poorly sorted, well-rounded, poor inter-granular porosity {07% & 01md}, clast-supported, well-imbricated. Clasts composed of etched oolitic limestones sandy biosparites, mudclasts and fossils (shallow marine); matrix composed of organic rich clay partially altered to pyrite, sand (very fine to coarse) and glauconite. No show of oil.
- 4761-62 Conglomerate: grey, lower-cobble to mostly pebble (largest: 80+ mm), poorly sorted, well-rounded, poor inter-granular porosity {06% & 0.7md}, clast-supported to partially matrix-supported, imbricated. Clasts as above, matrix as above. No show of oil.
- 4762-63 Conglomerate: (upper 4 inches) grey, cobble to pebble, (largest: 100+ mm), poorly sorted, well-rounded, poor inter-granular porosity, clast-supported. Clasts & matrix as above.
Sandstone: grey, very fine to coarse grained, poorly sorted, rounded to sub-angular, (qtz. rarely subhedral), abundant clay, partially organic and partially altered to pyrite, glauconitic, calcic cementation. No show of oil.
- 4763-64 Sandstone: (upper 6 inches) brown, very fine to upper-medium grained, moderately sorted, rounded to sub-angular (abundant sub-hedral & euhedral qtz.), fair inter-crystalline & inter-granular porosity {09% & 1.2md}, lithic arenite, calcic and silicic cemented, lower increasingly coarse and laminated. Fair to good show of oil.
Conglomerate: (lower 6 inches) grey, pebbles and granules, (largest 30+ mm), poorly sorted, mostly well-rounded, poor inter-granular porosity, clast supported, imbricated. Clasts & matrix as above.
- 4764-65 Conglomerate: grey, cobble to pebble, (largest: 80+ mm), poorly sorted, rounded, poor inter-granular porosity {05% & 0.7md}, clast-supported, well imbricated. Clasts and matrix as above. No Show of oil.
- 4765-66 Upper one inch: Conglomerate as above. 4765.1 ft. Mississippian/Pennsylvanian unconformity.
4765.1-66: oolitic limestone (calcirudite): brown, oolites fine-grained (0.1 to 0.25mm), spar-calcite cement, fair inter-granular porosity with very poor inter-crystalline porosity; good show of oil.
- 4766-67 Oolitic limestone; as above.

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SHARON RESOURCES

Well: #5 Sherman
 Field: Stewart
 Drilling fluid: Chem/monpac

State: Kansas
 County: Finney
 Location: SEC.11-T23S-R31W

Date: 13-FEB-1986
 TTCS File #: 86195
 Elevation: 2881KB

RETORT ANALYSIS - BOYLE'S LAW POROSITY DATA SUMMARY

Zone Number	Depth Interval (feet)	Number of Samples	Permeability		Porosity %	Saturation		Grain Density (gm/cc)
			Horz (md)	Vert (md)		Oil %	H2O %	
Morrow Formation								
1	4750.0-60.0	10	54. [46.5]		13.5 [1.45]	15.8 [4.36]	37.6 [10.4]	2.66 [0.02]
2	4760.0-65.0	5	.81 [0.47]		6.5 [1.57]	9.0 [4.09]	48.9 [2.69]	2.74 [0.03]
3	4765.0-69.0	4	34. [7.25]		7.6 [2.38]	24.8 [8.38]	36.9 [8.75]	2.69 [0.02]
4	4769.0-78.0	9	.02 [0.02]		3.7 [1.02]	6.5 [3.60]	40.2 [6.47]	2.68 [0.01]
5	4778.0-80.0	2	.73 [0.25]		4.4 [0.53]	1.4 [1.93]	50.5 [1.85]	2.68 [0.02]
6	4780.0-98.0	10	.03 [0.04]		2.5 [0.44]	0.0 [0.00]	45.9 [7.64]	2.69 [0.01]

[] Sample Standard Deviation

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HORIZONTAL PERMEABILITY VS POROSITY

SHARON RESOURCES

#5 Sherman
Stewart Field
Finney Co., Kansas
Feb. 14, 1986

Depth Interval: 4750 to 4798 feet		
Porosity (phi),		
Min	Max	Average
1.869	16.501	6.649
Permeability (Kh), mD		
Min	Max	Geo. Ave
0.006	164.345	0.452
Equation of the Line		
$\log Kh = \alpha \phi + \beta$		
$\log Kh = 0.3087 \phi - 2.3969$		
Correlation Coefficient : 0.919		

