

17-12-33W

CONFIDENTIAL

GEOLOGICAL REPORT

FRONTIER OIL COMPANY
NO. 1 CLARK "A"

RELEASED

SW SW SW SEC. 17-12-33W
LOGAN COUNTY, KANSAS

JAN 14 1991

FROM CONFIDENTIAL

OCT 18 1991

DATE COMMENCED: July 1, 1989

DATE OF RTD: July 15, 1989

GEOLOGIST:

RICHARD D. PARKER

RECEIVED
STATE CORRELATION COMMISSION

OCT 10 1989

CONSERVATION DIVISION
Wichita, Kansas

CONFIDENTIAL

OCT 12 1989

KANSAS GEOLOGICAL SURVEY
WICHITA BRANCH

Frontier Oil Company
1720 Kansas State Bank Bldg.
Wichita, Kansas 67202

Frontier Oil Company
No. 1 Clark "A"
SW SW SW Sec. 17-12S-33W
Logan County, Kansas

Dear Sir:

The following is a Geological Report with a Time Log attached on the above captioned test well.

Drilling was supervised from 3500' to 4800' rotary total depth. Samples were examined from 3500' to rotary total depth.

All formation tops, zones of porosity and staining are based on rotary bushing measurements. Any corrections in measurements during the drilling of the well have been incorporated into this report.

Elevation (American Elevations)

3153 DF -- 3156 KB

| | <u>SAMPLE TOPS</u> | | <u>LOG TOPS</u> | |
|---------------------|--------------------|-------|-----------------|-------|
| Anhydrite | 2620 | + 536 | 2620 | + 536 |
| Topeka | 3814 | - 658 | 3816 | - 660 |
| Heebner | 4040 | - 884 | 4040 | - 884 |
| Toronto | 4063 | - 907 | 4064 | - 908 |
| Lansing-Kansas City | 4082 | - 926 | 4082 | - 926 |
| Base of Kansas City | 4377 | -1221 | 4376 | -1220 |
| Marmaton | 4414 | -1258 | 4414 | -1258 |
| Pawnee | 4507 | -1351 | 4504 | -1348 |
| Fort Scott | 4562 | -1406 | 4566 | -1410 |
| Cherokee Shale | 4588 | -1432 | 4598 | -1442 |
| Johnson | 4642 | -1486 | 4644 | -1488 |
| Morrow Sand | 4706 | -1550 | 4702 | -1546 |
| Mississippian | 4712 | -1556 | 4712 | -1556 |
| RTD | 4800 | -1644 | 4802 | -1646 |

Structurally, on top of the Lansing-Kansas City the No.1 Clark "A" ran 2' high to the Beren Janice #1 a Johnson producer, located one half mile northeast. On top of the Fort Scott the Clark "A" No. 1 ran 4' high to the Janice No. 1. On top of the Johnson the Clark "A" No. 1 ran 4' low to the Janice No. 1. On top of the Mississippian the Clark "A" ran 9' low to the Janice No. 1.

ZONES OF INTEREST

TOPEKA (Top 3814)
3814 to 3820

Tan fine crystalline. Lime with no show.

TORONTO (Top 4063)
4063 to 4072

White fine crystalline to fossiliferous oolitic lime with fair fossiliferous porosity, no show of oil.

LANSING-KANSAS CITY (Top 4082)
4082 to 4090

White fossiliferous to oolitic lime with fair fossiliferous porosity. No show of oil.

4114 to 4118

White fossiliferous to oolitic lime with fair interoolitic porosity. No show of oil.

4135 to 4142

White fine crystalline to slightly dense cherty with fair vugular porosity. Trace of free oil. Trace of stain and no odor. (included in DST #1).

4151 to 4154

White to light tan fine crystalline to dense cherty lime and white chert. Fair vugular porosity. Fair show of free oil. Fair spotted stain and a fair odor.

DRILL STEM TEST NO. 1 (TRILOBITE)
4128 to 4158

30-30-30-30. 1st op - wk blow for 25". 2nd op - no blow. Rec. 10' M IF & FF 23-23 ISIP 315 FSIP 247

4159 to 4165

White fine crystalline lime with fair vugular porosity, fair show of free oil, fair odor, fair light to dark stain. (Included in DST #2)

4174 to 4180

White fine crystalline lime with fair vugular to pinpoint porosity. Fair show of free oil, fair light to dark stain, faint odor.

DRILL STEM TEST NO. 2 (TRILOBITE)

4158 to 4180

30-30-30-30. 1st op - wk blow 2nd op - no blow. Rec. 80' WM w/few specks of oil. IF 23-35 FF 35-47 ISIP 1266 FSIP 1254.

4200 to 4212

White fine crystalline to oolitic lime with no show of oil.

4234 to 4238

Tan fine crystalline to slightly fossiliferous with fair vugular porosity. Trace of free oil, fair odor, trace of spotted stain. Included in DST #3)

4240 to 4248

White to tan fine crystalline lime along with light grey dense cherty lime. Poor vuggy porosity. Trace of free oil, spotted stain and a faint odor.

DRILL STEM TEST NO. 3 (TRILOBITE)

4218 to 4261

30-30-30-30. 1st op - wk blow for 3". 2nd op - no blow. Rec. 10' M w/good oil show. IF & FF 23-23 ISIP 818 FSIP 698.

4276 to 4282

White oolitic to fossiliferous lime with fair fossiliferous porosity. Fair show of free oil, good odor, spotted stain.

DRILL STEM TEST NO. 4 (TRILOBITE)

4258 to 4288

30-30-30-30. 1st op - wk blo 2". 2nd op - no blo. Rec. 5' M IF & FF 11-11 ISIP & FSIP 23.

4298 to 4303

White fine crystalline to slightly oolitic lime with fair vugular porosity, good odor fair show of oil, good spotted light stain.

DRILL STEM TEST NO. 5 (TRILOBITE)

4280 to 4320

60-30-60-30. 1st op - wk inc. to fair blow.
2nd op - wk inc. to fair blow. Rec. 330'
GIP, 120' SGC0, 30' SOCM. IF 23-47
FF 58-70 ISIP 1137 FSIP 1091

4328 to 4334

Light tan fine crystalline to slightly
fossiliferous dense lime with some
slightly vuggy porosity in the dense lime,
fair odor, trace of free oil and trace of
stain.

DRILL STEM TEST NO. 6 (TRILOBITE)

4312 to 4360

30-30-30-30. 1st op - wk blow for 7".
2nd op - no blow. Rec. 5' M. IF & FF 11-11
ISIP 176 FSIP 117

4360 to 4364

Light grey to tan fine crystalline to dense
lime with no show of oil.

MARMATON (TOP 4414)

4414 to 4424

Light grey to tan fine crystalline lime,
slightly fossiliferous. No show of oil.

PAWNEE (TOP 4507)

4507 to 4520

Light tan fine crystalline to cherty dense
lime with no show of oil.

FORT SCOTT (TOP 4568)

4568 to 4588

Light tan fine crystalline to oolitic
fossiliferous lime with no show of oil
and no odor.

CHEROKEE SHALE (TOP 4588)

4588 to 4596

Grey to green shale, some carboneous black
shale, junky dense to chalky lime.

4608 to 4612

White to tan chalky to dense cherty lime
with traces of free oil. Oil stain in poor
pinpoint porosity. Very faint odor.

DRILL STEM TEST NO. 7 (TRILOBITE)

4580 to 4630

30-30-30-30. 1st op - wk blow for 18".
2nd op - no blow. Rec. 10' M. IF 23-23
FF 23-23 ISIP & FSIP 35

JOHNSON ZONE (TOP 4642)

4642 to 4658

Tan fossiliferous to oolitic lime and brown
dense to white chalky lime. Faint odor,
trace of slightly vuggy lime. Trace of
dark stain.

DRILL STEM TEST NO. 8 (TRILOBITE)
4580 to 4658

30-30-30-30. 1st op - wk blow for 10".
2nd op - no blow. Flushed tool - no help.
Rec. 5' M. IF & FF 23-23 ISIP 70 FSIP 47.

4658 to 4662

Tan fossiliferous to oolitic medium crystalline lime with some vuggy porosity. Fair odor, traces of free oil, trace of spotted oil stain. (Included in DST #9).

4674 to 4682

Tan fine crystalline to oolitic, some brown dense lime with fair vuggy porosity, faint odor, fair show of free oil, spotted light and dark stain.

DRILL STEM TEST NO. 9 (TRILOBITE)
4658 to 4682

60-45-60-45. 1st op - wk inc. to strong blow. 2nd op - wk inc. to strong blow. Rec. 600' GIP, 130' SGCO, 110' G&MCO. IF 23-70 FF 94-106 ISIP 722 FSIP 626.

MORROW (Top 4706)
4706 to 4712

White to clear to pale green sand, small well rounded loose clear sand, black, green shale and slity shale. No show of oil and no odor.

MISSISSIPPI (TOP 4712)
4712 to 4750

White oolitic to slighty sandy lime with no show of oil.

4759 to 4800

White chalky to dense lime grading into cherty lime. No show of oil.

4½" used 10½# casing was set at 4790 with 225 sx common cement, 10% salt added. Zero pint is 5' AGL and the shoe joint is 42-85 feet long.

Sincerely,



Richard D. Parker

DRILLING INFORMATION ON THE NO. 1 CLARK "A"

Drilling Contractor: Red Tiger Drilling Co.

Drillers: Burlison
Oden
Arnold

Tool Pusher: Walter Oden, Jr.

Spud Date: July 1, 1989

Date of RTD: July 15, 1989

Surface Pipe: 8 5/8"/345'/190 sx

Casing: 4½"/4790/225 sx com, 10% salt

TOTAL FOOTAGE DRILLED PER DAY

Under Surface @ 5:45 AM on July 2, 1989

| | Feet | At | 7:00 AM | On | |
|------|------|----|----------|----|---------|
| 400 | " | " | " | " | 7-02-89 |
| 1990 | " | " | " | " | 7-03-89 |
| 2768 | " | " | " | " | 7-04-89 |
| 3286 | " | " | " | " | 7-05-89 |
| 3664 | " | " | " | " | 7-06-89 |
| 4014 | " | " | " | " | 7-07-89 |
| 4158 | " | " | " | " | 7-08-89 |
| 4227 | " | " | " | " | 7-09-89 |
| 4288 | " | " | " | " | 7-10-89 |
| 4358 | " | " | " | " | 7-11-89 |
| 4473 | " | " | " | " | 7-12-89 |
| 4630 | " | " | " | " | 7-13-89 |
| 4665 | " | " | " | " | 7-14-89 |
| 4800 | " | " | 11:45 AM | " | 7-15-89 |

BIT RECORD

| <u>Bits</u> | <u>Type</u> | <u>Footage</u> |
|-------------|--------------------|----------------|
| No. 1 | Reed S-11 (Re-Run) | 348 to 1631 |
| No. 2 | CP-EH527B (New) | 1631 to 4320 |
| No. 3 | CP-EH527B (Re-Run) | 4320 to 4800 |

MUD RECORD

Mud Company: MSI, INC.

Mud Type: Chemical Drispac

| | |
|----------|---|
| Surface: | 25 sx gel, 2 sx lime |
| 1694 | 5 sx gel, 5 sx hulls |
| 2540 | (Pre-Mix) 120 sx gel, 6 sx soda ash, 6 sx lignite, 6 sx caustic, 5 sx hulls |
| 2768 | 25 sx gel, 1½ sx soda ash, 1½ sx lignite, 1½ sx caustic |
| 3561 | 43 sx gel, 2½ sx soda ash, 2½ sx lignite, 2½ sx caustic |
| 3918 | 24 sx gel, 1 sk soda ash, 2 sx lignite, 1 sk caustic, 2 sx drispac |
| 4158 | 15 sx gel, 1 sk soda ash, 1 sk lignite, 2 sk caustic |
| 4180 | 8 sx gel, 1 sk soda ash, 1 sk lignite, 1 sk caustic |
| 4283 | 1 sk soda ash, 1 sk lignite, 1 sk caustic |
| 4320 | 12 sx gel, 1 sk soda ash, 1 sk lignite, 1 sk caustic |
| 4411 | 1 sk soda ash, 1 sk lignite, 1 sk caustic, 1 sk drispac |
| 4547 | 35 sx gel, 1 sk soda ash, 1 sk lignite, 1 sk caustic, 1 sk drispac |
| 4658 | 5 sx gel, 1 sk caustic, 1 sk soda ash |
| 4687 | 25 sx gel, 5 sx hulls |
| 4800 | 12 sx gel, 1 sk soda ash, 1 sk caustic |

DRILLING TIME LOG

Frontier Oil Company
#1 Clark "A"

SW SW SW Sec. 17-12-33W
Logan County, Kansas

Elev.: 3153 DF
3156 KB

| DEPTH | MINUTES | REMARKS |
|-------|---------|---------|
|-------|---------|---------|

1 Foot Driling Time

| | | |
|--------------|---------------------|--|
| 3500 to 3510 | 3-3-3-4-5-5-2-3-4-3 | |
| 3520 | 4-3-5-6-6-5-5-5-5-5 | |
| 3530 | 5-4-4-4-6-7-7-6-7-6 | |
| 3540 | 6-5-5-5-5-5-6-5-5-5 | |
| 3550 | 6-4-5-4-4-4-4-4-3-3 | |
| 3560 | 4-4-4-4-5-4-4-3-3-4 | |
| 3570 | 3-3-4-3-3-3-4-5-4-4 | |
| 3580 | 3-3-3-3-4-3-4-4-3-4 | |
| 3590 | 5-6-5-3-3-3-3-4-4-5 | |
| 3600 | 5-6-8-5-2-5-5-6-6-4 | |
| 3600 to 3610 | 4-8-6-6-6-5-5-7-6-5 | |
| 3620 | 5-4-3-2-2-2-2-2-2-2 | |
| 3630 | 3-4-4-5-5-5-6-7-6-6 | |
| 3640 | 6-5-6-5-6-6-5-5-5-5 | |
| 3650 | 5-5-4-3-4-4-6-3-3-4 | |
| 3660 | 3-4-6-6-4-4-5-6-6-6 | |
| 3670 | 6-5-6-5-5-5-4-5-4-3 | |
| 3680 | 3-3-2-2-2-3-4-4-4-4 | |
| 3690 | 5-5-5-5-3-3-3-4-5-5 | |
| 3700 | 4-4-4-5-6-6-5-3-3-4 | |
| 3700 to 3710 | 4-5-4-5-4-5-6-6-3-3 | |
| 3720 | 3-3-4-6-5-6-4-4-5-6 | |
| 3730 | 5-5-5-5-4-5-5-4-3-4 | |
| 3740 | 3-3-4-4-6-6-4-4-4-3 | |
| 3750 | 3-2-4-3-3-3-3-2-3-3 | |
| 3760 | 3-4-4-3-4-3-3-3-4-3 | |
| 3770 | 3-2-3-3-2-4-4-3-3-2 | |
| 3780 | 3-3-3-2-3-2-3-4-4-3 | |
| 3790 | 3-4-4-3-3-3-3-4-4-4 | |
| 3800 | 3-3-3-3-4-2-3-3-3-3 | |

| | |
|--------------|---------------------|
| 3800 to 3810 | 2-5-5-4-3-3-3-4-5-4 |
| 3820 | 4-5-5-4-4-3-3-2-3-4 |
| 3830 | 3-3-3-4-3-2-4-3-3-3 |
| 3840 | 4-3-3-4-3-4-3-3-3-4 |
| 3850 | 4-4-4-3-3-3-3-3-2-3 |
| 3860 | 3-3-2-2-2-2-2-3-2-2 |
| 3870 | 2-2-4-4-5-4-2-5-4-4 |
| 3880 | 4-5-4-5-5-4-4-3-5-6 |
| 3890 | 4-4-3-2-4-2-3-3-2-2 |
| 3900 | 2-3-3-3-2-3-3-4-3-3 |
| 3900 to 3910 | 3-2-3-3-2-3-3-3-3-3 |
| 3920 | 2-2-3-3-3-4-4-3-3-3 |
| 3930 | 5-6-6-5-3-3-4-3-4-3 |
| 3940 | 3-3-2-2-2-2-2-2-1-2 |
| 3950 | 2-1-2-2-2-2-2-2-3-3 |
| 3960 | 4-7-7-6-7-7-6-6-5-4 |
| 3970 | 4-5-5-8-7-8-7-7-8-6 |
| 3980 | 7-7-8-7-7-6-5-5-6-6 |
| 3990 | 7-6-4-6-7-7-8-6-5-4 |
| 4000 | 5-8-8-8-6-3-2-4-3-3 |
| 4000 to 4010 | 2-2-4-4-2-2-3-3-6-9 |
| 4020 | 8-6-6-4-3-4-4-5-7-3 |
| 4030 | 2-2-3-2-3-3-4-2-3-2 |
| 4040 | 3-3-3-2-2-3-4-4-7-6 |
| 4050 | 4-3-4-4-6-7-7-7-6-6 |
| 4060 | 6-6-6-5-6-6-6-6-6-5 |
| 4070 | 6-6-6-4-4-3-4-5-5-6 |
| 4080 | 4-3-6-6-7-7-8-5-5-5 |
| 4090 | 6-4-5-5-5-5-4-5-3-2 |
| 4100 | 3-2-3-3-3-3-3-3-3-2 |
| 4100 to 4110 | 4-5-6-5-7-7-5-5-5-5 |
| 4120 | 5-5-4-5-4-3-2-2-3-5 |
| 4130 | 4-3-4-4-5-5-6-5-5-4 |
| 4140 | 4-5-5-5-6-5-4-4-3-3 |
| 4150 | 4-4-4-5-5-5-6-5-5-5 |
| 4160 | 7-5-4-5-6-6-6-7-3-5 |
| 4170 | 4-3-3-4-4-5-6-7-7-7 |
| 4180 | 6-6-5-4-4-3-3-3-3-3 |
| 4190 | 7-5-6-7-7-5-5-6-5-5 |
| 4200 | 6-5-4-5-5-8-7-9-8-6 |

DST #1 (4128-4158)

DST #2 (4158-4180)

| | | |
|--------------|-----------------------|--------------------|
| 4200 to 4210 | 5-5-5-4-5-5-4-4-5-5 | |
| 4220 | 5-5-5-6-8-8-8-7-6-6 | |
| 4230 | 6-7-9-7-6-6-5-6-7-6 | |
| 4240 | 9-9-8-8-4-5-6-6-5-6 | |
| 4250 | 4-4-5-4-4-5-5-4-6-5 | |
| 4260 | 5-5-6-5-6-6-6-5-5-7 | DST #3 (4218-4261) |
| 4270 | 6-3-6-6-6-7-5-7-5-6 | |
| 4280 | 7-7-6-7-6-6-5-6-5-6 | DST #4 (4258-4288) |
| 4290 | 5-3-5-8-8-7-8-7-7-6 | |
| 4300 | 6-4-4-6-5-6-6-5-5-6 | |
| 4300 to 4310 | 7-5-7-6-6-6-5-4-3-6 | |
| 4320 | 5-5-6-6-4-3-4-5-4-5 | DST #5 (4280-4320) |
| 4330 | 7-7-10-7-7-6-6-7-6-4 | |
| 4340 | 4-6-6-6-6-7-6-6-7-7 | |
| 4350 | 7-7-6-6-7-7-9-7-7-9 | |
| 4360 | 10-7-7-7-9-7-8-6-6-6 | DST #6 (4312-4360) |
| 4370 | 4-6-6-6-7-6-7-7-6-5 | |
| 4380 | 5-6-6-6-5-8-9-6-6-6 | |
| 4390 | 6-6-6-8-7-7-6-5-4-4 | |
| 4400 | 4-5-4-4-5-5-6-6-3-4 | |
| 4400 to 4410 | 4-4-3-3-3-3-3-4-3-4 | |
| 4420 | 4-4-7-5-7-8-7-6-7-6 | |
| 4430 | 6-8-6-7-8-9-7-7-7-8 | |
| 4440 | 7-7-6-6-7-7-6-7-7-7 | |
| 4450 | 9-9-7-8-8-7-8-9-9-7 | |
| 4460 | 8-9-9-9-9-7-9-9-6-7 | |
| 4470 | 8-6-7-6-7-7-6-6-7-6 | |
| 4480 | 7-6-9-8-9-8-7-7-7-7 | |
| 4490 | 6-6-6-7-7-7-5-6-7-7 | |
| 4500 | 6-7-7-7-7-6-5-7-5-5 | |
| 4500 to 4510 | 5-5-6-7-7-6-7-4-4-5 | |
| 4520 | 7-7-5-4-6-4-5-4-5-4 | |
| 4530 | 5-6-6-6-4-5-5-6-7-7 | |
| 4540 | 7-7-6-7-7-7-6-6-7-6 | |
| 4550 | 7-8-6-5-8-7-6-5-6-6 | |
| 4560 | 6-8-8-9-8-6-8-7-8-8 | |
| 4570 | 4-8-10-9-10-9-8-5-6-9 | |
| 4580 | 9-8-8-7-8-8-7-7-7-8 | |
| 4590 | 8-5-8-8-8-9-10-7-6-6 | |
| 4600 | 7-6-7-7-8-6-6-7-6-5 | |

| | | |
|--------------|----------------------|--------------------|
| 4600 to 4610 | 4-7-7-7-6-6-8-6-2-2 | |
| 4620 | 5-6-8-6-7-7-7-7-7-7 | |
| 4630 | 9-6-8-9-10-9-5-8-7-7 | DST #7 (4580-4630) |
| 4640 | 4-9-6-5-7-6-6-7-7-10 | |
| 4650 | 9-9-7-6-5-5-5-5-5-6 | |
| 4660 | 5-5-5-5-5-7-6-6-8-6 | DST #8 (4580-4658) |
| 4670 | 6-5-6-8-6-6-5-6-6-7 | |
| 4680 | 5-6-7-7-6-6-5-6-7-6 | DST #9 (4658-4682) |
| 4690 | 5-5-5-5-3-7-4-5-7-5 | |
| 4700 | 5-6-7-8-9-9-6-8-6-6 | |
| 4700 to 4710 | 7-5-5-9-8-8-8-1-1-1 | |
| 4720 | 2-4-8-8-7-8-8-7-6-5 | |
| 4730 | 6-6-5-7-6-4-5-6-7-7 | |
| 4740 | 7-7-9-7-6-5-5-6-6-6 | |
| 4750 | 6-6-5-6-5-7-7-8-7-7 | |
| 4760 | 9-9-11-7-8-7-6-6-4-6 | |
| 4770 | 6-5-4-4-5-5-6-5-6-7 | |
| 4780 | 6-7-5-6-7-8-6-6-7-6 | |
| 4790 | 6-5-7-6-6-6-7-6-5-6 | |
| 4800 | 5-5-4-6-7-5-7-7-8-6 | |