23-19-15W

GEOLOGICAL REPORT 1

FRONTIER OIL COMPANY

BUTTON "A" NO. 1

150' W NE NE NW

23-19S-15W

BARTON COUNTY, KANSAS

Commenced: April 12, 1983

Completed: April 26, 1983

SEP 16 1985
State Geological Survey
WICHITA BRANCH

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STATE CORPORATION COMMISSION
JUL 30 1985
CONSERVATION DIVISION
Wichita, Kansas

Frontier Oil Company
1720 Kansas State Bank Building
Wichita, Kansas 67202

Re: Frontier Oil Company
Button "A" No. 1
150' W NE NE NW 23-19S-15W
Barton County, Kansas

Dear Sir:

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

Drilling was supervised from 1600' to 3665', rotary total depth. Samples were examined from 1600' to 3665', 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 this well have been incorporated into this report.

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Elevation	1915 GL -- 1920 KB	
Anhydrite	847	(+1073)
Herrington-Krider	1768	(+152)
Winfield	1821	(+99)
Fort Riley	1921	(-1)
Council Grove	2082	(-162)
Neva	2278	(-358)
Red Eagle	2334	(-414)
Brownville Lime	2496	(-576)
Tarkio	2610	(-690)
Topeka	2891	(-971)
Heebner	3148	(-1228)
Lansing-Kansas City	3238	(-1318)
Base-Kansas City	3455	(-1535)
Conglomerate	3471	(-1551)
Reagan	3562	(-1642)
Quartz	3593	(-1673)
RTD	3665	(-1745)

Structurally, on top of the Lansing-Kansas City the Button "A" No. 1 ran 2' high to the AMCO No. 1 Curry located one half mile to the north.

No Arbuckle was present. The Reagan Sand came in at 3562 (-1642).

ZONES OF INTEREST

HERRINGTON-KRIDER (Top 1768)
1768 to 1780

Tan sucrosic silty lime with no show and no odor.

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WINFIELD (Top 1821) 1821 to 1835	Fine crystalline, white, slightly vuggy lime with good pinpoint porosity and no show of oil.
DRILL STEM TEST NO. 1 1716 to 1870	TEST: 60-30-60-30. Good blow throughout. SI 30". Good blow throughout. SI 30". Recovered 180' of watery mud. PRESSURES: 63-105, 116-148, 391-391 Bhps.
FORT RILEY (Top 1921) 1921 to 1935	Grey, fine crystalline lime with good pinpoint porosity to slightly vuggy lime with no show of oil.
1950 to 1960	Tan crystalline lime with good pinpoint porosity and no show of oil.
1960 to 1975	Tan to grey crystalline vuggy lime with no show of oil, fair fluorescent show.
DRILL STEM TEST NO. 2 1912 to 2080	TEST: 60-30-60-30. Strong blow throughout. SI 30". Strong blow throughout. SI 30". Recovered 1470' of salt water. PRESSURES: 150-561, 572-594, 604-604 Bhps.
COUNCIL GROVE (Top 2082) 2082 to 2090	White vuggy to oolicastic lime with a trace of light staining.
2105 to 2115	Tan slightly silty lime with no show of staining and a fluorescent show of hydrocarbons
2134 to 2142	Tan vuggy lime with a good show of fluorescence
2155 to 2163	White vuggy poorly developed oolitic and oolicastic lime with a small show of light staining.
2180 to 2190	Tan sucrosic lime with scattered vugs, scattered pinpoint porosity and light staining.
COTTONWOOD (Top 2211) 2211 to 2220	White silty lime with fair to good pinpoint porosity and no show of oil.
2226 to 2240	Greyish silty lime with good pinpoint porosity and no show of oil.

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2247 to 2260	Tan sucrosic silty lime with a trace of light staining.
DRILL STEM TEST NO. 3 2082 to 2260	TEST: 60-30-60-30. Strong blow - gas to surface in 58 minutes. Gauged 6,270 CFPD at 60 minutes. SI 30" Second opening gauged: 5" 19,500 CFGPD 10" 17,200 CFGPD 20" 14,100 CFGPD 30" 14,100 CFGPD 60" 14,100 CFGPD SI 30". Recovered 310' of gas cut mud. PRESSURES: 73-105, 105-158, 668-668 Bhps.
NEVA (Top 2278) 2278 to 2290	Tan crystalline dense lime with scattered tan vuggy lime with a fair show of light staining.
RED EAGLE (Top 2334) 2334 to 2345	White crystalline lime and scattered white fine crystalline lime with a show of light staining.
DRILL STEM TEST NO. 4 2260 to 2430	TEST: 60-30-60-30. Strong blow throughout. SI 30". Strong blow throughout. SI 30". Recovered 180' of heavy gas cut mud and 360' of gas cut muddy water. PRESSURES: 169-190, 211-286, 700-679 Bhps.
BROWNVILLE LIME (Top 2496) 2496 to 2500	Tan dense lime with no show of oil.
2570 to 2590	Grey, fine shalely sand with no show of oil and no odor.
TARKIO LIME (Top 2610) 2610 to 2625	Tan fossiliferous lime with no show and no odor.
2650 to 2670	Grey medium to large crystalline micaceous sand.
2673 to 2680	Tan sucrosic lime and tan fossiliferous lime with no show of oil and no odor.
DRILL STEM TEST NO. 5 2506 to 2703	TEST: 60-30-60-30. Weak blow to very weak blow. SI 30". No blow. SI 30". Recovered 70' of mud. PRESSURES: 51-51, 71-71, 659-559 Bhps.

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TOPEKA (Top 2891)	
2891 to 2900	Tan dense lime with no show of oil.
2925 to 2930	Tan sucrosic lime with a trace of light staining.
2932 to 2940	Tan crystalline and tan fossiliferous lime with a trace of light staining.
2943 to 2950	Tan crystalline lime with fair pinpoint porosity and a small show of staining.
DRILL STEM TEST NO. 6	
2878 to 2950	TEST: 60-30-60-30. Weak blow throughout. SI 30". Very weak blow throughout. SI 30". Recovered 195' of watery mud. PRESSURES: 61-102, 122-163, 978-948 Bhps.
3062 to 3070	Tan weathered, slightly vuggy lime, scattered pinpoint porosity with traces of light oil staining.
3092 to 3100	Tan well developed oolicastic lime with no show of oil.
3110 to 3120	Same as above.
3134 to 3140	Tan oolicastic crystalline lime with no show of oil and no odor.
3142 to 3148	Tan lime with scattered pinpoint porosity with traces of light staining.
HEEBNER (Top 3148)	
DRILL STEM TEST NO. 7	
3042 to 3150	TEST: 60-30-60-30. Strong blow throughout. SI 30". Strong blow throughout. SI 30". Recovered 1250' of muddy salt water. PRESSURES: 71-448, 469-639, 1216-1206 Bhps.
TORONTO (Top 3160)	
3160 to 3164	Tan crystalline lime with no show of oil.
DOUGLASS SHALE (Top 3177)	
3220 to 3230	Fine grey sand lense with no show of oil and no odor.

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DRILL STEM TEST NO. 8
3142 to 3235

TEST: 60-30-60-30. Weak to fair blow. SI 30". Fair blow throughout. SI 30". Recovered 500' of salt water.
PRESSURES: 71-163, 204-275, 1007-968 Bhps.

LANSING-KANSAS CITY (Top 3238)
3238 to 3246

Tan crystalline junky lime with no show and no odor.

3254 to 3260

Tan crystalline lime with no show and no odor.

3269 to 3275

Tan crystalline, slightly vuggy lime with scattered fair to good shows of free oil and no odor.

3278 to 3282

White crystalline lime with no show and no odor.

3287 to 3293

White fossiliferous lime with no show of oil and no odor.

3300 to 3305

Tan and white crystalline lime with no show of oil and no odor.

3307 to 3310

Tan fossiliferous lime with no show of oil and no odor.

DRILL STEM TEST NO. 9
3235 to 3310

TEST: 60-30-60-30. Weak blow throughout. SI 30". Weak blow throughout. SI 30". Recovered 140' of thin mud.
PRESSURES: 51-71, 102-112, 768-699 Bhps.

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3312 to 3322

Well developed tan oolicastic limes with no show of oil and no odor.

3324 to 3334

Same as above.

3350 to 3355

Tan weathered crystalline lime with no show and no odor.

3360 to 3365

Tan crystalline and tan oolitic and oolicastic lime with no show of oil and no odor.

3367 to 3371

White oolitic lime with a good show of black heavy oil and a good odor. Scattered fossiliferous lime with good shows of oil.

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DRILL STEM TEST NO. 10
3310 to 3373

TEST: 60-30-60-30. Strong blow increasing to a very strong blow throughout. SI 30". Strong blow increasing to a very strong blow throughout. SI 30". Recovered 2340' of salt water.
PRESSURES: 153-938, 968-1126, 1186-1196 Bhps.

3376 to 3383

Scattered tan crystalline lime with fair shows of free oil when broken and a fair odor.

3390 to 3398

Tan cherty lime with a small show of free oil and white junky lime with a fair show of free oil and a fair odor.

3400 to 3405

Tan cherty lime with a fair show of free oil and white oolicastic lime with a fair to good show of free oil and a good odor.

3406 to 3410

White fine crystalline lime with a trace of free oil and a faint odor.

DRILL STEM TEST NO. 11
3373 to 3410

TEST: 60-30-30-30. Very weak blow for 30". Flushed tool. Very weak blow for 2". SI 30". No blow. SI 30". Recovered 10' of mud.
PRESSURES: 40-40, 40-40, 778-689 Bhps.

3412 to 3420

White crystalline vuggy lime with a trace of free oil, fair show of free oil when broken an no odor.

3422 to 3430

Tan crystalline lime with no show and no odor.

3430 to 3440

Tan cherty, slighlty vuggy lime, with a fair show of free oil and no odor.

3443 to 3448

Tan crystalline lime and tan fossiliferous lime with no show of oil and no odor.

BASE-KANSAS CITY (Top 3455)

3458 to 3462

Tan crystalline and white chalky lime with no show of oil and no odor.

DRILL STEM TEST NO. 12
3357 to 3467

TEST: 60-30-30-30. Very weak blow for 50". SI 30". No blow. Flushed tool and had a weak blow for 5 minutes. SI 30". Recovered 20' mud.
PRESSURES: 51-51, 61-61, 255-224 Bhps.

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CONGLOMERATE (Top 3471)

3471 to 3480	Grey shales and white limes.
3480 to 3484	Tan and white cherty lime. One piece of white oolitic lime with a small show of free oil and no odor.
3488 to 3491	Tan junky limes and multi-colored shales.
3492 to 3496	Bonded brown to clear quartz sand with a small show of free oil and no odor.
3496 to 3500	Same as above with a trace of free oil and brown flakes of oil and no odor.

DRILL STEM TEST NO. 13
3454 to 3505

TEST: 60-30-60-30. Strong blow - gas to surface in 25 minutes.
27 minutes - gauged 3,710 CFPD
47 minutes - gauged 3,710 CFPD
57 minutes - gauged 3,710 CFPD
SI 30". 2nd Opening:
2 minutes - gauged 121,000 CFPD
12 minutes - gauged 4,120 CFPD
22 minutes - gauged 3,710 CFPD
32 minutes - gauged 3,710 CFPD
42 minutes - gauged 3,710 CFPD
52 minutes - gauged 3,710 CFPD
SI 30". Recovered 90' of gas cut mud.
PRESSURES: 71-71, 61-71, 1047-988 Bhps.

3506 to 3510	Grey and dark green shales.
3510 to 3515	Scattered quartz sand clusters with no show of oil and no odor.
3517 to 3520	Soft red shales and dark green
3522 to 3524	Bonded quartz sand with a small show of free oil and no odor.
3530 to 3540	Tan to white fresh sharp cherts with a trace of free oil and no odor. Abundant loose clear, well rounded sand grains.

DRILL STEM TEST NO. 14
3452 to 3540

TEST: 60-30-60-30. Strong blow - gas to surface in 38 minutes. Too small to measure.
SI 30". Gas to surface - too small to measure.
SI 30". Recovered 80' of gas cut mud.
PRESSURES: 61-71, 71-71, 659-689 Bhps.

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Sutton 'A' #1

23-19-15W

3550 to 3555	Soft red shales - samples washed blood red. White oolitic cherts.
REAGAN SAND (Top 3562) 3562 to 3570	Tan well compacted sand, slightly dolomitic with scattered shows of free oil and a good odor.
DRILL STEM TEST NO. 15 3452 to 3570	TEST: 60-30-60-30. Gas to surface in 29 minutes. 30 minutes - gauged 26,600 CFPD 40 minutes - gauged 77,500 CFPD 50 minutes - gauged 81,600 CFPD 60 minutes - gauged 89,600 CFPD SI 30". 1 minute - gauged 63,300 CFPD 10 minutes - gauged 197,000 CFPD 20 minutes - gauged 139,000 CFPD 30 minutes - gauged 139,000 CFPD 40 minutes - gauged 156,000 CFPD 50 minutes - gauged 156,000 CFPD 60 minutes - gauged 156,000 CFPD SI 30". Recovered 1170' of fluid. 30' of slightly oil and gas cut mud. (8% gas, 5% oil, 87% mud) 180' of oil and gas cut mud. (42% mud, 8% water, 20% oil, 30% gas) 660' of mud cut gassy oil (10% mud, 7% water 56% oil, 27% gas) 180' of slightly mud cut gassy oil (2% mud, 2% water, 75% oil, 21% gas) 115' slightly mud and water cut gassy oil (5% mud, 13% water, 62% oil, 20% gas) 5' of salt water. PRESSURES: 96-332, 343-429, 1017-1038 Bhps. Maximum temperature 109°.
3575 to 3580	Clear, slightly angular quartz with a good odor.
3580 to 3590	Rounded to sub rounded fine grained sand with a small show of free oil and a good odor.
QUARTZ (Top 3593) 3593 to 3605	Clear, slightly micaceous quartz, some clear quartz with muscouite mica, no show of free oil and a faint odor.
3610 to 3620	Highly fractured clear quartz with muscuoite and biotite mica with no show of free oil and a faint odor.
ROTARY TOTAL DEPTH @ 3665'	

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Frontier Oil Company
No. 1 Button "A"
23-19-15W

LOG TOPS

Anhydrite	850	(+1071)
Herington	1730	(+ 190)
Krider	1768	(+ 152)
Winfield	1820	(+ 101)
Ft. Riley	1924	(- 4)
Council Grove	2104	(- 184)
Cottonwood	2216	(- 296)
Neva	2266	(- 346)
Red Eagle	2326	(- 406)
Brownville	2496	(- 576)
Tarkio	2613	(- 693)
Elmont	2674	(- 754)
Topeka	2893	(- 973)
Heebner	3148	(-1228)
Toronto	3162	(-1242)
Brown Lime	3232	(-1312)
Lansing-KC	3240	(-1320)
Base Kansas City	3456	(-1536)
Conglomerate	3471	(-1551)
Arbuckle	3564	(-1644)
Quartz	3596	(-1676)

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Operator: Frontier Oil Co.
23-19S-15W
150' W of NE NE NW

BUTTON "A" #1
(Completion)

23-19-15W

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Rig #2

5-4-83 Moved from Kelly Angle's well to Button "A" #1 and rigged up. Ran Gamma Ray/Neutron and shut down.

5-5-83 Perforated from 3570' to 3572' w/4 shots per ft. D.P.'s. Swabbed well down. Oil is very muddy. 1st hr. - 4.64 Bbl., 90% oil and very muddy. 2nd hr. - 1.16 Bbl., 90% oil and muddy. Very gassy. Shut in.

5-6-83 Shut in pressure - 910#. Opened through 3". Fluid in 3 minutes. 15 minute open flow - 800,000 CF/Day. 1 hr. - 2.64 Bbl. oil; 2nd hr. - .58 Bbl. oil; 3rd hr. - 2.32 Bbl. oil; 4th hr. - 3.48 Bbl. oil; 5th hr. - 1.74 Bbl. oil; 6th hr. - 1.74 Bbl. oil; 7th hr. - 2.32 Bbl. oil.

5-7-83 WHP - 885#. Too windy to test.

5-8-83 Shut down.

5-9-83 Too windy to test. Ran 4-1/2" Model "D" production packer with flapper valve. Set at 3550'. (Fluid was at 2150' - gas cut.)

5-10-83 Ran 110 joints - 3535' - 2-3/8" tubing (upset), a 7' stinger & 2 - 6' subs. Stung into 4-1/2" production packer. Hooked up to separator and tank. Tore down. 2 hr test through separator - stable at 686,000 CF/Day and approximately 1.75 Bbl. fluid per hour.

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Button 'A' # 2349-15W

New 4½" Casing was set at 3652' - 59' into the quartz and 13' off bottom with 175 sx of common cement plus 10% salt.

The shoe joint is 42.83' in length and zero point is 5' above ground level.

Sincerely,

Steven D. Angle

Steven D. Angle

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