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

Re: Frontier Oil Company
Button "A" No. 2
C NW NE 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 3530', rotary total depth. Samples were examined from 1600' to 3530', 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.

Elevation	1916 GL -- 1921 KB	
Anhydrite	853 to 873	(+1068)+156)
Herrington	1765	(+156)
Winfield	1815	(+106)
Ft. Riley	1916	(+5)
Cottonwood	2201	(-280)
Red Eagle	2320	(-399)
Brownville	2484	(-563)
Tarkio	2604	(-683)
Elmont	2663	(-742)
Topeka	2879	(-958)
Heebner	3130	(-1209)
Toronto	3142	(-1221)
Brown Lime	3210	(-1289)
Lansing-KC	3222	(-1301)
Base-Kansas City	3436	(-1515)
Quartz	3485	(-1564)
Granite Wash	3515	(-1594)
RTD	3530	(-1609)

Structurally, on top of the Lansing-Kansas City the Button "A" No. 2 ran 17' high to the Frontier Oil Company Button "A" No. 1 located approximately 1000' feet to the northwest.

On top of the Quartz, the Button "A" No. 2 ran 9' high to the Button "A" No. 1.

Sutton A #2 23-19-15W

ZONES OF INTEREST

COTTONWOOD (Top 2201) 2201 to 2220	Tan crystalline limes with scattered pinpoint porosity and a trace of light staining.
DRILL STEM TEST NO. 1 2184 to 2250	TEST: 60-30-60-30. Gas to surface in 35". 40" = 18,800 CFGPD 50" = 21,900 CFGPD 60" = 22,800 CFGPD 2nd Opening. 20" = 29,400 CFGPD 30" = 31,900 CFGPD 40' = 33,200 CFGPD 50" & 60" = 33,200 CFGPD Recovered 96' gas cut muddy water. PRESSURES: 78-98, 98-108, 740-730 Bhps.
ROWNVILLE LIME (Top 2484) 2484 to 2500	Tan dense limes.
2560 to 2575	Scattered gray sandy micaceous shales.
TARKIO (Top 2604) 2604 to 2612	Tan junky limes.
DRILL STEM TEST NO. 2 2492 to 2630	TEST: 30-30-10-30. Very weak decreasing blow. SI 30". No blow, flushed tool - no help. SI 30". Recovered 15' watery mud. PRESSURES: 112-112, 125-125, 262-250 Bhps.
TOPEKA (Top 2879) 2879 to 2890	Tan to gray crystalline limes.
2910 to 2925	Tan crystalline silty limes with a few scattered traces of oil and no odor.
DRILL STEM TEST NO. 3 2866 to 2930	TEST: 30-30-15-30. Weak blow. SI 30". Very weak blow throughout. SI 30". Recovered 30' slightly gassy watery mud. Plugging action on IF & FF. 1088-1048 Bhps.
74 to 3085	Tan oolicastic limes.
3100 to 3110	Tan crystalline silty limes.

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3118 to 3128	Scattered tan fossiliferous limes.
HEEBNER SHALE (Top 3130)	
TORONTO (Top 3142) 3142 to 3152	Tan crystalline vuggy limes.
BROWN LIME (Top 3210) 3210 to 3218	Tan crystalline vuggy limes and tan cherty junky limes.
LANSING-KANSAS CITY (Top 3222) 3222 to 3234	Tan crystalline limes with a few scattere fair shows of free oil and no odor.
DRILL STEM TEST NO. 4 3218 to 3240	TEST: 60-30-60-30. Weak to strong blow 28" SI 30". Strong blow. SI 30". Recovered 1052' gas in pipe and 125' frothy oil. PRESSURES: 52-62, 75-87, 1115-1152 Bhps.
3266 to 3272	Tan crystalline fossiliferous and tan che fossiliferous limes with scattered black tar staining.
3275 to 3278	Tan crystalline junky limes with a fair show of tarry oil and a fair odor.
DRILL STEM TEST NO. 5 3244 to 3279	TEST: 30-30-15-30. Very weak blow for 18". Flushed twice, no help. SI 30". No blow. SI 30". Recovered 15' mud with few specks of oil in top of tool. PRESSURES: 50-62, 62-62, 87-75 Bhps.
3292 to 3297	Tan poorly developed oolicastic limes and scattered tan to white crystalline limes with scattered dead oil flakes.
DRILL STEM TEST NO. 6 3275 to 3297	TEST: 60-30-60-30. Weak to strong blow in 18". SI 30". Strong blow throughout. SI 30". Recovered 382' gassy muddy water, 186' gas in pipe, 682' gassy water. 75,000 ppm chlorides. PRESSURES: 108-324, 393-511, 1198-1188 Bhps.
3342 to 3350	Tan oolitic to oolicastic limes.

Britton A #2 23-19-15W

DRILL STEM TEST NO. 7 3339 to 3360	TEST: 60-30-60-30. Weak to strong blow in 30". SI 30". Strong blow. SI 30". Recovered 191' slightly gassy muddy water with few oil specks, 180' slightly gassy water with few oil specks. PRESSURES: 98-167, 196-236, 492-462 Bhps.
3366 to 3372	White cherty limes with a small show of free oil and dead oil flakes.
3374 to 3382	Tan weathered crystalline to oolitic limes with a small show of free oil, good staining and no odor.
RILL STEM TEST NO. 8 3360 to 3381	TEST: 30-30-15-30. Very weak blow for 5". Flushed tool twice, no help. SI 30". No blow. Flushed tool, no help. Recovered 15' mud. PRESSURES: 37-37, 50-50, 150-100 Bhps.
3388 to 3398	Tan white crystalline limes with scattered black dead oil.
3416 to 3424	Tan crystalline and cherty limes.
DRILL STEM TEST NO. 9 3374 to 3430	TEST: 20-30-15-30. Weak blow dead in 15". Flushed tool, no help. SI 30". No blow, flushed tool, no help. SI 30". Recovered 10' mud. PRESSURES: 37-37, 50-50, 1128-1064 Bhps.
BASE-KANSAS CITY (Top 3436) 3436 to 3442	Red shale, tan and white crystalline lime and scattered tan oolicastic lime.
3446 to 3456	Gray and green shales.
3460 to 3468	Brown sandy cherty limes, brown shalely sand and fresh red and orange cherts.
3470 to 3477	Scattered loose rounded sand grains and sand clusters with black dead flakes of oil.
RILL STEM TEST NO. 10 3429 to 3480	TEST: 60-30-15-30. Weak blow for 45". SI 30". No blow. Recovered 10' mud. PRESSURES: 78-68, 78-78, 78-78 Bhps.

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QUARTZ (Top 3485)
3485 to 3490

Scattered rounded sand clusters, scattered clear fractured quartz with muscovite mica.

DRILL STEM TEST NO. 11
3429 to 3500

TEST: 60-30-60-30. Gas to surface in 17".
20" = 175,000 CFGPD
35" = 194,000 CFGPD
50" = 202,000 CFGPD
60" = 202,000 CFGPD
SI 30". 2nd Opening.
15" = 219,000 CFGPD
30" = 211,000 CFGPD
45" = 219,000 CFGPD
60" = 219,000 CFGPD
Recovered 200' gassy mud.
PRESSURES: 216-226, 167-187, 1108-1108 Bhp.

GRANITE WASH (Top 3515)
3515 to 3530

Red feldspars, clear fractured quartz, containing muscovite and biotite micas.

DRILL STEM TEST NO. 12
3429 to 3530

TEST: 60-30-60-30. Gas to surface in 22".
25" = 86,300 CFGPD
30" = 97,800 CFGPD
40" = 94,500 CFGPD
50" = 86,000 CFGPD
60" = 81,800 CFGPD
SI 30". 2nd Opening.
15" = 134,000 CFGPD
30" = 153,000 CFGPD
45" = 141,000 CFGPD
60" = 147,000 CFGPD
Recovered 317' gassy mud.
IF = Plugging Action 226-226, 1108-1108 Bhps.

ROTARY TOTAL DEPTH @ 3530'

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4½" Casing was set at 3529' with 200 sx of common cement, plus 10% salt. A Halliburton DV Tool was set at 2465' with 150 sx of common cement, plus 10% salt. Cement circulated to surface.

The shoe joint is 38.68' in length and zero point is 5' AGL.

Sincerely,

Steven D. Angle

Steven D. Angle

DRILLING INFORMATION ON THE BUTTON "A" NO. 2 23-19-15W

Drilling Contractor: Red Tiger Drilling Co.
Rig #4

Drillers: W. C. Ogle, Jr.
A. Bates
D. Lillard

Tool Pusher: W. C. Ogle, Jr.

Spud Date: August 6, 1984

Date of RTD: August 17, 1984

Surface Pipe: 8-5/8" @ 863' w/400 sx
60/40 Poz, 2% Gel, 3% CC. CDC.

Casing: 4-1/2" @ 3529' w/200 sx
DV @ 2465' w/150 sx.
S.J. = 38.68'

TOTAL FOOTAGE DRILLED PER DAY
Under surface at 8:15 P.M. on 8-7-84

1905	Feet	At	7:00 A.M.	On	8-08-84
2275	"	"	"	"	8-09-84
2630	"	"	"	"	8-10-84
2930	"	"	"	"	8-11-84
3215	"	"	"	"	8-12-84
3279	"	"	"	"	8-13-84
3360	"	"	"	"	8-14-84
3415	"	"	"	"	8-15-84
3480	"	"	"	"	8-16-84
3510	"	"	"	"	8-17-84
3530	Feet	At	9:01 A.M.	On	8-17-84

MUD RECORD

Surface - 15 sx gel, 2 sx lime, 4 sx hulls.
1695 - 25 sx salt gel.
2250 - 49 sx salt gel, 25 sx starch, 3 sx hulls, 1 sx aldacide.
2630 - 35 sx salt gel, 5 sx hulls, 8 sx starch, 1 sx aldacide.
2930 - 20 sx starch, 15 sx salt gel.
3100 - 26 sx salt gel, 9 sx starch, 3 sx hulls.
3250 - 6 sx salt gel, 6 sx starch.
3297 - 5 sx starch.
3381 - 5 sx starch.
3470 - 3 sx starch, 6 sx starch.
3500 - 5 sx starch, 5 sx salt.gel.