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GEOLOGICAL REPORT

FRONTIER OIL COMPANY

NO. 4 DIRKS

50' East of NW NE SE Sec. 29-15S-35W

LOGAN COUNTY, KANSAS

DATE COMMENCED: March 28, 1990

DATE OF RTD: April 10, 1990

GEOLOGIST: JOEL A. ALBERTS

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NOV 28 1990

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STATE OF KANSAS
GEOLOGICAL COMMISSION

NOV 20 1990

RECEIVED
GEOLOGICAL COMMISSION
LOGAN COUNTY

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

Re: Frontier Oil Company's
No. 4 Dirks
50' East of NW NE SE Sec. 29-15S-35W
Logan County, Kansas

Dear Sir:

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

Drilling was supervised from 3650 feet to 4496 feet, rotary total depth. Samples were examined from 3700 feet 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 this well have been incorporated into this report.

Elevation (American Elevations)	3228 G.L.	3233 K.B.
	<u>Sample Tops</u>	<u>Log Tops</u>
Anhydrite	2495' (+738)	2497' (+736)
Topeka	3721' (-488)	3718' (-485)
Heebner	3950' (-717)	3950' (-717)
Toronto	3971' (-738)	3970' (-737)
Lansing-Kansas City	3997' (-764)	3998' (-765)
Base of Kansas City	4393' (-1160)	4384' (-1151)
Marmaton	4407' (-1174)	4400' (-1167)
Pawnee	4472' (-1239)	4472' (-1239)
RTD (LTD)	4496' (-1263)	4496' (-1263)
4-1/2" Casing	4491' (-1258)	4491' (-1258)

Structurally, on top of the Topeka the No.4 Dirks ran flat to the No. 1 Dirks, a Marmaton and Lansing producer located one location East. On top of the Toronto the No. 4 Dirks ran flat to the No. 1 Dirks. On top of the Lansing the No. 4 Dirks ran 1 foot low to the No. 1 Dirks. On top of the Marmaton the No. 4 Dirks ran 4 foot high to the No. 1 Dirks.

ZONES OF INTEREST

TOPEKA (Top 3721')

3794' to 3800'

White to buff fine-crystalline limestone, fossiliferous subchalky and grainular. No show of oil.

3816' to 3822'

Buff to fine-crystalline limestone, grainular and fossiliferous. No show of oil.

3844' to 3852'

Buff, fine-crystalline, sucrosic, fossiliferous limestone. No show of oil.

3907' to 3914'

Buff fine crystalline fossiliferous limestone. No odor. Few pieces with brown-black spotted stain. One drop of black free oil.

3940' to 3946'

White to buff, fine-crystalline, dense, fossiliferous limestone, fair pin-point porosity and vugular porosity. No odor. Trace of free oil. Scattered brown to black spotted stain.

TORONTO (Top 3971')

3971' to 3980'

Buff, fine-crystalline fossiliferous limestone. Fair to good vugular porosity. Strong odor. Slight to fair show of free oil. Brown to dark brown saturated staining.

DRILL STEM TEST NO. 1 (Western Testing)

3948' to 3990'

45-45-45-45

First opening weak blow throughout.
Second opening weak blow throughout
Recovered: 100 feet slightly oil cut
mud (25% oil, 75% mud).

Initial flow of 42 to 74#. Final flow of
74 to 74#. Initial shut in pressure
1054#. Final shut in pressure 1037#.
(plugging action on both flows.)

LANSING-KANSAS CITY (Top 3997')

4006' to 4014'

White fine crystalline limestone, very
fossiliferous and oolitic. Fair to good
pin-point and vugular porosity. Fair
show of free oil. Light brown to dark
brown saturated staining. Fair to good
yellow florescence.

DRILL STEM TEST NO. 2 (Western Testing)

3990' to 4020'

60-60-45-60

First opening weak to strong blow.
Second opening weak steady blow.
Recovered: 120' gassy oil (30° gravity)
100' oil cut mud (35% oil, 5% gas, 60%
mud).

Initial flow of 42 to 78#. Final flow of
106 to 121#. Initial shut in pressure
159#. Final shut in pressure 163#.

4034' to 4038'

4041' to 4045'

White to buff fine crystalline dense
limestone. Very fossiliferous. Good
vugular porosity and fair pin-point
porosity. Fair to good odor. Slight to
fair show of free oil. Brown saturated
staining. Good yellow florescence.

DRILL STEM TEST NO. 3 (Western Testing)

4018' to 4050'

30-45-30-45

First opening strong blow in 7 minutes
Second opening strong blow in 12 minutes.

Recovered: 15' slightly gas cut oil,
225' oil and gas cut watery mud (24%
oil, 6% gas, 35% water, 35% mud)

440' gassy saltwater.

Initial flow of 74 to 223#. Final flow
of 265 to 312#. Initial shut in
pressure 1054#. Final shut in
pressure 1027#.

4055' to 4062'

White to light grey fine crystalline
dense very fossiliferous limestone.
Good vugular porosity and pin-point
porosity. Strong odor. Fair to good
show of free oil. Brown saturated
staining. Good yellow florescence.

DRILL STEM TEST NO. 4 (Western Testing)

4048' to 4062'

45-60-45-60

First opening weak blow throughout.
Second opening weak blow
throughout.

Recovered: 40' oil (30° gravity), 90'
slightly oil and water cut mud (86%
mud, 8% oil, 6% water).

Initial flow of 10 to 36#. Final flow of
68 to 89#.

Initial shut in pressure 1106#.

Final shut in pressure 1085#.

4067' to 4075'

White to light grey fine crystalline dense limestone. fossiliferous with fair to good vugular and pin-point porosity. Fair odor and slight to fair show of free oil. Brown spotted and saturated staining. Fair yellow florescence.

4108' to 4110'

White fine crystalline to chalky fossiliferous limestone. No odor and slight show of free oil. Poor to fair pin-point porosity, spotted stain.

4174' to 4179'

White fine crystalline subchalky limestone with scattered poor to fair oolitic porosity, no odor, slight show of free oil, scattered spotted black staining.

4233' to 4245'

Buff fine crystalline limestone. Well developed oolitic and oolitic porosity. Fair odor and fair show of free oil.

DRILL STEM TEST NO. 5 (Western Testing)

4198' to 4240'

60-45-60-45

First opening weak blow throughout.

Second opening weak blow throughout.

Recovered: 3' of oil, 75' slightly oil cut mud (97% mud, 3% oil).

Initial flow of 21 to 42#. Final flow of 53 to 68#. Initial shut in pressure 1131#. Final shut in pressure of 1096#.

4271' to 4280'

White fine crystalline subchalky limestone with poor oolitic porosity. Trace of dark spotted staining. Faint odor and very slight show of free oil.

4312' to 4315'
4320' to 4326'

White fine crystalline to chalky limestone with grey chert. Trace of poorly developed oolitic porosity. No odor, now show of free oil. Scattered spotted stain.

MARMATON (Top 4407')

4423' to 4430'

Buff to brown fine crystalline dense limestone. No odor. Trace of poor to fair pin-point and vugular porosity. Brown spotted staining and slight show of free oil.

DRILL STEM TEST NO.6 (Western Testing)

4414' to 4446'

30-60-30-60

First opening weak blow throughout

Second opening no blow.

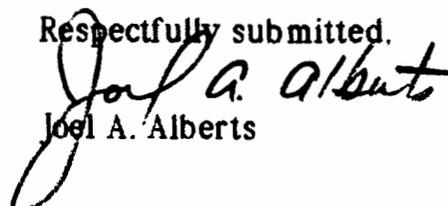
Recovered: 15' mud with specks of oil.

Initial flow of 14 to 21#. Final flow of 21 to 25#.

Initial shut in pressure of 180#. Final shut in pressure of 148#.

Due to positive Drill Stem Test results and favorable structural position, used 4-1/2" 10.5# casing was set at 4491' with 225 sacks A.S.C. cement. Zero point is 5' A.G.L.

Respectfully submitted,


Joel A. Alberts

DRILLING INFORMATION ON THE NO. 4 DIRKS

Contractor: Red Tiger Drilling Co. Rig 7

Drillers: Wagner, James

Ayres, Bill

Tool Pusher: Bill Ayers

Bertelmann, William

Spud Date: March 28, 1990

RTD Date: April 10, 1990

Surface Pipe: 8-5/8" @ 365' w/200 sx

Production Casing: 4-1/2" @
4491' w/225 sx A.S.C.

TOTAL FOOTAGE DRILLED PER DAY

Under Surface at 3:30 A.M. on March 28, 1990

	Feet	At	7:00 A.M.	On	
650					March 29, 1990
1825	"	"	"	"	" 30, 1990
2705	"	"	"	"	" 31, 1990
3236	"	"	"	"	April 1, 1990
3322	"	"	"	"	" 2, 1990
3600	"	"	"	"	" 3, 1990
3943	"	"	"	"	" 4, 1990
4020	"	"	"	"	" 5, 1990
4050	"	"	"	"	" 6, 1990
4064	"	"	"	"	" 7, 1990
4240	"	"	"	"	" 8, 1990
4369	"	"	"	"	" 9, 1990
4485	"	"	"	"	" 10, 1990

BIT RECORD

BITS

TYPE

FOOTAGE

1

CP EH 116

368' to 1226'

2

CP EH 517

1226' to 3990'

3

CP EH 537

3990' to 4496'

MUD RECORD (M.S.I. - CHEMICAL)

Surface- 35 sx Gel, 6 sx lime, 17 sx hulls
1825'- 90 sx Gel, 5 sx caustic, 5 sx soda ash, 5 sx lignite
2305'- 36 sx Gel, 1 sx caustic, 1 sx soda ash, 1 sx lignite
2705'- 25 sx Gel, 1 sx caustic, 1 sx soda ash, 1 sx lignite
3020'- 65 sx Gel, 2 sx caustic, 1 sx soda ash, 1 sx lignite, 50 sx hulls
3236'- 28 sx Gel, 1 sx caustic, 1 sx soda ash, 1 sx lignite
3322'- 4 sx hulls
3600'- 30 sx Gel, 5 sx caustic, 4 sx lignite, 3 sx drispac, 1 sx Aqua thinz
3943'- 5 sx Gel, 1 sx caustic, 8 sx hulls
3990'- 18 sx Gel, 3 sx caustic, 2 sx soda ash, 2 sx lignite, 1 sx aqua thinz
4020'- 1 sx caustic
4050'- 12 sx Gel, 2 sx caustic, 1 sx soda ash, 2 sx lignite, 1 sx drispac
4064'- 36 sx Gel, 2 sx caustic, 1 sx soda ash, 1 sx lignite, 1 sx drispac
4123'- 1 sx caustic
4210'- 20 sx Gel
4369'- 18 sx Gel, 2 sx caustic, 1 sx soda ash, 2 sx lignite, 1 sx drispac, 4 sx
hulls

DRILLERS TIME LOG

Frontier Oil Company
No. 4 Dirks

NW NE SE
Sec. 29-15S-35W
Rawlins County

Elev.: 3228 GR
3233 KB

DEPTH	MINUTES	REMARKS
	1 Foot Drilling Time	
3650 to 3660	4-5-5-5-3-4-3-5-3-3	
3670	4-2-3-3-2-3-3-4-3-3	
3680	4-3-3-4-4-3-3-3-3-4	
3690	5-5-7-6-5-4-5-6-5-6	
3700	5-4-5-5-5-4-4-3-4-3	
3700 to 3710	3-2-3-3-3-2-2-3-3-2	
3720	3-3-3-3-2-2-2-3-4-3	
3730	6-5-4-5-5-5-4-3-5-5	
3740	4-5-4-5-5-3-4-3-4-3	
3750	3-3-3-3-6-5-4-5-3-3	
3760	3-4-3-3-4-4-3-3-3-2	
3770	4-3-2-2-2-3-4-3-7-6	
3780	5-4-5-5-5-5-6-7-7-8	
3790	8-6-3-3-5-5-5-3-4-5	
3800	4-4-4-3-3-3-1-3-3-2	
3800 to 3810	2-3-4-3-3-3-2-3-3-3	
3820	7-6-3-5-4-2-2-1-2-2	
3830	2-2-2-2-2-3-2-3-4-3	
3840	6-5-4-4-5-3-5-3-4-3	
3850	3-3-3-2-3-2-1-2-2-2	
3860	3-2-4-4-5-5-5-5-5-5	
3870	5-4-5-4-4-4-3-4-5-4	
3880	7-7-6-8-7-8-5-4-5-5	
3890	4-4-5-4-5-3-4-4-5-5	
3900	6-5-4-3-3-2-4-3-3-3	
3900 to 3910	4-5-3-5-4-4-3-2-2-2	
3920	3-2-2-3-5-5-4-5-4-5	
3930	4-4-5-5-3-2-3-2-3-3	
3940	3-3-4-4-4-4-2-2-2-2	
3950	3-2-2-2-3-5-6-5-7-7	
3960	4-2-4-4-7-5-5-4-5-4	
3970	4-4-5-5-5-5-4-6-4-6	
3980	4-4-4-3-3-4-4-3-4-4	
3990	3-5-4-5-5-4-4-5-4-4	
4000	5-6-6-7-6-6-8-8-7-7	

4000 to	4010	7-6-7-7-6-5-5-5-4-3
	4020	4-3-4-5-6-5-5-6-5-5
	4030	3-5-5-6-7-8-7-8-4-7
	4040	6-5-7-5-4-5-3-5-5-4
	4050	4-3-3-3-5-4-6-8-8-5
	4060	5-7-5-5-5-4-4-4-5-4
	4070	4-5-5-6-6-6-6-4-5-4
	4080	3-3-3-3-4-3-3-4-4-6
	4090	5-3-6-4-5-6-5-6-6-5
	4100	2-5-5-7-5-5-3-4-4-4
4100 to	4110	5-6-5-5-6-4-5-3-2-3½
	4120	4½-5-5-4-4-4-5-8-9-8
	4130	7-6-7-6-6-6-6-4-4-2
	4140	3-5-4-5-4-5-5-6-5-4
	4150	7-5-6-4-5-4-4-4-4-3
	4160	3-3-3-4-5-5-5-5-4-7
	4170	7-5-6-6-6-4-5-5-5-6
	4180	7-6-5-4-3-3-3-3-5-6
	4190	5-6-7-5-3-4-5-5-4-6
	4200	6-6-5-7-5-7-7-7-7-4
4200 to	4210	5-6-8-8-9-6-6-5-7-5
	4220	6-8-10-8-6-6-6-9-6-5
	4230	8-9-5-21-7-7-10-10-10-8
	4240	7-5-5-4-5-3-5-3-3-6
	4250	4-4-3-2-1-5-6-5-5-6
	4260	5-6-5-6-5-6-5-2-6-4
	4270	5-6-6-5-3-6-6-3-4-2
	4280	3-3-3-4-3-3-3-4-3-3
	4290	7-8-7-6-4-4-6-5-6-5
	4300	7-6-6-5-5-4-4-5-5-3
4300 to	4310	5-5-6-7-7-8-8-7-6-7
	4320	6-7-4-5-6-7-19-8-9-7
	4330	5-5-4-3-4-6-7-8-7-5
	4340	6-8-4-5-3-5-10-7-7-9
	4350	10-10-9-8-7-6-5-16-7-4
	4360	8-9-7-7-6-6-5-9-7-6
	4370	4-5-3-3-3-4-3-4-3-3
	4380	3-3-3-2-3-3-2-3-3-3
	4390	3-3-4-6-5-6-4-5-5-4
	4400	6-7-5-5-4-5-5-5-7-6
4400 tp	4410	6-7-6-5-5-5-5-3-5-6
	4420	4-4-6-4-4-4-5-4-5-5
	4430	5-4-4-6-6-5-6-7-6-5
	4440	6-6-7-6-7-5-5-5-3-4
	4450	5-5-7-6-7-7-8-9-9-10
	4460	8-5-5-7-6-7-5-5-5-5
	4470	5-5-7-4-3-6-6-6-5-6
	4480	6-5-7-5-7-6-5-3-6-5
	4490	5-6-6-6-7-6-7-7-6-7
	4500	5-5-7-7-7-9-x-x-x-x