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PETROLEUM GEOLOGIST - PRODUCTION ENGINEER

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SEP 24 1979

## GEOLOGICAL REPORT

Foxfire Exploration & Rupe Oil Co.  
#1 Flagler  
C W/2 NW NW, Section 33-T11S-R22W  
Trego County, Kansas

Elevation: 2351 K.B.  
2350 D.F.  
2346 G.L. (L&S)

Commenced: September 6, 1979  
(Rig shut down for repairs for 24 hours - 9/11/79)  
Completed: September 16, 1979  
Contractor: Pioneer Drilling Co., Rig #1, Plainville, Kansas  
Surface Casing: 292' of 8-5/8"  
Production Casing: Cemented 4-1/2" @ 4062' with 200 sax Pozmix  
Hole Size: 7-7/8"  
Samples: 10' from 3300' to 3500'; 5' from 3500' to T.D.  
Drilling Time: 1' from 1775' to 1860'; 1' from 3300' to T.D.  
Electric Log: Welex Gamma Ray - Neutron - Guard & Caliper  
Drill Stem Tests: Miller Testing. See under Evaluation of Shows  
Total Depth: R.T.D. 4065'. E.Log T.D. 4066'

## FORMATION TOPS (ELECTRIC LOG)

Foxfire & Rupe No. 1 Flagler  
This well (W/2 NW NW-33)

Rains & Williamson No. 1 Flagler  
Comparison Well (SE SE NW-33)

1895(+556)	Anhydrite Top	1808(+565)
1940(+511)	Anhydrite Base	1858(+515)
3362(-1011)	Topeka Lime	3388(-1015)
3578(-1227)	Heebner Shale	3604(-1231)
3598(-1247)	Toronto Lime	3625(-1252)
3615(-1264)	Lansing Lime	3640(-1267)
3856(-1505)	Base of K.C.	3880(-1507)
3940(-1589)	Marmaton Chert	3966(-1593)
3956(-1605)	Marmaton Pay Zone	3974(-1601)
3992(-1641)	Conglomerate (Chert)	--
4016(-1665)	Simpson(?) Chert	4050(-1677) (Cherty Dolomite)
4040(-1689)	Arbuckle Dolomite	4058(-1685) or (-1692)?
4065(-1714)	Rotary Total Depth	4100(-1727)

SIGNIFICANT OIL SHOWS AND DRILL STEM TESTS

- Toronto Lime: From 3600-04. Cream to light tan; dense to very fine crystalline, slight fossiliferous, cherty, and oolitic lime, with poor, tight fossiliferous and vuggy porosity. Porosity is partly cherty and brittle; good free oil in samples and good odor. Appears too tight to produce. (included in DST #1)
- Lansing Lime: Lansing 'A' zone from 3618-25. White to cream; dense to very fine crystalline slight re-crystalized, slightly vuggy and fossiliferous porous lime, with some chert. Porosity is very tight and spotty stain but good free oil and odor. (included in DST #1) The middle of the 'A' zone at 3628-34' had minor, very tight porosity development in a cherty, slightly fossiliferous zone, with good free oil.
- DST #1 - From 3602-42':  
 Open 60, S.I. 60, Open 60, S.I. 60  
 Weak blow for 50 min. 1st opening.  
 Very weak blow for 8 min. Flushed tool, no blow.  
 Recovered 20 feet of mud. A few oil specks.  
 IFP, 43-43#                      ISIP, 1082#  
 FFP, 54-54#                      FSIP, 1040#
- Lansing 'K': From 3818-23. Cream, dense, slight fossiliferous and cherty. Soft to very hard lime with some very fine crystalline, slightly fossiliferous, porosity. Very tight but with light brown oil stain and good free oil. Slight trace of pinpoint porosity and microfossiliferous porosity. (included in DST #2)
- Lansing 'L': From 3840-44. White to cream, dense, slightly fossiliferous and cherty with poor, tight, scattered, slightly fossiliferous and vuggy porosity. No good. Too tight.
- DST #2 - 3807-57':  
 Open 30, S.I. 30, Open 30, S.I. 30  
 Weak blow 15 min. Flushed tool.  
 Second opening, no blow, flushed tool.  
 Recovered 6 feet of mud  
 IFP, 65-65#                      ISIP, 1019#  
 FFP, 65-65#                      FSIP, 868#
- Marmaton Chert: The chert pay zone from 3956-63 consisted of cream, dense to fine crystalline, very silicious Marmaton Lime to calcareous chert with no porosity, and tan to brown, recrystalized and silicified, dolomitic chert with good oil staining. Porosity is very slightly vuggy, inter-crystalline, slightly fossiliferous and fractured, tight but with good free oil and odor. From 3963' to 78', the same non-porous lime and much less porosity. Little free oil but good scattered oil stain. Much dense white to gray chert. This part of the Marmaton Chert pay zone appears too tight to produce.

Significant Oil Shows and Drill Stem Tests (continued)

DST #3 - from 3941-80':	Open 60, S.I. 60, Open 60, S.I. 60 Strong blow throughout test. Recovered 279' free oil, 372' of oil cut mud, 248' was 23% oil, and 124' was 21% oil. Total fluid recovery of 651' of oil and oil cut mud. IFP, 43-152#                      ISIP, 1189# FFP, 196-272#                      FSIP, 1157#
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There were no further significant shows encountered in this well. Dry tar was found in the structurally low Arbuckle. Minor shows of free oil were observed in the lower part of the Topeka, from 3550 to 65', and in the Lansing "B-F", and the top of the "G" zones.

CONCLUSIONS

Structurally, our No. 1 Flagler ran 4 feet higher on most tops to the old Flagler well located one-half mile to the southeast. This old well was drilled in 1965, and was not drillstem tested in the Marmaton. The samples show excellent porosity and oil staining in this zone, and the electric logs run on the well confirm this. The old Flagler well should be oil productive in the Marmaton, as should almost the entire north half of the Flagler Lease. In our new Flagler well, just the top one-third of the usual pay zone was porous and well oil saturated, and is highly oil productive. The lower two-thirds of the zone has oil staining, but is too tight to produce much oil.

It appears that the upper ten or more feet of the Marmaton Chert in the old Flagler well should also produce oil. The top of the pay zone in the Old Flagler well is 4 feet higher than in our new well, and possibly the entire 21 foot porosity zone in the old well could be productive. Our new Flagler well appears to lie on the western edge of this Marmaton porosity trap.

No other zones indicated commercial production in our new well. We encountered numerous shows of oil in generally tight porosity in the No. 1 Flagler which could easily be productive with better permeability development in off setting wells. The Anhydrite to Lansing Isopach interval in our well was anomalously thin, indicating that we are located on an old early Lansing structural high. This explains why all porosity encountered in the Toronto and Lansing Limes was oil saturated. We should find some oil production from these limes during our development drilling of the Marmaton oil reservoir.

RECOMMENDATIONS

It was recommended that production pipe be run on this well and cemented to total depth. The Marmaton oil zone should be perforated and the zone cleaned out with mud acid and swabbing until the oil is clean and free of mud. The zone should then be given a 1500 bbl. sand-water frac job for proper production stimulation, despite a possible high swab rate after acidizing. The history of this pay zone in this area is that it requires a high volume-high rate fracture treatment to develop a good sustained producing rate. Future development should be delayed until we have developed at least a 6 month production history. The next recommended location is the NW SE NW of

Section 33, which is the diagonal offset to the northwest of the old Flagler well. This location should be structurally high enough to produce and we should encounter a much thicker and more permeable oil zone.

Respectfully submitted,

A handwritten signature in cursive script, reading "Donald C. Marchant".

Donald C. Marchant  
Petroleum Geologist

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