GEOLOGICAL REPORT

PLAINS EXPLORATION CO.
BAUGHMAN FARMS #1-D

C/NE/NE Sec. 8-17S-45W
Kiowa County, Colorado

Elevation: 4126' K.B.

The Baughman Farms #1-D was spudded August 12, 1969, and 12 1/4" hole was drilled to 255'. 8 5/8" surface casing was run to 255' and cemented with 150 sacks of Lite Weight cement plus 3% calcium chloride. Cement circulated. Plug was down at 12:00 midnight.

The well went out from under surface at 12:00 noon, August 13, 1969.

The following formation tops, corrected to Schlumberger Electric Logs, were picked on the well.

Permian System:			
Stone Corral anhydrite	-	2572	(+1554)
Council Grove Group:			
Neva limestone	-	3272	(+ 854)
Foraker limestone	-	3344	(+ 782)
Pennsylvanian System:			
Virgilian Series:			
Waubunsee Group	-	3569	(+ 557)
Shawnee Group (Topeka)	-	3716	(+ 410)
Heebner shale	-	3863	(+ 263)
Missourian Series:			
Lansing-Kansas City Group	-	3947	(+ 179)
Base Kansas City	-	4354	(- 228)
Des Moinesian Series:			
Marmaton Group	-	4381	(- 255)
Cherokee Group	-	4518	(- 392)
Atokan Series	-	4679	(- 553)
Morrowan Series	-	4835	(- 709)
Mississippian System:			
Meramecian Series:			
St. Louis formation	-	5064	(- 938)
"X" Shale Marker	-	5211	(-1085)
Spergen formation	-	5212	(-1086)
Warsaw formation	-	5293	(-1167)
Osagian Series	-	5334	(-1208)
Osage Shale Marker	-	5362	(-1246)
St. Joe limestone	-	absent	
Kinderhookian Series	-	5398	(-1272)
Total Depth	-	5425	Driller
		5421	Schlumberger

The Baughman Farms #1-D was a wildcat test on a "seismic high" based on shooting that was carried out after the Plains #1 Fink was drilled in the NW/NW of Section 4-17S-45W.

The reported tops were consistently quite low to the corrected tops because there was an abnormal sample lag and no way to accurately determine the lag time. However, this well ran consistently higher than the #1 Fink to the top of the Missourian. The oil shows in the Topeka were much poorer and there was less porosity in the #1-D than in the #1 Fink.

The Missourian thickened slightly, and on the top of the Des Moinesian the #1-D was seven feet low to the #1 Fink. Only very slight shows were observed throughout the Missourian and, again, they were much poorer than those observed in the #1 Fink.

From the top of the Des Moinesian to the top of the Morrowan there were minor changes in interval, and at the top of the Morrowan the #1-D was four feet high to the #1 Fink. Only a faint trace of staining was observed in the upper Des Moinesian and this was the only show.

The section thickened in the lower Morrowan, and at the top of the Mississippian the #1-D was 19' low to the #1 Fink. This indicated that the "seismic high" was not valid.

No porosity and no shows were observed in the St. Louis, although there was a trace of spotted fluorescence in the bottom of the St. Louis.

The Spergen had good drilling breaks and some excellent minutely vuggular porosity, and it had excellent porosity on the logs. However, there was absolutely no sign of free oil, stain, cut or fluorescence in the samples throughout the section.

The Osage appeared quite tight and was devoid of shows. The logs indicated slight porosity in the upper 10' and immediately below the "shale marker".

The St. Joe limestone is apparently missing as the well penetrated crystalline to coarsely crystalline, rhombic dolomite below the typical cherty Osage section, and I believe this is dolomitized, coarsely crystalline, Kinderhook limestone.

Since the well was running low to the #1 Fink it was decided to halt drilling in the St. Joe and since this formation was absent drilling was stopped at 5425'.

Schlumberger Dual Induction-Laterolog and Sidewall Neutron Porosity Log were run, and the zones of interest in the lower Lansing-Kansas City from 4308-4336' and in the Spergen from 5212-5286' were calculated. The results indicated all were totally water bearing, so permission to plug and abandon was given by the participating parties.

The well was plugged with 15 sacks of cement in the base of the surface casing and 10 sacks in the top with steel plate welded on top of surface pipe in cellar. Plugging was completed August 30, 1969.

The lack of shows throughout the Mississippian was quite disappointing, of course. However, the porosity observed in the Spergen was considerably better than in the #1 Fink, and it is possible that "on structure" this zone could be an excellent reservoir.

Joseph R. Clair

JOSEPH R. CLAIR
Geological Consultant
C.P.G. #713

September 10, 1969

[redacted]

WELL SUMMARY

Operator:	Plains Exploration Company
Well:	Baughman Farms #1-D
Location:	C/NE/NE Section 8, Township 17 South, Range 45 West, Kiowa County, Colorado.
Elevation:	4116' Ground, 4126' K.B.
Spudded:	August 12, 1969.
Completed:	Finished drilling August 29, 1969. Plugged August 30, 1969.
Casing:	8 5/8" casing set at 255' and cemented with 150 sacks Lite Weight cement plus 3% calcium chloride. (Casing - Schlumberger - 259'.)
Cores:	None
Drill Stem Tests:	None
Total Depth:	5425' Driller 5421' Schlumberger
Logs:	Drilling Time Log - 3000' to 5425' Detailed Sample Log - 3200' to 5425' Schlumberger Electric Logs: Dual Induction Laterolog - Surface casing to 5420' Sidewall Neutron Porosity Log - 3200' to 5420'
Contractor:	Rains and Williamson - Rig #2 Bill Walker - Drilling Superintendent Dick Defenbaugh - Daylight Driller
Equipment:	Derrick: 86' Lee C. Moore Drawworks: Oil Well 52T Power: GMC Twin Diesel 671 Pumps: Two-Oil Well - PHD, 14" x 6 3/4" Gardner-Denver - FXK, 14" x 6 3/4" Power: Two GMC Twin Diesels 671 Drill Pipe: 4 1/2" Full Hole Drill Collars: 6 plus 18 stands of weight pipe
Status:	Plugged and abandoned August 30, 1969.

DRILLING TIME LOG

PLAINS EXPLORATION CO.
BAUGHMAN FARMS #1-D

C/NE/NE Sec. 8-17S-45W
Kiowa County, Colorado
Elevation: 4126' K.B.

One foot drilling time starts at 3000'.

3000-3020	2-1-2-2-2-1-2-2-2-2	2-2-2-2-2-2-2-2-2-3	
3020-3040	2-2-2-1-2-2-2-2-1-2	2-2-1-2-3-2-2-2-3-2	
3040-3060	1-1-2-2-2-2-2-2-2-4	2-4-4-3-3-4-3-4-3-3	
3060-3080	4-4-2-4-4-5-4-3-3-2	3-3-4-3-3-3-3-3-3-3	
3080-3100	4-3-3-2-3-3-2-3-3-3	4-5-5-3-3-4-3-3-3-3	
3100-3120	3-3-3-2-3-3-4-4-4-4	3-4-4-4-3-3-4-4-3-3	
3120-3140	2-3-3-3-3-2-3-2-3-2	3-4-3-4-4-3-4-4-4-4	
3140-3160	3-4-4-3-4-4-2-3-3-4	3-4-4-3-4-3-3-3-2-3	
3160-3180	2-2-3-3-3-3-5-5-5-4	4-3-3-4-5-4-3-4-4-5	
3180-3200	3-4-3-4-3-4-4-4-4-3	4-4-3-4-4-3-4-3-3-3	
3200-3220	2-3-4-3-4-4-4-2-2-2	1-2-1-1-2-2-1-1-2-2	
3220-3240	1-2-1-2-2-2-1-2-2-2	2-2-2-2-2-2-2-2-2-1	
3240-3260	2-2-2-3-3-4-2-3-4-4	3-4-4-5-6-6-6-7-6-7	
3260-3280	5-5-5-6-7-7-7-8-8-8	7-8-7-8-9-8-7-7-8-9	
3280-3300	7-6-6-6-9-10-9-9-8-10	3-4-4-3-3-3-2-3-3-3	Trip @ 3290'. Bit #7, M4N.
3300-3320	4-3-3-4-4-3-3-3-3-3	3-4-3-3-3-3-3-3-3-3	
3320-3340	3-3-3-3-3-3-3-2-3-3	3-3-3-3-3-3-4-3-3-3	
3340-3360	3-3-3-3-3-3-3-4-3-3	3-3-3-3-3-3-4-3-4-3	
3360-3380	3-4-4-4-3-4-4-3-3-4	3-3-3-2-3-3-4-3-3-3	
3380-3400	3-3-3-3-4-4-4-3-3-3	4-3-3-3-4-3-3-2-3-3	
3400-3420	3-3-3-2-2-2-3-3-3-3	2-3-3-3-2-3-2-1-2-2	
3420-3440	2-2-2-2-2-3-3-3-3-3	3-4-4-4-4-4-4-4-4-3	
3440-3460	3-4-4-3-4-2-3-3-3-3	4-3-4-4-4-3-3-3-3-4	
3460-3480	3-3-3-3-3-3-3-3-3-4	3-3-4-3-3-3-3-4-4-4	
3480-3500	3-5-3-4-4-4-4-5-4-4	4-4-4-3-4-4-4-4-3-4	
3500-3520	3-4-3-3-4-3-3-4-4-5	5-5-4-5-5-5-4-4-4-4	
3520-3540	4-4-4-4-4-4-4-4-5-4	4-4-4-4-4-5-4-5-5-6	
3540-3560	5-4-2-3-4-4-4-3-5-6	4-4-4-4-5-4-4-5-5-6	
3560-3580	5-6-7-6-7-6-6-6-5-5	6-6-9-8-7-6-7-6-6-6	
3580-3600	6-6-5-6-6-5-6-6-8-10	4-4-4-4-5-4-4-5-3-3	Trip @ 3590'. Bit #8, M4N.
3600-3620	3-4-3-3-4-3-3-4-3-4	4-3-4-4-4-3-4-4-4-4	
3620-3640	3-4-4-4-4-4-3-4-2-3	3-3-3-3-2-2-3-4-4-5	
3640-3660	5-5-5-4-3-3-5-3-3-3	3-4-3-3-3-3-3-2-3-3	
3660-3680	2-3-5-5-4-2-1-1-1-1	1-2-5-5-5-3-5-4-3-3	
3680-3700	3-4-3-4-3-4-5-5-3-5	5-5-4-3-2-4-5-5-6-4	

3700-3720	4-3-3-3-3-3-4-3-4-3	3-3-3-3-4-2-4-3-3-3	
3720-3740	4-2-3-3-4-4-4-3-2-5	5-5-5-5-3-4-5-4-3-3	
3740-3760	2-3-3-3-2-3-4-3-1-3	3-5-4-4-5-4-4-5-6-6	
3760-3780	5-5-3-3-4-3-3-4-4-6	3-4-2-5-4-7-9-6-6-6	
3780-3800	6-3-8-5-5-3-3-3-4-6	8-8-8-7-5-5-5-5-5-5	
3800-3820	6-8-7-7-7-8-8-6-5-6	4-4-8-7-9-10-11-10-10-10	
3820-3840	11-9-8-5-12-13-11-7-8-12	10-8-7-9-11-12-12-15-6-7	Trip @ 3838'. Bit #9, M4N.
3840-3860	6-5-4-4-4-2-3-4-4-3	3-4-4-4-3-3-4-4-5-4	
3860-3880	5-5-5-4-5-5-3-2-3-4	4-4-5-5-5-4-3-4-4-3	
3880-3900	2-4-6-5-6-8-7-4-4-4	6-5-3-4-6-7-6-6-7-6	
3900-3920	5-5-4-4-3-3-2-2-3-3	3-2-3-3-2-3-3-3-3-5	
3920-3940	3-1-3-4-3-2-2-6-4-4	3-3-6-6-8-6-6-6-5-4	
3940-3960	5-6-6-6-4-4-4-5-5-4	4-6-6-6-7-6-8-6-6-3	
3960-3980	4-5-3-4-5-7-8-6-7-6	7-5-4-5-5-4-6-7-8-7	
3980-4000	5-4-4-4-3-4-5-6-5-5	5-4-5-4-4-5-5-4-4-4	
4000-4020	4-4-5-4-10-7-8-7-9-8	8-9-8-10-6-5-5-6-8-7	Trip @ 4014'. Bit #10, M4N.
4020-4040	8-6-10-8-10-8-7-6-6-6	6-6-6-4-4-3-5-4-5-5	
4040-4060	4-4-3-4-5-7-7-7-6-6	5-5-5-5-6-5-5-4-4-3	
4060-4080	5-5-5-5-3-3-4-5-6-4	7-6-5-5-7-5-4-3-4-3	
4080-4100	4-5-5-5-6-6-5-7-8-6	6-5-5-5-5-3-2-3-2-2	
4100-4120	2-3-1-2-3-2-1-2-1/2-1/2	1/2-1/2-3-5-7-7-6-6-5-6	
4120-4140	6-7-7-7-6-5-7-4-5-4	5-6-4-3-6-5-7-7-4-4	
4140-4160	4-4-5-3-4-4-4-5-4-6	7-5-5-5-5-5-6-5-5-5	
4160-4180	5-6-7-4-7-6-7-4-4-5	5-5-5-4-4-3-4-6-5-4	
4180-4200	6-6-6-7-7-5-7-7-8-7	6-8-7-8-7-6-7-7-7-6	
4200-4220	7-6-7-7-4-3-6-6-10-6	4-5-4-5-9-4-8-10-10-11	
4220-4240	10-6-6-9-7-8-10-7-7-6	6-6-6-3-4-3-5-6-7-5	
4040-4060	6-6-6-6-6-6-5-5-5-5	5-10-10-8-9-10-10-9-10-10	Trip @ 4260'. Bit #11, S88.
4060-4080	6-7-9-8-9-8-10-11-9-8	8-9-8-9-7-5-8-8-9-10	
4280-4300	12-9-9-9-9-9-9-9-9-8	8-10-10-10-10-8-7-6-5-8	
4300-4320	10-10-7-10-10-10-12-21-20-18	10-9-4-3-4-2-4-5-6-4	
4320-4340	3-4-3-3-4-2-5-6-7-7	5-5-3-4-5-5-6-6-7-5	
4340-4360	4-5-4-8-7-8-6-8-9-12	10-5-7-7-10-9-9-8-7-8	
4360-4380	7-9-9-8-8-7-7-9-7-6	6-8-8-8-9-9-8-9-8-6	
4380-4400	7-8-9-8-8-12-8-8-9-7	5-6-5-10-9-8-9-12-5-6	
4400-4420	5-12-12-8-8-6-6-6-6-6	6-6-6-6-6-6-6-6-7-6	
4420-4440	6-6-6-4-7-10-5-6-6-7	7-6-5-5-6-5-4-4-5-6	
4440-4460	6-7-6-7-5-5-5-7-6-7	7-6-5-5-6-6-7-7-6-8	
4460-4480	7-7-6-5-5-6-7-7-7-7	6-7-6-6-5-5-6-5-7-5	
4480-4500	6-7-6-2-6-7-8-7-7-8	7-9-8-7-8-9-10-10-12-12	
4500-4520	10-11-11-11-11-10-12-10-11-11	10-13-12-10-8-8-9-9-8-9	
4520-4540	9-10-5-3-3-10-9-7-9-9	9-10-10-9-9-10-8-10-9-6	
4540-4560	3-3-5-12-9-10-8-9-12-10	9-9-9-10-11-9-11-11-10-11	
4560-4580	9-9-9-10-9-9-9-12-7-12	10-11-8-5-7-6-9-7-8-7	
4580-4600	6-6-8-4-2-2-3-7-7-8	6-7-5-8-6-6-7-8-7-6	

4600-4620	6-5-6-5-6-6-7-9-5-9	6-8-8-8-9-8-8-4-6-6	
4620-4640	10-12-9-6-6-2-5-6-6-7	8-9-6-7-6-7-7-7-5-2	
4640-4660	6-4-5-2-3-4-4-7-7-8	8-9-10-9-8-8-8-10-8-8	
4660-4680	8-10-8-7-10-9-10-11-10-8	11-11-7-6-6-6-9-8-5-4	
4680-4700	4-3-4-9-8-7-8-9-9-6	6-8-12-10-5-5-9-8-9-11	
4700-4720	8-9-5-5-7-7-5-4-8-10	11-12-11-13-10-11-13-10-10-11	
4720-4740	11-13-11-6-12-13-10-10-7-7	6-9-9-10-6-3-6-9-6-7	
4740-4760	7-9-8-8-6-3-3-4-6-8	7-8-7-10-9-7-8-5-4-5	
4760-4780	12-9-4-3-9-8-8-4-4-5	6-10-7-3-3-4-11-9-5-2	
4780-4800	8-8-6-7-10-10-7-6-5-3	7-7-6-6-4-2-6-6-6-6	
4800-4820	4-7-7-7-7-4-6-3-9-6	9-5-8-10-12-4-7-14-11-12	Trip @ 4814'. Bit #12, S88 rr.
4820-4840	7-9-10-7-9-9-10-9-10-7	7-8-5-10-6-10-11-8-2-3	
4840-4860	3-3-4-4-6-5-3-3-2-3	4-3-3-3-3-3-4-4-5-5	
4860-4880	5-4-4-6-6-4-5-4-5-5	4-5-6-5-4-4-5-5-4-4	
4880-4900	4-4-4-5-5-5-5-5-6-6	5-6-5-5-5-5-5-6-7-7	
4900-4920	6-5-5-5-6-5-5-5-5-4	4-3-3-3-3-4-5-4-3-3	
4920-4940	3-4-5-5-5-5-8-8-8-6	7-7-6-6-7-8-6-8-7-8	
4940-4960	7-10-6-5-7-8-6-3-3-4	4-5-6-5-5-5-5-5-6-5	
4960-4980	6-6-7-6-6-6-6-6-7-7	8-8-7-9-8-7-5-9-7-5	
4980-5000	3-8-9-4-2-2-7-6-10-4	8-8-10-7-10-8-9-4-5-5	
5000-5020	5-7-5-X-5-5-6-9-10-10	8-9-10-11-9-6-8-10-9-10	X - No time. Kelly short.
5020-5040	9-9-9-11-9-7-9-11-9-10	8-8-5-6-3-3-4-3-3-3	
5040-5060	5-4-6-8-8-8-9-9-8-8	9-8-7-8-9-6-7-7-9-8	
5060-5080	8-7-8-7-8-8-9-8-9-9	9-9-10-10-10-11-11-9-9-9	
5080-5100	10-11-23-19-17-11-14-15-20-13	10-9-10-9-10-8-8-10-10-12	Trip @ 5082'. Bit #13, M88.
5100-5120	10-10-8-8-7-7-9-8-7-9	8-8-9-9-10-6-9-7-7-9	
5120-5140	9-9-9-9-9-9-9-9-9-13	8-7-8-6-7-7-7-7-8-6	
5140-5160	8-8-10-9-9-8-8-9-7	7-7-7-10-8-8-10-6-8-8	
5160-5180	7-7-10-8-11-10-9-9-9-8	9-9-8-9-8-10-10-9-9-7	
5180-5200	8-8-9-8-10-8-7-8-8-7	6-5-7-8-11-16-16-28-7-9	
5200-5220	25-30-30-31-37-30-36-22-27-31	15-11-9-6-5-4-5-5-4-4	
5220-5240	3-4-4-12-14-14-16-14-10-10	5-6-5-5-5-8-7-16-12-11	
5240-5260	13-8-4-6-17-20-14-18-8-12	14-13-17-16-7-8-10-8-8-7	Trip @ 5248'. Bit #14, S88.
5260-5280	6-7-9-10-6-11-4-5-8-3	3-4-3-5-4-5-10-3-4-3	
5280-5300	6-4-4-8-7-5-4-4-7-4	3-3-2-3-4-4-5-4-8-11	
5300-5320	9-9-9-7-8-8-5-4-8-9	4-4-8-10-10-8-10-10-10-9	
5320-5340	9-10-11-11-9-9-9-9-7-8	7-8-8-10-10-9-10-7-6-6	
5340-5360	6-5-5-5-6-6-5-4-6-7	6-5-8-6-6-6-7-9-10-7	
5360-5380	6-7-6-6-5-6-8-9-7-8	7-5-6-7-7-6-7-6-9-6	
5380-5400	4-3-4-3-3-3-5-4-4-3	4-5-4-4-6-4-4-4-4-5	
5400-5420	4-6-5-5-10-6-9-9-9-9	8-8-7-8-8-6-7-8-10-5	
5420-5425	7-5-6-8-9		

5425 Total Depth - Driller
5421 Total Depth - Schlumberger

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WELL CHRONOLOGY

PLAINS EXPLORATION CO.
BAUGHMAN FARMS #1-D

C/NE/NE Sec. 8-17S-45W
Kiowa County, Colorado

Elevation: 4126' K.B.

1969

Aug. 12	Spudded. Drilled 12 1/4" surface hole to 255'. Ran 8 5/8" surface casing at 255' and cemented with 150 sacks Lite Weight cement plus 3% calcium chloride. Plug down at 12:00 midnight.
Aug. 13	Out from under surface at 12:00 noon.
Aug. 14	Drilling @ 1080' at 7:00 A.M.
Aug. 15	Drilling @ 1980' at 7:00 A.M.
Aug. 16	Drilling @ 2590' at 7:00 A.M.
Aug. 17	Drilling @ 2950' at 7:00 A.M.
Aug. 18	Drilling @ 3290' at 7:00 A.M. Geologist on well at 7:40 P.M.; drilling @ 3480'.
Aug. 19	Tripping @ 3590'. On bank at 7:00 A.M. Pipe strap okay.
Aug. 20	Tripping @ 3838'. On bank at 7:00 A.M.
Aug. 21	Drilling @ 4030' at 7:00 A.M.
Aug. 22	Drilling @ 4256' at 7:00 A.M.
Aug. 23	Drilling @ 4403' at 7:00 A.M.
Aug. 24	Drilling @ 4586' at 7:00 A.M.
Aug. 25	Drilling @ 4772' at 7:00 A.M.
Aug. 26	Drilling @ 4969' at 7:00 A.M.
Aug. 27	Drilling @ 5087' at 6:10 A.M. Trip @ 5082'.
Aug. 28	Drilling @ 5231' at 8:00 A.M. Trip @ 5248'.
Aug. 29	Drilling @ 5369' at 6:30 A.M. Drilled to 5425' T.D. at 12:40 P.M. Circulated two hours; out to log. Started logging at 6:30 P.M.
Aug. 30	Finished logging at 3:10 A.M. Permission to plug granted at 6:15 A.M. Well plugged.

[redacted]

BIT RECORD

PLAINS EXPLORATION CO.
BAUGHMAN FARMS #1-D
C/NE/NE Sec. 8-17S-45W
Kiowa County, Colorado
Elevation: 4126' K.B.

Run No.	Size	Make	Type	Depth out	Feet	Hours
1	12 1/4			259		
2	7 7/8	Sec.	S4T	1535	1276	18 1/4
3	"	"	S4T	1960	425	14 3/4
4	"	"	S4T	2590	630	17
5	"	"	M4N	2987	397	17 1/2
6	"	"	S4T	3290	303	17 1/4
7	"	"	M4N	3590	300	19
8	"	"	M4N	3838	248	18 1/4
9	"	"	M4N	4014	176	14
10	"	"	M4N	4260	246	23
11	"	"	S88	4814	554	68
12	"	"	S88 Rerun	5082	268	29 3/4
13	"	"	M88	5248	166	29
14	"	"	S88	5425	177	20

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DETAILED SAMPLE LOG

PLAINS EXPLORATION CO.
BAUGHMAN FARMS #1-D

C/NE/NE Sec. 8-17S-45W
Kiowa County, Colorado
Elevation: 4126' K.B.

Sample study starts at 3200' in lower Permian.

3200-3216	Shale, red to chocolate; traces of anhydrite; gray, finely crystalline, dense limestone and red, very finely crystalline, dense dolomite nodules; traces of gray siltstone.
3216-3255	Shale, chocolate to red; with interbedded stringers of sandstone, brown-red, very fine, angular, micro-micaceous, friable; traces of anhydrite.
3255-3270	Sandstone, brown-red, very, very fine to very fine, micro-micaceous, tight to friable.
3270-3272	Shale, light red to chocolate.
3272	Top - NEVA
3272-3290	Limestone, gray-buff and buff, very finely crystalline to very slightly crystalline, dense; trace micro-fossils; traces purple-gray, very finely crystalline, slightly limey, dense dolomite.
3290-3295	Shale, light red to chocolate.
3295-3304	Siltstone to very, very fine sandstone, gray and purple-gray, micro-micaceous.
3304-3306	Shale, as above.
3306-3339	Siltstone to very, very fine sandstone, gray and purple, micro-micaceous; with interbedded shale, red to chocolate; traces of anhydrite.
3339-3344	Shale, red to chocolate.
3344	Top - FORAKER
3344-3358	Limestone, gray-buff, little purple and red-gray, finely crystalline, dense; trace micro-fossils; some anhydritic.
3358-3361	Siltstone to very, very fine sandstone, gray, gray-green, brown-red, micro-micaceous, limey.
3361-3363	Shale, red to chocolate, brown-red.

3363-3372	Limestone, gray, gray-buff, some vari-colored, very finely crystalline to very slightly crystalline, dense; some micro-fossils.
3372-3373	Shale, as above.
3373-3387	Limestone, gray, gray-buff, red-gray, very finely crystalline to very slightly crystalline, dense; some micro-fossils.
3387-3388	Shale, red, little chocolate.
3388-3409	Siltstone to very, very fine sandstone, gray to brown-red, micro-micaceous, limey.
3409-3412	Shale, as above.
3412-3428	Siltstone to very, very fine sandstone, as above; with interbedded shale.
3428-3434	Limestone, gray, gray-tan, gray-buff, finely crystalline, dense; trace anhydritic.
3434-3506	Shale, light to dark red, chocolate; little anhydrite with lenses or lentils of siltstone to very, very fine sandstone, brown-red, pale purple, micro-micaceous; and limestone, gray, buff, gray-buff, red-gray, very finely crystalline to finely crystalline, dense.
3506-3510	Limestone, gray, very finely crystalline to finely crystalline, dense.
3510-3534	Shale, light to dark red, chocolate; with lentils of gray and gray-green siltstone.
3534-3538	Limestone, gray, gray-buff, tan-gray, very finely crystalline to finely crystalline, dense; little anhydritic; trace micro-fossils.
3538-3569	Shale, light red to chocolate; with interbedded siltstone to very, very fine sandstone, gray, micro-micaceous, tight to friable, limey.
3569	Top - PENNSYLVANIAN (VIRGIL)
3569-3579	Limestone, gray, gray-buff, very finely crystalline to finely crystalline, dense, trace silty.
3579-3584	Shale, light red to chocolate.
3584-3590	Limestone, gray, gray-buff, trace brown and red-gray, very finely crystalline to finely crystalline, dense.
3590-3608	Shale, as above; with interbedded gray, very limey siltstone.
3608-3618	Limestone, gray, gray-buff, little tan and brown, very finely crystalline, little finely crystalline, very dense; trace micro-fossils.
3618-3626	Shale, dark red, chocolate, little light red; little dark gray, hard, silty shale.

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3626-3632	Limestone, gray, dark gray, gray-tan, very finely crystalline to finely crystalline; trace micro-fossils.
3632-3634	Shale, red to chocolate, little dark gray; trace hard, silty.
3634-3644	Limestone, gray, gray-buff, gray-tan, very finely crystalline to finely crystalline, dense; trace micro-fossils; brachiopod spines.
3644-3658	Siltstone to very, very fine sandstone, dark gray, gray, brown-red, micro-micaceous, tight.
3658-3659	Shale, dark red, red, chocolate, little dark gray.
3659-3670	Limestone, gray, gray-buff, gray-tan, very finely crystalline to slightly crystalline, dense; few micro-fossils.
3670-3676	Dolomite, gray, gray-buff, dark gray, very, very finely crystalline, dense.
3676-3678	Shale, as above, more chocolate.
3678-3682	Dolomite, gray and buff, very, very finely crystalline, dense.
3682-3698	Limestone, gray, gray-tan, dark gray, very finely crystalline to finely crystalline, dense; few micro-fossils; trace silty; little interbedded shale 3691-92.
3698-3716	Siltstone to very, very fine sandstone, gray, gray-green, micro-micaceous; considerable interbedded shale.
3716	Top - SHAWNEE (TOPEKA)
3716-3732	Limestone, gray, gray-buff, little buff, trace brown, finely crystalline to slightly crystalline; few to abundant micro-fossils; trace oolitic; traces of gray and brown-gray, very finely crystalline, dense dolomite.
3732-3746	Shale, chocolate and red; with interbedded siltstone to very, very fine sandstone, gray, green, micro-micaceous, very tight.
3746-3748	Shale, black, carbonaceous, and dark gray.
3748-3769	Limestone, dark gray to gray, gray-buff, finely crystalline to slightly crystalline, dense; some abundantly micro-fossiliferous; trace brachiopod spines; trace gray-brown, opaque chert; little interbedded gray and gray-tan, very finely crystalline, dense dolomite.
3769-3770	Shale, as above.
3770-3788	Limestone, as above.
3788-3791	Sandstone, dark gray, very, very fine, angular, micro-micaceous, tight, limey.

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3791-3808	Limestone, gray to gray-buff and buff, finely crystalline to slightly crystalline, dense; some abundantly micro-fossiliferous; trace bryozoa; trace interbedded dolomite, gray-tan, very finely crystalline, dense; considerable chert, gray, dark gray, dull, opaque, specular and micro-fossiliferous.
3808-3819	Limestone, dark gray, gray, gray-tan, gray-brown, very finely crystalline to slightly crystalline, dense; considerable dolomitic; some finely granular to succrosic; trace chert, gray, dull, opaque; few micro-fossils and fossil fragments.
3819-3821	Shale, black, carbonaceous.
3821-3835	Limestone, dark gray, gray, gray-buff, very finely crystalline to slightly crystalline, dense, trace dolomitic; some micro-fossils; trace bryozoa; considerable chert, gray, dark gray, dull, opaque, specular to slightly fossiliferous.
3835-3852	Siltstone to very, very fine sandstone, gray, green-gray, traces brown-red, micro-micaceous, tight, limey; with some interbedded shale.
3852-3863	Limestone, gray, gray-buff, finely crystalline to slightly crystalline, dense; considerable micro-fossils and fossil fragments.
3863	Top - HEEBNER
3863-3865	Shale, black, carbonaceous to hard.
3865-3872	Siltstone to very, very fine sandstone, dark gray and gray, very micaceous, very limey, very tight.
3872-3884	Limestone, dark gray to buff, brown-gray, very finely crystalline to slightly crystalline, dense; few micro-fossils and fossil fragments; little silty.
3884-3886	Shale, dark gray.
3886-3896	Limestone, as above; some fossil vugs; trace white, opaque chert.
3896-3920	Limestone, gray to buff, gray-buff, finely crystalline to very slightly crystalline, dense; and dolomite, gray to brown, very finely crystalline to slightly granular, dense; little spotted fluorescence and trace brown, very spotted oil stain.
3920-3923	Shale, black, carbonaceous and gray-black.
3923-3947	Siltstone to very, very fine sandstone, gray, light gray, micro-micaceous, tight, slightly limey; some interbedded shale, black, gray-black, dark gray.
3947	Top - MISSOURI (LANSING-KANSAS CITY)
3947-3968	Limestone, buff-brown, buff, gray, finely crystalline to slightly crystalline, dense; abundant micro-fossils. (Note: This is not typical upper Lansing lithology.)

3968-3972	Siltstone to very, very fine sandstone, dark gray to gray-white, micro-micaceous, tight, very slightly limey.
3972-3999	Limestone, buff, buff-brown, gray-buff, finely crystalline to slightly crystalline, dense, medium to coarse oolitic and micro-fossiliferous; little very slightly oolicastic with trace very spotted brown oil stain.
3799-4001	Shale, black, gray-black, fissile; trace carbonaceous.
4001-4030	Limestone, gray to gray-brown, gray-buff, trace brown, very finely crystalline to slightly crystalline, dense; much medium to coarse, dense, oolitic and micro-fossiliferous; some interbedded siltstone, gray to green, micro-micaceous, shaly.
4030-4031	Shale, black and gray-black.
4031-4038	Siltstone to very, very fine sandstone, gray to green, micro-micaceous, limey, very shaly.
4038-4039	Shale, as above.
4039-4054	Limestone, buff, tan, brown, some gray, finely crystalline to slightly crystalline, dense; abundant micro-fossils; and some dense, oolitic; few fossil fragments; trace gray and buff, opaque chert.
4054-4056	Shale, dark gray, gray-black.
4056-4072	Limestone, gray to buff and gray-brown, finely crystalline to slightly crystalline, dense; abundant micro-fossils; trace fossil fragments; trace tan-buff, opaque chert; with interbedded siltstone to very, very fine sandstone, gray, dark gray, gray-green, micro-micaceous, tight, limey, very dirty.
4072-4074	Shale, black and gray-black, some carbonaceous.
4074-4087	Limestone, buff to buff-brown, tan, brown, finely crystalline to slightly crystalline, dense; abundant micro-fossils and fossil fragments.
4087-4090	Shale, as above.
4090-4108	Limestone, buff to brown, tan, gray, finely crystalline to slightly crystalline, fine to slightly coarsely oolicastic and dense oolitic; fair porosity, poor permeability; little spotted fluorescence, faint cut, no free oil or stain; trace tan, opaque chert.
4108-4128	Limestone, gray to buff, gray-buff and brown, very finely crystalline to finely crystalline, dense; abundant fossil fragments and some micro-fossils.
4128-4130	Shale, black, carbonaceous, and black and gray-black, hard.
4130-4135	Limestone, gray to buff, tan, light brown, very finely crystalline to slightly crystalline, dense; some micro-fossils.

4135-4142	Siltstone to very, very fine sandstone, gray-green, gray, micro-micaceous.
4142-4159	Limestone, gray to tan and brown, finely crystalline to slightly crystalline, dense; some micro-fossils; some medium to coarse, dense oolitic, and trace fine to medium oolicastic.
4159-4160	Shale, black, carbonaceous to hard.
4160-4171	Limestone, dark gray to buff and tan, finely crystalline, dense; few micro-fossils.
4171-4172	Shale, as above.
4172-4200	Limestone, gray and gray-brown, trace brown, very finely crystalline to finely crystalline, dense; some abundantly micro-fossiliferous; considerable fossil fragments; considerable argillaceous with little interbedded gray siltstone; trace Fusulina.
4200-4201	Shale, gray to black, trace carbonaceous.
4201-4206	Siltstone to very, very fine sandstone, gray, green-gray, tight, limey, slightly pyritic.
4206-4208	Shale, as above.
4208-4229	Limestone, buff-brown, brown, buff, some white and buff, chalky, very finely crystalline to finely crystalline, dense; few micro-fossils; interbedded shale, gray to black 4221-22.
4229-4249	Sandstone, gray, gray-green, very, very fine, tight, micro-micaceous, limey, very shaly and silty.
4249-4250	Shale, gray to black, some splintery.
4250-4270	Limestone, gray, gray-brown, brown, little gray-buff, very finely crystalline to finely crystalline, dense; some abundantly micro-fossiliferous and fossil fragmental; trace gray-tan, opaque, slightly fossiliferous chert.
4270-4272	Shale, black, carbonaceous;and gray-black and dark gray, hard.
4272-4283	Limestone, brown and gray-brown, gray-buff, very finely crystalline to slightly crystalline, dense; few micro-fossils; traces of buff and tan, opaque and semi-opaque chert.
4283-4290	Siltstone to very, very fine sandstone, dark gray and gray, micro-micaceous, slightly limey.
4290-4305	Limestone, brown, gray-brown, buff, finely crystalline to crystalline, dense; much abundantly micro-fossiliferous; traces of chert, buff, tan, brown, semi-opaque and opaque.
4305-4307	Shale, black, very carbonaceous; trace gray-black.

4307-4339 Limestone, brown to dark brown, gray-brown, very finely crystalline to crystalline, dense; with tan to light brown, medium to coarse, dense oolitic and oolicastic; and interbedded dolomite, tan and brown-gray, very, very finely crystalline, dense, slightly limey; with some secondary crystalline dolomite rhombs imbedded and white, granular anhydrite inclusions; oolicastic material has scattered, spotted fluorescence and traces of spotted oil stain, but no free oil and only slight trace of cut. Best zone 4311-22.

4339-4354 Limestone, gray, buff, tan, brown, finely crystalline to crystalline, dense; some micro-fossils; medium to coarse oolicastic and little oolitic; very spotted light brown oil stain; very spotted, mostly dull fluorescence; no free oil; one piece with faint cut; some interbedded dolomite, gray-brown and brown, very, very finely crystalline to slightly crystalline, dense, limey; with trace white, granular anhydrite; interbedded shale, dark gray, gray-black 4348-49.

4354 Base KANSAS CITY

4354-4356 Shale, gray-black, black, dark gray.

4356-4378 Sandstone, gray, gray-white, very, very fine to very fine, angular, tight, micro-micaceous, limey; with some imbedded oolites and micro-fossils; some very shaly.

4378-4381 Shale, black, carbonaceous.

4381 Top - DES MOINES (MARMATON)

4381-4395 Limestone, buff to brown, finely crystalline to crystalline, dense; some dense oolitic; trace oolicastic; few micro-fossils; trace brachiopod spines; traces of Chaetetes. (Note: Three fragments of Chaetetes were oil stained, one with bright fluorescence and cut, no free oil.)

4395-4397 Shale, black, gray-black, trace gray-green and brown.

4397-4423 Sandstone, gray, green-gray, very, very fine, micro-micaceous, tight, limey, to siltstone; some shaly laminae, some very dirty.

4423-4449 Limestone, gray-brown, buff-brown, brown, mottled, finely crystalline to very finely crystalline, dense; some abundantly micro-fossiliferous; few fossil fragments.

4449-4451 Shale, black, carbonaceous, dark gray, dark green.

4451-4466 Limestone, gray-brown, brown, tan, gray, finely crystalline to crystalline, dense; abundant micro-fossils; few fossil fragments.

4466-4518 Limestone, brown, dark brown, little tan, very finely crystalline to micro-crystalline, very dense; some finely crystalline with few micro-fossils, and considerably argillaceous 4508-18.

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4518	Top - CHEROKEE
4518-4521	Shale, black, brown-black, very carbonaceous.
4521-4535	Limestone, dark gray-brown, brown, little gray, very finely crystalline to slightly crystalline, dense; most bioclastic and slightly dense oolitic (Forams, Ostracods); traces of chert, black, opaque, specular and gray-brown, opaque, fossiliferous; pyrite.
4535-4539	Shale, black, very carbonaceous to hard.
4539-4568	Limestone, brown, buff-brown, gray-brown, finely crystalline to crystalline, dense; abundantly micro-fossiliferous (bioclastic); considerable fossil fragments; little dense oolitic; traces dark brown, gray-brown, opaque, fossiliferous chert; some very argillaceous and silty.
4568-4571	Shale, black, carbonaceous; and little gray-black and dark gray, micro-micaceous, slightly limey.
4571-4604	Limestone, gray to brown, very finely crystalline to slightly crystalline, dense; some micro-fossils (Forams, Ostracods), brachiopod spines, trace Fusulina; trace gray-brown and brown, opaque chert; interbedded lenses of dark gray and gray-black, very finely crystalline, dense, argillaceous and silty limestone 4577-79, 4587-89 and 4596-98; traces of pyrite.
4604-4605	Shale, black, gray-black, mostly carbonaceous.
4605-4613	Limestone, brown to buff-brown, buff, gray, finely crystalline to slightly crystalline, dense; few micro-fossils; considerable fossil fragments.
4613-4614	Shale, as above.
4614-4620	Limestone, gray to gray-brown and brown, very finely crystalline to slightly crystalline, dense; considerable fossil fragments; trace micro-fossils.
4620-4623	Shale, black, carbonaceous to gray-black, hard.
4623-4633	Limestone, as above; some pellatoid; slightly more micro-fossils; trace silty.
4633-4636	Shale, as above.
4636-4669	Limestone, gray to brown, very finely crystalline to finely crystalline, dense; few micro-fossils and fossil fragments (brachiopod spines); little earthy; and limestone, dark gray to gray-black, very finely crystalline, dense, argillaceous and silty; trace black, opaque chert with gray inclusions.
4669-4679	Shale, black, carbonaceous, gray-black, splintery, some micro-micaceous; with interbedded limestone, as above, 4671-74.

4679	Top - ATOKA
4679-4682	Dolomite, light gray, gray-buff and black-brown, very, very finely crystalline to very finely crystalline, dense, silty, argillaceous; pieces look oily but have no fluorescence.
4682-4698	Limestone, gray to brown, gray-black, very finely crystalline to finely crystalline, dense, some argillaceous and little silty to siliceous; with interbedded dolomite, black-brown, very finely crystalline, dense, argillaceous, oily looking, no fluorescence, in thin lentils; and interbedded black and gray-black shale 4685-87, 4690-91.
4698-4705	Shale, black, gray-black, carbonaceous to hard; with little interbedded limestone.
4705-4719	Limestone, gray to dark gray, gray-black, dark brown, very finely crystalline to slightly crystalline, dense, some argillaceous, little silty; trace pyrite; few fossil fragments; trace brown, mottled, slightly semi-opaque chert.
4719-4720	Shale, black, gray-black, trace carbonaceous.
4720-4731	Limestone, gray, gray-brown, dark gray, gray-black, little brown, very finely crystalline, considerable argillaceous and silty; more fossil fragments; trace micro-fossils.
4731-4733	Shale, black and gray-black, carbonaceous to splintery.
4733-4741	Limestone, as above; more gray-black and black, very argillaceous and silty to siliceous.
4741-4743	Shale, as above; more splintery; some micro-micaceous.
4743-4758	Limestone, gray to black, trace brown, very finely crystalline to finely crystalline, dense, very argillaceous, silty to siliceous; trace pyrite.
4758-4760	Shale, black, carbonaceous; and black and gray-black, splintery.
4760-4770	Limestone, as above; with interbedded shale as above, 4762-64, 4769-70.
4770-4774	Limestone, gray to gray-black, little black, very finely crystalline to finely crystalline, dense, argillaceous, some silty to siliceous; trace pyrite; trace brachiopod spines; trace black, opaque chert.
4774-4776	Shale, black to gray-black and dark gray, some splintery, little carbonaceous.
4776-4796	Limestone, as above; traces of chert, black, gray-black, dark brown, opaque, slightly glassy; with interbedded shale, as above, 4784-85, 4789-91.

4796-4798	Shale, black, gray-black, dark gray, carbonaceous to splintery.
4798-4818	Limestone, gray to dark gray, gray-black, little black, very finely crystalline to finely crystalline, dense, argillaceous, considerable silty to siliceous; trace pyrite; some fossil fragments; traces black, opaque chert; with interbedded shale, black to dark gray, splintery, 4801-03, 4811-12.
4818-4819	Shale, as above.
4819-4826	Limestone, gray to gray-black, little black, very finely crystalline to slightly crystalline, dense, very argillaceous, considerable silty.
4826-4827	Shale, as above.
4827-4829	Sandstone, gray and brown, fine, angular, tight to friable, slightly pyritic, with black residual oil stain.
4829-4835	Limestone, light gray to dark gray, some argillaceous, very finely crystalline to finely crystalline, dense; trace brachiopod shells and spines; trace pyrite.
4835	Top - MORROW
4835-4839	Shale, pale gray, satiny; trace poor coal.
4839-4843	Sandstone, gray and dark gray, very fine, angular, tight, glauconitic, very slightly limey.
4843-4900	Shale, pale green-gray, pale green, gray, satiny, trace glauconitic; much black toward bottom; lentils of gray and dark gray, very fine, angular, tight, glauconitic sandstone; some very dirty.
4900-4940	Shale, green-gray, gray-green, pale green, gray, black, satiny to sub-waxy, slightly glauconitic; with traces of gray, very fine, very, very tight, glauconitic sandstone, probably in lentils; pyrite.
4940-4945	Sandstone, brown to gray, fine to coarse, angular to subangular, little subrounded, very limey, tight, in part quartzitic, slightly glauconitic (in part is almost a very, very sandy, micro-fossiliferous limestone).
4945-4980	Shale, green, gray-green, gray, dark gray, satiny to sub-waxy, slightly glauconitic; trace poor coal; pyrite; some black.
4980-4983	Sandstone, gray, very fine to fine, angular, glauconitic, tight, dirty, very slightly limey.
4983-4985	Shale, as above.
4985-4995	Sandstone, gray-white, gray, fine to coarse, angular to subangular, very tight to slightly friable, glauconitic, trace limey, clean to slightly dirty.
4995-5002	Shale, green, gray-green, gray-black, satiny to sub-waxy; trace poor coal.

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5002-5029	Limestone, brown, gray-brown, gray, very finely crystalline to crystalline, dense, abundantly coarsely fossil fragmental (bryozoa, brachiopod, crinoid, gastropod), slightly glauconitic; some interbedded shale, as above; trace sandstone, gray, medium to very coarse, angular to subangular, quartz wash interbedded 5023-29.
5029-5036	Shale, gray to black, green, trace brown, satiny to sub-waxy.
5036-5064	Limestone, buff, buff-brown, brown, gray, very finely crystalline to crystalline, dense, coarsely fossil fragmental (bryozoa, brachiopod, crinoid); trace glauconite; some imbedded medium to very coarse, angular to subrounded, quartz wash grains.
5064	Top - MISSISSIPPIAN (ST. LOUIS)
5064-5105	Limestone, buff to light brown, very finely crystalline, dense, micro-oolitic and micro-pellatoid, very finely sandy; little finely oolitic; little white, chalky.
5105-5140	Limestone, buff to light brown, very finely crystalline, dense, micro-oolitic and micro-pellatoid; and brown, fine to medium oolitic; most very finely sandy; little light brown and brown, sub-lithographic limestone.
5140-5190	Limestone, light brown to buff-brown, fine to medium, dense oolitic; and limestone, light brown to brown and tan, sub-lithographic, very dense; some very finely sandy micro-oolitic and micro-pellatoid limestone (may still be in place); trace gray-tan, brown, buff, opaque chert; no shows.
5190-5211	Limestone, light brown and brown, finely crystalline, most fine to medium dense oolitic, and brown, sub-lithographic limestone; considerable chert, gray, buff, tan, opaque and semi-opaque, smooth to rough; trace white quartzose; little dolomite, buff to light brown, very finely crystalline, slightly granular, dense, possibly in lentils; trace spotted fluorescence, no stain or cut.
5211	Top - "X" MARKER
5211-5212	Shale, gray-green, dark gray, black, splintery, slightly dolomitic.
5212	Top - SPERGEN
5212-5222	Dolomite, brown, light brown, dark brown, black-brown, mottled, finely crystalline to slightly crystalline, dense to slightly vuggy, little resinous, some argillaceous; trace spotted fluorescence; no cut or stain.
5222-5248	Dolomite, brown to dark brown and black-brown, mottled, finely crystalline to crystalline, slightly granular, dense to some vuggy porosity, some very argillaceous; traces gray, opaque chert; no fluorescence, stain or cut.

5293	Top - WARSAW
5293-5306	Dolomite, gray and gray-brown, very finely crystalline, dense, slightly mottled, slightly glauconitic; chert, gray, gray-white, opaque, coarsely fossiliferous, trace weathered.
5306-5334	Dolomite, gray-brown, brown, gray, very finely crystalline, dense; and limestone, gray-brown, brown, buff-brown, crystalline, dense, slightly dolomitic, abundantly micro-fossiliferous; chert, gray, gray-tan, gray-brown, gray-buff, opaque and semi-opaque, coarsely fossiliferous, some weathered (5% to 6% chert at bottom).
5334	Top - OSAGE
5334-5362	Dolomite, buff, tan, light brown, very finely crystalline to finely crystalline, granular to succrosic, dense, slightly glauconitic; chert, buff, light gray, white, opaque and semi-opaque, rough to smooth, blocky, trace weathered, trace tripolitic (5% to 10% chert).
5362-5374	Note: This is the so-called Harrison or Osage Shale Marker. There is no shale in the samples and the only lithology that might be attributed to this interval is a dark gray, very finely crystalline, dense, very argillaceous dolomite.
5374-5398	Dolomite, buff to tan and light brown, very finely crystalline to finely crystalline, dense, very glauconitic; chert, gray, white, smokey, blue-gray, rough to smooth, opaque and semi-opaque, weathered to fresh, blocky, little tripolitic, some glauconitic (10% to 40% chert).
5398	Top - KINDERHOOK
5398-5425	Dolomite, brown to gray, finely crystalline to coarsely crystalline, dense to slightly vuggy, considerable rhombic.
5425	Total Depth - Driller.
5421	Total Depth - Schlumberger

Samples described:

Joseph R. Clair

JOSEPH R. CLAIR
(on well)