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COLO.OIL & GAS CONS.COMM.

GEOLOGIC REPORT
UNION PACIFIC RESOURCES CORPORATION
#1 EUHLING 41-11
SE/SE SECTION 11, T17S-R42W
KIOWA COUNTY, COLORADO

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COLO.OIL & GAS CONS.COMM.

OPERATOR: Union Pacific Resources Corporation
WELL NAME: #1 Euhling 41-11
MUD LOCATION: 1000' FSL, 600' FEL
 SE/SE Section 11, T17S-R42W
 Kiowa County, Colorado
TOTAL DEPTH: 5300' Driller, 5290' Logger, 5295.56' Strap
SPUD DATE: 10-18-89
COMPLETION DATE: 10-26-89
ELEVATION: 3946' GL, 3957' KB
CONTRACTOR: Murfin Drilling, Rig 22
SURFACE CASING: Set 9 joints, new 8 5/8" 23# casing at 404'
 KB with 175 sacks light, and 70 sacks common.
WELLSITE DRILLING CONSULTANT: Bobby Cooper, Cheyenne Wells, Colorado
WELLSITE GEOLOGIST: John D. Pruitt, Cheyenne Wells, Colorado
MUD LOGGING: Unmanned unit by Columbine Logging, Inc.,
 Denver, Colorado
MUD: Davis Mud, Burlington, Colorado
LOGS: Atlas Wireline Services, Ft. Morgan, Colorado

WELL HISTORY:

<u>Date</u>	<u>6AM Depth</u>	<u>Formation</u>	<u>Operation</u>
10-18-89	0'	Surface	Spud 8 PM.
10-19-89	407'	Surface	Waiting on Cement. Made 407' in 4 1/4 hrs. dev 1/8° at 282'
10-20-89	1080'	Surface	Drilling. Made 673' in 24 hrs. Drilling with water WOB 25, RPM 100, PP 850, SPM 64 dev 1° at 957'
10-21-89	2525'	Surface	Drilling. Made 1475' in 24 hrs. MW 9.4, Drilling with water WOB 30, RPM 90, PP 900, SPM 64 dev 1/8° at 1695', 1 1/4° at 2248'

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10-22-89	3490'	Surface,	Drilling. Made 965' in 24 hrs. MW 9.5, Drilling with water WOB 38, RPM 90, PP 1000, SPM 64 dev 3/4° at 3329'
10-23-89	4153'	Shawnee	Mudding Up. Made 663' in 24 hrs. VIS 39, MW 8.9, Cl 11,000, pH 11.5, WL 12.8, FC 2/32, LCM 0 WOB 38, RPM 85, PP 1000, SPM 64 dev 1/2° at 3823'
10-24-89	4565'	Lansing	Tripping. Made 412' in 24 hrs. VIS 39, MW 9.1, Cl 9,000, pH 11.0, WL 11.2, FC 2/32, LCM 1# WOB 38, RPM 90, PP 1000, SPM 64 dev 3/4° at 4556'
10-25-89	4850'	Cherokee	Drilling. Made 285' in 24 hrs. VIS 38, MW 9.1, Cl 12,000, pH 10.5, WL 11.0, FC 2/32, LCM 1# WOB 40, RPM 85, PP 950, SPM 64
10-26-89	5274'	St. Genevieve	Drilling. Made 424' in 24 hrs. VIS 42, MW 9.1, Cl 6,300, pH 9.5, WL 8.4, FC 2/32, LCM 1 WOB 40, RPM 85, PP 950, SPM 64 dev 2 1/2°

FORMATION TOPS

<u>Formation</u>	<u>Sample</u>	<u>Datum</u>	<u>E. Log</u>	<u>Datum</u>
Stone Corral	2684'	(+1273')	2692'	(+1265')
Shawnee	3840'	(+ 117')	3831'	(+ 126')
Lansing	4208'	(- 251')	4152'	(- 195')
Marmaton	4650'	(- 693')	4613'	(- 660')
Cherokee	4760'	(- 803')	4724'	(- 767')
Atoka	4920'	(- 963')	4899'	(- 942')
Morrow Shale	5068'	(-1111')	5054'	(-1097')
V-7 Sand	5166'	(-1209')	5156'	(-1199')
Lower Morrow	5190'	(-1233')	5178'	(-1221')
St. Genevieve	5254'	(-1297')	not logged	

SHOW DESCRIPTION:

No shows were observed in samples

BIT RECORD:

<u>No.</u>	<u>Size</u>	<u>Make</u>	<u>Type</u>	<u>Depth Out</u>	<u>Feet</u>	<u>Hours</u>
1A	12 1/4	Reed	HP12	407'	407	4-1/4
1	7 7/8	HTC	ATJ05	2264'	1857	23
2	7 7/8	HTC	ATJ22	4565'	2301	63
3	7 7/8	HTC	ATJ225	4741'	176	9-3/4
4	7 7/8	HTC	ATJ225	5300'	559	32

SAMPLE DESCRIPTION:

Samples were saved from 3800 feet to total depth at 5300 feet. Sample examination commenced at 3800 feet and continued to total depth. Samples were caught by crews and logged by geologist. Depths reported herein are logged depths.

3800'-3810' Shale. Gray, splintery-platy.
Sandstone. Light gray, very fine grain, salt and pepper, very shaly, pyritic, tight, no stain, fluorescence or cut.

3810'-3820' Shale. Gray-dark gray, splintery-platy.
Sandstone. Light gray, very fine grain, salt and pepper, very shaly, pyritic, tight, no stain, fluorescence or cut.

3820'-3830' Limestone. Light gray, mudstone, micritic, microfossils, marly, tight, no stain, fluorescence or cut.
Limestone. Light gray-light brown, mudstone, micritic, tight, no stain, fluorescence or cut.

3830'-3840' Limestone. Light gray-light brown, mudstone, micritic, argillaceous, tight, no stain, fluorescence or cut.
Sandstone. Light gray, very fine grain-fine grain, subangular-subrounded, very argillaceous, tight, no stain, fluorescence or cut.
Shale. Dark gray, splintery.

Top Shawnee 3840' (+117)

- 3840'-3850' Limestone. Light brown-brown, mudstone, micritic, pyritic, tight, no stain, fluorescence or cut.
Shale. Gray, waxy, slightly calcareous.
- 3850'-3860' Limestone. Light gray, mudstone, micritic, slightly argillaceous, microfossils, trace pyrite, tight, no stain, fluorescence or cut.
- 3860'-3870' Limestone. Light gray, mudstone, micritic, slightly argillaceous, microfossils, trace pyrite, tight, no stain, fluorescence or cut.
Shale. Gray, blocky, silty-sandy.
Limestone. Light brown, mudstone, micritic, microfossils, tight, no stain, fluorescence or cut.
- 3870'-3880' Limestone. Light brown, mudstone, micritic, microfossils, tight, no stain, fluorescence or cut.
Limestone. Light brown, wackestone, micritic, microfossils, tight, no stain, fluorescence or cut.
- 3880'-3890' Limestone. Light brown, wackestone, micritic, microfossils, tight, no stain, fluorescence or cut.
No sample log depth 3882'-3888'.
Limestone. Light brown-light grayish brown, wackestone-packstone, micritic matrix, slightly dolomitic, microfossils, tight, mineral fluorescence, no stain or cut.
- 3890'-3900' Limestone. Light brown-light grayish brown, wackestone-packstone, micritic matrix, slightly dolomitic, microfossils, tight, mineral fluorescence, no stain or cut.
- 3900'-3910' Shale. Dark gray, laminated, waxy in part.
Dolomite. Buff-light gray, microcrystalline, tight-poor pinpoint porosity, no stain, fluorescence or cut.

- 3910'-3920' Dolomite. Buff-light gray, microsugrosic-crystalline, argillaceous in part, tight-poor pinpoint porosity, trace tarry stain, no fluorescence or cut.
Limestone. Light brown, mudstone, micritic, tight, no stain, fluorescence or cut.
- 3920'-3930' Limestone. Buff, mudstone-wackestone, micritic, argillaceous in part, microfossils, tight, no stain, fluorescence or cut.
- 3930'-3940' Shale. Dark gray-black, blocky-platy.
Limestone. Light brown, wackestone, micritic, microfossils, oolites, tight, no stain, fluorescence or cut.
- 3940'-3950' Limestone. Light gray-light brown, wackestone-packstone, micritic matrix, shell fragments, microfossils, trace poor pinpoint porosity, no stain, fluorescence or cut.
- 3950'-3960' Shale. Dark gray-black, chippy.
Limestone. Light gray-light brown, wackestone-packstone, micritic matrix, shell fragments, microfossils, dolomitic in part, tight-poor pinpoint porosity, no stain, fluorescence or cut.
- 3960'-3970' Limestone. Buff-white, mudstone, micritic, argillaceous, trace microfossils, tight, no stain, fluorescence or cut.
- 3970'-3980' Limestone. Buff, wackestone, micritic, slightly-very dolomitic, microfossils, shell fragments, oolites, tight-poor pinpoint porosity, no stain, fluorescence or cut.
Shale. Dark gray, chippy-blocky, silty in part.
- 3980'-3990' Limestone. Buff-light brown, mudstone-wackestone, micritic, shell fragments, microfossils, tight, no stain, fluorescence or cut.
- 3990'-4000' Limestone. Buff-light brown, mudstone-wackestone, micritic, shell fragments, microfossils, tight, no stain, fluorescence or cut.
Shale. Dark gray-black, blocky-splintery.

- 4000'-4010' Shale. Dark gray-black, blocky-splintery.
Limestone. Light brown, mudstone, micritic,
microfossils, light brown chert, tight, no stain,
fluorescence or cut.
- 4010'-4020' Limestone. Light brown, packstone, micritic
matrix, slightly-completely dolomitized, shell
fragments, microfossils, oolites, tight-fair vuggy
porosity, no stain, fluorescence or cut.
- 4020'-4030' Limestone. Light brown, packstone, micritic
matrix, slightly-completely dolomitized, shell
fragments, microfossils, oolites, tight-fair vuggy
porosity, no stain, fluorescence or cut.
- 4030'-4040' Shale. Dark gray-black, chippy-blocky.
Limestone. Buff-light brown, mudstone, micritic,
slightly argillaceous, microfossils, tight, no
stain, fluorescence or cut.
- 4040'-4050' Limestone. Light brown, packstone, micritic
matrix, oolites, shell fragments, microfossils, no
visible porosity, no stain, fluorescence or cut.
- 4050'-4060' Shale. Gray-dark gray, splintery-blocky, silty in
part, calcareous in part.
Limestone. Gray, mudstone, micritic, very
argillaceous, tight, no stain, fluorescence or
cut.
- 4060'-4070' Sandstone. Light gray-light brown, fine grain,
subrounded, very argillaceous, dark lithic
fragments, slightly calcareous, no visible
porosity, no stain, fluorescence or cut.
Limestone. Light brown, wackestone, micritic,
dolomitic, microfossils, no visible porosity, no
stain, fluorescence or cut.
- 4070'-4080' Limestone. Light brown, wackestone, micritic,
dolomitic, microfossils, no visible porosity, no
stain, fluorescence or cut.
Shale. Dark gray-black, fissile, platy.
- 4080'-4090' Limestone. Light brown, wackestone, micritic,
dolomitic, microfossils, no visible porosity, no
stain, fluorescence or cut.

- 4090'-4100' Limestone. Light brown, wackestone, micritic, dolomitic, microfossils, no visible porosity, no stain, fluorescence or cut.
Limestone. Light gray-buff, mudstone, micritic, microfossils, tight, no stain, fluorescence or cut.
Shale. Black, chippy.
- 4100'-4110' Limestone. Light gray-light brown, mudstone, micritic, microfossils, tight, no stain, fluorescence or cut.
- 4110'-4120' Limestone. Light gray-light brown, light gray chert, mudstone, micritic, microfossils, tight, no stain, fluorescence or cut.
Shale. Dark gray, chippy-splintery.
- 4120'-4130' Limestone. Buff-light brown, wackestone-packstone, micritic matrix, slightly dolomitic in part, microfossils, tight-fair vuggy porosity, mineral fluorescence, no stain or cut.
- 4130'-4140' Limestone. Buff-light brown, wackestone-packstone, micritic matrix, slightly dolomitic in part, microfossils, tight-fair vuggy porosity, mineral fluorescence, no stain or cut.
- 4140'-4150' Limestone. Light gray-white, mudstone, micritic, microfossils, shell fragments, tight, no stain, fluorescence or cut.
Shale. Dark gray-black, chippy.
- 4150'-4160' No sample caught log depth 4150'-4158'
Limestone. Light brown-light gray, wackestone-mudstone, micritic, microfossils, oolites, tight, no stain, fluorescence or cut.
- 4160'-4170' Limestone. Light brown-light gray, wackestone-mudstone, micritic, microfossils, oolites, trace bryozoa, slightly-moderately dolomitic, tight-fair vuggy porosity, no stain, fluorescence or cut.
- 4170'-4180' Limestone. Light brown-light gray, wackestone-mudstone, micritic, microfossils, oolites, trace bryozoa, slightly-moderately dolomitic, tight-fair vuggy porosity, no stain, fluorescence or cut.

- 4180'-4190' Limestone. Light brown-light gray, wackestone-mudstone, micritic, microfossils, oolites, abundant bryozoans, slightly-very dolomitic, poor-fair vuggy porosity, no stain, fluorescence or cut.
Trace limestone, light brown, grainstone, slightly dolomitic, oolites, good porosity, no stain, fluorescence or cut.
- 4190'-4200' Limestone. Light brown, mudstone, micritic, microfossils, trace oolites, tight, no stain, fluorescence or cut.
- 4200'-4210' No sample caught log depth 4200'-4206'.
Shale. Dark gray, chippy-splintery.
Limestone. Buff-light brown, mudstone, micritic, slightly dolomitic in part, oolites, microfossils, tight, no stain, fluorescence or cut.
- Top Lansing 4208' (-251)
- 4210'-4220' Limestone. Buff-light brown, mudstone, micritic, slightly dolomitic in part, oolites, microfossils, tight, no stain, fluorescence or cut.
- 4220'-4230' Limestone. Buff-light brown, packstone, micritic matrix, slightly-completely dolomitized, oolites, microfossils, trace poor pinpoint vuggy porosity, no stain, fluorescence or cut.
Limestone. Buff-light brown, mudstone-wackestone, micritic, slightly dolomitic in part, microfossils, no visible porosity, no stain, fluorescence or cut.
- 4230'-4240' Limestone. Buff-light brown, mudstone-wackestone, micritic, slightly dolomitic in part, microfossils, no visible porosity, no stain, fluorescence or cut.
Shale. Gray-dark gray, chippy-blocky.
- 4240'-4250' Shale. Gray-dark gray, chippy-blocky, calcareous in part.
- 4250'-4260' Limestone. Light brown-grayish brown, mudstone, micritic, shell fragments, microfossils, slightly dolomitic in part, tight, no stain, fluorescence or cut.

- 4260'-4270' Limestone. Light brown-grayish brown, mudstone, micritic, shell fragments, microfossils, slightly dolomitic in part, tight, no stain, fluorescence or cut.
- 4270'-4280' Limestone. Light grayish brown-brown, mudstone-wackestone, micritic, oolites, black lithic grains, shell fragments, tight, no stain, fluorescence or cut.
- 4280'-4290' Shale. Dark gray, blocky, calcareous.
Siltstone. Gray.
Limestone. Grayish brown-dark gray, mudstone, micritic, very argillaceous in part, microfossils, tight, no stain, fluorescence or cut.
- 4290'-4300' Limestone. Buff-light brown, mudstone, micritic, dolomitic in part, oolites, no visible porosity, no stain, fluorescence or cut.
- 4300'-4310' Limestone. Buff-light brown, mudstone, micritic, dolomitic in part, oolites, no visible porosity, no stain, fluorescence or cut.
- 4310'-4320' Limestone. Buff-light brown, mudstone, micritic, dolomitic in part, oolites, no visible porosity, no stain, fluorescence or cut.
Shale. Gray-dark gray, blocky-splintery.
Limestone. Brown-dark brown, mudstone, micritic, microfossils, light brown chert, tight, no stain, fluorescence or cut.
- 4320'-4330' Limestone. Brown-dark brown, mudstone, micritic, microfossils, light brown chert, tight, no stain, fluorescence or cut.
Limestone. Buff-brown, wackestone, micritic, oolites, microfossils, no visible porosity, no stain, fluorescence or cut.
- 4330'-4340' Limestone. Grayish brown, mudstone, micritic-microcrystalline, slightly argillaceous, microfossils, tight, no stain, fluorescence or cut.
- 4340'-4350' Limestone. Grayish brown-dark grayish brown, mudstone, micritic, argillaceous, root structures, slightly dolomitic in part, tight, no stain, fluorescence or cut.

- 4350'-4360' Limestone: Grayish brown-dark grayish brown, mudstone, micritic, argillaceous, root structures, slightly dolomitic in part, tight, no stain, fluorescence or cut.
Limestone. Buff-brown, mudstone, micritic, microfossils, tight, no stain, fluorescence or cut.
- 4360'-4370' Limestone. Gray-dark gray-black, chippy, calcareous in part, tight, no stain, fluorescence or cut.
Limestone. Gray-brown, mudstone, micritic, argillaceous, tight, no stain, fluorescence or cut.
- 4370'-4380' Limestone. Gray-grayish brown, mudstone, micritic, trace oolites and microfossils, tight, no stain, fluorescence or cut.
- 4380'-4390' Limestone. Grayish brown, mudstone, micritic, trace oolites and microfossils, tight, no stain, fluorescence or cut.
Shale. Black, fissile, platy.
Limestone. Grayish brown-dark grayish brown, mudstone, micritic, argillaceous, tight, trace pyrite, no stain, fluorescence or cut.
- 4390'-4400' Limestone. Grayish brown-dark grayish brown, mudstone, micritic, argillaceous, trace shell fragments, tight, trace pyrite, no stain, fluorescence or cut.
Shale. Dark gray, splintery, micaceous.
- 4400'-4410' Limestone. Grayish brown-dark brownish gray, mudstone, micritic, very argillaceous in part, gray chert, slightly dolomitic, no visible porosity, no stain, fluorescence or cut.
- 4410'-4420' Limestone. Grayish brown-dark brownish gray, mudstone, micritic, very argillaceous in part, gray chert, slightly dolomitic, trace pyrite, no visible porosity, no stain, fluorescence or cut.
Limestone. Brown, packstone, micritic matrix, oolites, poor pinpoint vuggy porosity, no stain, fluorescence or cut.

- 4420'-4430' Limestone. Brown, packstone, micritic matrix, oolites, poor pinpoint vuggy porosity, no stain, fluorescence or cut.
Limestone. Grayish brown-dark gray, mottled, mudstone, micritic, very argillaceous in part, tight, no stain, fluorescence or cut.
- 4430'-4440' Limestone. Grayish brown-dark gray, mottled, mudstone, micritic, very argillaceous in part, tight, no stain, fluorescence or cut.
Shale. Dark gray-black, chippy, pyritic, waxy in part.
- 4440'-4450' Limestone. Buff-brown-dark gray, mudstone, micritic, shell fragments, very argillaceous in part, tight, no stain, fluorescence or cut.
Limestone. Buff-grayish brown, mudstone, microcrystalline, microfossils, tight, no stain, fluorescence or cut.
- 4450'-4460' Limestone. Buff-grayish brown, mudstone, microcrystalline, microfossils, tight, no stain, fluorescence or cut.
- 4460'-4470' Limestone. Buff-grayish brown, mudstone, microcrystalline, microfossils, tight, no stain, fluorescence or cut.
Limestone. Buff-grayish brown, micritic-microcrystalline, shell fragments, oolites, microfossils, trace light brown chert, tight, no stain, fluorescence or cut.
- 4470'-4480' Limestone. Buff-grayish brown, micritic-microcrystalline, shell fragments, oolites, microfossils, trace light brown chert, tight, no stain, fluorescence or cut.
Shale. Dark gray-black, chippy.
Limestone. Buff, mudstone, microcrystalline, microfossils, very pyritic, tight, no stain, fluorescence or cut.
Chert. Buff-light brown, mottled.
- 4480'-4490' Limestone. Brown, packstone, micritic matrix, oolites, microfossils, no visible porosity, dolomitic in part, no stain, fluorescence or cut.
Limestone. Light brown-brown, mudstone, micritic, trace microfossils, tight, no stain, fluorescence or cut.

- 4490'-4500' Limestone. Light brown-brown, mudstone, micritic, trace microfossils, tight, no stain, fluorescence or cut.
Shale. Black-dark gray, flaky, waxy sheen.
Limestone. Grayish brown, mudstone, micritic-microcrystalline, microfossils, argillaceous in part, tight, no stain, fluorescence or cut.
- 4500'-4510' Limestone. Grayish brown, mudstone, micritic-microcrystalline, microfossils, oolites, argillaceous in part, tight, no stain, fluorescence or cut.
Dolomite. Buff, crystalline, trace microfossils, tight, no stain, fluorescence or cut.
- 4510'-4520' Dolomite. Buff, crystalline, trace microfossils, tight, no stain, fluorescence or cut.
Limestone. Light brown-grayish brown, mudstone, micritic-microcrystalline, microfossils, oolites, tight, no stain, fluorescence or cut.
- 4520'-4530' Limestone. Light brown, packstone, micritic matrix, slightly-very dolomitic, oolites, tight-good oolitic porosity, no stain, fluorescence or cut.
- 4530'-4540' Limestone. Light brown, packstone, micritic matrix, slightly-very dolomitic, oolites, tight-good oolitic porosity, no stain, fluorescence or cut.
Shale. Black, chippy.
Limestone. Light brown, mudstone, microcrystalline, trace light brown chert, tight, no stain, fluorescence or cut.
- 4540'-4550' Limestone. Light brown, mudstone, microcrystalline, trace light brown chert, tight, no stain, fluorescence or cut.
Limestone. Light brown-light gray, packstone, micritic matrix, oolites, shell fragments, no visible porosity, no stain, fluorescence or cut.
- 4550'-4560' No sample log depth 4550'-4565'.
No sample caught before trip.
No circulation before trip.

- 4560'-4570' Limestone. Light gray-light brown, mudstone, micritic, shell fragments, tight, no stain, fluorescence or cut.
- 4570'-4580' Limestone. Light gray-light brown, mudstone, micritic, shell fragments, tight, no stain, fluorescence or cut.
Limestone. Light gray-light brown, packstone, micritic matrix, dolomitized in part, microfossils, oolites, tight-poor porosity, no stain, fluorescence or cut.
- 4580'-4590' Limestone. Light gray-light brown, packstone, micritic matrix, dolomitized in part, microfossils, oolites, tight-fair vuggy porosity, sparry calcite vug filling, no stain, fluorescence or cut.
Dolomite. White, microsugrosic-crystalline, chalky, tight, limy, no stain, fluorescence or cut.
- 4590'-4600' Dolomite. White, microsugrosic-crystalline, chalky, tight, limy, no stain, fluorescence or cut.
Limestone. Light grayish brown, mudstone, micritic, microfossils, tight, no stain, fluorescence or cut.
- 4600'-4610' Limestone. Light grayish brown, mudstone, micritic, microfossils, tight, no stain, fluorescence or cut.
Limestone. Light grayish brown, wackestone-packstone, micritic matrix, oolites, microfossils, no visible porosity, no stain, fluorescence or cut.
- 4610'-4620' Limestone. Light gray-brown, mudstone, micritic-microcrystalline, tight, no stain, fluorescence or cut.
- 4620'-4630' Limestone. Light gray-brown, mudstone, micritic-microcrystalline, trace pyrite, microfossils, tight, no stain, fluorescence or cut.
- 4630'-4640' Limestone. Light gray, wackestone-packstone, dolomitic matrix, oolites, microfossils, tight-poor visible porosity, no stain, fluorescence or cut.

4640'-4650' Limestone. Light gray, wackestone-packstone, dolomitic matrix, oolites, microfossils, tight-poor visible porosity, no stain, fluorescence or cut.
Shale. Dark gray, chippy, calcareous.

Top Marmaton 4650' (-693)

4650'-4660' Limestone. Gray-dark gray, mudstone, micritic, pyrite, argillaceous, no stain, fluorescence or cut.

Limestone. Light brown-dark gray, mottled, wackestone, micritic, dolomitic in part, argillaceous in part, shell fragments, microfossils, tight, no stain, fluorescence or cut.

4660'-4670' Limestone. Gray-dark gray, mudstone, micritic, slightly-very argillaceous, tight, no stain, fluorescence or cut.
Shale. Dark gray-black, chippy-splintery.

4670'-4680' Limestone. Gray-dark gray, mudstone, micritic, slightly-very argillaceous, tight, no stain, fluorescence or cut.
Limestone. Light brown, mudstone-wackestone, micritic, oolites, microfossils, tight, no stain, fluorescence or cut.

4680'-4690' Limestone. Dark gray, mudstone, micritic, very argillaceous, pyritic, tight, no stain, fluorescence or cut.
Limestone. Light brown, mudstone, micritic, oolites, microfossils, tight, no stain, fluorescence or cut.

4690'-4700' Limestone. Dark gray, mudstone, micritic, very argillaceous, tight, no stain, fluorescence or cut.
Trace shale black, chippy.
Limestone. Light grayish brown-brown, mudstone, packstone, micritic matrix, oolites, shell fragments, microfossils, tight, no stain, fluorescence or cut.

- 4700'-4710' Limestone. Light grayish brown-brown, mudstone, packstone, micritic matrix, oolites, shell fragments, microfossils, tight, no stain, fluorescence or cut.
- 4710'-4720' Limestone. Light grayish brown-brown, mudstone, packstone, micritic matrix, oolites, shell fragments, microfossils, tight, no stain, fluorescence or cut.
Limestone. Gray-dark brown, mudstone, micritic, slightly argillaceous in part, tight, no stain, fluorescence or cut.
Limestone. Gray-dark gray, mottled, mudstone-wackestone, micritic, slightly argillaceous, shell fragments, oolites, tight, no stain, fluorescence or cut.
- 4720'-4730' Limestone. Gray-dark gray, mottled, mudstone-wackestone, micritic, slightly argillaceous, shell fragments, oolites, tight, no stain, fluorescence or cut.
Trace shale dark gray-black, chippy.
- 4730'-4740' No sample log depth 4728'-4741'.
No circulation before trip.
- 4740'-4750' Limestone. Gray-brownish gray, mudstone, micritic, argillaceous, tight, no stain, fluorescence or cut.
Limestone. Light gray-gray, mudstone, micritic, argillaceous, slightly dolomitic in part, tight, no stain, fluorescence or cut.
- 4750'-4760' Limestone. Light gray-gray, mudstone, micritic, argillaceous, slightly dolomitic in part, tight, no stain, fluorescence or cut.
Siltstone. Gray, salt and pepper, very argillaceous.
Limestone. Light gray, mudstone, micritic-microcrystalline, trace pyrite, tight, no stain, fluorescence or cut.
- Top Cherokee 4760' (-803)
- 4760'-4770' Shale. Black, chippy-splintery.
Limestone. Brown-dark brownish gray, mudstone, micritic, slightly argillaceous, shell fragments, tight, no stain, fluorescence or cut.

- 4770'-4780' Limestone. Brown-dark brownish gray, mudstone, micritic, slightly argillaceous, shell fragments, tight, no stain, fluorescence or cut.
Shale. Dark gray-black, splintery, micaceous.
Limestone. Grayish brown-brown, mudstone, micritic, trace microfossils, trace pyrite, tight, no stain, fluorescence or cut.
- 4780'-4790' Limestone. Grayish brown-brown, mudstone, micritic, trace microfossils, trace pyrite, tight, no stain, fluorescence or cut.
- 4790'-4800' Limestone. Gray-brown-dark grayish brown, black chert, mudstone, micritic, trace microfossils, trace pyrite, tight, no stain, fluorescence or cut.
Shale. Dark gray-black, splintery.
- 4800'-4810' Limestone. Light gray, mudstone, micritic, argillaceous, dolomitic, microfossils, tight, no stain, fluorescence or cut.
- 4810'-4820' Shale. Dark gray-black, chippy-blocky.
Limestone. Gray-dark gray-dark brownish gray, mudstone, micritic, shell fragments, trace microfossils, tight, no stain, fluorescence or cut.
- 4820'-4830' Limestone. Gray-dark gray-dark brownish gray, mudstone, pyritic, micritic, shell fragments, trace microfossils, tight, no stain, fluorescence or cut.
- 4830'-4840' Limestone. Gray-dark gray-dark brownish gray, mudstone, pyritic, micritic, shell fragments, trace microfossils, tight, no stain, fluorescence or cut.
Shale. Black, blocky.
- 4840'-4850' Shale. Gray-dark gray, argillaceous, calcareous in part.
Siltstone. Gray, salt and pepper, very argillaceous.
Shale. Black, chippy-blocky.
- 4850'-4860' Limestone. Gray-dark gray, mudstone, micritic, slightly argillaceous, trace microfossils, tight, no stain, fluorescence or cut.

- 4860'-4870' Limestone. Gray-dark gray, mudstone, micritic, slightly argillaceous, trace microfossils, tight, no stain, fluorescence or cut.
Shale. Dark gray-black, chippy, micaceous.
- 4870'-4880' Limestone. Brown-gray-dark gray, mudstone, micritic, light gray and brown chert, tight, no stain, fluorescence or cut.
- 4880'-4890' Limestone. Light brown, mudstone, micritic, dolomitic in part, trace microfossils, no visible porosity, no stain, fluorescence or cut.
Limestone. Light gray-gray, mudstone, micritic, slightly argillaceous, tight, no stain, fluorescence or cut.
- 4890'-4900' Limestone. Light gray-gray, mudstone, micritic, slightly argillaceous, tight, no stain, fluorescence or cut.
- 4900'-4910' Limestone. Light gray-gray, mudstone, micritic, slightly argillaceous, tight, no stain, fluorescence or cut.
Shale. Dark gray-black, chippy-splintery, micaceous.
Limestone. Light gray, mudstone, micritic, slightly argillaceous and silty in part, tight, no stain, fluorescence or cut.
- 4910'-4920' Shale. Black, blocky, micaceous.
Limestone. Gray-dark gray, mudstone, micritic, slightly-very argillaceous, trace microfossils, trace pyrite, tight, no stain, fluorescence or cut.
- Top Atoka 4920' (-963)
- 4920'-4930' Shale. Black, splintery, micaceous.
Limestone. Dark gray, mudstone, micritic-microcrystalline, very argillaceous, tight, no stain, fluorescence or cut.
- 4930'-4940' Limestone. Gray-dark gray, mottled, mudstone, micritic, slightly argillaceous, microfossils, tight, no stain, fluorescence or cut.
Shale. Dark gray-black, laminated, chippy-blocky.

- 4940'-4950' Shale. Dark gray-black, laminated, chippy-blocky.
Limestone. Gray-brownish gray, mudstone, micritic, microfossils, tight, no stain, fluorescence or cut.
- 4950'-4960' Limestone. Gray-brownish gray, mudstone, trace pyrite, micritic, microfossils, tight, no stain, fluorescence or cut.
Shale. Dark gray, chippy.
- 4960'-4970' Limestone. Gray-brownish gray, mudstone, trace pyrite, micritic, microfossils, tight, no stain, fluorescence or cut.
Limestone. Light gray-light brown, mudstone, micritic, microfossils, tight, no stain, fluorescence or cut.
- 4970'-4980' Limestone. Light gray-light brown, mudstone, micritic, microfossils, tight, no stain, fluorescence or cut.
Shale. Dark gray, splintery, trace pyrite.
Limestone. Light gray-dark gray, mudstone, micritic-microcrystalline, argillaceous, trace pyrite, tight, no stain, fluorescence or cut.
- 4980'-4990' Limestone. Light gray-dark gray, mudstone, micritic-microcrystalline, argillaceous, trace pyrite, tight, no stain, fluorescence or cut.
Shale. Dark gray-black, chippy, micaceous.
- 4990'-5000' Shale. Dark gray-black, chippy, micaceous.
Limestone. Very light gray, mudstone, micritic, argillaceous, silty, tight, no stain, fluorescence or cut.
Limestone. Light brown, mudstone, micritic-microcrystalline, tight, no stain, fluorescence or cut.
- 5000'-5010' Limestone. Light brown, mudstone, micritic-microcrystalline, tight, no stain, fluorescence or cut.
Shale. Gray-black, blocky, micaceous.
Shale. Dark gray, siliceous, chippy.
Limestone. Gray, mudstone, micritic, argillaceous, trace pyrite, tight, no stain, fluorescence or cut.

- 5010'-5020' Limestone. Gray, mudstone, micritic, argillaceous, trace pyrite, tight, no stain, fluorescence or cut.
- 5020'-5030' Limestone. Gray, mudstone, micritic, argillaceous, trace pyrite, microfossils, tight, no stain, fluorescence or cut.
Shale. Dark gray, blocky, micaceous.
Shale. Black, splintery.
- 5030'-5040' Limestone. Gray-dark gray, mudstone, micritic, argillaceous, trace pyrite, microfossils, tight, no stain, fluorescence or cut.
Limestone. Light gray-gray, mudstone, micritic-microcrystalline, argillaceous, black chert with white polka dots, tight, no stain, fluorescence or cut.
- 5040'-5050' Limestone. Light gray-gray, mudstone, micritic-microcrystalline, pyritic, argillaceous, black chert with white polka dots, tight, no stain, fluorescence or cut.
Shale. Dark gray-black, chippy.
- 5050'-5060' Limestone. Light brown-light grayish brown, mudstone, micritic, pyritic, microfossils, tight, no stain, fluorescence or cut.
Limestone. Gray, mudstone, micritic, very argillaceous, pyritic, tight, no stain, fluorescence or cut.
- 5060'-5070' Limestone. Gray-dark gray, mudstone, micritic, very argillaceous, pyritic, tight, no stain, fluorescence or cut.
Siltstone. White, very argillaceous, calcareous.
Shale. Black, chippy-splintery.
- Top Morrow Shale 5068' (-1111)
- 5070'-5080' Shale. Dark gray-black, splintery-chippy, coaly in part.
Coal. Black, vitreous.

- 5080'-5090' Shale. Dark gray-black, splintery-chippy, coaly in part.
Coal. Black, vitreous.
Limestone. Very light gray-light brown, mudstone, micritic, argillaceous in part, shell fragments, tight, no stain, fluorescence or cut.
- 5090'-5100' Shale. Dark gray, splintery-blocky, laminated and micaceous in part.
- 5100'-5110' Shale. Gray-dark gray, chippy, micaceous, trace pyrite.
Trace shale, dark gray, waxy.
- 5110'-5120' Shale. Gray-dark gray, trace black, splintery, micaceous, trace sandy, pyritic.
Shale. Greenish gray, waxy and pyritic in part.
- 5120'-5130' Shale. Greenish gray, waxy and pyritic in part.
Shale. Light gray-gray, blocky, silty-sandy, trace carbonaceous fragments, occasional lithic grains.
- 5130'-5140' Shale. Light gray-gray, blocky, silty-sandy, sandiness increases with depth, trace carbonaceous fragments, occasional lithic grains.
- 5140'-5150' Shale. Light gray-gray, blocky, silty-sandy, sandiness increases with depth, trace carbonaceous fragments, occasional lithic grains.
Shale. Dark gray, splintery.
Siltstone. Light gray-gray, salt and pepper, sandy, very argillaceous.
- 5150'-5160' Siltstone. Light gray-gray, salt and pepper, sandy, very argillaceous, carbonaceous partings, abundant pyrite.
Sandstone. White gray, very fine grain-medium grain, subangular-subrounded, poorly sorted, very argillaceous in part, glauconitic and pyritic in part, no visible porosity, no stain, fluorescence or cut.

5160'-5170' Sandstone. White gray, very fine grain-medium grain, subangular-subrounded, poorly sorted, very argillaceous in part, glauconitic and pyritic in part, no visible porosity, no stain, fluorescence or cut.
Shale. Dark gray, laminated, splintery.
Sandstone. White-clear, very fine grain-coarse grain, subangular-subrounded, poorly sorted, occasional chert clasts, 75% loose grains, siliceous in part, calcareous in part, no visible porosity in clusters, no stain, fluorescence or cut.

Top V-7 Sand 5166' (-1209)

5170'-5180' Sandstone. White-clear, white clay filling in part, very fine grain-coarse grain, subangular-subrounded, poorly sorted, occasional chert clasts, 75% loose grains, siliceous in part, calcareous in part, estimate tight-fair porosity, no stain, fluorescence or cut.

5180'-5190' Sandstone. White-clear, white clay filling in part, very fine grain-coarse grain, subangular-subrounded, poorly sorted, occasional chert clasts, 75% loose grains, siliceous in part, calcareous in part, estimate tight-fair porosity, no stain, fluorescence or cut.
Shale. Greenish gray, slightly waxy.
Shale. Dark gray-dark grayish green, splintery.

Top Lower Morrow 5190' (-1233)

5190'-5200' Limestone. Buff-light brown, mudstone-wackestone, micritic, microfossils, oolites, tight, no stain, fluorescence or cut.

5200'-5210' Limestone. Buff-light brown, mudstone-wackestone, micritic, trace bryozoa, slightly dolomitic, microfossils, oolites, tight, no stain, fluorescence or cut.

5210'-5220' Limestone. Buff-light brown, mudstone-wackestone, micritic, microfossils, oolites, tight, no stain, fluorescence or cut.

- 5220'-5230' Limestone. Buff-light brown, mudstone-wackestone, micritic, trace pyrite, microfossils, oolites, tight, no stain, fluorescence or cut.
- 5230'-5240' Limestone. Buff-light brown, mudstone-wackestone, micritic, trace pyrite, shell fragments, dolomitic in part, microfossils, oolites, tight, no stain, fluorescence or cut.
Shale. Dark gray-gray, splintery.
Limestone. Light brown-brown, wackestone-packstone, microcrystalline matrix, shell fragments, tight, no stain, fluorescence or cut.
- 5240'-5250' Limestone. Light brown-brown, wackestone-packstone, microcrystalline matrix, shell fragments, tight, no stain, fluorescence or cut.
Shale. Dark chocolate brown-dark gray, waxy.
Limestone. Light brown-brown, mudstone, micritic, microfossils, tight, no stain, fluorescence or cut.
- 5250'-5260' Limestone. Light brown-brown, mudstone, micritic, microfossils, tight, no stain, fluorescence or cut.
Sandstone. White, very fine grain-medium grain, subrounded, moderate sorting, very calcareous, tight, no stain, fluorescence or cut.
Limestone. Grayish brown-brown, mudstone, micritic, shell fragments, looks fractured, tight, no stain, fluorescence or cut.

Top St. Genevieve 5254' (-1297)

- 5260'-5270' Limestone. Grayish brown-brown, mudstone, micritic, shell fragments, looks fractured, tight, no stain, fluorescence or cut.
Shale. Dark gray, splintery, waxy in part.
Sandstone. White, fine grain-medium grain, subrounded, moderate sorting, very calcareous, tight, no stain, fluorescence or cut.
- 5270'-5280' Sandstone. White, fine grain-medium grain, subrounded, moderate sorting, very calcareous, tight, no stain, fluorescence or cut.
Shale. Gray-greenish gray, splintery.
Limestone. Buff-grayish brown, mudstone, micritic, light gray chert, tight, no stain, fluorescence or cut.

- 5280'-5290' Limestone. Buff-grayish brown, mudstone, micritic, light gray chert, tight, no stain, fluorescence or cut.
Limestone. Buff-light brown, conglomeratic, chert and limestone clasts in microcrystalline matrix, tight, no stain, fluorescence or cut.
Shale. Dark greenish gray-gray, splintery.
- 5290'-5300' Shale. Dark greenish gray-gray, splintery.
Sandstone. White-light brown, very fine grain-medium grain, subrounded, moderate sorting, chert grains, no visible porosity, very calcareous, no stain, fluorescence or cut.

RECOMMENDATION:

No sample shows were observed in any horizon in this well. Gas shows were recorded in the Morrow section above the objective V-7 Sand. An excellent quality reservoir approximately 10 feet thick was encountered in the V-7 horizon. Because log and sample evaluations in the V-7 are not always conclusive, I recommend that the interval be drill stem tested even though no sample shows were observed and electric logs indicate the zone is probably wet.

Respectfully submitted,

John D. Pruitt/slo

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