H. W. ADDINGTON & ASSOC.

STEINFORD 3351-7-4

NW/NW Sec. 7-33S-51W

Las Animas County, Colorado

JOSEPH R. CLAIR
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WELL SUMMARY

Operator:	H. W. Addington & Assoc.
Well:	Steinford 3351-7-4
Location:	NW/NW Section 7, Township 33 South, Range 51 West, Las Animas County, Colorado.
Field:	Wildcat
Elevation:	5252' Ground, 5263' K.B.
Spudded:	January 6, 1975 at 8:00 A.M. Lost hole at 252'. Skidded rig. Spudded new surface hole January 12, 1975 at 4:30 A.M.
Completed:	Finished drilling January 26, 1975.
Casing:	10 3/4" surface casing set at 344'. Schlumberger found bottom of casing at 332'.
Cores:	None.
Drill Stem Tests:	One. 2412-2834'.
Total Depth:	2834' - Driller. 2828' - Schlumberger.
Testing Co.:	Halliburton.
Mud Logging:	Monaco Engineering, Inc. - Leon Hancock and Don Hardy, Logging Engineers.
Air Equipment:	Ingersoll Rand - Two 1500 CFM Compressors, mist pump and other equipment. - Jim Heinen, Air Engineer.
Logs:	Drilling Time Log - 5' time 352-1770'. 1' time 1774-2834'. Detailed Sample Log - 380' to 2834'. Schlumberger: Dual Induction-Laterolog - 332' to 2828'. Compensated Neutron-Formation Density - 332' to 2828'.
Contractor:	Signal Oilfield Services, Inc. - Rig #8 Buck Taylor - Tool Pusher
Equipment:	Mast: Ideco 96' telescoping derrick - 212,000# capacity with 8' wide, 15' long, 10' high substructure with 3' folding wings. Drawworks: Ideco H-37, Drive-in with double drum. Power: One 8V-71 GMC diesel motor - 250 HP through Allison torque converter. Pump: Gardner-Denver FXK - 14" x 5 1/2" Power: Two 671 GMC diesel engines. Drill Collars: 19 - 6" x 2 1/4" x 30' Drill Pipe: 3 1/2" IF
Status:	Plugged and abandoned January 30, 1975

WELL CHRONOLOGY

H. W. ADDINGTON & ASSOC.
STEINFORD 3351-7-4

NW/NW Sec. 7-33S-51W
Las Animas County, Colorado

Elevation: 5263' K.B.

1975

Jan. 5 Moving in.

Jan. 6 Rigging up. Spudded at 8:00 P.M. Drilled 15" hole using Ingersoll-Rand air hammer.

Jan. 7 Drilling @ 106' at 8:00 A.M. Pin sheared off bit at 252'. Could not fish out. Preparing to skid rig.

Jan. 8 Waiting on trucks to skid rig.

Jan. 9 Moving rig.

Jan. 10 Moving. Rigging up.

Jan. 11 No report.

Jan. 12 Spudded new surface hole at 4:30 A.M. Drilling @ 50' at 8:00 A.M. Drilled to 352'. Had to cement old hole because of communication.

Jan. 13 Preparing to run surface casing at 8:00 A.M. Surface pipe would not go; hit ledge at 32'. Sent for 17 1/2" hole opener.

Jan. 14 Reamed hole to 17 1/2" to 60'. Went in and cleaned out hole to TD. Ran 11 joints of 32.75#, H40, new Canadian 10 3/4" casing to 344'. While trying to break circulation with air prior to cementing, surface pipe came out of ground 10' then went back to bottom. When hole unloaded there was a back surge which plugged the bottom joint of casing. Pulled casing and cleaned out joint. Ran casing back in hole and cemented with 150 sacks of Halco Liteweight plus 2% calcium chloride and 100 sacks of Class H cement plus 3% calcium chloride.

Jan. 15 Plug down at 12:30 A.M. Geologist out to well. Cement settled to 32' and additional cement was spotted from top. Finished at 6:00 A.M.

Jan. 16 Drilling @ 405' at 8:00 A.M. using air-mud-mist.

Jan. 17 Tripping from 1041' at 8:00 A.M. Started out at 5:00 A.M. Had tight spot at 650'. Back to drilling at 12:20 P.M.

Jan. 18 Drilling @ 1550' at 8:00 A.M. Twisted off at 1774' eleven joints above drill collars at 9:00 P.M.

Jan. 19 Fishing at 8:00 A.M.

1975

Jan. 20 — Milled over fish and caught same. On bank with fish, filling hole with mud at 10:30 A.M.

Jan. 21 — Back to drilling from 1774' at 2:20 A.M. Drilling @ 1850' at 8:00 A.M. Drilling with mud.

Jan. 22 — Drilling @ 2060' at 8:00 A.M.

Jan. 23 — Drilling @ 2300' at 8:50 A.M.

Jan. 24 — Drilling @ 2481' at 8:50 A.M. Trip to check bit at 2496' (11:37 A.M. to 3:55 P.M.) Bit OK. Back to drilling from 2496' at 3:55 P.M.

Jan. 25 — Drilling @ 2611' at 8:45 A.M.

Jan. 26 — Drilling @ 2791' at 8:55 A.M. Drilled to 2834' TD at 4:00 P.M. Circulated 2 hours conditioning hole. Came out to log. Started logging at 11:30 P.M.

Jan. 27 — Got logs at 4:00 A.M. Going in hole with DST #1 at 8:00 A.M. Ran DST from 2412' to 2834' with hook wall test. Geologist left for Denver after tool was opened. After test was pulled it was determined that no formation fluid had been recovered.

Jan. 28 to Jan. 30 — Testing formation. Ran DST tool on drill pipe. Set hook at 2416'. Ran 1" tubing inside drill pipe and connected with compressor. Unloaded hole with air and recovered total of 63 bbls. of fluid. Analysis indicated 10,000 PPM equivalent NaCl, considered to be formation fluid. Well plugged according to instructions from State Plugging Engineer. Completed January 30, 1975.

GEOLOGICAL REPORT

H. W. ADDINGTON & ASSOC.
STEINFORD 3351-7-4

NW/NW Sec. 7-33S-51W
Las Animas County, Colorado

Elevation: 5263' K.B.

The Steinford 3351-7-4 was spudded at 8:00 P.M. on January 6, 1975. At 252' the stem broke off the bit and it was impossible to fish the bit out of the hole, which made it necessary to skid the rig.

The rig was moved some 10' to 15' and a new surface hole was spudded at 4:30 A.M., January 12, 1975. 13 3/4" hole was drilled to 352'. Started to run surface casing, hit ledge at 32' and casing would not go. Reamed surface hole to 17 1/2" with hole opener, then cleaned out to 352'. Ran 11 joints of 32.75#, H40, 10 3/4" casing at 344.21 K.B. measurement. While trying to break circulation with air prior to cementing, surface pipe came out of hole 10' then went back to bottom. When hole unloaded there was a back surge that plugged bottom joint of casing. Casing was pulled out and bottom joint cleaned out, then casing was run back in the hole. It was then cemented with 150 sacks of Halco Liteweight plus 2% calcium chloride and 100 sacks of Class "H" cement plus 3% calcium chloride. Plug was pumped down at 12:50 A.M., January 15, 1975. There was a 32' settling of cement, so hole was filled up from the top. Cementing was completed at 6:00 A.M.

The well went out from under surface about 6:00 A.M., January 16, 1975, drilling with air-mud-mist.

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

Cretaceous System:			
Dakota	-	Behind casing	(No samples or log)
Jurassic System:			
Morrison	-	Behind casing	" "
Wanakah	-	Behind casing	" "
Entrada-Ocate	-	468 (+4795)	
Triassic System:			
Santa Rosa	-	575 (+4688)	
Permian System	-	1049 (+4214)	
Day Creek	-	1154 (+4109)	
Blaine	-	1378 (+3885)	
Glorietta	-	1471 (+3792)	
Stone Corral	-	1820 (+3443)	
Pennsylvanian System:			
Madera Clastics	-	2016 (+3247)	?
Madera Carbonates	-	2095 (+3168)	
Lower Madera Arkose	-	2218 (+3045)	
Morrow	-	2338 (+2925)	
Mississippian System:			
St. Louis	-	2397 (+2866)	
Spergen-Warsaw	-	2472 (+2791)	

Mississippian System (cont'd):			
Osage	-	2586	(+2677)
Kinderhook	-	2661	(+2602) ?
Arbuckle (Jeff City)	-	2685	(+2578)
Roubidoux	-	2742	(+2521)
Total Depth	-	2834	Driller
		2828	Schlumberger

The Steinford 3351-7-4 was the sixth in the 10-well series being drilled in Las Animas County, Colorado, for the Weyerhaueser Company and others.

On the upper markers the Steinford 3351-7-4 was somewhat lower in structural position than anticipated in relation to the State 3251-36-14 and much lower in relation to the State 3252-16-7, particularly in view of its intermediate position between the two tests.

No attempt was made to test the Glorietta in this well, but while hole was open during the fishing job at 1774' there was a slight CO_2 kick (8 units) on the Chromatograph.

After recovering the fish at 1774' it was decided to continue drilling with mud rather than air-mud-mist, so the hole was filled with mud.

The presence of the Stone Corral anhydrite in this well was totally unexpected since this sequence had not been observed in any of the other wells. Also, the presence of the total Pennsylvanian (?) Madera Group was certainly not anticipated since only portions of this formation were found in the State 3251-36-14 and State 3252-16-7.

The well was much higher structurally on top of the Mississippian than was indicated by the upper hole markers (Day Creek, Blaine, Glorietta). The thickness of the Mississippian (288') was much greater than I would have expected this far up on the Sierra Grande Uplift, particularly on the upthrown side of the Freeze-out Creek fault complex. However, the thickness of the St. Louis member (75' in this well) compared to the St. Louis in the State 3251-36-14 (117') is indicative of the sub-aerial erosion which took place on the Uplift.

The Steinford 3351-7-4 penetrated the Arbuckle in the Ordovician (Jefferson City member) as I would have anticipated. However, it was considerably lower structurally than the Boswell & Frates well in Section 2, Township 35 South, Range 52 West. The well was carried to 2834' TD bottoming in Ordovician-Roubidoux.

The hole was then conditioned and Schlumberger Dual Induction-Laterolog and Compensated Neutron-Formation Density Log were run. Log calculations were made by H. W. Delay, the logging engineer. These are included with final log prints and are not repeated here. In summary, the logs indicated positive gas separation throughout most of the Glorietta with porosities ranging from 15% to 20%. The porosities throughout the carbonate section were quite low, which was a disappointment.

After logs were run, decision was made to drill stem test the entire carbonate section. DST #1 was run from 2412' to 2834'. This was a hook wall test with hook set at 2416' and packers at 2412' and 2406'. The tool was opened for an initial flow period of 10 minutes with good blow off bottom of five gallon bucket in one minute. Tool was shut in for 45 minutes and reopened for 45 minutes second flow with good blow off bottom of bucket in three minutes. Blow started decreasing to four inches from bottom in 15 minutes, eight inches in 25 minutes and died in 40 minutes. Tool was closed for 60 minutes second shut in pressure period and test pulled.

Recovery was as follows:

511' of drilling mud.
502' frothy mud progressively gassy.

Pressures were as follows:

Initial Hydrostatic -	1240#	(office corrected)
Final Hydrostatic -	1230#	" "
1st Open Flow (10") -	462#-586#	" "
1st Shut in (45") -	592#	" "
2nd Open Flow (45") -	588#-592#	" "
Final Shut in (60") -	592#	" "

Bottom Hole Temperatore - 101°

Pressures indicated that the hole stabilized during 1st shut in period. Resistivity of the recovered fluid indicated no formation fluid had been recovered. I had been released from the well after the initial 10 minute open period and was not present during remainder of the test.

It was decided to attempt to recover formation fluid with air. One inch tubing was secured from Great Bend, Kansas. DST tool was again run on drill pipe and set on hook at 2416'. One inch tubing was run inside the drill pipe and connected to the compressors. Tool was opened and the hole unloaded through annulus between tubing and inside of drill pipe. After cleaning out all mud, a total of 63 barrels of fluid was blown out the hole, some of it quite gassy. Resistivity check on the fluid indicated 10,000 ppm equivalent sodium chloride and considered to be formation fluid.

The test was then plugged and abandoned according to instructions from the State Plugging Engineer. Plugging was completed January 30, 1975.

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DETAILED SAMPLE LOG

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Elevation: 5263' K.B.

Sample study starts at 380' in Jurrasic (Wanakah).

380-384	Shale, pale green, hard, talcy.
384-391	Limestone, gray, very finely crystalline, dense, some very finely sandy.
391-397	Shale, pale green, gray, hard, talcy.
397-411	Limestone, gray, very finely crystalline, dense, drab, quite argillaceous, little very finely sandy.
411-419	Shale, pale green, gray, green-gray, hard, talcy; with interbedded Limestone, as above.
419-456	Limestone, as above; with interbedded Shale, as above.
456-462	Limestone, gray, brown-gray, very finely crystalline, quite argillaceous, trace very finely sandy.
462-468	Shale, pale green, gray, hard, talcy.
468	Top - ENTRADA-OCATE (+4795)
468-478	Siltstone to very fine Sandstone, red, brown, gray, pink-buff, some micromicaceous, very tight, slightly limey to limey.
478-479	Shale, red-brown, hard.
479-488	Sandstone, gray-white, little red-brown and red, very fine to medium, angular to subrounded, very tight to slightly friable, considerable varicolored grains.
488-489	Shale, brown, red-brown, hard.
489-520	Sandstone, gray-white, pink-red, very fine to medium, angular to subrounded, most loose, some varicolored grains; some coarse, rounded floating grains; some interbedded brown-red, shaly Siltstone; and traces of red, pink-red, very finely crystalline, dense Limestone (probably as nodules).
520-526	Siltstone, brown-red, brown, micromicaceous, some shaly.
526-538	Sandstone, as above; all loose.

538-544 Siltstone, brown-red, red, some micromicaceous, some shaly.

544-560 Sandstone, gray-white, fine to medium, angular to subangular and subrounded, all loose.

560-565 Shale, brown-red; trace red, red-gray, very finely crystalline, dense Limestone (? nodules).

565-575 Sandstone, as above.

575 Top - TRIASSIC (+4688)

575-622 Siltstone to very, very fine Sandstone, brown-red, tight to very friable, very slightly limey, some shaly.

622-624 Shale, brown-red, red, hard.

624-639 Sandstone, brown-red, very very fine to very fine, very tight, slightly limey.

639-644 Shale, chocolate, brown, fairly hard.

644-660 Siltstone to very fine Sandstone, brown-red, micromicaceous, tight.

660-662 Shale, chocolate, brown, brown-red, hard.

662-680 Siltstone to very fine Sandstone, as above; mostly Sandstone 672-80.

680-682 Shale, as above.

682-832 Questionable. Samples extremely poor 600 to 940. Samples are all Shale but electric logs indicate section is mostly Siltstone to Sandstone.

832 Top - SANTA ROSA (+4431)

832-859 Sandstone, chocolate, purple, brown-red, very fine to fine, angular, very tight; quartzitic in part; some very shaly.

859-879 Sandstone, dark purple-red, chocolate, brown-red, very fine to fine, angular to slightly subangular, very tight; quartzitic in part; most very dirty.

879-885 Shale, brown-red, dark chocolate, hard.

885-922 Sandstone, brown-red, chocolate, purple-red, pale orange-buff, very fine to fine, angular to slightly subangular, very tight; quartzitic in part; scattered loose Quartz and Chert grains; very dirty; Shaly 898-913 (conglomeratic in appearance).

922-929 Shale, brown, hard.

929-954 Sandstone, as above; much varicolored; very, very tight and very dirty.

954-1010 Sandstone, dark red, purple-red, and much varicolored, very fine to fine, angular to subangular, very very tight; quartzitic in part; very dirty; conglomeratic in appearance; considerable varicolored, subangular to subrounded, loose quartz grains, particularly toward bottom.

1010-1012 Shale, brown-red, chocolate.

1012-1049 Sandstone, highly varicolored, very fine to medium and some coarse, angular to subangular and subrounded, very tight, dirty; with loose quartz grains, as above; and some interbedded Shale, brown-red and chocolate.

1049 Top - PERMIAN (+4214)

1049-1064 Siltstone to Sandstone, dark orange, orange-brown, very very fine to very fine, micromicaceous, tight.

1064-1102 Siltstone to Sandstone, dark orange, orange-brown, orange, very very fine to very fine, most micromicaceous, very tight; trace interbedded Shale, dark orange-brown; and traces of Dolomite, orange-buff, orange, pink-buff, very finely crystalline, dense (probably as nodules or lentils).

1102-1105 Shale, dark chocolate-brown, hard.

1105-1112 Siltstone to very fine Sandstone, dark orange, orange-brown, orange, most micromicaceous, very tight; trace Dolomite, as above.

1112-1116 Shale, dark chocolate, hard; with some interbedded Siltstone.

1116-1134 Siltstone to Sandstone, dark orange, orange-red, very very fine to very fine and little fine, angular, tight, most micromicaceous.

1134-1138 Shale, dark chocolate, brown-red, hard.

1138-1150 Sandstone, dark orange, orange-red, very very fine to fine, with few medium floating grains, angular to subangular and trace subrounded, very tight, considerable micromicaceous.

1150-1154 Shale, as above.

1154 Top - DAY CREEK (+4109)

1154-1186 Dolomite, pale purple, purple, pink, buff, white, very finely crystalline to finely crystalline, dense to traces of oolicastic and minute vug porosity, considerable silty to very finely sandy.

Note: The abnormal lag in samples for this interval (1st Dolomite in 1180-1200 sample) is due to poor sample catching.

1186-1196 Sandstone, dark orange, orange-red, very fine to fine, angular, very tight.

1196-1197 Shale, dark chocolate, chocolate-red, very hard.

1197-1201 Siltstone, dark orange, orange-brown, micromicaceous.

1201-1214 Shale, as above.

1214-1240 Siltstone to very, very fine Sandstone, dark orange, orange-red, micromicaceous.

1240-1242	Shale, dark orange-brown, chocolate, chocolate-red, very hard, some micromicaceous.
1242-1250	Siltstone to Sandstone, as above.
1250-1254	Shale, brown-red, chocolate, dark brown, very hard.
1254-1264	Siltstone to very, very fine Sandstone, dark orange, orange-red, micromicaceous.
1264-1266	Shale, as above.
1266-1280	Siltstone to very, very fine Sandstone, dark orange, orange-red, dark brown-red, micromicaceous, very tight.
1280-1282	Shale, dark chocolate, chocolate-red, dark brown-red, very hard.
1282-1288	Siltstone to Sandstone, as above; little white, soft Gypsum.
1288-1301	Sandstone, dark orange-brown, dark orange-red, orange, very very fine to very fine, micromicaceous, very tight; traces of white, soft Gypsum.
1301-1355	Siltstone to very, very fine Sandstone, dark orange-brown, dark orange-red, orange, micromicaceous, very tight; with some interbedded Shale, chocolate, brown-red, dark red, red, very hard; traces of white, soft and satiny Gypsum.
1355-1370	Siltstone to Sandstone, dark orange-red, brown-red, dark orange and orange, very very fine to very fine, very tight, most micromicaceous; traces of white, intergranular Gypsum or Clay.
1370-1372	Shale, as above; some red, gypsiferous Shale.
1372-1378	Siltstone to Sandstone, as above.
1378	Top - BLAINE (+3885)
1378-1383	Anhydrite, white, pink, red, very finely crystalline to massive, dense; trace white, satiny Gypsum.
1383-1387	Shale, dark red, red, orange-red, fairly hard; with interbedded Anhydrite, as above.
1387-1401	Anhydrite, white, red, pink, very finely crystalline to massive, very dense; trace white, soft Gypsum.
1401-1402	Shale, as above.
1402-1412	Anhydrite, as above.
1412-1414	Shale, dark red, red, orange-red, fairly hard.
1414-1443	Anhydrite, white, pink, pale purple, massive to slightly crystalline, very dense; traces of white, soft Gypsum; with some interbedded Dolomite, gray, very finely crystalline, dense.

1443-1471 Shale, chocolate, dark red, red, hard.

1471 Top - GLORIETTA (+3792)

1471-1522 Sandstone, pale orange, orange-buff, gray-white, fine to slightly medium, angular to subangular, tight to slightly friable; little medium to slightly coarse, subrounded, floating grains.

1522-1534 Shale, chocolate, dark red, red, hard; with some interbedded Sandstone, as above.

1534-1568 Sandstone, pale orange to gray-white, trace pink, very fine to medium; with few medium to coarse aggregates, angular to subangular and some subrounded, very tight to slightly friable; with considerable intergranular cement.

1568-1599 Shale, chocolate, red, dark red, hard; with interbedded Sandstone, gray-white, pale orange, orange-buff, very fine to medium, angular to subangular and subrounded, very tightly cemented; some with abundant intergranular silica cement; few medium to coarse, subrounded to rounded flating grains; traces of pyrite.

1599-1650 Sandstone, gray-white, pale orange, very fine to medium and some coarse, angular to some subrounded, very tight; with much intergranular cement; some medium subangular to subrounded floating grains; quite dirty toward bottom.

1650-1652 Shale, chocolate, dark red, hard.

1652-1687 Sandstone, dark orange, orange-red, orange, gray-white, very fine to medium; and some coarse, subangular to rounded, floating grains; tight to soft and friable, considerable loose.

1687-1698 Shale, red, dark red, purple, chocolate, hard to soft.

1698-1726 Siltstone to very, very fine Sandstone, dark brown-red, micromicaceous, very very tight, dirty.

1726-1733 Shale, as above.

1733-1747 Siltstone to very, very fine Sandstone, as above.

1747-1748 Shale, as above.

1748-1761 Siltstone to very, very fine Sandstone, dark brown-red, micromicaceous, very tight, dirty.

1761-1771 Shale, dark red, brown-red, red, chocolate; with interbedded Siltstone to Sandstone, as above; with traces of loose Quartz and Granite Wash grains.

1771-1778 Sandstone, orange, orange-red, fine to medium, angular to subangular, very tight; with considerable intergranular Clay; with traces Granite Wash and Quartz Wash fragments.

Note: Twisted off at 1774. Resumed drilling with mud.

1778-1786 Shale, dark brown-red, chocolate, brown, red, hard.

1786-1808 Sandstone, orange, dark red, fine to medium and little coarse, angular to subangular, very tight, some quartzitic, quite dirty; traces of Granite Wash, Quartz Wash, coarse and very coarse, angular to subangular.

1808-1809 Shale, dark red, brown-red, red, chocolate, hard.

1809-1816 Sandstone, dark red, red, orange-red, fine to medium and some coarse grains, angular to subangular, very tight, very dirty, slightly dolomitic; with traces of coarse Quartz Wash, Granite Wash fragments; little white Gypsum.

1816-1820 Shale, brown-red, red, chocolate, dark red, hard, with traces of black, gray-black, gray and green.

1820 Top - STONE CORRAL (+3443)

1820-1828 Anhydrite, purple-gray mottled, gray, white, buff, massive, dense; with some interbedded Dolomite, purple-gray, dark red, very finely crystalline to slightly crystalline, dense to slightly vuggy.

1828-1850 Anhydrite, purple-gray, gray-white, white, very finely crystalline to massive, dense; with interbedded Dolomite, purple, pale purple, purple-red, very finely crystalline, very dense.

1850-1851 Shale, chocolate, brown-red, red, hard.

1851-1876 Siltstone to Sandstone, dark red, brown-red, orange, orange-red, purple-gray, very very fine to fine, angular to slightly subangular, very tight, very dirty, some shaly, slightly dolomitic.

1876-1878 Shale, dark red, red, chocolate, hard, some silty and micromicaceous.

1878-1890 Sandstone, red, orange-red, dark red, very fine to slightly medium, angular to subangular, micromicaceous, tight to friable, dirty; with much intergranular white Clay; slightly dolomitic.

1890-1895 Shale, chocolate, dark red, red, hard; with interbedded Sandstone, as above.

1895-1906 Siltstone to Sandstone, red, dark red, orange, very fine to slightly medium, angular to subangular, some micromicaceous, most dirty, some shaly.

1906-1908 Shale, dark red, brown, chocolate, red, hard, some silty.

1908-1924 Siltstone to Sandstone, as above; more dark red, some dolomitic; trace Quartz Wash and Granite Wash grains.

1924-1926 Shale, chocolate, dark red, red, brown, hard.

1926-1944 Siltstone to Sandstone, red, orange-red, dark red, very very fine to slightly medium, angular to subangular, very tight, very micromicaceous, considerable dirty, some shaly (some Sandstone looks arkose derived); trace Dolomite, red, dark red, very finely crystalline, dense (? nodules).

1944-1945 Shale, as above.

1945-1973 Siltstone to Sandstone, as above; some purple-red.

1973-1975 Shale, chocolate, dark red, red, hard.

1975-2000 Siltstone to Sandstone, orange-red, red, dark red, very very fine to medium and little coarse, angular to subangular, very tight, micromicaceous, some dolomitic, dirty, some shaly; little Dolomite, red, dark red, very finely crystalline to finely crystalline, dense, some shaly and silty (possibly as lentil); trace Arkose and Granite Wash grains.

2000-2001 Shale, chocolate, red, trace red-green, fairly hard.

2001-2013 Siltstone to Sandstone, red, dark red, orange-red, red-gray, trace purple-gray, gray-green, very very fine to medium; with some coarse to very coarse Quartz Wash grains imbedded; angular to subangular, very tight, micromicaceous, some dolomitic; with interbedded Shale, chocolate, brown, dark red 2005-07.

2013-2016 Shale, as above.

2016 Top - PENNSYLVANIAN (MADERA CLASTICS) (+3247) ?

2016-2034 Siltstone to Sandstone, varicolored, very very fine to medium and some coarse, angular to subangular; with considerable imbedded Quartz Wash grains and Quartz fragments, very tight, dirty, slightly to quite dolomitic, some shaly; with traces of Dolomite, red, dark red, purple, buff, very finely crystalline, dense, slightly nodular.

2034-2035 Shale, chocolate, dark red, brown-red, hard.

2035-2058 Siltstone to Sandstone, brown-red, orange-red, red, purple-red, trace gray-green, very very fine to some medium, angular to subangular, tight, micromicaceous, tight, dolomitic, dirty, some shaly; traces of coarse Quartz and Arkose grains; trace Dolomite, as above.

2058-2062 Shale, chocolate, brown, hard.

2062-2089 Siltstone to very fine Sandstone, brown-red, orange-red, purple-gray, traces purple, gray, gray-green, tight, micromicaceous, dolomitic, shaly; with traces of varicolored, coarse to very coarse conglomeratic aggregates.

2089-2095 Shale, dark red, chocolate, red, hard.

2095 Top - MADERA CARBONATES (+3168)

2095-2103 Dolomite, red, dark red, pink, buff and varicolored, very finely crystalline to finely crystalline, dense, some granular, some nodular, some silty and slightly argillaceous.

2103-2122 Siltstone to Sandstone, orange-red, brown-red, dark red; with traces purple-gray, pale gray, brown, pale green, very very fine to little fine, angular, micromicaceous, dolomitic, considerable shaly; with

little Dolomite, red, pink, pale orange, buff, very finely crystalline to very slightly crystalline, dense, some nodular, little silty and some argillaceous; trace Quartz Wash and Arkose grains; traces black and purple metamorphic grains.

2122-2124 Shale, chocolate, dark red.

2124-2153 Siltstone to Sandstone, as above; slightly dolomitic and quite shaly; traces Dolomite, as above.

2153-2155 Shale, as above.

2155-2160 Siltstone to Sandstone, red, dark red, pale green, very very fine to very fine, micromicaceous, tight, shaly, dolomitic; with scattered, imbedded, fine to medium grains; trace Quartz Wash and Granite Wash aggregates.

2160-2163 Shale, red, dark red, chocolate.

2163-2169 Dolomite, red, pink, dark red, buff, very finely crystalline, dense, some nodular, some silty and argillaceous.

2169-2190 Siltstone to Sandstone, red, dark red, very very fine to little fine, angular to subangular, micromicaceous, tight, dolomitic, shaly; traces of scattered Quartz Wash grains.

2190-2192 Shale, red, dark red, chocolate.

2192-2205 Siltstone to Sandstone, as above; more Quartz Wash, Arkose and Feldspar grains.

2205-2207 Shale, as above.

2207-2214 Siltstone to Sandstone, red, dark red, traces pale green, gray-white, very very fine to very fine, micromicaceous, tight, dolomitic, quite shaly; with little Dolomite, dark red, red, pink-buff, gray-white, finely crystalline to slightly crystalline, dense; and little Quartz Wash and Granite Wash aggregates.

2214-2218 Shale, red, dark red, chocolate, hard.

2218 Top - LOWER MADERA ARKOSE (+3045)

2218-2245 Quartz Wash, Arkose Wash and Granite Wash, varicolored, medium to very coarse, angular to subangular, some weathered, most loose.

2245-2250 Shale, dark red, brown-red, chocolate, hard.

2250-2268 Quartz Wash, Arkose, Granite Wash, varicolored, coarse to very coarse, angular to subangular, most loose to very tight, some weathered.

2268-2273 Shale, red, dark red, chocolate, purple.

2273-2278 Quartz Wash, Arkose, Granite Wash, as above; more aggregates are very tight, considerable weathered.

2278-2290 Shale, red, dark red, chocolate and purple; with some interbedded Wash, as above.

2290-2299 Quartz Wash, Arkose, Granite Wash, varicolored, medium to very coarse, angular to slightly subrounded, considerable weathered, most loose; few very tight aggregates.

2299-2300 Shale, dark red, purple, dark purple-red, hard.

2300-2338 Quartz Wash, Arkose, Granite Wash, varicolored, medium to very very coarse, angular to subangular and slightly subrounded, loose to very tightly cemented, some weathered; with considerable interbedded Shale, purple, purple-red toward base.

2338 Top - MORROW (+2925)

2338-2352 Shale, purple, purple-red, purple-gray, gray, gray-green, red, dark red, subwaxy, slightly talcy; with interbedded Quartz Wash and Sandstone, varicolored, fine to very coarse, angular to subangular, tightly cemented to loose 2348-50.

2352-2369 Quartz Wash Sandstone, gray-white and varicolored, coarse to very coarse, very tightly cemented to loose grains; traces of Feldspar and Granite Wash grains.

2369-2386 Shale, purple, purple-red, purple-gray, green, gray, dark red, dark gray, traces of black, subwaxy, talcy and splintery; trace poor coal; with interbedded Quartz Wash Sandstone, as above 2381-83.

2386-2397 Quartz Wash Sandstone, gray-white, gray, with few varicolored grains, medium to very very coarse, angular to subangular, tight to friable, most loose grains.

2397 Top - MISSISSIPPIAN (+2866)

2397-2419 Dolomite, gray-white, buff, gray, and little varicolored, finely crystalline to crystalline, dense to traces of vug porosity; little finely rhombic; some very very finely sandy; with few scattered medium, subrounded sand grains imbedded. trace buff and pale gray, opaque Chert.

2419-2425 Dolomite, purple-red-gray, very finely crystalline to finely crystalline, very dense, very very finely sandy and slightly argillaceous.

2425-2445 Dolomite, white, gray-white, buff, tan, traces of gray and brown, crystalline to very crystalline, dense to little vug porosity; little Chert, red jasperoid, dark red, salmon, orange-red-gray mottled, opaque and semiopaque.

2445-2470 Dolomite, buff, gray-white, tan, brown, gray, crystalline to very crystalline, dense; trace secondary quartz crystals filling vug; traces of Chert, brown, tan-brown, dark red, opaque.

2470 Top - "X" MARKER (+2793)

2470-2472 Shale ? Note: No lithology attributable to this section was found in the samples.

2472 Top - SPERGEN-WARSAW (2791)

2472-2490 Dolomite, buff, white, gray, tan, red-gray and purple-red, very finely crystalline to very crystalline, dense to trace vug porosity, some slightly argillaceous; trace Chert, orange-buff, semitranslucent, quartzose, and purple-buff, tan, opaque and semiopaque; trace secondary quartz crystals in vug.

Note: The Spergen top is not very definitive lithologically in this well

2490-2523 Dolomite, red, purple-red, gray, brown, red-gray, very finely crystalline to finely crystalline, dense, slightly argillaceous and slightly silty; trace brown, semiopaque Chert.

2523-2550 Dolomite, brown, tan, red, red-brown, some mottled, very finely crystalline to slightly crystalline, dense to some very fine vug porosity, some slightly argillaceous.

2550-2564 Dolomite, brown, gray-brown, gray, buff-brown, little dark purple-red, very very finely crystalline to slightly crystalline, dense to slight and poor vug porosity, some slightly argillaceous; trace white, buff-white, gray, opaque, rough, slightly weathered, fossiliferous Chert.

2564-2586 Dolomite, gray, brown, buff, very finely crystalline to slightly crystalline, dense, some argillaceous; little dark purple-red, as above, is quite argillaceous and some silty; traces of Chert, gray-white, buff, opaque, slightly weathered, rough, and gray, opaque and semiopaque.

2586 Top - OSAGE (+2677)

2586-2604 Dolomite, purple-red-gray, pale purple, red, pink, very finely crystalline to slightly crystalline, dense to slight vug porosity, considerable argillaceous and silty; little Chert, white, buff, tan, gray, opaque, some fossiliferous, trace slightly weathered; trace Glauconite.

2604-2620 Dolomite, pale purple-red, pale purple-gray, pale purple, very very finely crystalline to finely crystalline, dense to slight vug porosity, some silty, slightly glauconitic; Chert, white, tan, brown, gray, and varicolored, some mottled, opaque, blocky, rough to smooth, some fossiliferous, some weathered. (40% to 60% Chert in sample.)

2620-2635 Dolomite, pale purple, purple-red, purple-gray, very very finely crystalline to finely crystalline, dense to slight vig porosity, slightly glauconitic; Chert, varicolored, white, gray, tan, some mottled, opaque, blocky, rough to smooth, little weathered; traces of Glauconite. (40% to 70% Chert).

2635 Top - OSAGE SHALE MARKER (+2628)

2635-2639 Shale ? Note: Electrically this is the Osage Shale Marker but no lithology attributable to this zone was found in the samples.

2639-2661 Dolomite, pale purple, purple-gray, gray, very very finely crystalline to very finely crystalline, dense, some very glauconitic; Chert, white, gray, tan, some mottled and little varicolored, opaque, blocky, rough to smooth, little fossiliferous; trace Glauconite in Chert. (Little to 5% Chert.)

2661	Top - KINDERHOOK (+2602) ?
2661-2685	Dolomite, brown and light brown, tan, buff, finely crystalline, dense; Chert, gray, tan-brown, white, gray-buff, opaque and semiopaque.
	Note: The lithology is not typical of the Kinderhook.
2685	Top - ARBUCKLE (JEFF CITY) (+2578)
2685-2719	Dolomite, brown, light brown, tan, buff, finely crystalline to crystalline, dense to slight vug porosity; trace secondary Dolomite crystals in vug.
2719-2742	Dolomite, brown and light brown, finely crystalline to crystalline, dense to trace vug porosity; traces of Chert, gray-brown, mottled, slightly dolomitic, and brown, tan, opaque, oolitic.
2742	Top - ROUBIDOUX (+2521)
2742-2758	Dolomite, gray-buff, gray, gray-white, traces of buff, tan, pink, very finely crystalline to quite crystalline, some granular, little finely sandy; and some scattered imbedded sand grains.
2758-2774	Dolomite, buff, tan, gray, traces white, pink, finely crystalline to quite crystalline, dense to some vug porosity, granular to some rhombic; traces of imbedded sand grains; traces of Chert, white, gray, opaque and semiopaque, trace weathered.
2774-2797	Dolomite, buff to brown, gray, finely crystalline to quite crystalline, dense to slight vug porosity; traces of imbedded secondary crystals from vugs; traces of Chert, white, gray, opaque, semiopaque and semi-translucent.
2797-2834	Dolomite, brown to buff, little gray and pink, very very finely crystalline to finely crystalline, dense to trace vug porosity; little Chert, white, gray, opaque, rough and smooth, some weathered; traces of brown, yellow, gray-white, very finely oolitic, and some tan and brown, semi-opaque Chert.
2834	Total depth - Driller.
2828	Total depth - Schlumberger.

Samples described:

JOSEPH R. CLAIR
(on well)

DRILLING TIME LOG

H. W. ADDINGTON & ASSOC.
STEINFORD 3351-7-4

NW/NW Sec. 7-33S-51W
Las Animas County, Colorado
Elevation: 5263' K.B.

Five foot drilling time starts at 352'.

352- 400		5-7-5-5-6-4-5-5-5-3	
400- 500	9-5-5-6-5-6-3-4-3-3	5-4-3-3-4-5-2-2-2-6	
500- 600	6-5-4-4-6-5-6-6-6-3	6-6-5-4-6-3-6-7-5-5	
600- 700	4-4-4-6-6-6-7-5-6-5	5-5-8-6-6-7-10-6-7-5	
700- 800	7-8-7-8-7-10-8-6-6-5	5-3-6-6-8-11-15-13-12-13	
800- 900	7-10-10-8-9-11-11-6-9-9	7-7-6-6-6-7-6-6-8-7	
900-1000	6-4-5-2-5-6-7-5	7-8-5-7-5-6-9-6-3-5	
1000-1100	5-7-5-5-6-4-5-5-4-3	7-9-5-6-6-4-8-5-5-7	Losing partial
1100-1200	5-5-3-5-4-3-2-3-6-3	3-5-4-3-3-6-5-7-5-3	returns from 1075.
1200-1300	3-4-3-3-3-3-3-3-3-3	3-3-3-5-3-3-5-2-2-3	
1300-1400	4-2-3-6-4-3-4-4-3-2	3-4-4-4-3-4-7-3-8-6	
1400-1500	6-8-5-6-8-6-8-8-13-5	4-5-3-5-6-6-5-4-4-5	
1500-1600	3-7-5-6-7-3-3-6-4-6	3-4-4-9-4-9-9-8-6-8	
1600-1700	5-5-3-9-7-3-5-6-5-5	10-7-7-2-9-7-5-13-7-11	
1700-1770	8-4-6-5-10-8-9-8-6-2	5-8-9-6	Twisted off 1774.

One foot drilling time 1774-2834 TD.

1774-1780		5-4-5-6-3-5	Drilling with
1780-1800	3-4-2-3-3-2-4-4-3-4	2-3-3-3-4-3-2-3-2-3	straight mud.
1800-1820	2-3-4-3-2-2-3-3-3-4	2-2-2-2-2-2-3-3-2-3	
1820-1840	2-3-2-1-2-2-2-2-2-4	3-2-2-5-8-7-5-2-6-5	
1840-1860	5-6-5-6-4-12-7-7-7-6	5-8-6-7-7-7-5-5-5-5	
1860-1880	4-5-5-4-4-4-5-8-7-3	7-5-9-10-8-7-6-7-8-7	
1880-1900	8-7-7-8-5-8-4-5-6-4	5-5-5-4-5-9-7-6-4-5	
1900-1920	5-5-6-7-7-5-5-7-3-5	5-8-8-7-10-4-5-5-6-8	
1920-1940	4-3-2-4-4-3-3-3-4-9	7-3-4-3-3-7-6-9-9-7	
1940-1960	3-5-4-4-9-11-9-5-4-3	3-4-9-5-4-5-4-4-8-11	
1960-1980	7-9-6-5-9-8-7-5-10-8	5-10-3-6-6-5-5-5-5-10	
1980-2000	14-7-8-5-8-5-4-6-8-10	14-11-11-9-9-11-13-10-9-5	
2000-2020	3-2-4-3-3-7-11-6-5-5	5-5-11-9-12-11-7-8-6-5	
2020-2040	5-6-7-5-7-8-7-10-9-8	11-10-9-7-7-8-8-9-7-6	
2040-2060	8-6-7-8-6-6-7-4-4-4	5-3-5-5-4-5-6-5-7-5	
2060-2080	6-6-6-6-4-3-6-4-5-4	5-5-5-6-8-5-6-5-5-4	
2080-2100	6-7-6-5-3-4-3-4-5-4	4-5-5-5-4-5-4-5-5-4	

2100-2120	5-4-6-4-6-6-7-8-7-6	4-3-4-4-4-5-5-5-6-7	
2120-2140	6-5-6-7-7-7-6-7-7-6	5-6-7-5-8-10-9-8-8-2	
2140-2160	7-8-10-11-8-9-8-6-6-6	7-7-7-7-9-8-8-7-8-7	
2160-2180	8-8-11-11-6-9-8-9-5-6	5-5-6-7-10-9-8-8-8-8	
2180-2200	7-9-9-9-8-8-8-7-6-6	7-7-5-5-5-6-6-6-6-3	
2200-2220	6-5-7-7-7-5-5-5-3-6	5-7-7-4-5-3-3-3-3-4	
2220-2240	6-7-8-6-8-7-4-8-6-7	8-6-7-7-7-7-10-7-10-8	
2240-2260	7-6-5-7-7-3-2-2-5-3	3-2-2-4-6-7-3-4-4-4	
2260-2280	3-4-5-4-5-4-3-2-3-2	3-2-3-3-2-3-5-4-4-4	
2280-2300	8-5-7-6-4-4-2-3-2-3	4-6-7-5-7-7-6-4-6-9	
2300-2320	7-6-8-9-9-5-6-6-6-6	7-6-9-10-8-10-8-7-8-8	
2320-2340	5-9-4-9-5-7-7-4-6-7	7-8-10-11-10-9-5-5-5-7	
2340-2360	7-4-5-5-4-5-6-5-10-5	7-9-6-6-8-7-4-6-4-5	
2360-2380	4-3-4-4-6-5-4-4-3-4	3-4-2-2-5-2-3-6-6-6	
2380-2400	5-8-7-5-7-6-10-7-7-6	4-5-2-3-3-3-5-6-5-4	
2400-2420	8-11-11-5-5-9-10-10-13-9	8-8-9-8-12-10-12-9-8-7	
2420-2440	6-7-5-6-8-11-10-12-13-10	12-9-5-9-10-10-10-12-11-7	Rough 2425-30
2440-2460	2-6-5-9-5-8-7-5-6-7	6-6-7-6-8-6-8-10-8-11	
2460-2480	12-12-6-9-8-8-9-9-9-8	9-8-8-7-7-6-5-8-5-6	
2480-2500	5-7-5-7-7-6-7-8-9-10	8-8-10-10-10-13-4-7-11-11	Trip @ 2496. Check bit - OK.
2500-2520	8-7-9-8-8-8-10-9-7-6	6-9-5-7-7-6-5-6-7-7	
2520-2540	7-8-7-7-8-7-8-8-8-8	8-11-8-7-7-10-9-11-10-8	
2540-2560	9-9-9-7-8-8-9-6-8-7	7-8-7-10-12-11-8-9-8-10	
2560-2580	7-12-8-12-10-6-10-11-9-9	8-10-8-10-8-8-8-7-7-8	
2580-2600	7-8-7-8-5-7-8-7-8-6	8-8-8-7-9-9-7-8-6-9	
2600-2620	8-4-5-3-4-4-4-5-5-7	9-11-7-9-8-8-8-7-9-10	
2620-2640	12-9-9-7-8-10-9-9-8-11	11-8-10-6-6-6-6-9-6-10	
2640-2660	12-11-9-10-13-8-10-9-7-6	8-3-2-5-10-8-8-6-5-10	
2660-2680	6-7-7-5-8-6-6-5-5-5	4-6-6-6-5-8-7-5-7-7	
2680-2700	9-16-7-8-8-7-7-6-6-6	6-4-5-5-6-6-6-6-5-6	
2700-2720	6-8-6-6-8-7-7-6-5-7	5-6-7-5-5-5-3-5-5-6	
2720-2740	5-6-5-7-8-9-4-8-7-7	7-8-8-8-9-10-9-6-11-10	
2740-2760	7-9-7-7-7-10-8-7-7-7	4-5-6-5-8-6-7-8-7-7	
2760-2780	8-7-5-6-5-7-7-6-9-7	6-6-5-5-5-6-6-6-7-5	
2780-2800	5-7-6-5-4-5-7-7-5-8	9-8-7-8-10-10-8-6-9-11	
2800-2820	10-9-8-6-8-10-11-9-10-9	9-9-10-10-10-9-11-11-10-10	
2820-2834	12-9-9-11-7-10-11-11-9-10	10-9-10-9	

2834 Total depth - Driller
2828 Total depth - Schlumberger

BIT RECORD

H. W. ADDINGTON & ASSOC.
STEINFORD 3351-7-4
NW/NW Sec. 7-33S-51W
Las Animas County, Colorado
Elevation: 5263' K.B.

Run No.	Size	Make	Type	Jet Size 1	2	3	Depth out	Feet	Hours	Remarks
1	14 3/4	Sec. Retip	M4NG		open		252	252	11 1/2	Bit lost in hole.
2	13 3/4	Sec. Retip	M4NG		open		352	352	12 1/2	Skid hole.
1	9 7/8	Sec.	M4N		open		1041	689	11 1/2	Bit dull. Drlg w/air-mud-mist
2	9 7/8	Sec.	M4NJ		open		1774	733	15	Bit worn out.
3	7 7/8	HTC	J-33	3/4	3/4	3/4	2834	1060	121	Drlg. w/mud.