

ALU 667359



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SUITE 220, C. A. JOHNSON BLDG.

TABOR B-BLDG.

DENVER 2, COLORADO



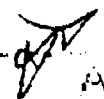
AD 367359

FINAL REPORT ON DRILLING OF
PRESSURE INJECTION DISPOSAL WELL
ROCKY MOUNTAIN ARSENAL
DENVER, COLORADO

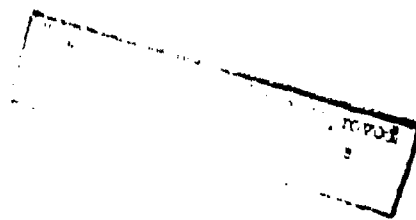
VOLUME II

Chronological Log
Daily Engineering Report

APR 4 1968



Contract DA-25-066-ENG-6033



CHRONOLOGICAL LOG

13 February 1961 Loffland Brothers Company received notice to proceed.

15 February 1961 Dirt Contractor was given working limits of location and commenced operations to construct location.

16 February 1961 Freezing weather hampered dirt work somewhat. Tuboscope Company arrived on location to begin checking tubular goods to be used.

17 February 1961 Tuboscope unable to work due to pipe being frozen. Reserve pit being dug.

19 February 1961 Tuboscope checking pipe. Dirt Contractor preparing location.

20 February 1961 Tuboscope checking pipe. Dirt Contractor preparing location.

21 February 1961 Moving in equipment.

22 February 1961 Water line being ditched

23 February 1961 Water line being ditched.

24 February 1961 Laying water line. Cementing collar.

27 February 1961 Began moving equipment into place.

28 February 1961 Moving equipment into place.

1 March 1961 Began rigging up equipment with all drilling crews working during daylight hours. Rig water line was installed and tested for leaks. The following items were placed: a. Substructure, b. Rotary table, c. Conductor casing, d. Drawworks, and e. Transmission. Due to 12" guide on 17 1/2" reamer, it was decided to drill the first 2,000' to facilitate the 13 3/8" casing, with a 12 1/4" bit. A 12 1/4" bit would also be nearer the i. d. of the 13 3/8" casing than an 11" bit, in drilling out cement. This could eliminate possible future sloughing of the undisturbed sheath of cement that could remain if an 11" bit were utilized.

2 March 1961 Rigging up. The following items were placed:
a. Two rig engines, b. Warning lights on crown,
c. Shale Shaker, d. 3 mud tanks, e. Stand pipe,
f. Mud and Stand-by pump, g. Toolhouse, and
h. Fuel and water tanks.

3 March 1961 Shut down due to bad weather. Snow and moisture
made location too muddy to work. Drill collars
arrived on location.

4 March 1961 Rigging up. Placed: a. Dog house, b. Stairs, c. 3rd
engine, and d. pipe and casing racks. Hardbanding
was put on all drill pipe to be used.

5 March 1961 Rigging up. All drill pipe has been placed on the racks.
The blocks were strung with eight lines, chains in-
stalled in compound, new liners, rods, heads, and
seats installed in pumps. Inspected pin and box end of
all drill pipe for proper facing. Caution Contractor
that mast must be lighted at all time after raising.

6 March 1961 Flange up mud lines, steam lines, etc. Hook up lights
and all electrical wiring.

7 March 1961 Finished flanging up all lines, accepted delivery of 20"
and 13 3/8" casing. Started motors, raised mast and
erected housing.

8 March 1961 Measured mud pits, erecting housing. Crew started on
24-hour per day basis as of 8:00 A. M.

9 March 1961 Finished erecting housing.

10 March 1961 Started mixing spud mud at 1:00 A. M. Tallied 20"
casing total 127.58 feet plus landing joint of 26.80 feet.
Ground level is top of cellar. Ground level to rotary
table 14.30 feet. Ground level to kelly bushing 15.53
feet. Kelly bushing 1.23 feet. Cellar 3' deep.

3:45 A. M. Spud 3:45 A. M. with bit No. 1-12 1/4" DT.

10:45 A. M. T. D. 106'. Pipe tended to stick. Raise mud vis-
cosity to 70 seconds.

4:00 P. M. T. D. 139'. Rig up to ream 24" hole. Finish drilling
12 1/4" hole. Ran Eastco-deviation, 3/4° at 139'.

6:00 P. M. Started reaming 24" hole. Viscosity raised to 130
seconds.

11 March 1961

12:01 A. M. Ream 24" hole.
1:00 A. M. Condition mud. Finish reaming 24" hole to 138.
Halliburton standing by.
2:30 A. M. Welded shoe on 20" casing with 4-3" beads.
3:00 A. M. Run first joint 20" casing.
4:10 A. M. Run second joint 20" casing.
4:50 A. M. Run third joint 20" casing.
5:35 A. M. Run fourth joint 20" casing, no obstructions in hole.
Run landing joint and nipple up cementing equipment.
Total pipe plus landing joint 152.38'
Rotary table to top of landing joint 20.35'
Total pipe in hole 132.03'
Rotary table to ground level 14.30'
Ground level to shoe 117.73'
Plus shoe 2.00
Pipe set at 119.73 G. L.
8:05 A. M. Cement 20" casing with 180 sacks regular cement plus
2% CaCl₂. Circulated 20 sacks and left 24 feet of
cement in pipe.
8:55 A. M. Plug down. Wait on cement at least 18 hours.
9:00 P. M. Nipple up to drill 12 1/4" hole. Cut off 20" casing 1.5
feet above bottom of cellar.

12 March 1961

12:01 A. M. Nipple up to drill 12 1/4" hole (changed rotary tables,
cleaned mud pits, installed blowout preventers).
3:50 P. M. Tested blind rams with 225 psi. Installed a mousehole.
5:05 P. M. Tested pipe rams with 150 psi.
5:15 P. M. Drill cement plug with water. Drilled 21' of cement.
6:00 P. M. Pick up drill collars to drill ahead.
7:20 P. M. Drilling ahead with bit No. 1 RR.
9:30 P. M. Drill to 196'. Run Eastman survey 3/4°.
10:45 P. M. Drill to 246'. Run Eastman survey 0°, drilling ahead.

13 March 1961

12:01 A. M. Drilling at 325'.
12:30 A. M. Run Eastman at 370', 1 1/2°. Checked this reading on
trip out 1/2°.
12:35 A. M. Cleaning out plugged flowline.
1:15 A. M. Flowline open, drill ahead at 385'.
3:15 A. M. Drill to 440', run Eastman 1/4°.
4:45 A. M. Drill to 500', run Eastman 1/2°.
5:20 A. M. Drill to 506'.

13 March 1961 (Continued)

6:15 A. M. Drill to 569', clutch on drawworks heating up. Shut down for repairs.
9:15 A. M. Work on transmission clutch 3 hours, completed. Valve on mud line washed out. Drilling ahead.
9:50 A. M. Eastman at 599' 1/2°.
10:15 A. M. Putting clamp on standpipe.
10:55 A. M. Drilling ahead.
11:35 A. M. Eastman at 660' 1/2°.
11:55 A. M. Drilling ahead.
1:45 P. M. Eastman at 820' 3/4°.
2:10 P. M. Drilling ahead.
3:00 P. M. Shut down to work on low clutch.
4:50 P. M. Drilling ahead at 946'.
5:25 P. M. Clean flowline plugged with shale.
6:05 P. M. Drilling ahead.
8:15 P. M. Eastman 3/4° at 1090'.
8:30 P. M. Drilling ahead. Clutch on drawworks hot.
9:15 P. M. Shale shaker plugged.
11:30 P. M. Drilling ahead at 1135'.

14 March 1961

12:01 A. M. Drilling ahead at 1145'.
12:30 A. M. Condition mud to prevent balling up. Drilling ahead.
4:00 A. M. Eastman 3/4° at 1300'.
4:15 A. M. Drilling ahead.
6:15 A. M. Eastman 1/2° at 1481'.
6:30 A. M. Trip out.
7:30 A. M. On bank with bit No. 1 RR. Repair air hose. Pick up 4-7" drill collars.
9:25 A. M. Start in hole with bit No. 2, 12 1/4" YT-3.
10:20 A. M. On bottom, drilling ahead.
2:20 P. M. Eastman 1/4° at 1756'.
2:40 P. M. Drilling ahead.
6:00 P. M. Eastman 1/4° at 2007'.
6:30 P. M. Drilling ahead.
7:00 P. M. T. D. 2030'. Circulating and condition mud.
7:30 P. M. Pull 5 stands for short trip, 12' fill-up.
8:40 P. M. Condition mud.
9:45 P. M. Trip out to log.
11:00 P. M. On bank with bit No. 2, rig up to run logs.
11:30 P. M. Log stopped at 800'.
11:40 P. M. Trip in to condition mud. Driller's strap on trip out 2031.23'.

15 March 1961

12:01 A.M. Tripping into hole.
1:10 A.M. Mix mud and circulate.
4:00 A.M. Trip to log.
5:30 A.M. Sonde hit bridge at 115'.
6:00 A.M. Trip in to condition hole.
7:00 A.M. Hit bridge at 320'.
7:20 A.M. Circulate and condition mud, on bottom.
11:30 A.M. Trip out to log drilled tight spots at 1280' and 800'.
1:40 P.M. Rig up to run logs, hit bridges at 1065', 1080' and 1160'.
2:30 P.M. Trip in hole to drill bridges, hit bridges at 1280' and 1360', reamed 1280-1360. Hit bridge at 1980'.
5:10 P.M. Circulate hole, 8' of fill-up.
6:00 P.M. Trip out to log.
7:00 P.M. On bank with drill pipe, no bridges, to run logs.
9:00 P.M. Rig up to ream, have run IES & micrologs.

16 March 1961

12:01 A.M. Rig up to ream.
2:00 A.M. Trip into hole.
2:45 A.M. Ream 12 1/4" hole to 17 1/2".
3:15 A.M. Repair rig, gear box heating.
3:30 A.M. Resume reaming, mixing mud.
10:10 A.M. Repair high clutch.
11:00 A.M. Ream to 910'.
5:45 P.M. Shut down to repair mud valve.
7:00 P.M. Resume reaming.
10:00 P.M. Trip for new reamer. Reamed to 1200'.
11:00 P.M. On bank with reamer. Pick up 3 more drill collars.
Trip back in hole.

17 March 1961

12:01 A.M. Repairing mud lines.
12:50 A.M. Reaming ahead. Driller reports hole tight all the way.
3:15 A.M. Flowline plugged.
5:25 A.M. Resumed reaming. Bit tends to ball up with low volumes.
10:05 A.M. Split compound put #1 engine on rotary. 1050 rpm on engine gives 210 rpm on rotary. #2 and #3 engines on pumps at 850 rpm gives #1 pump 48 spm; #2 pump 62 spm, 900 psi.
10:10 A.M. Resumed reaming.
10:55 A.M. Ream to 1650'.
1:40 P.M. Reamed to 1746', shut down to jet shale pits.

17 March 1961 (Continued)

2:10 P. M. Resume reaming.
2:35 P. M. Lost prime on pump.
2:40 P. M. Resumed reaming.
7:35 P. M. Reamed to T. D. 2031'. Began circulating mud.
9:00 P. M. Trip out, tight 1st 8 stands, free rest of way, strap pipe 2031.63'.
10:40 P. M. Trip in. Put kelly on at 1700. Broke circulation, resume trip in.

18 March 1961

12:01 A. M. Trip in.
1:10 A. M. Mix mud, condition hole.
2:00 A. M. Short trip 8 stands. Tight 1st 3 stands; 3 places on 5th stand; pulled 15-20,000 on 6th stand 30'.
2:55 A. M. Circulate, condition mud.
4:00 A. M. Trip out, rig up to run casing.
7:30 A. M. Run 63 joints 13 3/8" casing. Torque to 6250 ft. lbs.
22 joints J-55 bottom 707.5'
26 joints H-40 middle 807.4'
15 joints J-55 top 484.6'
Total casing 1999.5'
Hole tight 11 joints off bottom, working.
4:00 P. M. Landed casing. Rig up to circulate.
Total pipe 199.54
Guide shoe 1.80
Baffle collar 1.63
2002.97
1.60 Depth from top cellar
Pipe set at 2004.57' Below top of cellar
Centralizers at 15', 94', 185' above casing shoe
4:25 P. M. Circulate hole.
5:50 P. M. Drop wiper plug.
6:00 P. M. Pump 25 barrels water.
6:15 P. M. Pump 1450 sks. cement; 280 bbls. at 5 bbls./min. for 56 min.
7:12 P. M. Displace plug
7:18 P. M. 66 spm equals 13.3 bbls./min.
7:29 P. M. Got returns, circ. press. 900 psi.
7:35 P. M. Rig pump out. Pumped 17 min. at 13.3 Bbls./min. = 226 bbls. Began displacing with Halliburton pumps.

18 March 1961 (Continued)

7:55 P. M. Pump Halliburton 123 bbls.
Total Disp. 312
123
189 ÷ 17 = 11.1 bbls./min.
5 x 11.1 = 55.5 bbls. Rig pump
125 bbls. Halliburton
180.0 bbls. x 5 = 900 sks. cement
circulated to surface.

To wait on cement 36 hours.

19 March 1961

12:01 A. M. Nippling up casing head equipment while waiting on cement.

20 March 1961

12:01 A. M. Wait on cement.
8:00 A. M. End of waiting on cement time. Shut down due to rig repairs. General rig cleanup while waiting on parts.

21 March 1961

12:01 A. M. Shut down for rig repairs. General rig cleanup while waiting on repairing rig.

22 March 1961

12:01 A. M. Shut down for rig repairs. General rig cleanup while waiting on repairing rig.

23 March 1961

12:01 A. M. Shut down for repairing rig.
5:30 P. M. Completed rig repairs. Pick up drill collars. Shut down for repairs 8 1/2 hrs - 3.4 days.
9:45 P. M. Put on joint of drill pipe and kelly and displaced 70' mud with water.
10:00 P. M. Closed pipe rams on joint of drill pipe and attempted to pressure up.
10:25 P. M. Pressured up on pipe rams to 1000# and seemed to hold. Checked in cellar for leaks. Found leak in flange on BOP due to missing stud. Replaced missing stud. Also found leak in 4" valve on choke line. Repairing valve and tightening all bolts on tree.

24 March 1961

12:01 A. M. Repairing valve on choke line.
12:30 A. M. Found valve threads fouled and they stripped threads on replacement part. Crew is now attempting to locate another valve and replace faulty choke line valve. Did not have to replace valve. The fouled threads in the valve were repaired and new plug inserted. Repairs completed at 2:00 A. M.

2:00 A. M. Pressured up on pipe rams to 1000# and held for 30 min. No visible leaks in cellar equipment or blowout preventers. No leak from top of rams. There was a slight leak from stem of 4" valve on No. 1 pump. Test completed at 2:30 A. M. Lost 50# during test.

2:40 A. M. Shut Hydril on kelly and pressured to 1000#. Slight leak on blowout line valve. Released pressure and opened and closed fouled valve a few times to clean it out.

3:04 A. M. Shut Hydril on kelly and pressured to 1000#. Slight leak in blowout line valve but less than before. No visible leak in Hydril or Hydril-BOP flange. There were 2 good sized leaks in 2-4" valves just off No. 1 pump. Completed test at 3:14 A. M. Lost 175# in 10 minutes.

3:15 A. M. Tightened 2-4" valves on pump No. 1.
3:26 A. M. Pressured up on Hydril, closed on kelly. Held for 10 minutes. Lost less than 25#. Still have slight leak from blowout line valve. Bled off pressure at 3:36 A. M.

3:40 A. M. Started out of hole.
5:00 A. M. Finished trip out of hole. Closed blind rams and started to pressure up but had leak in stand pipe valve. Had stand pipe valve replaced by 5:45 A. M.

5:45 A. M. Pressured up on blind rams to 1000#. Held for 10 minutes. Have slight leak in blowout line valve, 4" pump valve, and stand pipe valve. Lost 25# in 10 minutes. No leak through blind rams.

5:55 A. M. Closed Hydril on self and began to pressure up. Test failed. Bled fluid level in hole down to see Hydril.

6:00 A. M. Closed Hydril on self. Saw approximate 2" opening in center of Hydril rubber.

6:15 A. M. Prepared to run in hole to drill cement with bit No. 3-11", OSC3J, with 3-1/2" nozzles.

6:45 A. M. Started in hole; ran 6 - 8" drill collars and 9 - 7" drill collars in string.

9:20 A. M. Start drilling cement at 1980'. Cement firm.
9:40 A. M. Shut down to repair leaky valve on choke line for positive test.

24 March 1961 (Continued)

10:30 A. M. Pressure to 1025 held 30 minutes. Test okay.
11:00 A. M. Resume drilling cement to 5' below shoe.
3:00 P. M. Drilled cement, pressured up to 475#.
3:30 P. M. Held pressure 30 minutes. Held okay. Displacing water prior to mixing mud in order to avoid the use of contaminated water in the preparation of the drilling mud.
5:00 P. M. Preparing drilling fluid with driscose and condet. Figured total cumulative repairs according to Contract through 23 March 1961:
Total time paid for by Government 10 hrs.
Total time sustained by Contractor 81 hrs.
7:30 P. M. T. D. 2033' (driller). Finished mixing mud. Started drilling with 24,000# on bit at 94 rpm. Pump pressure 600#.
8:30 P. M. Check on mud showed:
Density 8.4 #/gal. Filter cake Nil
Viscosity 34 Sec. pH 11.5
Plastic Vis. 6 cp. Yield 1
Water loss 10.4 cc. Cl 400 ppm
11:00 P. M. T. D. 2222'. Ran Eastman survey at 2205', 0°.
11:30 P. M. T. D. 2222'. Resumed drilling after survey.

25 March 1961

12:01 A. M. T. D. 2252'. Mud checks out all right. Made connection and found union on mud line leaking. Changed out bad union. Down from 12:01 to 12:45 A. M.
12:45 A. M. T. D. 2252'. Resumed drilling.
3:00 A. M. T. D. 2384'. Leak in mud line at pump No. 1. Switched to pump No. 2. Resumed drilling at 3:05 A. M.
7:50 A. M. Drilled to 2629'. Ran the Eastman survey 1/4° and started out of the hole for a new bit. Hole tight. Swabbed some mud for 2 1/2 stands. Hole tight for 6 stands. Bit #3 made 599' in 11 hours to run average penetration rate of 54.5 ft./hr. Bit teeth were medium dull, bearings were green. Run bit #4, OSC-3J, with 1 13/32" nozzle and 2 - 14/32" nozzles.
11:30 A. M. On bottom drilling, 23' fill-up.
1:10 P. M. Shut down to repair mud line at 2,769'.
1:50 P. M. Drilling mud viscosity 37 sec., water loss 6.6 cc's.
6:15 P. M. Survey at 3098'. 1/4° deviation.

25 March 1961 (Continued)

6:45 P.M. Drilling ahead.
7:30 P.M. T.D. 3156'. Mud check:
Viscosity 35 Sec. Filter cake 1/32"
Weight 9.2 #/gal. pH 8.5
Water loss 7.2 cc. Cl 400 ppm
11:00 P.M. T.D. 3411'. Shut down to tighten mud gauge and fix spinning chain.
11:10 P.M. Resumed drilling. Noticed red lights on crown not operating properly. One burned out, the other on steady. Checked with driller. He said derrick ladder was down due to welder repair. Told him as long as the one light was on, to fix it during daylight.

26 March 1961

12:01 A.M. T.D. 3474', drilling.
1:40 A.M. Drilling rate on last joint was 54 ft./hr. Told driller to increase weight on bit to 40,000#. T.D. 3538'.
2:05 A.M. T.D. 3569'. Drilling rate on last joint was 72.8 ft./hr. Continue drilling with 40,000# on bit.
2:40 A.M. T.D. 3600'. Ran Eastman survey at 3590', 1° deviation.
3:10 A.M. Drilling ahead.
3:40 A.M. Jet shale pit to lower mud weight.
3:45 A.M. Will take another survey at 250' or about 3850'.
5:15 A.M. T.D. 3725'. Circulate hole prior to trip for bit.
5:30 A.M. Mud check:
Weight 9.5 #/gal.
Viscosity 31 Sec.
Water loss 6.8 cc.
5:45 A.M. Finished circulating - dropped Eastman.
6:00 A.M. Began coming out of hole.
8:00 A.M. On bank with bit No. 4. Eastman at 3725' - 1 1/2°. Trip in with bit No. 5, DT.
10:24 A.M. Back on bottom. Drilling at 3725'.
2:35 P.M. T.D. 4008', ran deviation survey 1° at 4008'.
3:05 P.M. Drilling ahead.

26 March 1961 (Continued)

Mud Checks

	<u>12:00 A.M.</u>	<u>3:00 P.M.</u>	<u>5:00 P.M.</u>	
Weight	9.5	9.5	9.5	#/gal.
Viscosity	35	33	32	Sec.
Water loss	6	5.8	7.4	cc.
Filter cake	2/32	1/32	1/32	in.
pH	9+	9	9	
4:15 P.M.	T.D. 4059'. Gasket on pump No. 1 went out. Switched to stand-by pump, downtime 7 minutes. Resumed drilling.			
8:00 P.M.	T.D. 4294'. Bit plugged with bentonite. Pressured and bounced pipe to free bit.			
8:25 P.M.	Resumed drilling.			
9:10 P.M.	Jay DeMille, Baroid mud logger, informed of an increase in gas content in samples from about 4288' to 4300'. Recorded a maximum reading of 19 units of CH ₄ or 7000 ppm. Sample was gray shale with trace of sandstone. No lithologic change from previous samples. Previous samples were running an average of 7 units or 2000 ppm CH ₄ .			
10:30 P.M.	T.D. 4385'. Ran Eastman survey 1 1/4° deviation at 4380'.			
10:55 P.M.	Drilling ahead.			

27 March 1961

12:01 A.M.	T.D. 4445'. Drilling.
6:04 A.M.	T.D. 4770'. Circulating prior to pulling bit No. 5. Bit No. 5 made 1045' in 18 hours rotating time.
7:10 A.M.	Finished circulating. Dropped Eastman. Started out of hole.
8:45 A.M.	On bank with Bit No. 5. No. 1 cone on bit was loose, teeth were medium dull. Dumped shale pit and ran one more stand of drill collars. Total drill collar weight 66,000#, deviation at 4770' 3/4°. First 11 stands - 1000' was tight on trip out. Trip in with bit No. 6, OSC3.

27 March 1961 (Continued)

10:50 A. M. On bottom, had 0 feet fill-up. Circulating for one hour prior to tripping bit No. 5. Apparently eliminated fill-up experienced on tripping bit No. 4. Drilling ahead.

8:10 P. M. T. D. 5259'. Ran Eastman survey at 5255', 1° deviation.

8:50 P. M. Drilling ahead.

11:30 P. M. T. D. 5387'. Shut down to replace washed-out union on mud line.

28 March 1961

12:01 A. M. T. D. 5387'. Shut down for repairs.

3:04 A. M. T. D. 5387'. Started drilling after repairing mud line union. Also replaced valve on mud line.

4:50 A. M. Cleaned shale pits.

4:55 A. M. Drilling ahead.

6:15 A. M. T. D. 5487'. Bit balled up.

6:22 A. M. T. D. 5487'. Started circulating 1 hr. for trip.

7:22 A. M. Bit #6 drilled 717' in 14 3/4 hrs. on bottom.

7:22 A. M. Dropped Eastman. Start out of hole.

9:45 A. M. On bank with bit #6. Bearings locked, teeth dull, some tooth breakage. Deviation 1° at 5470'. Hole free all the way out. Picked up all DC's and bit #7-DT. Weight in air 95,300#. In 9# mud 83,250#-weight of blocks 24,000#. Total weight 107,250#. Weight indicator showed 100,000#, approximately 7% error. Weight on bottom should be 172,850# at 5480', actual weight 160,000#, approximately 7.5% error.

12:25 P. M. On bottom drilling. Attempted breaking in bit by adding one thousand pounds each minute to thirty thousand, then 5,000 pounds each minute to 60 thousand in order to avoid tooth breakage observed on bit No. 6.

10:07 P. M. T. D. 5900'. Bit beginning to lock. Began circulating prior to trip.

11:00 P. M. Finished circulating, dropped Eastman survey and blew out mud lines with steam.

11:20 P. M. Started out of hole with bit No. 7.

11:30 P. M. Mud check at 10:30 P. M.

Weight	9.5 #/gal.	pH	9
Viscosity	33 Sec.	Pl. Vis.	8
Water loss	7.6 cc.	Yield Pt.	3
Filter cake	1/32 "		

29 March 1961

12:01 A. M. T. D. 5900'. Tripping out of hole. Bit No. 7 made 413' in 9 1/2 hours on bottom.

1:45 A. M. Out of hole with bit No. 7, teeth medium dull, many teeth broken. No. 3 cone bearing locked. Eastman survey at 5890' 1° deviation.

2:05 A. M. Started back in hole with drill collars only. Bit No. 8 is OSC-3.

2:50 A. M. Finished running drill collars and one stand of drill pipe in hole.

2:55 A. M. Cut drilling line 150'.

4:00 A. M. Install new sprocket on transmission shaft in order to slow transmission speed to 600 rpm.

6:30 P. M. Cleaning mud lines.

7:30 P. M. Resume trip in hole.

8:45 P. M. On bottom drilling - noted 5' of fill-up. Tight spots in hole at 5250' and 5500'. String weighs 170,000#. Began drilling with 1,000# on the bit. Increased weight 1,000# per minute until 30,000# was reached at 9:15 P. M.

9:15 P. M. Drilling with 30,000# on bit at 5910'.

9:45 P. M. Drilling with 40,000# on bit at 5925'.

10:15 P. M. Drilling with 40,000#. Made connection. Hole tight at 5900'. Pulled 90,000# over weight of string. Reciprocated and rotated through interval numerous times until no drag was noted.

10:50 P. M. Drilling at 5936' with 50,000# on the bit.

11:59 P. M. Drilling at 5967' with 50,000# on the bit.

30 March 1961

12:01 A. M. T. D. 5967', drilling ahead. Tight hole noted on connection at 5925'. Mud logger notes that visual inspection of the shale shaker indicates a larger volume of material now coming over. Now running 60,000# on the bit.

3:00 A. M. Tight hole on connections - noted water loss up to 11.2 cc's. Told driller to add 2 sacks of driscose instead of scheduled one.

6:00 A. M. Water loss back down to 8.4 cc's.

7:30 A. M. T. D. 6204'. Twisted drill pipe in two and started out of hole; left 21 - 7" and 6 - 8" drill collars, 1 sub, tool joint and 4" of drill pipe. Dressed American overshot with 5 3/4" slips and 5 3/4" packoff rubber. Layed down 5 joints of drill pipe. These 5 joints include section of twisted off joint, 1 joint of crooked pipe, and 3 joints which seemed to be badly rubber cut. Picked up 5 new joints of pipe including sub and overshot.

30 March 1961 (Continued)

11:15 A. M. Run overshot to top of fish. Idled pump. Caught fish at 11:30 A. M. and started out of the hole. Locked the rotary and used spinning chain to uncouple the drill pipe.
12:25 P. M. Hole tight first 4 stands, then free.
2:20 P. M. Recovered overshot with fish. Bit No. 8, medium green; made 304' in 10 1/2 hrs. Start in hole with bit No. 9-YT3.

Discussed fishing job with O. E. Mechem, J. L. Wible, and after examining damaged joint and reviewing operating conditions, the following recommendations have been considered:

1. Reduce the rotary speed from 130 rpm to 100-110.
2. Alternate joint immediately above drill collar so as to reduce flexure stresses in critical joint every trip. This takes into consideration metallurgical variations in the pin area due to manufacturing processes.
3. Consideration has been given to use of stabilizers in recognition of the greater than normal hole clearances. This decision has been deferred until the results of previous recommendations can be evaluated.

A sample of the joint has been retained for possible metallurgical investigation in the event similar failures are experienced. Discussed procedures to be used in drilling Niobrara and from discussions with various field personnel confronted with problems in the Niobrara previously, the following procedure has been considered: While drilling the Niobrara, short trips should be made at the end of 1 1/2 hours, 2 1/4 hours, 3 1/2 hours, 5 1/4 hours, 7 1/2 hours and 10 hours. This procedure appears prudent in avoiding possible hole trouble.

6:00 P. M. On bottom with bit #9. Checked rotary combinations available after installation of new sprocket in transmission:

		1150 rpm - Engines	
Low Transmission	} 30 rpm	Low Transmission	} 80 rpm
Low Rotary		High Rotary	
Second Transmission	} 50 rpm	Second Transmission	} 125 rpm
Low Rotary		High Rotary	
Third Transmission	} 65 rpm		
Low Rotary			

7:00 P. M. Drilling ahead at 6204'.

31 March 1961

12:01 A. M. T. D. 6305'. Drilling.
2:35 A. M. Drilling. Working drill pipe and making connection.
3:00 A. M. Drilling at 6347'.

31 March 1961 (Continued)

- 6:30 A.M. Experiencing tight hole on connections. Losing 15-20 minutes on each connection, working pipe.
- 7:30 A.M. Started mixing 10 sacks of gel in order to raise viscosity. Bentonitic shales have resulted in some tight hole. If raising the viscosity does not clear up the shale problem, consideration will be given to an early conversion to a Gyp base mud.
- 9:30 A.M. T. D. 6435'. Start circulating for trip. Mix 5 sacks of gel while circulating.
- 10:30 A.M. Drop Eastman and start out of hole with bit No. 9. Mud properties prior to trip: weight 9.4, viscosity 32, W.L. 6.0.
- 1:20 P.M. On surface with bit No. 9, teeth medium dull, all bearings loose, made 231' in 15 1/2 hours. Run in bit No. 10-OSC3 and DC's. Dumped pits. Weighed drill collar to see if any changes had occurred in weight recorder as a result of cutting the drilling line. The reading was the same as previously recorded on 28 March. Trip out was free all the way with no tight hole experienced. Deviation at 6400' 3/4°. Resume trip in.
- 4:00 P.M. On bottom, drilling at 6435'.
- 8:00 P.M. Attempted to compound mud pumps but motors became overloaded.
- 9:00 P.M. Logger notes large chunks of shale coming over shaker.

1 April 1961

- 12:01 A.M. T. D. 6597'. Repairing air line on #2 engine. Drilling ahead.
- 2:30 A.M. T. D. 6642'. Shut down to repair mud line. Washed out threads on connections, clutch out also. Worked 1 hour on drawworks.
- 7:10 A.M. Resumed drilling at 6642'.
- 11:15 A.M. T. D. 6700'. Began circulating 1 hr. before trip out with bit No. 10.
- 12:15 P.M. Dropped Eastman. Started trip out of hole. First three stands tight. Free rest of way.
- 2:10 P.M. Out of hole. Bit No. 10 description: teeth worn, no breakage, all bearings shot. Bit No. 10 made 265' in 14 1/2 rotating hours. Eastman survey was 1° deviation at 6690'. Loffland toolpusher observed and reported to engineer in charge scoured shoulder on 7" DC. Scoured shoulder was milled down and remaining 7" DC's were checked for same on tripping in with bit No. 11-OSC-3.

1 April 1961 (Continued)

4:10 P. M. Resumed normal trip back in hole.
5:20 P. M. On bottom at 6700' - observed 0 fill-up. Hit bridge going in at depth of approximately 6575'.
5:30 P. M. Mud circulating. Drilling ahead, breaking in bit No. 11, same as bit No. 10 since no tooth breakage was observed on bit No. 10.
11:59 P. M. Drilling at 6822'.

2 April 1961

12:01 A. M. T. D. 6822'. Drilling ahead.
3:30 A. M. Water loss increasing. Instructed driller to add 1 sack driscose. Since a large volume of water has been added to the system, also instructed 5 sacks of gel. There have been periodic intervals of "rough" drilling, probably due to bit "balling" up. In these intervals weight on the bit was slacked off, and then gradually increased back to 60,000#.
6:30 A. M. Drilling has become considerably rougher since 6920'. Running only 40,000# and periodically attempting to increase weight.
9:15 A. M. Drill to 7004'. Circulate 1 hr. prior to trip. Bit No. 11 made 304' in 15 3/4 hrs. Mud properties prior to trip: weight 9.4, viscosity 31 sec., water loss 9.2 cc's.
10:15 A. M. Started out of hole with bit No. 11. Dropped Eastman.
12:01 P. M. Broke out first stand of drill collars. Shoulders were galled. Will break all 7" DC's and check for galling.
4:00 P. M. Broke all 7" collars and faced all collars. Galling condition ranged from severe to mild. It appears as if the Brinell hardness on the shoulders is not adequate to prevent galling. On all future trips care will be taken to assure that the drill collars are broken on a different joint each time. Bit No. 11 teeth dull, bearings loose. Deviation was 2 1/2° at 7000'. Checked hoisting speeds with various gear combinations with 155,000-pound hook load. Low on the transmission and high on the drum clutch resulted in a total speed per stand of 75 sec. which is 15 sec. faster than the next fastest combination.
4:35 P. M. Started in hole with bit No. 12-OSC-3.
5:15 P. M. Had all DC's back in hole. Began running drill pipe. Hit bridge at 6570'. Had to put kelly on and drill bridge.
8:00 P. M. On bottom - drilling at 7004'. Rotated last 5 stands to bottom.

3 April 1961

12:01 A.M. T. D. 7117'. Drilling ahead.
1:00 A.M. Ran survey at 7117', 3° deviation.
3:00 A.M. Had 50 unit gas kick at 7130'. 9,000 ppm methane, 1,200 ppm ethane and propane. Notified geologist.
3:30 A.M. Tightened weight indicator. New string weight 184,000#, carrying 60,000# on the bit.
5:45 A.M. 3 1/4° at 7211'.
10:20 A.M. T. D. 7350', circulating 1 hr. prior to trip. Eastman dropped. Had 60 unit gas at 7300'. Bit No. 12 made 346' in 13 hrs.
11:30 A.M. Start out of hole. Bit No. 12 teeth dull, bearings medium dull. 3 1/4° at 7350'. Conducted pilot test of mud conversion in order to ascertain if any prior treatment may prove necessary. Results indicated that no problems should be encountered. Trip in with bit No. 13-OSC-3.
7:30 P.M. Tight hole last 5 joints. On bottom at 8:00 P.M. at 7350'.
9:00 P.M. Added 120 sacks of Q-Broxin at 1 minute/sack to mud system. Also added 6 cans of Caustic at 20 minutes/can. Circulated. Added 60 sacks of Gypsum at 2 minutes/sack. No. 1 engine down, drilling ahead. Repaired mud line leak on circulating mud pump lines. No. 1 engine needs new manifold.
11:45 P.M. Finished adding Q-Broxin and Caustic; began adding Gypsum. Noticed gas kicks since returning to bottom. 9,000 ppm at 7450', 6,000 ppm at 7440', and 5,500 ppm at 7400'. No lithologic change noticed. Contacted geologist.

4 April 1961

12:01 A.M. T. D. 7474'. Converting mud system to Gypsum base and drilling ahead. De-sander not operating.
1:35 A.M. Finished mixing Gypsum.
4:00 A.M. De-sander operating. Since 7510' gas has been detected in the shale cuttings. 6,000 ppm ethane at 7570' to 7580'. Notified geologist.
6:45 A.M. T. D. 7694', began circulating for trip. Added 1 sack of high viscosity driscose and circulated 45 minutes. Dropped straight hole survey.
7:50 A.M. Start out of hole, tight first 7 stands. Bit No. 13 made 344' in 11 hours. Misrun on deviation survey. Inspected every third drill collar for galling; none was observed. Visually inspected all drill pipe on trip into hole to ascertain if any undue wear has occurred. This visual inspection revealed that drill pipe wear is at a minimum.

4 April 1961 (Continued)

- 1:20 P. M. On bottom with bit No. 14-OSC-3, drilling ahead at 7694'. Bit No. 13 teeth medium dull, bearings loose. Held conference with O. E. Mechem and J. L. Wible concerning drilling techniques which may be employed in improving penetration rates. Consideration was given to the use of stabilizers in conjunction with higher rotary speeds or running additional weight on the bit. Pending the results of drilling rate tests currently being conducted, the final decision will be made. Mixed 3920 gallons of diesel in the mud.
- 11:45 P. M. Short trip, 6 stands. Geologist calls Niobrara at 7720'.

5 April 1961

- 12:01 A. M. T. D. 7945', drilling ahead.
- 12:30 A. M. "Slugged" drill pipe with 10 sacks of "bar". Mud flow controlled. Pulled up 6 stands. Tight hole at 7700'. Waited 10 minutes. Back to bottom at 1:30 A. M. Tight hole at 7700'. 30' of fill-up.
- 2:30 A. M. T. D. 7960'. Will circulate 60 minutes. Drop straight hole survey and trip bit No. 14 out.
- 3:45 A. M. Start out of hole. Bit No. 14 made 266' in 10 hours. Teeth dull, bearings loose. Some tooth chippage noted.
- 6:45 A. M. On bank with Bit No. 14. Drilling rate tests conducted on 4-4-61 showed that the penetration rate for 40,000# and 72 rpm was 24.0' per hour and for 60,000# 72 rpm was 31.3' per hour. This represents a 32% increase in penetration rate for a 50% increase in weight.
- 10:00 A. M. On bottom with Bit No. 15-YT3.
- 12:15 P. M. Short trip at 7993'. Second stand took 1 hour and 40 min.
- 2:40 P. M. Hit bridge 57' off bottom, plugged bit.
- 3:55 P. M. Unplugged bit. Began drilling.
- 6:30 P. M. Short trip at 8039', pulled 6 stands.
- 8:00 P. M. Drilling. First stand on short trip was slightly tight, the rest were free. Bit was off bottom for about 25 minutes while cleaning mud pit. Found 10' of fill on short trip in.
- 9:17 P. M. T. D. 8074'. Had drilling break for 5'. Began circulating for possible Codell sample.
- 11:00 P. M. Geologist found no sign of Codell Sand. Resumed drilling at 8074'. During circulating added 1 extra sack of driscose to raise viscosity for possible coring.

6 April 1961

12:01 A. M. Drilling at 8102'. Tops geologist picked are:
Niobrara 7680'
Fort Hayes 8035'
Base Fort Hayes 8069'
Estimated "J" 8450'

1:15 A. M. T.D. 8134'. Short trip. Pulled 6 stands. Slightly tight on first stand, free rest of way out.

1:55 A. M. Started trip back in after cleaning pits. Found several bridges. Circulated to bottom.

2:45 A. M. Resumed drilling at 8134'.

4:45 A. M. T.D. 8178'. Began circulating 1 hr. and 15 min. prior to trip out with bit No. 15.

6:20 A. M. Finished circulating. All samples out of hole. Dropped Eastman. Started trip out of hole.

6:30 A. M. Mud check:
Weight 9.3 #/gal. Filter cake 1/32"
Viscosity 33 Sec. pH 7.2
Plastic Vis. 5 cp Yield 5
Water loss 8 cc

9:05 A. M. On bank with bit No. 15, 218' in 9 1/2 hours. Teeth dull, bearings slightly loose. 3/4" at 8160'.

12:01 P. M. On bottom, bit No. 16, DT2G, hit bridge 60' off bottom. Conducted drill-off tests.

2:55 P. M. Short trip, pull 6 stands.

3:35 P. M. On bottom drilling. Mix gel and driscose to raise viscosity to 40 sec.

8:00 P. M. Short trip, 8 stands. Hole tight 1st two stands. Swabbed some mud to pits.

8:50 P. M. Out 8 stands, repairing clutch.

10:25 P. M. Start back in hole. 1 hr. and 25 min. down, repairing clutch.

11:10 P. M. On bottom - rotated 2 stands down.

7 April 1961

12:01 P. M. T.D. 8320'. Tight place in hole noted at 8110'. Twelve feet of fill-up, drilling ahead. Mud check not made since such a short period of time had elapsed after the short trip. Will check at 3:00 A. M.

4:00 A. M. Short trip, 8 stands. First 3 stands tight. Waited 10 min. and went back to bottom. Hit bridge at 8200'. On bottom at 5:40 A. M. Six feet of fill-up. "D" sand at 8435'.

7:15 A. M. T.D. 8482'. Starting to circulate. Plan to circulate 90 min.

7 April 1961 (Continued)

9:00 A. M. Start out of hole for new bit and junk sub.
11:40 A. M. Out of hole with bit No. 16, dull to medium dull, bearings loose; made 304' in 11 1/4 hrs.
12:20 P. M. Start in hole with bit No. 17, Smith K2P regular, and junk sub.
3:00 P. M. On bottom with bit No. 17. T.D. 8482'.
4:40 P. M. T.D. 8492'. Started circulating. Plan to circulate for 2 hours.
6:30 P. M. Start out of hole
9:45 P. M. Out of hole. Bit No. 17, Smith K2P, teeth completely bald-headed, bearings worn; made 10' in 1 1/2 hrs. Discussed problem with O. E. Mechem and Lou Scopel, and it was decided that in lieu of the condition of the bit and the time sequence for running drill stem tests that the proper procedure would be to run a junk basket and W7R type bit in order to rid the hole of any junk. Made up core barrel and stood it back.

8 April 1961

12:01 A. M. T.D. 8492'. Going in hole with bit No. 18, W7R, and junk sub. Bit No. 17 approximately 1/2" out of gauge. Bit No. 18 to attempt to ream to gauge.
4:30 A. M. Reaming at 8482', 40' of fill-up. Reamed to T.D. 8492'.
7:30 A. M. Start out of hole with bit No. 18.
10:45 A. M. Out of hole with bit No. 18, teeth medium dull, bearings green, full gauge. Bit No. 18 reamed 10'. Picking up core barrel to run core. Discussed gauge problems with O. E. Mechem and Loffland toolpusher, Louis Brown. It was decided that in the event further gauge trouble is encountered, a suitable reamer would be employed above the bit in order to minimize the amount of out of gauge hole.
3:50 P. M. On bottom at 8492' with core barrel, 34' of fill-up, Truco diamond bit C18404, size 8 7/8" x 4 3/8".
4:00 P. M. Commenced cutting core No. 1.

9 April 1961

12:01 A. M. T.D. 8506'. Coring ahead at rate of 2' per hr.
6:30 A. M. Cored to 8519', 27' in 14 1/2 hrs. Pulled up to make connection, worked pipe 60 min., jarred up to 50,000# over the weight of the pipe in order to free the barrel.
8:00 A. M. Started out of hole with core barrel.
12:40 P. M. On bank with core No. 1, cut 27', recovered 27'. Inner barrel had come unscrewed and was stuck on top of bit. Pipe strap 8520', T.D. corrected to this depth. Repair core barrel 4 hours.

9 April 1961 (Continued)

5:20 P.M. Start in hole with bit No. 19, W7R.
9:10 P.M. On top of core rathole, reaming.

10 April 1961

12:01 A.M. T. D. 8520'. Reaming core rathole at 8507', mixing mud.
1:35 A.M. Start out of hole with bit No. 19, reamed 19' to 8511'.
Viscosity had increased to 48 seconds. Baroid engineer reported increase in mud volume.
2:45 A.M. Gauge mud pits in order to check for water flow while tripping.
4:35 A.M. Out of the hole with bit No. 19. Recovered 7 pieces of iron debris from junk sub. Second gauge indicates no apparent increase in mud volume.
5:00 A.M. Started back in hole with bit No. 20, W7R. Bit No. 19, teeth dull, 1/4" out of gauge. Bit was pinched, gauge teeth heeled off.
6:45 A.M. On top of rathole 8511' with bit No. 20, reaming ahead. Began checking viscosity of mud every 5 minutes in order to determine if any unusual viscosity variation might be found which would indicate water influx. Ran test for 4 hours; found no indication of viscosity variation due to water influx.
12:01 P.M. Mud check at 12:00 noon: Viscosity 49 Sec.
 Weight 9.6 #/gal.
 Water loss 7.2 cc.
1:55 P.M. Reamed core hole to 8520'. Drilled 1' and circulated the hole at T. D. 8521'.
4:30 P.M. Started out of hole to pick up core barrel.

Mud Checks

	<u>3:30 P.M.</u>	<u>4:05 P.M.</u>	
Viscosity	102	74	Sec.
Weight	9.7	9.7	#/gal.
Cl	10,000	15,000	ppm
Water loss	6.1	6.4	cc.

The increased viscosity resulted in considerable hole cleaning of cavings. The previous mud tests would seem to indicate that increased salt concentration tends to inhibit the yield of gel solids and possibly Q-Broxin. Further tests will be necessary in order to determine what adjustments, if any, will be necessary.

7:15 P.M. Out of the hole with bit No. 20-reamed 8', cut 1' new hole. Teeth medium green, bearings medium green and to gauge. Picking up core barrel with corehead C18404.

10 April 1961 (Continued)

10:35 A. M. Finished making up core barrel and started in hole.

11 April 1961

12:01 A. M. T. D. 8521'. Trip in core barrel.
1:30 A. M. On bottom with core barrel, commenced coring. Dropped lag time marker and began taking 15-minute mud checks.
1:30 A. M. 75 second viscosity
1:45 A. M. 72 "
2:00 A. M. 75 "
2:15 A. M. 77 "
2:30 A. M. 80 "
2:45 A. M. 87 " 9.8 #/gal., 6.8 W. L., 9.0 pH, 18,000 ppm Cl
3:00 A. M. 86 "
3:15 A. M. 85 "
3:30 A. M. 88 "
3:45 A. M. 80 "
4:00 A. M. 78 "
4:15 A. M. 78 "
4:30 A. M. 87 "
4:30 A. M. Coring rate increasing at 8529.
6:45 A. M. Lag time noted to be 2 hrs.
1:35 P. M. Core to 8556'. Start out of hole.
5:00 P. M. On bank with core No. 2. Core 35' full recovery.
5:30 P. M. Start back in hole with bit No. 21, W7R, with junk sub.
8:45 P. M. On top of rathole at 8521'. Starting to ream core hole carrying 3000-5000# on bit.

12 April 1961

12:01 A. M. T. D. 8556', reaming at 8543'. Reaming rate appeared to be slowing. Increased rpm from 50 to 80 and maintained 12,000# on bit.
1:50 A. M. T. D. 2556'. Finished reaming. Starting to circulate.
4:20 A. M. Start out of hole to pick up tester.
6:40 A. M. Out of hole. Making up tester. Bit No. 21 green, reamed 35' corehole.
9:15 A. M. Start in hole with test tool. Maximum pipe speed 60 sec. per stand.
12:01 P. M. On bottom with test tool. Packer set at 8482'. Interval tested 8482' to 8556' for DST No. 1.
3:40 P. M. Coming out of hole with test tool.
6:00 P. M. Out of hole with test tool. Recovered 200' of gas cut mud.

Field Pressures Recorded (Uncorrected)

IH 4355	FF 170
ISI 447	FSI 278
IF 147	FH 4355

Tool open 1 hr. and shut in 1 hr. Packers failed after 1 hr. shut in. Test successful.

12 April 1961 (Continued)

8:20 P. M. Start back in hole with bit No. 22, OWSV.

13 April 1961

12:01 A. M. T. D. 8556'. Trip in.
12:10 A. M. On bottom. 10' of fill-up, drilling ahead.
3:00 A. M. Mud check:
Weight 9.8 #/gal. Filter cake 1/32"
Viscosity 55 Sec. Cl 6000 ppm
Water Loss 6.0 cc. pH 8.0
6:00 A. M. Weight 9.4 #/gal. Filter cake 1/32"
Viscosity 44 Sec. Cl 7000 ppm
Water loss 6.8 cc. pH 8.0
Pl. Vis. 18 cp.
Reduced weight on bit to 40,000# and increased rpm to 74 because of rough drilling.
7:00 A. M. Drilled to 8620' and circulated for samples. Lag time 1 hr. and 50 min.
9:10 A. M. Drilling ahead.
10:00 A. M. Drilled to 8623'. Circulated for samples. Mud check:
Weight 9.4 #/gal. Filter cake 1/32"
Viscosity 49 Sec. Cl 6000 ppm
Water loss 6.8 cc. pH 8.5
Pl. Vis. 15 cp.
11:30 A. M. Weight 9.5 #/gal. Filter cake 1/32"
Viscosity 49 sec. Cl 7000 ppm
Water loss 6.7 cc. pH 8.5
Pl. Vis. 19 cp.
12:01 P. M. Started out of hole with rock bit to pick up core barrel for Dakota. Notified Art Jersin, Colorado Oil & Gas Commission of intent to core. Notified Jim Zeltinger who in turn notified Mr. Sikso of intent to core.
3:15 P. M. One tight spot in hole approximately 40' off bottom. Strapped pipe out at 8621.72', no correction. Out of hole with bit No. 22, teeth dull, bearings good, 1/8" out of gauge; drilled 67' in 7 1/3 hrs.
3:30 P. M. Two small cracks noticed on corehead. Called to attention of engineer-in-charge by D & S engineer.
4:30 P. M. Rig up core barrel and start in hole with corehead C18404.
8:45 P. M. On bottom coring; encountered 36' fill-up.
10:00 P. M. Mud check:
Weight 9.7 #/gal. Filter cake 1/32"
Viscosity 55 Sec. Cl 7000 ppm
Water loss 6.6 cc. pH 7.5

14 April 1961

12:01 A.M.

Coring at 8632' and mixing driscose. Mud check:

Weight	9.8 #/gal.	Filter cake	1/32"
Viscosity	50 sec.	Cl	6000 ppm
Water loss	7.2 cc.	pH	8.0
Pl. Vis.	19 cp.		

Mixing "gel" to increase viscosity. With core barrel in the hole, the maximum mixing rate is 16-18 min./sk.

3:00 A.M.

Mud check:

Weight	9.6 #/gal.	Filter cake	1/32"
Viscosity	61 sec.	Cl	7000 ppm
Water loss	6.8 cc.	pH	8.0
Pl. Vis.	25 cp.		

Mixing "gel".

4:50 A.M.

Made connection at 8644'. 10' of cavings. Circulate through cavings.

5:35 A.M.

Coring at 8,644 feet.

6:00 A.M.

Mud check:

Weight	9.5 #/gal.	Filter cake	1/32"
Viscosity	58 sec.	Cl	7000 ppm
Water loss	7.0 cc.	pH	8.0
Pl. Vis.	20 cp.		

Mixing driscose at 45 min./sk.

1:20 P.M.

Start out of hole at 8,657 feet.

6:15 P.M.

On bank with core #3. Cut 34 feet, rec. 34 feet. Corehead had run on junk and had been grooved. Drilling and Service representative said that it would be necessary to run a junk sub and then a magnet in order to adequately clean the hole so that a full 50-foot core can be cut; otherwise, it would be necessary to cut only 30-foot cores. The decision was reached to run a kelly extension tube so that full cores could be taken without the necessity of making connections.

9:05 P.M.

TD 8657', reaming corehole at 8623' with bit #23, W7R.

10:45 P.M.

Mud check:

Weight	9.8 #/gal.	Filter cake	1/32"
Viscosity	51 sec.	Cl	10,200 ppm
Water loss	4.8 cc.	pH	7.0
Pl. Vis.	17 cp.		

15 April 1961

12:01 A.M.

TD 8657', reaming corehole; repair shale shaker. Mud check:

Weight	9.8 #/gal.	Filter cake	1/32"
Viscosity	60 sec.	Cl	6000 ppm
Water loss	5.2 cc.	pH	6.5
Pl. Vis.	20 cp.		

15 April 1961
(Continued)

2:15 A.M. Finished reaming core hole to T. D. 8657'. Drilled to 8660'.
Repairing shale shaker.

2:45 A.M. Began circulating samples.

3:15 A.M. Mud check:
Weight 9.9 #/gal. Filter cake 1/32
Viscosity 75 sec. Cl 6000 ppm
Water loss 4.6 cc. pH 8.5
Pl. Vis. 24 cp.

5:00 A.M. Start out of hole with bit No. 23. Mud check:
Weight 9.9 #/gal. Filter cake 1/32
Viscosity 100 sec. Cl 6000 ppm
Water loss 5.8 cc. pH 8.5
Pl. Vis. 26 cp.

8:00 A.M. Out of hole with bit #23. Reamed 34', drilled 3
feet, 5 3/4 hrs., teeth dull, bearings loose, 1/8" out
of gauge.

8:30 A.M. Trip in hole. Truco diamond corehead C18350, size 8 9/16" x 4 3/8"

11:40 A.M. On bottom, no fill-up. Circulating hole. Waiting on
Kelly extension. Mud check 12:15 P.M.
Weight 9.7 #/gal. Gel 5
Viscosity 81 sec. NaCl 13,200 ppm
Water loss 4.6 cc. pH 8
Pl. Vis. 23 cp.

1:10 P.M. Rig up kelly extension.

2:00 P.M. Commenced coring at 8,660 feet.

6:30 P.M. Coring. Mud check:
Weight 9.7 #/gal. Filter cake 1/32
Viscosity 76 sec. Cl 7000 ppm
Pl. Vis. 25 cp. pH 8.5
Water loss 4.8 cc.

8:35 P.M. Removed kelly extension.

9:15 P.M. Working stuck pipe. Mud check:
Weight 9.7 #/gal. Filter cake 1/32
Viscosity 91 sec. Cl 7000 ppm
Water loss 5.2 cc. pH 8.5
Pl. Vis. 33 cp.

9:20 P.M. T. D. 8672'. Start out of hole with core bbl. Cored 12'.

16 April 1961

12:01 A.M. T. D. 8672'. Tripping out core barrel.

12:30 A.M. Out of hole with core #4, cut 12', recovered 10' of sand-
stone, fine, medium grey to light grey, quartzitic.
Recovered 8660-70 feet.

16 April 1961 (Continued)

1:45 A. M. Starting back in hole with bit No. 24, W7R. Coring engineer attributes jamming of core to fractured formation causing wedging in core barrel.

5:30 A. M. Reaming corehole at 8660'.

6:00 A. M. Mud check:
Weight 9.7 #/gal. Filter cake 1/32
Viscosity 76 Sec. Cl 6000 ppm
Water loss 5.6 cc. pH 7.0
Pl. Vis. 25 cp.

8:30 A. M. T. D. 8675', reamed 12' corehole and drilled ahead 3'. Circulate prior to trip for core barrel.

11:30 A. M. T. D. 8675'. Dropped Eastman. Start out of hole to pick up core barrel. Mud check:
Weight 9.6 #/gal. Ca 600 ppm
Viscosity 66 Sec. pH 8.5
Water loss 5.2 cc.

2:30 P. M. On bank with bit No. 24, teeth dull, bearings medium dull, 1/16" out of gauge. Reamed 12', drilled 3', 1/4" at 8675'.

3:40 P. M. Check all bearings on core barrel, install stinger and start in hole with corehead C18350.

6:15 P. M. On bottom. 4' fill-up, commenced coring.

9:00 P. M. Mud check:
Weight 9.3 #/gal. Filter cake 1/32
Viscosity 68 Sec. Cl 7000 ppm
Water loss 6.5 cc. pH 8.5
Pl. Vis. 15 cp.

10:40 P. M. Coring - pressure fluctuation 1200# to 1400#. Attempting to free jammed core barrel. Picked barrel up and circulated, pump pressure 1200 psi. Sat down 24,000# on corehead, pressure increased to 1700 psi. Disengaged rotary table. Table had essentially no back lash. Pressure remained about 16-1700 psi.

17 April 1961

12:01 A. M. T. D. 8681'. Start out of hole with core barrel. Mud check:
Weight 9.5 #/gal. Filter cake 1/32
Viscosity 75 Sec. Cl 7000 ppm
Water loss 6.6 cc. pH 8.5
Pl. Vis. 19 Cp.

17 April 1961
(Continued)

3:00 A. M. Tripping drill collars. Notified geologist of pulling of core barrel.

3:45 A. M. Out of hole. Cut 6', Recovered 6' of core. 8675-8681'.
1/2' of black shale, 2' sandstone, fine shaly cement, carbonaceous material disseminated throughout.
1/2' of black shale, 3' sandstone, fine shaly cement, carbonaceous material disseminated throughout.
Going back in hole with bit #25, W7R.
Truco diamond corehead C18350 grooved by either junk or formation.

7:00 A. M. Reaming at 8,675 feet. Examination of core indicates concentrations of pyrite in certain intervals which could have resulted in diamond damage. A telephone conversation between E. A. Polumbus, Jr., Bert Lear, L. J. Scopel and A. Samuels resulted in the following evaluation of procedure for Dakota, Lakota, Morrison section. The original plans, as outlined in the Final Design Report, for evaluating the Dakota, Lakota, and Morrison section included 110 feet of coring and 3 DST's.

Core analysis data from the 53 feet cored indicates that the sandstone encountered is a quartzitic sand with less than 1 Md permeability and less than 10% porosity.

Evaluation of this 53-foot interval has required 4 days rig time in cutting 3 cores of 34 feet, 12 feet, and 6', respectively and has resulted in damage to 2 diamond core heads probably as a result of pyrite and/or bit teeth. Remedial measures taken after damaging the first core head included the use of a kelly extension while coring 50 feet. A full 50-foot core could be cut without the necessity of a rat-hole connection and the attendant risk in allowing bit debris to enter the core hole. However, this did not eliminate all problems as further coring revealed the presence of pyrite inclusions in the quartzitic sandstones encountered which also resulted in damage to the corehead similar to that produced by bit debris.

In light of the information obtained from visual inspection of the cores and their physical analysis, further evaluation of these zones by the coring technique is not justified by the time and expense involved until sufficient porosity and permeability is encountered in the drilled cuttings. Further, the information obtained from the cores does not warrant that this zone be drill stem tested until more section has been exposed.

17 April 1961
(Continued)

11:50 A. M. Reamed corehole to 8681' and began circulating samples.
Drill to 8699'.
2:30 P. M. Fish for junk.
3:20 P. M. Trip out with bit #25. Reamed 6' and drilled 18' in 5
hrs. Mud check prior to trip:
Weight 9.7 #/gal. pH 9.0
Viscosity 71 Sec. NaCl 9800 ppm
Water loss 6.0 cc. Ca 1160 ppm
8:50 P. M. On bottom T. D. 8699'. Had 10' fill-up. Drilling ahead
with bit #26, T2.

18 April 1961

12:01 A. M. T. D. 8714'. Drilling ahead. Mud check:
Weight 9.8 #/gal. Filter cake 2/32
Viscosity 71 Sec. pH 8.5
Water loss 5.6 cc. Cl 6500 ppm
Pl. Vis. 23 cp. Ca 1000 ppm
Yield 17
1:00 A. M. T. D. 8721'. Had drilling break. Circulated for samples.
3:15 A. M. T. D. 8721'. Geologist found no porosity in sand samples.
Reamed drilling.
3:30 A. M. Mud check:
Weight 9.8 #/gal. Filter cake 2/32
Viscosity 67 Sec. pH 8.5
Water loss 5.4 cc. Cl 7000 ppm
Pl. Vis. 20 cp.
6:00 A. M. Mud check:
Weight 9.8 #/gal. Filter cake 2/32
Viscosity 74 Sec. pH 8.0
Water loss 6.2 cc. Cl 7000 ppm
Pl. Vis. 18 cp.
6:20 A. M. T. D. 8753'. Bit bouncing badly and drilling slow. Circu-
lating approximately 2 hrs. for samples.
8:45 A. M. Trip out bit #26.
12:01 P. M. On bank with bit #26. Made 54' in 6 3/4 hrs. Teeth dull,
bearings loose, 1/4" out of gauge. Recovered piece of
tong die from junk sub.
2:50 P. M. In hole with bit #27, W7R. Reamed 20' to bottom.
4:30 P. M. On bottom drilling.

18 April 1961
(Continued)

6:00 P. M. Mud check.
Weight 9.7 #/gal. Filter cake 2/32"
Viscosity 71 sec. pH 9.0
Water Loss 5.8 cc.
Pl. Vis. 20 cp.

9:00 P. M. Drilling. Mud check:
Weight 9.8 #/gal. Filter cake 2/32
Viscosity 70 sec. pH 9.0
Water loss 5.6 cc. Cl 6,500 ppm
Pl. Vis. 20 cp. Ca 1000 ppm

10:30 P. M. T. D. 8778', circulate samples for geologist.
11:00 P. M. Fish for junk and drop straight hole survey.
11:30 P. M. Trip out bit #27. Mud check:
Weight 9.8 #/gal. Filter cake 2/32"
Viscosity 75 sec. pH 9.0
Water loss 6.0 cc. Cl 5000 ppm
Pl. Vis. 20 cp. Ca 1000 ppm

19 April 1961

12:01 A. M. T. D. 8778'. Trip out bit #27.
2:40 A. M. Out of hole with bit #27. Teeth and bearings medium green. Bit was to gauge. No metal recovered in junk sub. 1/2" at 8,778 feet.

3:00 A. M. Dump shale pit and repair cathead. No downtime.
3:50 A. M. Start in hole with bit #28, W7. Bit #27 made 25' in 6 hrs.

6:30 A. M. On bottom. No fill-up. Drilling ahead.
6:45 A. M. Called Morning Report to Mr. Sikso, Corps of Engineers, Omaha.

11:00 A. M. TD 8,798 feet. Started building mud up to 80 viscosity. Preparatory to DST.

6:00 P. M. TD 8,821 feet. Starting to circulate. Mud check:
Weight 9.8 #/gal. pH 9
Viscosity 90 sec. Cl 7000 ppm
Water Loss 6 cc. Ca 1000 ppm
Pl. Vis. 20 cp.

7:00 P. M. Viscosity check results

4:30 P. M.	68 seconds	5:20 P. M.	71 seconds
4:40 P. M.	68 seconds	5:30 P. M.	80 seconds
4:50 P. M.	61 seconds	5:45 P. M.	71 seconds
5:00 P. M.	65 seconds	6:00 P. M.	90 seconds
5:10 P. M.	70 seconds	6:30 P. M.	76 seconds
		7:00 P. M.	74 seconds

19 April 1961
(Continued)

8:15 P. M. Mud check:
Weight 9.8 #/gal. Filter cake 2/32 "
Viscosity 79 sec. pH 9.0
Water loss 5.6 cc. Cl 7500 ppm
Pl. Vis. 20 cp. Ca 1000 ppm

8:30 P. M. Start off bottom - bit #28. Made 43 feet in 1 1/2 hrs.
10:00 P. M. Attempted to notify Colorado Oil & Gas Commission of
intent to test. No answer.
11:30 P. M. Out of hole. Bit #28 medium dull teeth and bearings.
Bit to gauge. Some metal in sub.

20 April 1961

12:01 A. M. T. D. 8821'. Make up DST tool for #2 test.
TD 8,821.00' 7' of open perforated pipe
Tool 193.38' 1/2" bottom hole choke
Bottom of packer 8,627.62' 3 pressure recorders
5.15' Thermometer
Top of packer 8,622.47' No water cushion

12:15 A. M. Dump shale pit.
12:30 A. M. Start in hole with test tool.
1:00 A. M. Cut drilling line.
1:30 A. M. Continue going in hole.
3:30 A. M. On bottom with test tool waiting for daylight.
5:30 A. M. Open test tool.
5:35 A. M. Close tool 24 minutes.
5:59 A. M. Open tool 60 minutes.
7:00 A. M. Close tool 120 minutes.
9:00 A. M. Start out of hole.
12:01 P. M. On bank with test tool. Recovered 400 feet of slightly
gas cut mud. Interval test for DST #2, 8628'-8821'.
ISI 1996 FSI 1854
IF 190 IH 4490
FF 190 FH 4490
Pick up 4 - 8" DC's.

5:15 P. M. On bottom bit #29, YM.
9:00 P. M. Mud check:
Weight 9.7 #/gal. Filter cake 2/32 "
Viscosity 63 sec. pH 8.0
Water lost 4.8 cc. NaCl 11,000 ppm
Pl. Vis. 21 cp. Cl 960 ppm

9:30 P. M. Two visitors to rig from Humble Oil Co. Marketing Div.
10:00 P. M. Visitors left. Mr. Hermanepan and Mr. Henson, Denver office.

21 April 1961

12:01 A.M. T.D. 8854'. Drilling ahead. Mud check:
Weight 9.7 #/gal. Filter cake 2/32
Viscosity 65 Sec. pH 8.0
Water loss 5.6 cc. NaCl 10,700 ppm
Pl. Vis. 20 cp. Ca 960 ppm

3:00 A.M. Mud Check:
Weight 9.7 #/gal. Filter cake 2/32
Viscosity 51 Sec. pH 8.0
Water loss 5.4 cc. NaCl 11,550 ppm
Pl. Vis. 18 cp. Ca 920 ppm

5:00 A.M. T.D. 8871'. Begin circulating prior to trip. Bit #29
made 50' in 11 1/2 hrs.

5:30 A.M. Start out of hole. Mud check:
Weight 9.6 #/gal. Filter cake 2/32
Viscosity 60 Sec. pH 8.0
Water loss 5.4 cc. NaCl 9,900 ppm
Pl. Vis. 13 cp.

9:25 A.M. On bank with bit #29, teeth dull, bearings medium dull,
considerable tooth breakage. Pick up 4 - 8" drill collars.
Total drill collar weight
14 - 8" x 3" = 4,400 x 14 = 61,600#
21 - 7" x 2 3/4" = 3,324 x 21 = 69,804#
Wt. in air 131,404#
Wt. in 10.0 #/gal. mud 115,000#

11:10 A.M. Pick up 4 - 8" drill collars. Start in hole bit #30, C2.
All drill collars plus blocks weighed 119,000#.
Blocks indicated 20,000#. Collars weighed 100,000#;
should weigh 131,000#. Indicator error 23.6%
low. Will check O.D. of drill collars next trip to
ascertain if previous calculations are correct.

2:40 P.M. On bottom bit #30, drilling ahead. Added 1,000 #/min.
up to 40,000#, then 10,000# each hr. up to a maximum of
80,000#.

6:00 P.M. Mud check:
Weight 9.4 #/gal. Filter cake 2/32
Viscosity 59 Sec. pH 8.0
Water loss 5.2 cc. NaCl 9,900 ppm
Pl. Vis. 20 cp. Ca 1,200 ppm

9:00 P.M. Mud check:
Weight 9.4 #/gal. Filter cake 2/32
Viscosity 53 Sec. pH 8.0
Water loss 5.2 cc. NaCl 12,400 ppm
Pl. Vis. 20 cp. Ca 1,200 ppm

22 April 1961

12:01 A.M. T.D. 8925', drilling ahead. Mud check:
Weight 9.5 #/gal. Filter cake 2/32
Viscosity 53 Sec. pH 8.0
Water loss 5.6 cc. NaCl 13,200 ppm
Pl. Vis. 20 cp. Ca 1,200 ppm

3:00 A.M. Mud check:
Weight 10.1 #/gal. Filter cake 2/32
Viscosity 55 Sec. pH 8.5
Water loss 5.6 cc. NaCl 11,500 ppm
Pl. Vis. 13 cp.

6:00 A.M. Drop straight hole survey instrument and start out of hole with bit #30; made 66' in 11 3/4 hrs. Block and collars have indicated weight of 125,000#. Calipered collars.

9:30 A.M. On bank bit #30, teeth and bearings medium dull, deviation 1/4° at 8925'. Run in all DC's and string up 10 lines.

3:00 P.M. Start back in hole.

6:00 P.M. On bottom bit #31, OWC. Hit bridge at 8487', had 14' fill-up, drilling ahead. Indicator weight 230,000#. Mud check:
Weight 9.8 #/gal. Filter cake 2/32
Viscosity 63 Sec. pH 8.0
Water loss 5.6 cc. NaCl 11,550 ppm
Pl. Vis. 25 cp. Ca 1,000 ppm

9:00 P.M. Mud check:
Weight 9.9 #/gal. Filter cake 2/32
Viscosity 58 Sec. pH 8.0
Water loss 4.8 cc. NaCl 13,200 ppm
Pl. Vis. 23 cp. Ca 1,120 ppm

10:45 P.M. T.D. 8955', start out of hole bit #31, made 18' in 4 1/4 hrs. Mud check prior to trip:
Weight 9.8 #/gal. Filter cake 2/32
Viscosity 53 Sec. pH 8.0
Water loss 6.0 cc. NaCl 9,900 ppm
Pl. Vis. 20 cp.

23 April 1961

12:01 A.M. T.D. 8955'. Trip out.
12:30 A.M. Traveling block binding and heating up.
12:55 A.M. Resume trip out of hole.
1:05 A.M. Blocks heating up and binding.
2:00 A.M. Resume trip.

23 April 1961
(Continued)

3:20 A.M. Out of hole with bit #31, teeth dull, bearings medium dull, 1/8" out of gauge.
3:30 A.M. Ran back in hole with bit #32, W7R, and drill collars.
4:30 A.M. Replacing traveling block.
3:35 P.M. Resume trip to bottom.
5:15 P.M. On bottom, no fill-up drilling ahead.

24 April 1961

12:01 A.M. T.D. 8973', drilling ahead.
1:30 A.M. T.D. 8978'. Start out of hole with bit #32, made 23' in 7 1/4 hrs.
4:35 A.M. Out of hole. No cones on bit.
5:25 A.M. Going in hole with bit #33, 2C, and junk sub to drill on cones.
8:00 A.M. Reaming to bottom 8978'.
1:35 P.M. Start out of hole.
5:10 P.M. Out of hole, Recovered 1/4 to 1/3 junk left in hole. Bit #33, medium dull, no new hole; mill on junk.
5:45 P.M. Trip in bit #34, 2C.
9:00 P.M. On bottom with bit #34. Drilling on junk.

25 April 1961

12:01 A.M. T.D. 8978', milling on junk.
1:50 A.M. Start out of hole with bit #34.
5:30 A.M. Out of hole with bit #34. Medium green, small amount of tooth chippage and to gauge. Recovered twice as much junk as last run; drill no new hole.
6:20 A.M. Start in hole with bit #18 RR, W7R. Running junk sub.
9:00 A.M. On bottom. Found 23' of fill. Circulating and going to bottom.
9:30 A.M. Milling on junk.
12:15 P.M. Broke air line on rotary clutch.
1:30 P.M. Milling on junk.
5:15 P.M. Began circulating to catch junk in junk sub.
7:00 P.M. Start out of hole with bit #18 RR.
9:30 P.M. Cut drilling line.
10:45 P.M. Resume trip out.
11:30 P.M. Out of hole with bit #18 RR. Teeth completely worn off, bearings loose, 1/4" under gauge. Recovered large chunks of cones and smaller pieces of metal in junk sub.

26 April 1961

12:01 A. M. T. D. 8978'. Out of hole. Waiting on Bowen milling tool to arrive from Casper.

3:05 A. M. Bowen tool arrived along with magnet.

3:45 A. M. Started in hole with Bowen tool and junk sub.

6:45 A. M. On bottom with Bowen tool. Pipe strap going into hole at 8979.70', no correction. Estimated approximately 10' of fill-up on bottom.

7:00 A. M. T. D. 8978'. Drilling ahead with Bowen milling tool.

11:40 A. M. Milled approximately 1' and started out of hole.

3:20 P. M. On bank with junk basket and junk sub, recovered two large chunks of shale and 4 small pieces of iron. Shoe worn on one quarter, no wear otherwise. Pick up bit #35, W7R, and trip in hole.

6:30 P. M. On bottom, drilling on junk.

10:00 P. M. Drilled on junk, made approximately 2' new hole. Circulating to catch junk.

11:00 P. M. Started out of hole.

27 April 1961

12:01 A. M. T. D. 8981'. Tripping out of hole. Mud check prior to trip:

Weight	10.1 #/gal.	Filter cake	2/32
Viscosity	51 Sec.	pH	7.6
Water loss	6.0 cc.	Salt	11,000 ppm
Pl. Vis.	18 cp	Ca	1,200 ppm
Yield	8	Oil	5 %
		Solids	16 %

2:45 A. M. Out of hole. Bit #35, teeth worn, to gauge, bearings loose, recovered 3 pieces of junk in junk sub.

3:00 A. M. Trip in hole with bit #36, W7R.

6:30 A. M. Found about 40' of fill on bottom. Circulating through fill to T. D. 8981'. Drilling ahead. Told Baroid to raise viscosity to 65 seconds.

11:30 A. M. Drill to 8989'. Fish for junk. Mud properties prior to trip:

Weight	10.1 #/gal.	Water loss	7.2 cc.
Viscosity	50 Sec.	pH	7.5

3:15 P. M. On bank bit #36. Made 8' in 5 hrs., teeth medium dull, bearings green. Dumped shale pit. No junk recovered.

27 April 1961
(Continued)

4:05 P. M. Start in hole bit #37, OWC.
6:50 P. M. On bottom drilling. Breaking in bit to 25,000#, then increasing weight by 10,000#/hr. to 80,000#.
7:00 P. M. Mud check:
Weight 10.0 #/gal. pH 8.8
Viscosity 48 Sec. Cl 5,000 ppm
Water loss 6.4 cc. NaCl 8,250 ppm
Filter cake 2/32 Ca 1,000 ppm
8:37 P. M. T. D. 9000'.
9:30 P. M. Mud check:
Weight 9.9 #/gal. pH 7.5
Viscosity 56 Sec. Salt 9,900 ppm
Water loss 8.0 cc. Yield 9
Filter cake 2/32 Ca 1,200 ppm
Pl. Vis. 18 cp.
10:00 P. M. Started desander.

28 April 1961

12:01 A. M. T. D. 9022' drilling. Mud check:
Weight 9.9 #/gal. Yield 9
Viscosity 54 Sec. pH 8.0
Water loss 7.6 cc. Salt 9,900 ppm
Pl. Vis. 18 cp. Cl 6,000 ppm
Filter cake 2/32 Ca 1,200 ppm
3:00 A. M. Mud check:
Weight 9.6 #/gal. Yield 7
Viscosity 52 Sec. pH 7.0
Water loss 7.6 cc. Salt 9,900 ppm
Pl. Vis. 20 cp. Cl 6,000 ppm
Filter cake 2/32 Ca 1,200 ppm
3:45 A. M. Checked viscosity; was 48 seconds. Started adding gel.
4:30 A. M. Began circulating 1 hr. prior to trip out with bit #37.
5:25 A. M. T. D. 9049'. Started out of hole. Bit #37 made 60' in 9 2/3 hrs.

28 April 1961
(Continued)

8:45 A.M. On bank bit #37, teeth medium dull, bearings tight. Pick up bit #38, C2. No junk sub. Cut drilling line. Run in hole.

12:45 P.M. T.D. 9049'. On bottom. 4' of fill-up, drilling ahead.

6:45 P.M. Drilling at 9086. Checked rotary torque; 50,000# bit weight 2 1/4 turns, 80,000# 3 1/2 turns, and 85,000# 5 turns.

7:25 P.M. T.D. 9093'. Made connection and increased weight on bit to 90,000#.

8:15 P.M. Shut down to weld new nipple on mud line.

8:35 P.M. Drilling ahead.

9:00 P.M. Mud check:

Weight	9.7 #/gal.	pH	7.5
Viscosity	50 Sec.	Yield	7
Water loss	6.4 cc.	Salt	9,900 ppm
Pl. Vis.	18 cp.	Ca	1,120 ppm

29 April 1961

12:01 A.M. T.D. 9130'. Mud check:

Weight	9.8 #/gal.	pH	8.0
Viscosity	54 Sec.	Yield	10
Water loss	6.0 cc.	Ca	1,200 ppm
Pl. Vis.	20 cp.	Cl	6,000 ppm

Filter cake 2/32

12:10 A.M. T.D. 9131'. Dropped Eastman survey prior to trip out.

12:30 A.M. Started out of hole bit #38. Made 82' in 11 hrs.

3:30 A.M. Out of hole with bit #38, teeth medium worn, bearings tight, to gauge. Deviation 1/2° at 9130'.

4:00 A.M. Started in hole with bit #39, OSC-1G.

6:35 A.M. On bottom. Circulating through 18' of fill. Drilling ahead.

6:00 P.M. Mud check:

Weight	9.8 #/gal.	pH	8.0
Viscosity	48 Sec.	Salt	9,700 ppm
Water loss	8.6 cc.	Cl	5,900 ppm
Pl. Vis.	15 cp.		

Filter cake 2/32

8:15 P.M. T.D. 9221'. Washed out mud line nipple. Started out of hole with bit #39, made 90' in 13 3/4 hrs. Mud check:

Weight	9.6 #/gal.	pH	8
Viscosity	44 Sec.	Salt	9,240 ppm
Water loss	8.4 cc.	Cl	5,600 ppm
Pl. Vis.	10 cp.	Ca	1,200 ppm

Filter cake 2/32

30 April 1961

12:01 A. M. T. D. 9221'. Trip out of hole with bit #39.
12:30 A. M. On bank with bit #39. Teeth medium dull, bearings slightly loose, to gauge. Started in hole with bit #40, OSC-1G.
3:15 A. M. Found 18' of fill. Circulating through fill.
4:15 A. M. T. D. 9221' on bottom drilling ahead with 35,000#. Increasing bit weight to 80,000# by 10,000# every 40 min.
6:00 A. M. Mud check:
Weight 9.7 #/gal. pH 8.0
Viscosity 50 sec. Salt 9,070 ppm
Water loss 8.6 cc. Cl 5,500 ppm
Pl. Vis. 14 cp. Ca 1,800 ppm
Filter cake 2/32
1:30 P. M. Conducted drilling rate tests to determine if continued use of additional drill collars is economical, affirmative.
9:15 P. M. TD 9,344 feet. Dropped Eastman Survey and started out of hole. Bit #40 made 123 feet in 17 hrs. Mud check prior to trip:
Weight 9.8 #/gal. Filter cake 2/32
Viscosity 63 sec. pH 8.5
Water loss 8.0 cc. Salt 9,080 ppm
Pl. Vis. 15 cp. Cl 5,500 ppm

1 May 1961

12:01 A. M. T. D. 9344'. Trip out bit #40.
1:00 A. M. On bank bit #40, teeth medium worn, bearings loose, to gauge. Ran collars and bit #41, OSC-1G in hole, jet mud pit, cut drilling line. Eastman Survey 3/4" at 9,343 feet.
2:00 A. M. Resume trip in hole.
5:15 A. M. Found 36' of fill on bottom. Circulating through fill.
6:00 A. M. TD 9,344 feet. Drilling ahead with 35,000# on bit and increasing weight to 80,000# at 10,000# every 40 min. Mud check:
Weight 9.8 #/gal. pH 8.5
Viscosity 66 sec. Yield 9
Water loss 8.4 cc. Salt 9,075 ppm
Pl. Vis. 19 cp. Ca 1,000 ppm
Filter cake 2/32
Drilling. Mixing water, oil and driscose into mud to bring down weight and water loss.
7:00 P. M. TD 9,440 feet. Drilling ahead.

2 May 1961

12:01 A.M. T.D. 9473'. Drilling ahead.
12:15 A.M. T.D. 9475'. Dropped Eastman survey and started out of hole with bit #41, made 131' in 19 hrs.
4:10 A.M. On bank with bit #41, teeth dull, bearings loose, to gauge. Eastman survey $1\ 1/4^\circ$ at 9470'.
4:40 A.M. Started in hole with bit #42, YTL.
7:15 A.M. On bottom drilling ahead.
1:10 P.M. T.D. 9523'. Start out with bit #42, made 48' in 7 hrs. Pilot tested $1/2$ #/bbl. of Q-Broxin to see how water loss would be affected. If reduced water loss to 7.0 cc and improved the properties of the cake. Will add 12 sks, when on bottom with new bit. Bit #42, teeth dull, break-age. Recovered several broken teeth in junk sub.
7:45 P.M. T.D. 9523'. On bottom with 18' fill with bit #43, OWS, drilling ahead.
8:25 P.M. Broke rotary chain.
8:45 P.M. Drilling ahead.

3 May 1961

12:01 A.M. T.D. 9,553'. Drilling ahead.
12:35 A.M. TD 9,556 feet. Reverse drilling break will drill 10'.
2:52 A.M. TD 9,566 feet. Circulate for samples and condition mud.
3:30 A.M. Circulating. Mud check:
Weight 10.0 #/gal. pH 9.0
Viscosity 64 sec. Yield 15
Water loss 6.0 cc. Ca 1,200 ppm
Pl. Vis. 22 cp. NaCl 10,725 ppm
Filter cake 2/32
6:00 A.M. Circulating. Mud check:
Weight 10.0 #/gal. pH 9.0
Viscosity 57 sec. Yield 12
Water loss 6.0 cc. Ca 1,240 ppm
Pl. Vis. 20 cp. NaCl 12,375 ppm
Filter cake 2/32
6:15 A.M. Fishing for junk.
6:30 A.M. Started out of hole with bit #43, made 43' in 6 3/4 hrs.
9:35 A.M. On bank, teeth medium dull, bearings tight, in gauge. No junk recovered in sub.
10:00 A.M. Start in hole bit #44, T2, and junk sub. Analysis of drilling rate tests conducted on 30 April 1961 indicates that the additional drill collars procured through amendment to Loffland's drilling contract resulted in an 81% increase in penetration rates over what could have been obtained

3 May 1961
(Continued)

10:00 A. M. with the original collar string. This has resulted in a net savings since the collars were procured of 70 hrs. which represents a total savings to date of approximately \$4,600.

1:10 P. M. On bottom bit #44, 3' fill-up, drilling ahead.

6:00 P. M. Had drilling break at 9589'. Drilled to 9592' and circulated hole.

9:45 P. M. Geologist found no sand in samples. Began fishing for junk prior to trip with bit #44. Will strap pipe out of hole.

10:30 P. M. T. D. 9592'. Started trip out of hole with bit #44.

Mud check:

Weight	10.0 #/gal.	Yield	20
Viscosity	80 Sec.	pH	9.0
Water loss	6.0 cc.	Ca	1,200 ppm
Pl. Vis.	25 cp.	NaCl	13,860 ppm

Filter cake 2/32

4 May 1961

12:01 A. M. T. D. 9592'. Trip out bit #44, made 20' in 6 3/4 hrs.

2:45 A. M. On bank with bit #44, teeth worn, bearings medium tight, 1/8" out of gauge. No junk in junk sub. Pipe strap 9594.76', no correction. Started in hole with bit #45, W7R.

5:45 A. M. On top of 8' of fill. Circulating through fill and reaming out of gauge hole to T. D. 9592'.

6:55 A. M. On bottom with 40,000#. Drilling ahead.

Talked with Herb McKay of Drilling and Service concerning the condition of the hole with respect to junk. He said that the only positive way to be sure the hole is clean would be to run a magnet, but in light of past experience with the junk subs, use of the kelly extension would probably be adequate.

10:30 A. M. T. D. 9604'. Started circulating prior to trip for core barrel. Accepted delivery of 27 joints of X line 40# 8 5/8" S. L. casing. Fish for junk, drop Eastman. Bit #45 made 12' in 4 1/2 hrs. Trip out bit #45.

8:00 P. M. On bank with bit #45, teeth dull, bearings tight, to gauge. Survey at 9600' - 1°. Making up core bbl. to run in hole.

8:15 P. M. Accepted delivery of 26 joints 40# 8 5/8" S. L. casing and 1 joint 49# 8 5/8" casing. Checked total delivery today of 53 joints 40# and 1 joint 49# casing.

4 May 1961
(Continued)

8:45 P. M.

Started in hole with core barrel. Corehead serial No. R-18182 (8 7/8" x 4 3/8").

Core Barrel 59.80' Sub 0.91'
Jars 7.55' Bottom-hole 7" collar 30.35'

5 May 1961

12:01 A. M.

T. D. 9604', preparing to core.

12:35 A. M.

T. D. 9604'. Started coring 40 rotary rpm, 18,000# bit weight, 37 spm pump #1, 1200 psi.

1:55 A. M.

Cut 10' of core to T. D. 9614'. Lost circulation.

3:35 A. M.

Mix mud and lost circulation material in an attempt to control lost circulation. Lost approximately 150 barrels of drilling mud after pumping mud and lost circulation material. Static pressure remaining after pumping was 500 psi. Assuming all fluid in the drill pipe was water, the hydrostatic pressure at the bottom of the hole would be $500 \text{ plus } 433 \times 96.14 = 500 \text{ plus } 4163 = 4663 \text{ psi}$. 8990' of 10#/gal. mud in the annulus would produce the same pressure. In order to circulate fluid, the mud weight must be reduced to 9.3#/gal.

After mixing new mud without lost circulation material and pumping down the drill pipe, the static pressure was 250 psi with 9.0#/gal. fluid. This would produce a hydrostatic head of $4480 \text{ plus } 250 = 4730$ which is in close agreement with previous calculations.

9:00 A. M.

Start out with core #6, cut 10', no recovery.

Discussed problems of evaluating top 25' of Lyons with O. E. Mechem, Bert Lear, Lou Scopel, all of E. A. Polumbus, Jr. & Associates, Inc., and Louis Brown with Loffland, J. Zeltinger, Corps of Engineers, J. Neighbours, Chemical Corps and H. McKay, Drilling and Service.

This discussion included the possible reasons for not obtaining any core recovery and the methods available for evaluation of the 25' cut in the Lyons which are:

1. Core could be unconsolidated in which case no core could be recovered.
2. Core could have been dropped which might allow for some recovery in junk sub.
3. Core could still be on bottom and could possibly be recovered complete by going in with the core barrel and new catcher and setting over core.

5 May 1961
(Continued)

In light of the problems involved, particularly with lost circulation, the decision was reached to go in with an 11" bit and attempt to stop lost circulation, then ream corehole and drill 1 or 2' to see if lost circulation has been stopped. If samples from reaming indicate that the formation is hard, then evaluation of the top zone can be obtained through a DST. If samples are friable, evaluation can be made on basis of zone below and electric logs.

12:30 P. M. T.D. 9614', on bank with core #6.
2:30 P. M. Start in hole with bit #46, W7R. Will break circulation at 2000', 5000', 6000' and 9600'.
7:20 P. M. Finished going in hole. Starting to build up pump pressure.
9:05 P. M. T.D. 9614', start reaming corehole at 9604'.

6 May 1961

12:01 A. M. T.D. 9614. Reaming corehole at 9612'.
1:25 A. M. Finish reaming corehole. Fish for junk.
2:00 A. M. Drilling at 9614'.
2:30 A. M. T.D. 9616', fish for junk.
3:00 A. M. Circulate samples.
6:00 A. M. Start out of hole.
9:45 A. M. On bank with bit #46, reamed 10' corehole, drilled 2' new hole; gauge teeth heeled off, bit 1/4" out of gauge. Recovered some pieces of Lyons in junk sub and 3 small pieces of junk. Cut drilling line.
11:00 A. M. Start in hole to cut core #7. Corehead No. R-18182
1:45 P. M. On bottom, 19' fill-up.
3:00 P. M. Circulate to bottom. Rig up, kelly extension, run to bottom. Circulate prior to coring.
3:30 P. M. T.D. 9616', commence coring. Mud check:
Weight 9.8 #/gal. pH 7
Viscosity 45 Sec. Ca 1,280 ppm
Water loss 5.2 cc.
Mixing lime and gel to raise pH and viscosity.
4:30 P. M. Mud check:
Weight 9.8 #/gal Water loss 7.6 cc.
Viscosity 40 Sec. pH 7.0
Mixing gel, zeogel, and draisose to raise viscosity and lower water loss. The low pH is probably due to the addition of cottonseed hulls as a lost circulation material and has caused a decrease in the viscosity and an increase in the water loss. At the present time, lime is being mixed to raise the viscosity and the hulls are being removed from the system.

6 May 1961
(Continued)

Mud checks:

Time	Weight	Viscosity	pH
6:00 P. M.	10.1 #/gal.	47 Sec.	9.0
7:00 P. M.	9.8	61	9.0
8:00 P. M.	9.8	53	7.0
9:00 P. M.	9.8	59	9.0

6:10 P. M.

Removed kelly extension.

6:50 P. M.

Resumed coring.

8:30 P. M.

Started mixing polyflakes to mud to restrict partial lost circulation.

7 May 1961

12:01 A. M.

T. D. 9635', coring ahead.

1:00 A. M.

TD 9639'. Core barrel jamming. Cannot drill further. Trying to free jammed barrel.

2:15 A. M.

Had conference with Alvin Samuels, O. E. Mechem, B. A. Lear with Herb McKay. Decided to pull core and try to test 23' of rathole which exists, after examination of recovered core.

3:00 A. M.

T. D. 9639'. Started out of hole with core barrel.

Mud checks:	Weight	Viscosity	pH	Water Loss
12:01 A. M.	10.1 #/gal.	59 Sec.	9.0	6.4 cc.
1:00 A. M.	10.0	63	10.0	6.0
2:00 A. M.	9.5	55	7.2	-
3:00 A. M.	9.6	40	9.0	6.8

4:00 A. M.

Notified Halliburton (Otis Hamberlin-Sterling, Colorado) of intent to test.

6:30 A. M.

On bank with core #7.

7:00 A. M.

Pulled core #7 (Lyons 9616-39). Full recovery. Visual examination of core showed multiple vertical fracturing.

9:00 A. M.

Conference with O. E. Mechem, Al Samuels, B. A. Lear. Decided to ream corehole.

9:15 A. M.

Going in hole to ream with bit #47, 2C, with junk sub.

12:30 P. M.

T. D. 9639', reaming at 9588'.

5:30 P. M.

Start out for new bit. Corehole reamed to 9629'.

Mud check prior to trip out:

Weight	9.7 #/gal.	pH	8.5
Viscosity	55 Sec.	Filter cake	2/32

Water loss 5.0 cc.

9:00 P. M.

On bank with bit #47, 2C, reamed 13' corehole; gauge teeth badly worn, bearings exposed on both small cones, 1/8" out of gauge. Had some difficulty breaking bit due to lack of a 4-cone bit breaker. Have 1 on location, but will not fit into rotary table. Found 5 large pieces of junk in junk sub.

9:45 P. M.

Decided to run W7R, as bit #48 rather than another 2C because of bit breaker absence. Started in hole with bit #48, W7R, to ream corehole.

8 May 1961

12:01 A.M. T. D. 9639', tripping in bit #48.
12:15 A.M. Reaming at 9624'.
5:30 A.M. Noticed loss in mud volume, started mixing lost circulation material.
6:00 A.M. Mud check:
Weight 9.6 #/gal. Yield 10
Viscosity 57 Sec. pH 9.0
Water loss 6.4 cc. Ca 1,200 ppm
Filter cake 2/32 NaCl 11,550 ppm
Pl. Vis. 20 cp.
9:00 A.M. T. D. 9639', ream to 9639', began circulating. Checked pit volume, lost 2" last hr. (20 barrels).
11:50 A.M. Fish for junk.
12:45 P.M. Pull bit #48. Hole tight, 450' off bottom. Plugged bit working through tight places, pulled wet string.
5:50 P.M. On bank bit #48, reamed 10'. Gauge teeth heeled off, 1/4" out of gauge. Recovered several small pieces of junk. One joint of drill pipe was badly cut and had to be removed from string.
6:15 P.M. Start in hole bit #49, W7R.
7:00 P.M. Cut drilling line and removed damaged joint of drill pipe from string.
8:05 P.M. Continued trip in hole. Running in at about 30 sec. per stand.
9:15 P.M. Stopped trip in to hole with 44 stands to go. Can't fill hole due to low mud volume in tanks. Started mixing mud.
10:10 P.M. Accepted delivery of 150 sacks Aquagel from Baroid (Sterling). Accepted delivery Baroid (Casper). Will have ticket later.
Polyflakes 19 sacks Driscose 10 sacks
Jeil Flakes 41 sacks Q-Broxin 200 sacks
11:55 P.M. Mud mixing completed. Resume trip in hole.

9 May 1961

12:01 A.M. T. D. 9639', tripping in bit #49.
1:15 A.M. 20' off bottom washing down and reaming.
2:15 A.M. Fishing for junk.
2:45 A.M. T. D. 9639'. Drilling ahead.
3:00 A.M. Mud check:
Weight 9.9 #/gal. Filter cake 2/32
Viscosity 70 Sec. pH 9.0
Water loss 4.8 cc. NaCl 7,000 ppm
Ca 1,100 ppm

9 May 1961

(Continued)

6:00 A. M.

Mud Check:

Weight	9.6 #/gal.	Filter cake	2/32
Viscosity	55 sec.	pH	8.0
Water loss	6.0 cc.	Yield	9
Pl. Vis.	23 cp.	Ca	760 ppm
		NaCl	6650 ppm

6:10 A. M.

TD 9651. Started circulating prior to trip with bit #49. Bit #49 made 16' in 3 1/2 hrs.

11:40 A. M.

Strap 9654.89'. On bank with bit #49. Teeth dull, bearings tight, 1/4" under gauge. Corrected T.D. to pipe strap 9655'. One small piece of junk recovered.

12:35 P. M.

Trip in bit #50, W7R.

3:25 P. M.

On bottom with 21' of fill and/or out of gauge hole. Because of spotty nature of the mud, bit #50 was run rather than going in with core barrel.

The final decision on evaluation of the Lyons formation was outlined by Mr. O. E. Mechem in a letter dated May 9, 1961 and discussed with Mr. John Neighbours, Mr. J. M. Zeltinger, Mr. Louis Brown and Mr. A. Samuels.

3:45 P. M.

Checking mud viscosity every 600 pump strokes in order to smooth out variations in the mud system.

5:30 P. M.

Finished circulating through fill. On bottom 9655' drilling and conditioning mud to 70 viscosity.

7:45 P. M.

TD 9663'. Bit not drilling off. Began circulating to condition mud.

10 May 1961

12:01 A. M.

TD 9663' Circulating.

1:30 A. M.

Mud in condition for coring. Began fishing for junk.

2:00 A. M.

Started out of hole.

5:45 A. M.

On bank with bit #50, made 8' in 5 1/4 hrs. Teeth medium worn to gauge, bearings tight, no junk recovered.

6:00 A. M.

Dropped stripper rubber in BOP. Getting it out.

6:30 A. M.

Picked up core barrel. Put on corehead R-18182 and started in hole at rate of 30 sec/stand.

10:45 A. M.

On bottom 0' fill-up. Commenced coring.

12:01 P. M.

Mud Check:

Weight	9.8 #/gal.	pH	7.5
Viscosity	63 sec.	Ca	1,040 ppm
Water loss	6.0 cc.		

Mixing lime and Gyp to raise pH and Ca concentration.

10 May 1961
(Continued)

2:00 P. M. Barrel started jamming.
3:00 P. M. Mud check:
Weight 9.8 #/gal. pH 7.5
Viscosity 65 Sec. Ca 1,240 ppm
Water loss 5.6 cc.
3:55 P. M. T. D. 9672', barrel jammed, started out of hole.
6:40 P. M. On bank with core #8, cut 9', recovered 9'. Serviced
core barrel. Picked up bit #51, W7R.
9:00 P. M. Ran bit #51, junk sub and drill collars in hole.
9:20 P. M. Cut drilling line.
10:00 P. M. Resumed trip in with bit #51. Running in at velocity
of not less than 30 sec./stand.

11 May 1961

12:01 A. M. T. D. 9672'. Trip in bit #51.
12:15 A. M. On top of rathole 9663'. Reaming 8 7/8" hole to 11".
Had 9' of fill, circulated through fill, started ream-
ing at 1:00 A. M.
4:15 A. M. Corehole reamed to 9672'. Commenced drilling.
5:15 A. M. T. D. 9676'. Began circulating for samples and to con-
dition mud prior to trip out. Bit #51 reamed 9' in
3 1/4 hrs. and drilled 4' in 1 hr.
8:15 A. M. Fish for junk.
9:00 A. M. Trip out.
12:20 P. M. Bit #51, teeth dull, 1/2" out of gauge, bearings
medium tight. Recovered several small pieces of junk
in sub.
1:15 P. M. Start in hole with corehead No. R-18182.
3:20 P. M. On bottom, 4' fill-up, circulating.
4:20 P. M. Commence coring. 21' kelly in with 10,000#.
6:22 P. M. T. D. 9681', cored 5' and lost circulation, approxi-
mately 150 bbls.
7:00 P. M. Mixing mud.
9:30 P. M. T. D. 9681'. Start out with core #9. Strapping at.

12 May 1961

12:01 A. M. Trip out.
1:30 A. M. T. D. 9681'. On bank with core #9, cut 5', rec. 5'.
Piece of junk lodged in corehead water course. Pipe
strap tallied 9703' or 22' long. Driller's T. D. is
9681'. No correction.

12 May 1961
(Continued)

3:30 A.M. T.D. 9681'. Start in hole with bit #52, W7R and junk sub to ream corehole. Strapping in.

7:15 A.M. T.D. 9674', on bottom, reaming corehole. Strapped 9680', 1' short. Drill pipe tally is accurate. Corrected geograph to 9674' from 9681' and will carry geograph with 20,000# of bit weight rather than 60,000#. As a result of this correction, core #8 is from 9656' to 9665' and core #9 is from 9669' to 9674'.

11:00 A.M. T.D. 9676'. Circulate samples up.

2:00 P.M. Trip out bit #52.

5:05 P.M. On bank bit #52, teeth medium dull, 1/2" out of gauge. Reamed 5', drilled 2' new hole. Recovered several small pieces of junk.

6:05 P.M. Pick up corehead No. R-18182 and start in hole. Core barrel assembly 6.40' longer than drilling assembly.

9:10 P.M. T.D. 9676'. On bottom with 6' fill-up. Circulating through fill.

9:15 P.M. Began coring.

9:45 P.M. T.D. 9678'. Cored 2', lost circulation. Consulted with Mr. O. E. Mechem. Decided to pull off bottom and mix mud. Slug bottom with lost circulation material and pulled off bottom.

Removed kelly extension, pulled 2 stands, and began mixing mud. Had lost approximately 2' in mud tanks, are mixing 300 barrels mud now.

13 May 1961

12:01 A.M. T.D. 9678', mixing mud.

2:15 A.M. Started circulating, took approximately 45 barrels to get returns. Circulated slug of lost circulation material to bottom.

3:30 A.M. Stopped circulating. Letting pressure flow back.

3:50 A.M. Started out of hole with core #10.

7:30 A.M. Out with core #10, cut 2', recovered 1 1/2' Lyons sandstone with 2 vertical fractures. Service core barrel. Start in hole with bit #53, W7R.

12:30 P.M. On bottom reaming corehole at 9676'.

1:45 P.M. T.D. 9678', corehole reamed, began drilling ahead.

3:30 P.M. T.D. 9681'. Lost circulation. Initial loss approximately 50 bbls. mud. Total loss 210 bbls.

13 May 1961

(Continued)

3:30 P. M.

Mud Check at 3:00 P. M. prior to loss:

Weight	9.8 #/gal.	Filter cake	2/32
Viscosity	103 sec.	pH	8.0
Water Loss	6.0 cc.	Yield	20
Pl. Vis.	30 cp.	Ca	1200 ppm
		NaCl	3500 ppm

Began mixing mud.

8:00 P. M.

Tried to establish circulation. Could not. Mixing mud.

8:35 P. M.

Mud Check:

Weight	9.4 #/gal.
Viscosity	46 sec.
Water loss	9.2 cc.
pH	8.5

9:45 P. M.

Pulled 10 stands out of hole.

10:30 P. M.

Mud Check:

Weight	9.4 #/gal.	pH	8.0
Viscosity	77 sec.	Filter cake	2/32
Water loss	6.8 cc.	Yield	13
Pl. Vis.	18 cp.	Ca	2000 ppm
		NaCl	3300 ppm

11:15 P. M.

Mud mixed with approximately 6 percent lost circulation material in 300 barrels in mud tanks. Tried to establish circulation with 10 stands out of hole. Successful in establishing circulation. Running 10 stands in hole to try and establish circulation on bottom.

11:55 P. M.

Ten stands back in hole, Kelly on, Rotated, established circulation. Will try to increase pump pressure to 1100 psi gradually without losing circulation. Will mix lost circulation material (jell flakes) at rate of one sack per 15 minutes while circulating.

14 May 1961

12:01 A. M.

T. D. 9681' circulating, increasing pump pressure and mixing lost circulation material. Pressure up to 1100 psi, circulating through 10' of fill-up in hole. Checked pipe stretch, 1'10" between zero and 20,000 weight on bit.

2:45 A. M.

T. D. 9681'. Began fishing for junk. Lost approximately 3" in tanks while circulating.

14 May 1961
(Continued)

3:30 A.M.

T.D. 9681'. Started out of hole with bit #53. Kelly up 2'10" with 20,000# on bit.

Mud Checks

	<u>2:30 A.M.</u>	<u>3:00 A.M.</u>	
Weight	9.7	9.5	#/gal.
Viscosity	110	85	Sec.
Water loss	6.8	6.6	cc.
Filter Cake	2/32	2/32	inches
pH	8.0	8.0	
Plastic Vis.	25	23	cp.
Yield	-	14	
NaCl	3500	3400	ppm
Ca	2000	2000	ppm

6:45 A.M.

On bank with bit #53, reamed 2' corehole, drilled 3'. Teeth medium dull, in gauge. Recovered 4 small pieces of junk. Pick up corehead R-18182. Start in hole.

11:15 A.M.

T.D. 9681'. On Bottom 5' fill-up. Broke circulation with 600 psi. Circulate for 1 hr.

12:15 P.M.

Pick up to install kelly extension, had 33' kelly in with 20,000#.

1:00 P.M.

Commence coring at 9681'.

9:00 P.M.

T.D. 9690' - Viscosity checks for one full circulation are as follows:

6:00 P.M. - 63	7:30 P.M. - 62
6:30 P.M. - -	8:00 P.M. - -
7:00 P.M. - 63	8:30 P.M. - 60
	9:00 P.M. - 62

Stopped adding water to mud. Began adding lime at 30 minutes to sack to raise pH.

10:30 P.M.

Pump #1 lost gland packing, switched to pump #2. #2 was running 70 spm and could not keep up. Checked #2, had washed out valve and seat. #1 repaired and put on hole.

10:50 P.M.

Resumed coring.

11:59 P.M.

Have lost 2" in tanks since 7:00 P.M. Approximately 20 barrels mud lost.

15 May 1961

12:01 A.M.

T.D. 9693'. Coring ahead.

1:00 A.M.

Lost 2" in tanks during last 45 min. Slowed pump from 35 spm to 32 spm. Pressure dropped from 1100 psi to 975 psi, rotary speed reduced from 76 rpm to 40 rpm. Coring rate observed about the same (40 min./ft.) after change. Slight loss of mud after change. Mixing mud slowly to increase mud volume.

15 May 1961

(Continued)

4:00 A. M.

TD 9698'. Began pressuring up to 1400 psi. Came off bottom and found no increased pressure. Back on bottom and pressuring up again. Herb McKay (D&S) determined core head was ringed.

4:15 A. M.

Started out of hole with core #11, cored 17 feet.

Mud Check prior to pulling core:

Weight	9.6 #/gal.	Filter cake	2/32
Viscosity	60 sec.	pH	7.2
Water loss	8.4 cc.	Yield	
Pl. Vis.	15 cp.	Ca	3,000 ppm
		NaCl	6,600 ppm

7:55 A. M.

On bank. Recovered 16 1/2'. Inner barrel parted at swivel. Core head ringed on junk.

11:45 A. M.

Repaired core bbl. Started in hole with #54, W7R.

2:15 P. M.

T. D. 9698', on bottom bit #54, reaming at 9681'. Adding water at the rate of 12 gals./min. in order to build the mud volume. Mixing gel, Driscose, Gyp and lime in order to maintain desired properties while adding water.

Gel	5 min./sk.
Driscose	45 min./sk.
Lime	45 min./sk.
Gyp	30 min./sk.

Fluid level in mud pits:

<u>Shale Pit</u>	<u>Middle</u>	<u>Suction</u>	
*34"		17"	
x 3.2 bbls/"	x 2.8 bbls/"	x 2.6 bbls/"	
109 bbls.	56 bbls.	44 bbls.	= 209 bbls.

Check 14 May

	28"	27"	
x 3.2 bbls/"	x 2.8 bbls/"	x 2.6 bbls/"	
115	78	70	= 263 bbls.

Lost 54 barrels in last 24-hour period.

For ease in measuring pits, all future measurements will be of distance to fluid, from top of pit. Example below:

<u>Shale Pit</u>	<u>Middle Pit</u>	<u>Suction</u>
* 14"	19"	28"

* These measurements correspond to those checks above.

7:10 P. M.

Blew out vibrating hose on #1 pump. Shut down, Switched to #2.

7:40 P. M.

Resumed reaming.

9:10 P. M.

Shut down to replace control valve (pump) on Drillers console.

15 May 1961

(Continued)

9:55 P.M. Repairs completed. Started fishing for junk.
10:30 P.M. Dropped Eastman survey and started out of hole with bit #54. Reamed 11' to 9692'.
10:45 P.M. Clutch release on drawworks not operating properly. Shut down for repairs.
11:20 P.M. Resumed trip out.

16 May 1961

12:01 A.M. T.D. 9698'. Reamed to 9692'. Trip out with bit #54.
3:00 A.M. On bank with bit #54, gauge teeth worn, 3/16" under gauge, bearings tight. Eastman survey 3/4° at 9675'. No junk.
3:30 A.M. Start in with bit #55, 2C.
6:20 A.M. Reaming hole at 9630'. Tank measurements:
Shale 16" from top
Middle 21 1/2" from top
Suction 24" from top.
7:00 A.M. Mud check:
Weight 9.7 #/gal. pH 7.0
Viscosity 72 Sec. Yield 20
Filtrate 7.0 cc. Ca 1200 ppm
Pl. Vis. 20 cp.
12:55 P.M. Reamed to 9698', drilled 1/2'. Circulate and condition mud. Tabulation of log time data from Baroid Mud Logging Unit indicates that the average hole size at the present time is 13". The mud volume therefore is between 1800 and 2000 bbls.
4:30 P.M. Fish for junk.
5:15 P.M. Start out of hole. Kelly in 22 1/2', 20,000# and 800 psi pump pressure. Mud check prior to trip:
Weight 9.7 #/gal. Pl. Vis. 27 cp.
Viscosity 86 Sec. Yield 16
Water loss 6.6 cc.
6:15 P.M. Shut down to repair broken chain in compound.
7:25 P.M. Resumed trip.
10:00 P.M. On bank with bit #55, reamed 6'. Broke bit breaker breaking out bit. Did not break bit from junk sub. Broke off junk sub. Bit #55, gauge teeth worn, bearings loose, 1/16" out of gauge. Many small (less than 1/2") pieces of junk recovered in sub.

16 May 1961

10:45 P.M.

Started in with corehead #418007 (8 7/8" x 4 3/8") to cut core #12.

11:20 P.M.

Drill collars in hole. Shut down to cut drilling line.

17 May 1961

12:01 A.M.

TD 9698'. Cutting drilling line.

12:35 A.M.

Resumed trip in with core barrel.

2:30 A.M.

On bottom. Circulating through 5' of fill-up.

3:45 A.M.

Began coring at 9698'. Kelly down 19' with 20,000#. Pressure drop across core head 200 psi. Pump pressure 1000 psi, rotary speed 40 rpm, bit weight 22,000#. Mud check:

Weight	9.7 #/gal.	Filter cake	2/32
Viscosity	88 Sec.	pH	7.6
Water loss	7.4 cc.	Yield	27
Pl. Vis.	25 cp.	Ca	1120 ppm
		NaCl	4950 ppm

Pit Straps - Shale 16" From Top
Middle 21" From Top
Suction 26" From Top

6:30 A.M.

Have lost about 1" of mud in pits since start of coring.

9:00 A.M.

TD 9705' Mud check.

Weight	9.7 #/gal.	pH	8.5
Viscosity	135 Sec.	Yield	30
Water loss	7.6 cc.	Ca	1200 ppm
Pl. Vis.	30 cp.	NaCl	5000 ppm

11:30 A.M.

TD 9707'. Barrel jammed. Cut 9', core #12.

Mud check prior to trip:

Weight	9.7 #/gal.	pH	8.5
Viscosity	118 Sec.	Yield	20
Water loss	7.4 cc.	Ca	1200 ppm
Pl. Vis.	30 cp.		

3:45 P.M.

On bank with core #12. Cut 9', recovered 9'.

4:45 P.M.

Start in hole with bit #56, W7R.

5:40 P.M.

Shut down to repair compound chain.

6:20 P.M.

Resume trip.

8:00 P.M.

Found about 12' of tight hole above core rathole.

10:45 P.M.

Finished reaming tight hole. Started reaming core hole at 9698'.

11:15 P.M.

9699' reaming. Losing mud. (slow). Started mixing mud-Gel, Gyp, Driscose and Q-Broxin. Mud check:

Weight	9.7 #/gal.	pH	8.0
Viscosity	111 Sec.	Ca	1120 ppm
Water loss	6.6 cc.	NaCl	3630 ppm
Pl. Vis.	30 cp.		

18 May 1961

12:01 A.M. T.D. 9707'. Reaming corehole at 9702'.
4:05 A.M. T.D. 9707'. Finished reaming corehole, starting to circulate.
6:30 A.M. Fish for junk.
7:00 A.M. Start out of hole with bit #56. Mud check before starting out of hole:
Weight 9.7 #/gal. Filter cake 2/32
Viscosity 62 Sec. pH 8.0
Water loss 7.4 cc. Ca 960 ppm
Pl. Vis. 17 cp. Cl 2800 ppm
10:20 A.M. On bank bit #56, reamed 9', 1/4" out of gauge, teeth heeled off, recovered several pieces of junk. Reamed 9' corehole plus 12' above corehole.
10:45 A.M. Trip in with corehead #R-18007 for core #13.
12:10 P.M. Shut down to increase mud volume.
2:30 P.M. Resume trip in hole. Mud check:
Weight 9.1 #/gal. pH 9.0
Viscosity 79 Sec. Yield 14
Water loss 6.0 cc. Ca 600 ppm
Pl. Vis. 17 cp.
4:10 P.M. Circulate prior to coring.
5:32 P.M. T.D. 9707', commence coring.
9:00 P.M. Core jammed. Broke core off. Back on bottom. Resumed coring.

19 May 1961

12:01 A.M. T.D. 9716'. Shut down to remove kelly extension.
12:30 A.M. Resumed coring.
5:45 A.M. T.D. 9727'. System pressuring up. Indication that bit is ringed. Start out of hole. Cored 20' (core #13). Lost approximately 2" out of pits during cutting of core #13. Mud check prior to trip out:
Weight 9.6 #/gal. Filter cake 2/32
Viscosity 89 Sec. pH 7.8
Water loss 6.4 cc. Yield 20
Pl. Vis. 25 cp. Ca 1000 ppm
NaCl 4950 ppm
10:15 A.M. On bank. Corehead ringed. Recovered 20'.
11:00 A.M. Pick up bit #57, W7R. Start in hole.
1:00 P.M. T.D. 9727'. On bottom reaming corehole at 9707'. Had 2' out of gauge above rathole. Regauged bit #56, 1/8" out of gauge.

19 May 1961

(Continued)

5:45 P. M. Ream to 9727'. Fish for junk.
6:30 P. M. Start out with bit #57.
11:00 P. M. On bank with bit #57, reamed 20'. Outer teeth dull,
bearings slightly loose on cone #1. Other 2 cones tight.
1/4" under gauge.
11:30 P. M. Start in hole with bit #58, W7R. (Strap out with bit #57,
showed 9728' T. D., no correction)

20 May 1961

12:01 A. M. T. D. 9727'. Trip in with bit #58 and junk sub.
2:00 A. M. Start washing down hole and reaming undergauge section.
5:30 A. M. On bottom at 9727' and drilling ahead.
6:00 A. M. T. D. 9729'. Start circulating up samples prior to pulling
bit #58. Mud check:
Weight 9.8 #/gal. Filter cake 2/32
Viscosity 60 Sec. Yield 33
Water loss 8.0 cc. Initial Gel 8
Pl. Vis. 19 cp.
9:00 A. M. Fish for junk.
10:00 A. M. Start out of hole.
3:45 P. M. On bank with bit #58, reamed out of gauge hole, drilled
2' new hole, teeth dull, 1/8" out of gauge. Recovered
numerous pieces of junk in sub.
7:15 P. M. On bottom with bit #59, W7R. Bridge 47' off bottom.
Reaming to bottom.

21 May 1961

12:01 A. M. T. D. 9729'. Washed to bottom with bit taking sporadic
amounts of weight. Last 50' of hole was tight.
Mud check:
Weight 9.7 #/gal. Filter cake 2/32
Viscosity 55 Sec. pH 8.0
Water loss 9.2 cc. Yield 14
Pl. Vis. 18 cp. Ca 640 ppm
NaCl 3300 ppm
1:20 A. M. Mixing gel and driscose to bring up viscosity and
reduce water loss.
2:15 A. M. Short trip 2 stands. Slight drag noted on 1st joint then
free. Circulated 15 minutes and went back to bottom.
No fill-up or obstructions.

21 May 1961

(Continued)

3:05 A.M.

Mixing mud. Viscosity checks:

1:00 A.M.	57	3:15 A.M.	57
1:30 A.M.	65	4:30 A.M.	60
2:00 A.M.	55	4:45 A.M.	65
2:30 A.M.	45	5:00 A.M.	71
2:40 A.M.	54		

4:00 A.M.

Mud check:		Yield	15
Weight	9.8 #/gal.	Filter cake	2/32
Viscosity	57 Sec.	pH	8.3
Water loss	8.8 cc.	Ca	1200 ppm
Pl. Vis.	19 cp.	NaCl	4100 ppm

5:00 A.M.

Fishing for junk. Obtained 5 gallons mud sample.
Preparing to trip out to log. Mud check:

Weight	9.8 #/gal.	Filter cake	2/32
Viscosity	71 Sec.	pH	8.3
Water loss	8.4 cc.	Yield	21
Pl. Vis.	22 cp.	Ca	1200 ppm
		NaCl	4100 ppm

Resistivities:	Mud Filtrate	0.87
	Mud	0.90
	Cake	1.40

5:25 A.M.

Start out of hole.

9:30 A.M.

T.D. 9729', on bank with bit #59, reamed out of gauge hole. Bit green, bearings ok, 1/16" undergauge.

10:00 A.M.

Rig up Schlumberger equipment and start running IE log.

7:00 P.M.

IE log, sonic, micro-caliper log completed.

9:30 P.M.

Running temperature log.

Finished running temperature log. Rigging up formation tester. Running formation tester in hole.

22 May 1961

12:01 A.M.

T.D. 9729', running formation tester.

1:30 A.M.

On bank with formation tester.

Summary of logging and testing operations:

1. Es-Ind. Log 9719-2020 (TD 9725)
2. Sonic Log 9718-2020 (TD 9721)
3. Microlog 9717-2020 (TD 9718)
4. Temperature Log 9710-10

Logs indicate that Lyons Formation is highly fractured from 9604 to present TD and is most probably water bearing.

5. Ran Schlumberger formation interval tester and set at 9662 (ES log). Fired perf. shot to open tool to Formation. Had no indication of flow into tool.

22 May 1961

(Continued)

1:30 A. M. Left tool open for 15 min. and pulled tool. This formation tester operation is designated as DST#3. Found that tool was completely plugged with lost circulation material. Recovered no fluid and obtained no pressure data. Decided that additional attempts to obtain test would not be warranted due to high probability that tool would again be plugged by lost circulation material.
Note: Lost 1 rubber seal ring from test tool in hole.

2:00 A. M. Schlumberger rigged down. Started in hole with bit #60, W7R. Running 5-8" drill collars. Running in at rate of 30 seconds or more per stand. Notified Baroid mud logger (Harold Newman) to be on location at 7:00 A. M. 5-22-61.

5:45 A. M. Reaming 40' off bottom.

9:30 A. M. T. D. 9729'. On bottom drilling. Mud check:
Weight 9.7 #/gal. pH 9.0
Viscosity 61 Sec. Yield 15
Water loss 9.6 cc. Gels 6-22
Pl. Vis. 20 cp. Ca 960

12:10 P. M. T. D. 9734'. Began circulating prior to trip.

3:00 P. M. Started out with bit #60. Lost approximately 1' of mud in pits (100 bbls.) while circulating and tripping out bit #60.

6:50 P. M. On bank with bit #60, reamed out of gauge hole and drilled 5', teeth worn, bearings tight, 1/16" under gauge. Rec. 1 small tooth and 2 very small pieces of junk in junk sub.

7:30 P. M. Started in hole with bit #61, RG2BJ. Strapped pipe out with bit #60, had 27.80' kelly (with 20,000#) down, strap gave T. D. as 9730.60', no correction.

10:30 P. M. Reaming 70' off bottom. Mixing mud and adding 50 bbls. of diesel to mud system.

23 May 1961

12:01 A. M. T. D. 9734', reaming to bottom and mixing mud.

2:00 A. M. Found bottom with 35 1/2' kelly down (with 20,000#). Corrected T. D. to 9738. Breaking in bit, varying weight, rpm, and pump pressure to find optimum drilling rate. Bit bouncing occasionally, seems to torque up then bounce then torque again. Pull off bottom a few feet and go back and bouncing stopped. Drilling ahead.

3:00 A. M. Very little bouncing last 1/2 hr. Split engines to vary rpm and pressure separately

23 May 1961

(Continued)

5:10 A. M. Started losing mud.
5:30 A. M. Mud loss stopped, reduced pump pressure from 1400 psi to 900 psi. Lost approximately 32 bbls. mud, Began equalizing pits.
5:52 A. M. TD 9748'. Lost complete returns. Lost pump suction due to loss of mud. Shut down pump, equalized pits, got pump suction, tried to regain circulation, no returns. Pulled 5 stands, established circulation, mixing mud to increase mud volume. Mud check prior to loss (approximately 5:45 A. M.):
Weight 9.6 #/gal. pH 8
Viscosity 56 Sec. Yield 9
Water loss 7.2 cc. Filter cake 2/32
Pl. Vis. 19 cp. Ca 1080 ppm
Oil 7 % NaCl 4950 ppm
Solids 11 %
8:50 A. M. On bottom drilling. Losing small amount of mud while drilling. Mud check:
Weight 9.6 #/gal. pH 8.0
Viscosity 56 Sec. Yield 9
Water loss 7.2 cc. Ca 1080 ppm
Pl. Vis. 19 cp.
12:01 P. M. Mud properties:
Weight 9.6 #/gal. pH 9.0
Viscosity 52 Sec. Yield 5
Water loss 7.6 cc.
Pl. Vis. 20 cp.
7:00 P. M. Drilling at 9776'.
7:20 P. M. Lost circulation at 9777'. Lost 112 bbls. mud. Pulled up 5 stands and filled hole through fill-up line. Level dropped rapidly.
7:45 P. M. T. D. 9777'. Shut down, mixing mud. Lost approximately 150 bbls. mud total.
11:15 P. M. Broke circulation and washed down a few feet to bottom.
11:30 P. M. Resumed drilling at 9777'.
11:59 P. M. Drilling at 9778'.

24 May 1961

12:01 A. M. T. D. 9778', drilling ahead. Mud check:
Viscosity 86 Sec. Pl. Vis. 28 cp.
Water loss 7.2 cc. pH 9.0
5:30 A. M. Lost 50-70 bbls. mud at 9799'. Continuing drilling, mixing mud and lost circulation material.

24 May 1961

(Continued)

7:00 A.M.

Drilling at 9810'.

8:00 A.M.

Circulating drilling break at 9815'. Calculations based on the amount of mud material mixed yesterday indicate that the mud volume lost was approximately 800 bbls. Pit level check from 9:00 a.m., 5-22 to 7:30 A.M. 5-24 showed 120" lost which is approximately 1,000 bbls.

12:01 P.M.

T.D. 9815'. Trip out. Mud check:

Weight 9.2 #/gal. Pl. Vis. 10 cp

Viscosity 36 Sec. Yield 0

Water loss 10.6 cc. Ca 740 ppm

2:40 P.M.

On bank with bit #61, drilled 81' in 20 3/4 hrs, teeth good, bearings slightly loose, in gauge. No junk recovered in junk sub. Run bit #62, RG2BJ.

6:00 P.M.

On bottom 30 feet fill-up. Circulating through fill-up.

7:40 P.M.

On bottom with no weight.

8:00 P.M.

On bottom with 20,000# kelly 17' down. Drilling ahead.

9:00 P.M.

TD 9820' drilling. Losing some mud but mixing more.

25 May 1961

12:01 A.M.

TD 9835' Drilling ahead. Mud loss decreasing, volume beginning to hold steady. Stopped mixing mud. Pressure decreased to 950 psi.

1:25 A.M.

Pump down, valve plugged with lost circulation material.

1:45 A.M.

Resumed drilling.

4:00 A.M.

No mud loss since reducing pressure to 950 psi. Water loss is 10.2, began treating mud system with Q-Broxin, driscose and lime for 1 circulation.

2:40 P.M.

Switch to #2 pump. Replace liner in pump #1. No downtime.

6:30 P.M.

Pump #1 back on hole.

8:00 P.M.

TD 9892'. Began circulating for samples. Bit #62 made 77' in 23 2/3 hrs.

10:40 P.M.

Mud check:

Weight 9.5 #/gal. Filter cake 2/32

Viscosity 83 Sec. Yield 17

Water loss 8.0 cc. pH 9.0

Pl. Vis. 25 cp. Salt 3300 ppm

Ca 860 ppm

10:50 P.M.

Finished circulating. Started short trip. Kelly down 33' with 20,000#.

11:30 P.M.

10 stands out. Letting fill-up accumulate for 1 hr.

26 May 1961

12:01 A.M.

T.D. 9892'. Shut down. Checking fill-up with 10 stands out of hole.

12:45 A.M.

Start back to bottom.

1:00 A.M.

On bottom with 4' of fill-up. Fish for junk 15 minutes. Dropped Eastman Survey.

1:30 A.M.

Started trip out with bit #62 to pick up magnets.

4:25 A.M.

On bank with bit #62, teeth good, bearings slightly loose, to gauge. Rec. 8 pieces of junk, including 2 recognizable bit teeth and 2 carbide buttons from RG2 bit.

5:00 A.M.

Eastman survey 1 3/4° at 9860'. Start in hole with 10 1/2" magnet and junk sub.

7:45 A.M.

T.D. 9892', on bottom. Magnet plugged and stuck.

Worked pipe 300,000#.

10:15 A.M.

Pipe free. Pulling wet string.

3:15 P.M.

On bank. Magnet plugged with cavings.

4:10 P.M.

Trip in bit #59 RR.

5:00 P.M.

Cut drilling line.

6:00 P.M.

Resume trip in hole.

7:50 P.M.

Establish circulation. Approximately 300' off bottom.

8:35 P.M.

On top of 15' fill-up. Circulating through fill. Pump #2 down. Repairing valves. Will begin mixing mud when pump repairs are completed.

10:00 P.M.

Started mixing mud.

11:25 P.M.

Pump #1 down. Valves in crooked.

11:50 P.M.

Put #2 pump on hole to circulate. Cannot mix mud.

27 May 1961

12:01 A.M.

TD 9892'. Circulating with pump #2. Repairing pump #1.

1:00 A.M.

Pump #1 on hole. Mixing mud with #2 pump. Conditioning mud. Running viscosity checks every 20 minutes.

8:00 A.M.

Fish for junk.

9:00 A.M.

Trip out for magnet. Mud check prior to trip:

Weight 9.5 #/gal. pH 9.0

Viscosity 82 Sec. Yield 15

Pl. Visc. 25 cp. C 80" ppm

Water loss 8.2 cc.

Checked viscosity every 20 minutes in order to treat low spots in the system.

1:40 A.M. 67 4:00 A.M. 84 6:25 A.M. 74

2:00 A.M. 62 4:20 A.M. 67 6:45 A.M. 76

2:20 A.M. 64 4:40 A.M. 80 7:05 A.M. 78

2:40 A.M. 65 5:05 A.M. 104 7:25 A.M. 78

3:00 A.M. 53 5:25 A.M. 84 7:45 A.M. 82

3:20 A.M. 60 5:45 A.M. 71 8:05 A.M. 81

3:40 A.M. 74 6:05 A.M. 70 8:25 A.M. 80

12:20 P.M.

On bank. Lay down 6-8" drill collars. Rec. no junk in sub. Start in with 9" magnet and 2 junk subs.

27 May 1961

(Continued)

3:45 P. M. Broke circulation half way in hole.
4:05 P. M. Resume trip.
4:40 P. M. Break circulation 5 stands off bottom.
5:05 P. M. Resume trip.
5:35 P. M. On bottom 8' fill-up.
6:00 P. M. Mud check prior to trip out:
Weight 9.4 #/gal. pH 8.5
Viscosity 82 Sec. Yield 15
Water loss 8.0 cc. Ca 920 ppm
Pl. Vis. 30 cp.
6:45 P. M. Started trip out with magnet. Checked size of diamond
corehead #R18674. O. D. 7 13/16", I. D. 4 3/8".
Stabilizer O. D. 7 13/16". New corehead.
10:45 P. M. On bank with magnet. Recovered no junk in subs or
magnet.
11:30 P. M. Start in with corehead #R18674.

28 May 1961

12:01 A. M. T. D. 9892', trip in core bbl.
2:00 A. M. On top of 4' fill-up. Barrel plugged. Unplugging bbl.
3:00 A. M. Circulating through fill to tag bottom.
3:30 A. M. Rigging up kelly extension.
3:51 A. M. Began coring core #14.
11:30 A. M. TD 9907'. Shut down to remove kelly extension.
11:40 A. M. Resume coring.
3:00 P. M. 9915'. Mud check:
Weight 9.4 #/gal. pH 9.0
Viscosity 73 Sec. Yield 3
Water loss 8.6 cc. Ca 880 ppm
Pl. Vis. 33 cp.
Mixing gyp and driscose to increase Ca and decrease
water loss.
8:30 P. M. TD 9928'. Bbl. seems to be jammed. No torque in
table, broke core off String indicated wt. 220,000#,
10,000 less than previously thought due to temperature
variation (night) on indicator. Had been coring with
only 10,000# on bit since sundown.
8:45 P. M. Resumed coring.
11:00 P. M. T. D. 9935', core jamming, pressuring up to 1800 psi.
Pulling core. Core #14, cut 43' in 13 3/4 hr. Kelly
down 46 1/2'. Strapping out.

29 May 1961

12:01 A.M.

TD 9935'. Trip and strap out core #14. Mud check prior to trip.

Weight	9.4 #/gal.	Filter cake	2/32
Viscosity	76 Sec.	Yield	15
Pl. Vis.	25 cp.	pH	9.0
Water loss	7.6 cc.	Ca	900 ppm
		NaCl	3,000 ppm

Lost circulation material 1%.

4:00 A.M.

On bank with core. Waiting on geologist.

4:30 A.M.

Tried to lay down core. Pipe tally TD 9934.60', no correction. Core jammed in bbl., inner bbl. parted, dismantling bbl. to remove core. Core #14 cut 43', rec. 35 1/2'.

9:30 A.M.

Finished servicing core barrel. Bearings locked in swivel and parted at swivel, probably due to jamming of the bbl.

11:00 A.M.

Trip in bit #62 RR, RG2BJ and knobby reamer. Gauged knobby reamer and it appeared to be over gauge too far. Checked with Drilco in Midland, Texas and they said that top layer of buttons should be a maximum of 3/32" over gauge and that the gauge ring should pass freely when rollers are properly oriented. The gauge ring could not be made to pass this layer of buttons. Midland is checking now on whether a mistake has been made in the size block used in the body of the reamer. Mr. Rollins (Drilco Oil Tool) called back to say that the tool on location is properly designed as to gauge clearance.

2:30 P.M.

Trip in with reamer and bit. All tight spots indicated on caliper log have been noted and extreme care will be used in passing these sections.

6:30 P.M.

Reaming 300' from top of cored rathole.

9:30 P.M.

Reaming core hole at 9892'. Mud check:

Weight	9.4 #/gal.	Filter cake	2/32
Viscosity	75 Sec.	pH	9.0
Water loss	7.6 cc.	Yield point	15
Pl. Vis.	30 cp.	Ca	960 ppm
		NaCl	3,300 ppm

30 May 1961

12:01 A.M.

T.D. 9935', reaming corehole at 9905'. Mud check:

Weight	9.4 #/gal.	Filter cake	2/32
Viscosity	77 Sec.	pH	9.0
Water loss	6.8 cc.	Yield point	15
Pl. Vis.	25 cp.	Ca	1,000 ppm
		NaCl	1,650 ppm

30 May 1961
(Continued)

3:00 A.M.	Reaming corehole at 9916'. Mud check.
	Weight 9.3 #/gal. Pl. Vis. 24 cp.
	Viscosity 69 Sec. Yield Point 14
	Water loss 7 cc. pH 9.0
	Filter cake 2/32 Ca 1000 ppm
	NaCl 1600 ppm
6:25 A.M.	Finish reaming corehole. Mud check:
	Weight 9.4 #/gal. Filter cake 2/32
	Viscosity 58 Sec. pH 9.0
	Water loss 7.2 cc. Yield point 10 ppm
	Pl. Vis. 20 cp. Ca 1000 ppm
	NaCl 2100 ppm
7:45 A.M.	Start circulating for samples. Measured 3 1/2' kelly up with 20,000#.
11:45 A.M.	Start out with bit #62 RR, RG2BJ and reamer. Scopel found no apparent porosity in samples and decision was made to run bit and reamer.
3:00 P.M.	On bank with bit #62 RR, reamer 43' corehole. Knobs on reamer broken off. 1/2" under gauge. Bit was missing 3 knobs, same as when this RR bit went in. Bearings loose, 1/16" undergauge as before.
3:15 P.M.	Start in with bit #63, RG2BJ, and junk basket. Strapped pipe in. No correction on T.D.; still 9935.
6:00 P.M.	Nearing bottom with toolpusher on brake. Carefully washing down with no weight on bit.
8:00 P.M.	T.D. 9935', on bottom. Drilling ahead. Fished for junk off and on since 6:00 P.M. Mud Check:
	Weight 9.4 #/gal. Filter cake 2/32
	Viscosity 165 Sec. Yield 20
	Water loss 6.4 cc. pH 9.0
	Pl. Vis. 45 cp. Ca 1120 ppm
	NaCl 1650 ppm
8:40 P.M.	Began fishing for junk.
9:40 P.M.	Resumed drilling.
10:30 P.M.	Bit not drilling at all, no torque in table. Fish for junk prior to trip out
11:30 P.M.	T.D. 9935'. Start out with bit #63.
<u>31 May 1961</u>	
12:01 A.M.	T.D. 9935'. Tripping out with bit #63.
2:50 A.M.	On bank with bit #63, made no new hole. Bit green.
3:20 A.M.	Start in hole with bit #64, W7R.

31 May 1961

(Continued)

6:00 A. M. On top of 3' of fill-up.
6:15 A. M. TD 9935'. Drilling ahead.
2:00 P. M. T. D. 9960', began circulating for samples.
4:25 P. M. Moved pipe and lost circulation.
4:45 P. M. started out of hole with bit #64.
7:45 P. M. On bank with bit #64, drilled 25' in 8 hrs., teeth medium dull, bearings tight, to gauge. No junk rec. in sub. Dressed 11" reamer with Q-type cutters.
8:55 P. M. Began running drill collars in hole with reamer, junk sub and bit #65, 4W4. Checked gauge on reamer, 11" gauge ring would not move freely over Q-type cutters.
9:30 P. M. Drill collars in hole, began mixing mud.

1 June 1961

12:01 A. M. T. D. 9960', mixing mud.
12:20 A. M. Began trip in hole with bit #65. Will shut down every 25 stands, put kelly on and establish circulation. Going in hole slowly looking for first under gauge hole at about 8750' (microlog).
3:30 A. M. Began reaming 10 stands + one joint off bottom (approximately 8990'). Found no tight hole at 8750'.
4:40 A. M. Finished reaming tight spot. Reamed about 20'. Continuing trip in hole slowly.
5:15 A. M. Tight spot 2 stands + 2 joints off bottom (approximately 9700'). Reaming through tight spot.
5:30 A. M. Broke rotary chain. Shut down for repairs.
6:05 A. M. Resumed reaming. Losing a little mud. Began adding water and mixing mud while reaming.
9:00 A. M. Mud check:
Weight 9.3 #/gal. pH 9.0
Viscosity 79 Sec. Yield point 20.0
Water loss 7.0 cc. Ca 920 ppm
Pl. Vis. 20 cp.
Reaming 270 feet off bottom.
12:01 P. M. Reaming 120 feet off bottom. Mud check:
Weight 9.2 #/gal. pH 9.0
Viscosity 94 Sec. Ca 880 ppm
Water loss 8.0 cc.
3:00 P. M. Reaming 30' off bottom. Mud check:
Weight 9.2 #/gal. Pl. Vis. 20
Viscosity 70 Sec. pH 9.0
Water loss 6.8 cc. Yield 15
Lost returns 5 feet off bottom.

1 June 1961

(Continued)

4:00 P. M.

On bottom, drilling ahead. Lost 9" mud, 80 bbls. in 30 min. Mixing lost circulation material, adding 2" stream of water.

6:00 P. M.

T. D. 9968'. Total mud lost 12", 108 bbls. Mud check:

Weight 9.4 #/gal. Yield 9

Viscosity 67 Sec. Ca 1,000 ppm

Water loss 8.0 cc.

Pl. Vis. 22 cp.

Drilling ahead.

10:00 P. M.

Losing mud, adding water and mixing mud. Keeping up with loss. Drilling ahead.

2 June 1961

12:01 A. M.

TD 9991'. Drilling ahead.

12:20 A. M.

Pump aired up.

12:40 A. M.

Resumed drilling.

3:00 A. M.

TD 10,000'. Fishing for junk prior to trip out with bit #65 drilled 40' in 10 3/4 hrs.

4:00 A. M.

Dropped Eastman survey.

4:15 A. M.

Started out of hole.

6:45 A. M.

About 9/10 out of hole. Ran 2000' of pipe back in hole.

7:15 A. M.

Circulating and conditioning mud with about 3000' of pipe in hole.

8:10 A. M.

Resumed trip out.

9:50 A. M.

On bank with bit #65, 1/2" out of gauge. Reamer 1/16" out of gauge. Deviation misrun.

10:50 A. M.

Dress reamer with "Q" cutters. Start in hole with bit #66, W7R.

11:30 A. M.

String up new drilling line.

1:30 P. M.

Resume trip.

3:30 P. M.

On bottom, 30' out of gauge, hole losing mud.

6:10 P. M.

On bottom, drilling ahead.

3 June 1961

12:01 A. M.

TD 10,015'. Drilling ahead. Losing no mud.

12:25 A. M.

TD 10,016'. Began circulating for samples.

3:30 A. M.

Fish for junk and drop Eastman survey.

4:00 A. M.

Start trip out with bit #66, drilled 16' in 6 1/4 hrs. Mud check prior to trip:

Weight 9.4 #/gal. pH 9.0

Viscosity 70 Sec. Yield 8

Water loss 7.0 cc. Ca 1,000 ppm

Pl. Vis. 23 cp. NaCl 1,650 ppm

Filter cake 2/32 Rm 1.3

Rmf 1.2

Rmc 1.9

3 June 1961
(Continued)

7:45 A. M. On bank with bit #66, teeth medium worn, bearings slightly loose, 1/32" under gauge. Reamer to full 11" gauge. Eastman survey 3/4" at 10,016'. Make up test tool 171 ft. anchor.

9:25 A. M. Trip in hole with DST tool, 60 sec./stand.

10:45 A. M. Shut down to fill water cushion, 1,500'.

1:45 P. M. On bottom. No fill. Packer failed. Set at 9845'.

5:45 P. M. DST #4 (10,016 -9,845). Recovered 1500' water cushion plus 893' of drilling mud. Packer had been set in fractured zone, no test.

6:30 P. M. Start in hole with bit #64 RR, W7R, to condition mud.

9:30 P. M. On top of 40' of fill-up. Circulating to bottom.

10:00 P. M. On bottom, conditioning mud. Mud check:

Weight	9.4 #/gal.	Filter cake	2/32
Viscosity	107 Sec.	Yield point	12
Water loss	7.2 cc.	pH	8.0
Pl. Vis.	33 cp.	Ca	1160 ppm
		NaCl	1650 ppm

4 June 1961

12:01 A. M. T. D. 10,016'. Circulating on bottom to condition mud.

1:00 A. M. Start out of hole with bit #64 RR.

4:15 A. M. On bank with bit #64 RR. Start picking up DST tool.

5:45 A. M. Start in hole with DST tool at 60 sec./stand, 2024' water cushion.

11:30 A. M. Set 2 packers 9836' and 9833'. Packer failed.

12:20 P. M. Working packer free. Trip out.

4:50 P. M. On bank with test tool - DST #5 (10,016-9,836). Recovered 2024' water, 1280' of drilling mud. When tool was opened initially, approximately 16 barrels of mud were bypassed around the packer. Test misrun.

7:00 P. M. Trip in hole with bit #67, W7R, plus reamer and junk sub.

10:45 P. M. On bottom with bit #67, 22' fill-up, drilling ahead. Analysis of DST mud for gas.

C1	310 ppm	C3	120 ppm
C2	60 ppm	C4	+ Trace

Mud sample with traces of oil shows bright white fluorescence - brighter than sample of diesel used in mud.

Recovered - water analysis:

	Sample 1	Sample 2
Ca ppm	120	1080
NaCl ppm	330	1650

5 June 1961

12:01 A. M. T. D. 10,020'. Drilling ahead.
3:00 A. M. Mud check:
Weight 9.4 #/gal. pH 9
Viscosity 90 Sec. Cl 1000 ppm
Water loss 8 cc.
5:45 A. M. T. D. 10,033'. Circulating samples prior to trip.
6:00 A. M. Mud check:
Weight 9.5 #/gal. pH 9.0
Viscosity 70 Sec. Cl 1000 ppm
Water loss 7.8 cc. Ca 1120 ppm
9:00 A. M. Trip out with bit #67, drilled 17' in 7 hrs. Mud prop-
erties prior to trip:
Weight 9.5 #/gal. pH 8.5
Viscosity 70 Sec. Yield 9
Water loss 9.6 cc. Ca 1200 ppm
Pl. Vis. 23 cp. NaCl 1650 ppm
12:45 P. M. On bank with bit #67, bit medium dull, in gauge. Reamer
in gauge.
1:20 P. M. Ran bit #68, W7R plus new reamer and cutters.
3:45 P. M. Hit bridge 120' off bottom.
4:30 P. M. On bottom, drilling. 6' fill.
6:00 P. M. Mud check:
Weight 9.5 #/gal. pH 8.5
Viscosity 58 Sec. Yield 8
Water loss 8.4 cc. Ca 940 ppm
Pl. Vis. 21 cp.
10:30 P. M. Began losing mud. Started adding water and mixing mud
to system.
11:00 P. M. Could not keep up with mud loss. T. D. 10,050'. Began
circulating without drilling.

6 June 1961

12:01 A. M. T. D. 10,050'. Circulating and mixing mud.
12:20 A. M. Lost complete returns. Started to pull 5 stands and mix
pit of mud. Pipe stuck, could not establish circulation.
Working stuck pipe.
1:00 A. M. Pipe free, pulling 25 stands out to mix mud.
4:30 A. M. Mud mixed. Circulation established with 8 minutes
pumping before returns. Circulated light mud out of
hole, pulling bit #68.
8:00 A. M. Out of hole with bit #68, drilled 17' in 6 1/2 hrs. Bit
medium green
8:20 A. M. Start in hole with bit #69, W7R, to condition hole and mud
for DST.
9:20 A. M. Shut down, rig repairs.
10:05 A. M. Resume trip in hole.
12:00 P. M. Hit bridge about 176' off bottom.

6 June 1961

(Continued)

4:05 P. M. On bottom, drilling ahead at 10,050'. Losing some mud.

6:05 P. M. TD 10,057'. Losing mud pulled off bottom, circulating and mixing mud.

6:30 P. M. TD 10,057'. Pulling up above Lyons to build up mud volume.

7:00 P. M. Ten stands out, building mud volume.

7:30 P. M. Mud check:
Weight 9.5 #/gal. Filter cake 2/32
Viscosity 92 Sec. pH 9.0
Water loss 7.0 cc. Yield 15
Pl. Vis. 30 cp. Ca 920 ppm
NaCl 1,650 ppm

9:30 P. M. Start back to bottom. Mud check:
Weight 9.5 #/gal. Filter cake 2/32
Viscosity 75 Sec. pH 9.0
Water loss 7.3 cc. Yield 13
Pl. Vis. 28 cp. Ca 1,000 ppm
NaCl 1,650 ppm

10:00 P. M. On bottom circulating. Had 6' fill-up in 2 1/2 hrs. off bottom. Losing no mud with 800 psi. increased pressure to 950 psi. Started losing mud. Reduce pressure to 800 psi. Mixing mud and checking viscosity every 20 minutes. Will circulate up samples.

10:20 P. M. 70	12:20 A. M. 79
10:40 P. M. 71	12:40 A. M. 98
11:00 P. M. 75	1:00 A. M. 92
11:20 P. M. 74	1:20 A. M. 70
11:40 P. M. 78	1:40 A. M. 70
12:01 A. M. 80	2:00 A. M. 72

7 June 1961

12:01 A. M.

2:00 A. M.

TD 10,057'. Circulating samples and conditioning mud. Mud loss slight during circulating. Began trip out with bit #69. Mud check:

Weight 9.5 #/gal. pH 9.0
Viscosity 72 Sec. Filter cake 2/32
Water loss 7.0 cc. Yield 14
Pl. Vis. 26 cp. Ca 1,000 ppm
NaCl 1,650 ppm

6:00 A. M.

On bank with bit #69, drilled 7' in 2 hrs., teeth medium worn, 1/32" out of gauge, bearings tight. Picked up DST tool with 195.21' anchor, started in hole with DST tool.

7 June 1961

(Continued)

7:20 A. M. Fill cushion 9 stands.
11:25 A. M. On bottom, no fill. Open packer, failed.
11:31 A. M. Reset packer, holding 9862'.
11:38 A. M. Closed in.
12:38 A. M. Open.
1:08 P. M. Close.
3:08 P. M. Start out.
7:20 P. M. On bank with DST #6 (10,057-9862'). Rec. 6 stands water,
2 stands water cut mud, 18 stands mud. Lay down
DST tool.
8:30 P. M. Start in hole with bit #70, W7R.
9:30 P. M. Cut drilling line.
10:15 P. M. Resume trip in hole. Estimated mud loss for June
5, 1961 is 200 barrels for June 6, 1961, 150 barrels.

8 June 1961

12:01 A. M.

T. D. 10,057', trip in bit #70, hit bridge 80' off bottom.
Circulating and reaming to bottom, Field pressures from DST #6.
IF 1113 FSIP 3958
FF 1238 IHP 4862
ISIP 3040 FHP 4815
Temperature 220°. Left 1 packer rubber in hole.
2:00 A. M. On bottom, drilling ahead.
3:00 A. M. Pump #1 plugged with packer rubber. Switched to #2.
6:00 A. M. Began losing mud. Turned 3" and 1" water in system.
Started mixing gel and lost circulation material.
6:10 A. M. Pump #1 plugged with packer rubber, switched to #2.
6:45 A. M. T. D. 10,065', still losing mud. Can't keep
up with water. Pulling 10 stands and will
mix mud. Estimated mud loss 200 barrels.
9:30 A. M. Start back to bottom after breaking circulation.
9:50 A. M. On bottom 10,065'. Nine feet of fill-up.
10:40 A. M. On bottom drilling.
11:25 A. M. Bit bouncing. 10,067'. Losing mud. Shut down to
mix mud.
12:25 P. M. Build up pit. Volume broke circulation.
12:45 P. M. Lost returns, 200 barrels. Shut down to mix mud.
2:40 P. M. Build up mud volume. Broke circulation. Commence
drilling.

8 June 1961

(Continued)

3:00 P.M.

Mud check:

Weight 9.5 #/gal. pH 8.5
Viscosity 75 Sec. Ca 1,040 ppm
Water loss 8.2 cc.

5:45 P.M.

T.D. 10,076'. Trip out bit #70, drilled 19' in 8 3/4 hrs.

9:15 P.M.

On bank with bit #70, teeth worn (bald), bearings
loose, 1/4" under gauge. Reamer over 11" gauge.
Recovered no junk in sub.

9:30 P.M.

Start in with bit #63 RR, RC2BJ with 2-7/8"
and 1-1/2" jets.

9 June 1961

12:01 A.M.

T.D. 10,076'. Trip in bit #63 RR.

12:20 A.M.

Ream and circulate 25' to bottom. Build mud volume
and mix mud.

2:00 A.M.

Drilling ahead.

6:00 A.M.

TD 10,087'. Have lost no mud since drilling began.

9:00 A.M.

10,092'. Mud holding steady. Mud check:

Weight 9.4 #/gal. pH 9.0
Viscosity 100 Sec. Yield 15
Water loss 6.6 cc. Ca 1,080 ppm
Pl. Vis. 35 cp.

12:01 P.M.

10,102'. Mud check:

Weight 9.4 #/gal. pH 9.5
Viscosity 87 Sec. Yield 15
Water loss 6.4 cc. Ca 1,280 ppm
Pl. Vis. 30 cp.

1:45 P.M.

Started losing mud 10,112'.

2:15 P.M.

Shut down to mix mud. Lost 160 barrels.

3:40 P.M.

Tried to break circulation.

3:55 P.M.

Stopped pumping, lost 120 bbls.

4:50 P.M.

Mix up new mud. Mud check:

Weight 9.3 #/gal. pH 7.5
Viscosity 60 Sec. Yield point 8
Water loss 6 cc. Ca 920 ppm
Pl. Vis. 17 cp. Lcm 24 %

5:25 P.M.

Pumped in 215 bbls. Pull up 10 stands to mix mud.

Total loss 160 + 120 + 215 = 495 bbls.

7:15 P.M.

Mud volume built up. Pumping in hole with 300 psi.

Got returns after filling hole with 125 bbls. mud.

Returns diminished, then stopped. Kicked pump out,
mud level in hole dropped quickly. Shut down, mix-
ing mud and increasing mud volume.

9 June 1961

(Continued)

9:30 P. M.

Mud volume built up. Viscosity 200-, water loss 5.4 cc. LCM 20%. Began pumping in hole, got returns with 97 bbls. to fill hole. Returns diminished to almost nothing. Shut down. Pulled 10 stands, total of 20 stands out, mixed mud and building mud volume. Will wait 5 hours before trying to establish circulation. Total mud loss for day:

160
120
215
125
97
717 Barrels

10 June 1961

12:01 A. M.

T. D. 10, 112'. Mixing mud and increasing mud volume. Waiting 5 hours to break circulation.

3:30 A. M.

TD 10, 112'. Began pumping mud in hole. Got returns in 10 minutes with 83 bbls. Returns diminishing, tried to keep up with losses with 1" and 3" water lines, could not keep up with losses. Shut down to mix mud.

8:05 A. M.

Pull up 25 stands total, 45 stands out, pump 20 min. got returns with 250-325 psi. Losing mud slowly.

9:50 A. M.

Pumped in total of 240 barrels. Mixing mud.

11:40 A. M.

Started pumping with 175-250 psi.

11:45 A. M.

Mud circulating 175-275 psi.

12:20 P. M.

Increased pump pressure to 500 psi.

12:35 P. M.

Increased pump pressure to 700 psi.

12:55 P. M.

Run in 20 stands. Lost a total of 60 barrels. Mud check at 12:50:

Weight 9.5 #/gal.

Viscosity 146 Sec.

Water loss 6.6 cc.

Pl. Vis. 43 cp.

Yield point 22

1:45 P. M.

Start pump. Mud returns in 2 minutes, increased pump pressure gradually to 600 psi. Pumped in 70 barrels.

Shut down to mix mud.

3:30 P. M.

Start pump returns in 3 minutes.

3:45 P. M.

Run to bottom.

4:30 P. M.

Hole full when on bottom.

4:45 P. M.

Tag bottom 5' fill-up.

5:00 P. M.

Commence drilling. Total loss since 12:01 A. M. 450 barrels.

10 June 1961

6:00 P. M.

T. D. 10, 121'. Hit drilling break at 10, 109'.

6:30 P. M.

Circulate samples.

7:00 P. M.

Loss complete returns. Pulled off bottom and mixed pit of mud. Al called Mechem in Fraser and decision was made to come out of hole and go back in with core barrel.

8:30 P. M.

Got mud returns after pumping in about 100 barrels. Start out of hole to pick up core barrel.

11:45 P. M.

On bank with bit #63 RR. Bit medium green, 1/16" under gauge. Reamer in gauge. Total mud loss 450 - 150 = 600 bbls. Bit #66RR made 45' in 13 3/4 hrs.

11 June 1961

12:01 A. M.

TD 10, 121'. On bank getting ready to go in hole with core barrel. Welder enlarged two holes in water course of core barrel in order to handle more lost circulation material.

2:00 A. M.

Start in hole. Ran in corehead #R18674, core barrel and drill collars. Shut down to mix a pit of mud.

4:00 A. M.

Finished mixing mud, continue in hole. Broke circulation ok at 4,000' and 7,000'. Plan to break circulation again at 9,000'.

7:30 A. M.

Start pump 9,000'. Returns in one minute.

7:37 A. M.

Resume trip.

8:00 A. M.

On bottom 30' fill, probably lost circulation material. Circulating fill.

9:00 A. M.

Mud check:

Weight	9.0 #/gal.	pH	9.0
Viscosity	89 Sec.	Yield	20
Water loss	6.0 cc.	Ca	1,600 ppm
Pl. Vis.	29 cp.	LCM	10 %

9:45 A. M.

Shut down to rig up kelly extension.

10:15 A. M.

Commence coring. Losing some mud. Keeping up with 3" line and mixing.

12 June 1961

12:01 A. M.

T. D. 10, 152. Coring ahead.

3:45 A. M.

TD 10, 158'. Started pulling core #15.

7:30 A. M.

On bank with core #15. Recovered 36' of 37' cut. Core shows high incidence of vertical fracturing. All fine grained red sandstone serviced core barrel; diaphragm broken and will have to be replaced before next core. Corehead in excellent condition.

11:30 A. M.

Cut drilling line 1 hr.

12 June 1961

(Continued)

12:30 P. M.

Start in hole with bit #61 RR, RG2BJ to ream core hole (core #15). From 10,121 to 10,158 TD.

3:00 P. M.

Repair rig 1 hr.

4:00 P. M.

Reaming and washing down hole.

5:00 P. M.

Reaming core hole.

6:00 P. M.

Calculation of mud loss during cutting of core #15. 3" line in system 10:13 A. M. 6-11 to 3:00 A. M. 6-12 Total of 16 3/4 hrs. Flow rate 5 gals./11 seconds.

$$16.75 \text{ hrs.} \times \frac{60 \text{ min.}}{\text{hr.}} \times \frac{60 \text{ secs.}}{\text{min.}} \times \frac{5 \text{ gals.}}{11 \text{ secs.}} \times \frac{\text{Bbl.}}{42 \text{ gals.}}$$

Total mud loss while cutting core #15 = 653 bbls.

6:30 P. M.

Reaming core hole. Mud check:

Weight	9.3 #/gal.	Yield	10
Viscosity	57 Sec.	Filter cake	2/32
Water loss	8.0 cc.	pH	9.0
Pl. Vis.	20 cp.	Ca	1,400 ppm
		NaCl	1,485 ppm

Running 1" stream to keep up with losses.

10:00 P. M.

Reaming ahead. Losing some mud, but keeping up with losses with 1" line. Mixing mud. Mud check:

Weight	9.2 #/gal.	Filter cake	2/32
Viscosity	55 Sec.	pH	8.5
Water loss	8.0 cc.	Yield	9
Pl. Vis.	17 cp.	Ca	1,480 ppm
		NaCl	1,620 ppm

13 June 1961

12:01 A. M.

TD 10,158'. Reaming core hole.

1:10 A. M.

Reamed to TD 10,158'. Drop Eastman survey, start out with bit #61 RR. Bit reamed 37' in 8 hrs.

5:15 A. M.

On bank with bit #61 RR. 1/32" under gauge, same as when it was run, teeth good, bearings loose. Reamer to gauge.

5:30 A. M.

Start trip in with bit #71, RG2BJ with 3-7/8" jets, 11" reamer and junk sub. Eastman survey was 1 3/4° at 10,158'.

8:45 A. M.

Washing down and reaming.

9:45 A. M.

On bottom and drilling at 10,158 TD.

7:00 P. M.

Drilling at 10,199'.

14 June 1961
12:01 A. M.

Drilling at 10,211'. Had slight loss of mud about 9:00 P. M. but came back. Had about 5' reverse drilling break at 10,199 to 10,204. Notified geologist. Seems to be shale stringer although a few pieces of dolomite are present in samples. Drilling ahead. 10,236' drilling ahead.

9:00 A. M.
11:30 A. M.

T.D. 10,242'. Trip out bit #71, lay down 15 jts. of #2 drill pipe, bit #71 made 84 ft. in 25-1/2 hours for a total of 62,400 revolutions at 55,000#, tests will be run on the next bit run to determine most economical weight and rpm combination to run on 'R' type bit.

4:15 P. M.

On bank bit #71, bearings loose, bit and reamer in gauge, picked up other reamer and bit #72 RG2BJ. Survey 2 1/4° 10,242'. Start in hole with bit #72.

7:30 P. M.

On bottom with bit #72, tried to break circulation, both pumps in need of repairs. Shut down to repair pumps.

8:45 P. M.

T. D. 10,242'. Drilling ahead.

10:00 P. M.

Mud check:

Weight	9.2 #/gal.	pH	9.0
Viscosity	85 Sec.	Filter cake	2/32
Water Loss	7.4 cc.	Yield	15
Pl. Vis.	30 cp.	Ca	1,400 ppm
		NaCl	1,300 ppm

15 June 1961
12:01 A. M.

T. D. 10,251'. Drilling ahead. Down 1/2 hr. since 9:00 P. M. for pump repairs.

2:00 A. M.

Have lost mud for last hour. Will begin mixing mud and build mud volume to stay ahead of loss.

3:00 A. M.

Baroid mud logger notified increase in gas reading from 6 to 8 units to 20 to 22 units. Notified geologist. No change noted in samples.

6:00 A. M.

Baroid mud logger feels gas increase was a recycle of trip gas which he was not looking for at the time it came around, due to frequent pump changes since on bottom. Mud volume back to original level. Mud loss estimated at: Water in at 20 gal/min for 4 hours, 20 x 60 x 4 x 1/42 = 114 barrels total loss to 6:30 A. M.

9:00 A. M.

10,279'. Mud check:

Weight	9.3 #/gal.	pH	9.5
Viscosity	78 Sec.	Yield point	5
Water Loss	8.0 cc.	Ca	1,400 ppm
Pl. Vis.	40 cp.	Gels	4-38

15 June 1961

(Continued)

6:00 P. M.

T. D. 10, 309'. Mud check:

Weight	9.3 #/gal.	pH	9.0
Viscosity	92 Sec.	Yield Pt.	15
Pl. Vis.	30 cp.	Ca	1340 ppm
Water loss	8 cc.		

9:30 P. M.

T. D. 10, 317'. Start out of hole to pick up DST tool.

Kelly down 13.50' with 20,000#. Mud check.

Weight	9.3 #/gal.	pH	8.0
Viscosity	83 Sec.	Filter cake	2/32
Pl. Vis.	27 cp.	Yield	11
Water loss	8.0 cc.	Ca	1460 ppm
Rm	2.05	NaCl	1320 ppm
Rmf	1.3	Rmc	1.5

16 June 1961

12:01 A. M.

T. D. 10, 317'. Trip out bit #72, 75' in 22 1/2 hrs.

1:00 A. M.

On bank with bit #72, teeth good, bearings locked or binding, to gauge. Began making up DST tool and running in hole with 17 stands water cushion. Top of top packer will be set at 10,070'.

8:45 A. M.

On bottom, packer failed, attempted to reset twice, failed both times.

1:20 P. M.

On bank with DST tool. Lay down test tool, pick up core-barrel. No recovery, DST #7 (10,317-10,076') failed.

4:00 P. M.

Trip in with corehead #R18674.

7:00 P. M.

Hit bridge 120' off bottom. Washing to bottom slowly. Hook up kelly extension.

9:05 P. M.

On bottom and coring at T. D. 10, 317'.

9:30 P. M.

Pump pressure rose to 2,300# after coring 1'. Came off bottom a few feet and resumed coring.

10:30 P. M.

Pump pressure again high. Circulated 1/2 hr.

17 June 1961

12:01 A. M.

T. D. 10, 319'. Coring.

1:15 A. M.

T. D. 10, 321'. Core not cutting.

1:30 A. M.

Begin pulling core #16.

5:30 A. M.

On bank with core #16, cored 4', recovered 2' of shale, inner barrel parted at swivel

9:15 A. M.

Trip in bit #73, RG2BJ and reamer and junk sub. Hit tight spot on trip with bit yesterday at 7100, could be keyseat.

17 June 1961

(Continued)

11:25 A. M. T. D. 10, 321'. On bottom, no fill-up.
11:50 A. M. Work on pumps.
12:01 P. M. Commence drilling.
3:00 P. M. 10, 327'. Mud check:
Weight 9.3 #/gal. pH 8.5
Water Loss 7.0 cc. Yield 12
Viscosity 106 Sec. Ca 1,000 ppm
Pl. Vis. 29 NaCl 1,200 ppm
5:30 P. M. Mud check: Total depth 10, 333.
Weight 9.8 #/gal. pH 9.0
Viscosity 80 Sec. Filter cake 2/32
Water Loss 8.0 cc. Yield 16
Pl. Vis. 24 cp. Ca 980 ppm
LCM 12 % NaCl 1,155 ppm
6:30 P. M. Total depth 10, 339. Began circulating samples up
prior to trip out for DST tool.
11:00 P. M. Drop Totco, start trip out. Mud check:
Weight 9.4 #/gal. pH 8.0
Viscosity 87 Sec. Filter cake 2/32
Water Loss 8.0 cc. Yield 8
Pl. Vis. 36 cp. Ca 1,300 ppm
Rm 1.3 NaCl 1,320 ppm
Rmf 1.5 Rmc 1.1
Bit #73 made 18' in 8 1/2 hour.

18 June 1961

12:01 A. M. TD 10, 339'. Trip out bit #73
3:00 A. M. On bank with bit #73. Bit green. Bit and reamer to
gauge. Pick up DST tool and run same in hole. Top of
top packer will be set at 10, 130'. Deviation survey -
2 1/2° at 10, 339'.
4:00 A. M. Start in hole with test tool.
9:00 A. M. On bottom with tool. No tight places going in. Negli-
gible fill-up.
1:00 P. M. Preparing to start out of hole with test tool. 1:00 to
1:40 working test tool free. Starting out of hole.
5:00 P. M. On bank with DST #8. (10, 339'-10, 137').
IHP 4,940 FF 1,197
ISIP 4,092 FSIP 4,030 (Field Pressures)
IF 808 FHP 4,898
DST recovery:
1,395' Water Cushion
93' Muddy Water
1,188' Mud

18 June 1961
(Continued)

5:00 P. M. Approximately 768' of mud was recovered in excess of that lost during testing. Mud check on mud recovered during test:

Weight	9.3 #/gal.	Cl	1000 ppm
Water loss	7.6 cc.	Rm	1.2 at 80°F
pH	8.0	Rmf	1.1

6:30 P. M. Start in hole with bit #73 RR, reamer and junk sub.
9:30 P. M. On top of 30' fill-up. Circulating to bottom.
10:00 P. M. T. D. 10,339'. Drilling ahead. Mixing one circulation of mud with 1" stream in system to increase mud volume.

19 June 1961

12:01 A. M. T. D. 10,346'. Drilling ahead.
8:00 A. M. 10,369'. Drilling. Mud check:

Weight	9.3 #/gal.	Yield point	15
Viscosity	88 Sec.	pH	8
Water loss	8.2 cc.	Ca	880 ppm
Pl. Vis.	30 cp.		

4:00 P. M. T. D. 10,388'. Circulate samples prior to trip. Mud check:

Weight	9.3 #/gal.	Yield	10
Viscosity	66 Sec.	pH	9.5
Water loss	7.0 cc.	Ca	1040 ppm
Pl. Vis.	25 cp.		

6:45 P. M. Bit #73 RR made 67' in 26 1/2 hrs.
Trip out to pick up core bbl.

Weight	9.3 #/gal.	pH	8.5
Viscosity	67 Sec.	Ca	1120 ppm
Water loss	7.6 cc.		

10:15 P. M. On bank with bit #73 RR, teeth good, bearings very loose. Reamer full gauge. No junk recovered. Pick up core-head R18674, bbl. and run in hole with drill collars
11:15 P. M. Cut drilling line.
11:45 P. M. Resume trip in hole.

20 June 1961

12:01 A. M. T. D. 10,388'. Trip core bbl. in hole to cut core #17.
2:30 A. M. On top of 35' fill-up. Circulate through fill to bottom.
3:30 A. M. Rig up kelly extension and circulate.
4:40 A. M. Commence coring at 10,388'.
1:50 P. M. T. D. 10,401'. Barrel jammed. Cored 13' in 9 1/4 hrs. Strapping pipe out of hole. Remove kelly extension.
2:15 P. M. Commence trip out.
5:45 P. M. On bank with core barrel.

20 June 1961

(Continued)

7:00 P. M. Lay down core #17, cut 13' recovered 12'. Inner barrel jammed with lost circulation material and fractures.

8:45 P. M. Start in hole with bit #74, RC2BJ, reamer and junk sub.

11:00 P. M. On top of 35' fill-up, circulating to bottom.

11:30 P. M. On top of core rathole, reaming to bottom.

21 June 1961

12:01 A. M. TD 10,401'. Reaming core hole.

4:00 A. M. Core hole reamed. Drilling ahead at 10,401'.

7:45 A. M. Pipe strap yesterday. 10,402' (no correction). Received copy of letter concerning techniques of combatting lost circulation as per conference held with W. E. Gorham, Baroid; and O. E. Mechem, E. A. Columbus, Jr. and Associates, Inc. on 6-15.

9:00 A. M. 10,415'. Mud check:

Weight	9.4 #/gal.	pH	9.0
Viscosity	73 Sec.	Yield Point	15
Water loss	8.0 cc.	Ca	1,200 ppm
Pl. Vis.	25 cp.		

7:00 P. M. TD 10,428'. Baroid mud logging unit inoperable due to short in unit and no more fuses.

10:45 P. M. Hit drilling break at 10,433'. Seem to be back in sand.

11:45 P. M. Baroid mud logging unit operating.

22 June 1961

12:01 A. M. T. D. 10,437', drilling ahead. Mud check:

Weight	9.5 #/gal.	Yield	11
Viscosity	67 Sec.	Filter cake	2/32
Water loss	6.8 cc.	pH	8.5
Pl. Vis.	27 cp.	Ca	1,120 ppm
		NaCl	1,155 ppm

3:00 A. M. T. D. 10,441'. Begin circulating for samples.

4:00 A. M. Start trip out with bit #74, made 40' in 22 1/2 hrs. plus 13' ream.

8:00 A. M. On bank with bit #74, bit in gauge, reamer 1/32 under gauge. Bearings loose.

8:30 A. M. Pick up bit #75, W7R. Reamer and junk sub, start in hole. Will dress reamer with new cutters.

11:05 A. M. On bottom 4' of fill-up.

3:00 P. M. Mud check:

Weight	9.3 #/gal.	pH	9.0
Viscosity	94 Sec.	Yield	19
Water loss	7.0 cc.	Ca	1,000 ppm
Pl. Vis.	27 cp.		

22 June 1961

(Continued)

9:00 P. M.

10,483'. Drilling at 12 to 15 minutes per foot.

Mud check:

Weight	9.5 #/gal.	Filter cake	2/32
Viscosity	83 Sec.	pH	8.5
Water loss	7.0 cc.	Ca	1,100 ppm
		Cl	700 ppm

23 June 1961

12:01 A. M.

TD 10,494'. Drilling at average rate of 4.2 ft./hr.

3:45 A. M.

TD 10,506'. Starting to circulate.

5:20 A. M.

Start out of hole for new bit. Bit #75 made 65' in 16 1/4 hrs. or 4'/hr.

9:10 A. M.

On bank, bit in gauge, medium dull, reamer 1/32 under-gauge.

9:30 A. M.

Pick up bit #76, W7, and reamer with new cutters.

12:30 P. M.

On bottom 7' of fill-up. Drilling ahead.

3:00 P. M.

10,515'. Drilling. Mud check:

Weight	9.4 #/gal.	pH	8.5
Viscosity	99 Sec.	Yield	13
Water loss	8.2 cc.	Ca	1,000 ppm
Pl. Vis.	35 cp.		

Lou Scopel advised as to setting top of top packer at 10,330'

10:00 P. M.

TD 10,542'. Began circulating samples prior to trip out.

24 June 1961

12:01 A. M.

TD 10,542'. Circulating samples prior to trip out for DST.

1:00 A. M.

Start trip out with bit #76. Made 36' in 8 1/2 hrs. Dropped Eastman survey. Mud check:

Weight	9.5 #/gal.	Filter cake	2/32
Viscosity	87 Sec.	Ca	1,120 ppm
Water loss	7.6 cc.	NaCl	1,155 ppm
Pl. Vis.	26 cp.	Rm	0.9
pH	8.5	Rmf	1.1
Yield	14		

5:15 A. M.

On bank with bit #76, medium dull, to gauge, bearings slightly loose. On trip out pipe was tight for 5 stands beginning with the 8th stand off bottom. Eastman survey 3 1/4° at 10,530'.

5:30 A. M.

Pick up test tool and start in hole.

11:04 A. M.

On bottom open tool. Open 2 minutes, close tool.

11:34 A. M.

Open tool, no blow.

11:55 A. M.

Close tool and open bypass to determine if tool is plugged. Fluid level dropped 1 foot.

24 June 1961

(Continued)

12:03 P.M. Opened tool, weak blow, tool not plugged.
1:43 P.M. Close tool, lay down top joint.
1:55 P.M. Start working packer.
2:05 P.M. Packer loose, pulling DST # 9, 10, 326-10,542'.
5:30 P.M. On bank with DST tool. Recovered 17 stands water cushion (1,560') 1 1/2 stands (126') mud.
IHP 5,088' FSIP 1,550' }
ISIP 1,300' FHP 5,088' } Field Pressures
IFP 603' Temp. 212° F }
FFP 685' Test Successful. }
Lay down DST tool and clean suction pit. Left half a packer rubber and half of two packer cushions in hole.
7:15 P.M. Start in with bit #77, W7R, junk sub and reamer with new Q-cutters.
10:30 P.M. Hit tight spot of about 15', 150' off bottom. Put kelly on, reamed tight hole.
11:00 P.M. On top of 30' fill-up. Reaming and circulating to bottom.

25 June 1961

12:01 A.M. TD 10,542'. Circulating and reaming to bottom through 30' fill-up.
12:20 A.M. Commenced drilling.
1:30 A.M. Mud check:
Weight 9.4 #/gal. Filter cake 2/32
Viscosity 213 Sec. pH 8.5
Water loss 8.4 cc. Ca 1,100 ppm
Pl. Vis. 31 cp. NaCl 1,155 ppm
3:00 A.M. TD 10,557'. Have cut 15' since start of drilling at about 6'/hr. Bit #76 was cutting about 4'/hr. when pulled, medium dull. Notified geologist, began circulating samples.
5:00 A.M. TD 10,557'. Resumed drilling.
7:00 A.M. TD 10,565'. Losing mud.
7:30 A.M. Losing mud at rate of 150 bbls./hr. for last 15 minutes. (Rate from Baroid pit watcher). Still getting some returns but mud volume very low. Pulled out 12 stands to mix mud and lost circulation material.
12:30 P.M. Pumped 210 bbls. mud with 30% lost circulation material on bottom. Pumping at 400#. Got some circulation in 8 minutes.
12:45 P.M. Small returns. Total loss estimated at 280 bbls.

25 June 1961

(Continued)

1:00 P. M. Pulled 12 stands and shut down to mix mud and lost circulation material.

5:00 P. M. Work on pump to 6:00 P. M.

6:00 P. M. Broke circulation with 400# pump pressure, took 200 barrels to get circulation.

6:15 P. M. Getting small returns.

6:30 P. M. Losing mud at 150 barrels/hour rate, still pumping at 400#.

6:45 P. M. Lost suction on pump.

7:00 P. M. T. D. 10,567', start out of hole with bit #77. Total loss for day estimated at 600 ± barrels. Mud checks on two pits pumped in:

Pit #1 (12:30 P. M.)

Weight	9.2	#/gal.	Yield	14
Viscosity	90	Sec.	Filter cake	2/32
Water loss	8.0	cc.	pH	9.0
Pl. Vis.	23	cp.	Ca	800 ppm
L. C. M.	30	%	NaCl	700 ppm

Pit #2 (6:00 P. M.)

Weight	9.3	#/gal.	Yield	10
Viscosity	68	Sec.	Filter cake	2/32
Water loss	7.6	cc.	pH	9.0
Pl. Vis.	20	cp.	Ca	1,000 ppm
L. C. M.	30	%	NaCl	700 ppm

11:45 P. M. TD 10,567'. Still pulling bit #77. String wet all the way out, bit plugged, bit #77 made 25' in 4.8 hours.

26 June 1961

12:01 A. M. TD 10,567'. Pulling bit #77, bit plugged, pipe wet. Waiting 15 hours (to 10:00 A. M.) on lost circulation to heal.

2:00 A. M. On bank with bit #77, green. No junk. Bottom drill collar was completely full of cuttings. Reamer to gauge. Picked up bit #78, W7. Running bit #78 reamer, junk sub and collars in hole.

3:10 A. M. Drill Collars in hole. Began mixing mud and LCM.

9:36 A. M. Began pumping.

9:55 A. M. Pressure on pump after pumping 160 barrels.

10:00 A. M. Returns after pumping 240 barrels total.

10:10 A. M. Run in 70 stands.

11:38 A. M. Broke circulation 41 stands off bottom.

26 June 1961

(Continued)

12:08 P. M. Resume trip.
12:30 P. M. Broke circulation 26 stands off bottom, build up mud volume.
2:54 P. M. Broke circulation. Resume trip to bottom.
3:45 P. M. Broke circulation.
4:00 P. M. T. D. 10, 567'. On bottom, no fill-up, drilling ahead.
5:40 P. M. T. D. 10, 574'. Started losing mud. Lost 7' in 21 minutes. Shut down to mix mud. Pulled 3 stands. Total loss 60 barrels since midnight. 240 plus 60 equals 300 barrels.
9:32 P. M. Break circulation.
9:40 P. M. Mud to surface after pumping 50 barrels.
9:55 P. M. Complete lost returns, total loss 180 barrels.
10:05 P. M. Pulled 12 more stands. Will wait 10 hours before trying to circulate again. Total mud loss for the day is 240 plus 60 plus 180, equals 480 barrels.

27 June 1961

12:01 A. M. TD 10, 574'. Waiting 10 hours to break circulation,
8:00 A. M., mixing mud and L. C. M.
1:45 A. M. Mud mixed. Mud check:
Weight 9.2 #/gal. Yield 17
Viscosity 78 Sec. Filter cake 2
Water loss 6.4 cc. pH 9.5
Pl. Vis. 22 cp. Ca 800 ppm
L. C. M. 30 NaCl 700 ppm
8:04 A. M. Break circulation.
8:12 A. M. Returns after pumping, drilling ahead 50 bbls. at 325 psi.
8:30 A. M. Trip to bottom.
8:57 A. M. T. D. 10, 574'. On bottom. No fill-up.
12:01 P. M. Drilling 10, 586'. Hit drilling break at 10, 582'.
3:30 P. M. TD 10, 594'. Circulate samples for core barrel.
Mud check:
Weight 9.3 #/gal. pH 9.0
Viscosity 82 Sec. Yield point 12
Water loss 7.8 cc. Ca 1,040 ppm
Pl. Vis. 26 cp.
Bit #78 made 27 feet in 7 3/4 hours.
7:00 P. M. Start out of hole with bit #78.
11:00 P. M. On bank with bit #78.
11:01 P. M. Start in with core barrel. Bit #78 medium green, to gauge.

28 June 1961

12:01 A.M.

TD 10,594'. Going in hole with corehead R18674 and bbl.
Broke circulation at 3000'. Circulation ok. Resumed trip.

12:45 A.M.

1:40 A.M.

Broke circulation at 7000' (15 minutes) ok. Resumed trip.

2:20 A.M.

Broke circulation at 9000' (15 minutes) ok. Resumed trip.

3:30 A.M.

On bottom. Circulating for 2 hours prior to coring.

5:30 A.M.

Began tagging bottom.

6:00 A.M.

T.D. 10,594'. Commenced coring. Mud check:

Weight	9.3 #/gal.	Filter cake	2/32
Viscosity	74 Sec.	pH	9.0
Water loss	7.6 cc.	Ca	1,040 ppm
Pl. Vis.	24 cp.	NaCl	800 ppm
Yield	12	LCM	15 %

9:00 A.M.

TD 10,601'. Coring. Mud check:

Weight	9.3 #/gal.	Yield point	.3
Viscosity	72 Sec.	pH	9.0
Water loss	7.8 cc.	Ca	1,040 ppm
Pl. Vis.	22 cp.		

3:00 P.M.

Checked all valves on choke manifold to assure they were in proper working order. Mud check:

Weight	9.3 #/gal.	Yield point	10
Viscosity	72 Sec.	pH	9.0
Water loss	7.6 cc.	Ca	1,040 ppm
Pl. Vis.	25 cp.		

29 June 1961

12:01 A.M.

T.D. 10,623'. Coring ahead. (Core #18). Remove kelly extension.

7:00 A.M.

Coring at 10,639'. Mr. N. L. Barnes with Hughes Tool Company picked up an RG2BJ.

9:00 A.M.

10,644'. Cut 50' in 26 hrs. Start trip out with core #18. Mud check:

Weight	9.3 #/gal.	pH	8.5
Viscosity	74 Sec.	Ca	980 ppm
Water loss	7.6 cc.		

1:00 A.M.

On bank with core #18.

1:50 P.M.

Start laying down core. Diamond core head in good condition.

3:00 P.M.

Finish laying down core, cut 50', recovered 51'.
Pick up bit #59 RR, W7R. New reamer and junk sub.
Trip in hole. Pipe strap 10,643.04. No correction.

29 June 1961

(Continued)

6:20 P. M. On top of core hole. Reaming ahead.
10:30 P. M. Began losing mud. Mixed LCM.
11:15 P. M. Reamed to 10,611'. Pulled off bottom. Building mud volume and LCM percentage. Mud loss 75 barrels.

30 June 1961

12:01 A. M. TD 10,644'. Reamed to 10,611'. Lost some mud. Shut down building mud volume and LCM percentage.

2:00 A. M. Resumed reaming. Mud check:

Weight	9.6 #/gal.	Yield	17
Viscosity	90 Sec.	pH	9.0
Water loss	5.6 cc.	NaCl	600 ppm
Pl. Vis.	33 cp.	Filter cake	2/32
L. C. M.	28 %		

4:05 A. M. Losing mud, cannot keep up with 3" stream. Shut down to mix mud and LCM. Estimated loss 280 barrels. Reamed to 10,619'.

5:45 A. M. Mud volume and LCM% up. Began pumping at 300 psi. Pumped 33 minutes. No returns, pumped in 200 barrels mud. Have slug of high LCM % mud on bottom. Pulling 15 stands. Will let hole stand for 8 hours, to 2:30 P. M.

6:20 A. M. Started pulling up 15 stands.

7:00 A. M. Out with 15 stands. Will let hole stand until 3:00 P. M. and then try to get circulation.

3:00 P. M. Broke circulation, got returns in 10 minutes. Started losing immediately, could not keep up with losses. Losing about 60-70 barrels per hour while mixing. Mixed mud and circulated until 4:15 P. M. Quit mixing mud. Pumped remaining mud in hole. Mud loss 250 barrels.

5:00 P. M. Start out of hole.

9:00 P. M. T. D. 10,644'. On bank with bit #59 RR, reamed to 10,619' (25'). Bit worn, 1/16" under gauge, bearings loose. Reamer full gauge. Pick up bit #79, W7R, reamer, junk sub and crows foot, start in hole. Recovered no junk with bit #59 RR.

10:30 P. M. Collars in hole, cutting drilling line. Laid down 10 joints of drill pipe on trip out, picking up 10 joints of grade 3 drill pipe. Total mud loss for 6-30-61 730 barrels.

1 July 1961

12:01 A. M.

TD 10,644'. Reamed core hole to 10,619'. Picking up 10 joints of drill pipe.

12:05 A. M.

Began mixing mud and LCM.

2:15 A. M.

Mud check:

Weight	9.2 #/gal.	Yield	9
Viscosity	62 Sec.	Filter cake	2/32
Water loss	6.4 cc.	Ca	1,000 ppm
Pl. Vis.	18 cp.	NaCl	600 ppm
pH	9.0	LCM	30 %

2:30 A. M.

Broke circulation at 2,000'. No apparent mud loss. Took 96 barrels to get return.

3:00 A. M.

Resumed trip in hole.

4:00 A. M.

Broke circulation at 7,000'. No mud losses.

4:15 A. M.

Resumed trip in.

4:50 A. M.

Broke circulation at 9,000'. No mud losses.

5:05 A. M.

Resumed trip in.

6:00 A. M.

T. D. 10,644'. On bottom letting hole stand.

6:15 A. M.

Broke circulation on bottom.

6:30 A. M.

Repairing rotary clutch, continuing to circulate.

9:00 A. M.

Reaming and drilling ahead. Mud check:

Weight	9.2 #/gal.	pH	8.5
Viscosity	69 Sec.	Yield Pt.	15
Water loss	8.0 cc.	Ca	1,040 ppm
Pl. Vis.	25 cp.		

3:00 P. M.

10,657'. Appear to have made some fluid, instructed toolpusher to advise driller of this condition and to observe further development.

6:00 P. M.

10,671. Mud check:

Weight	9.3 #/gal.	pH	8.5
Viscosity	68 Sec.	Yield point	12
Water loss	8.4 cc.	Ca	940 ppm
Pl. Vis.	24 cp.	LCM	20 %

9:00 P. M.

TD 10,679'. Began circulating samples for 1 1/2 hours.

10:35 P. M.

Dropped Eastman survey.

11:10 P. M.

Started trip out with bit #79, reamed 25' of rat hole and drilled 35' in 14 1/2 hours. Mud check:

Weight	9.4 #/gal.	Yield	15
Viscosity	91 Sec.	Filter cake	2/32
Water loss	9.2 cc.	Ca	1,680 ppm
Pl. Vis.	25 cp.	NaCl	450 ppm
pH	9.0	LCM	30 %

2 July 1961

12:01 A. M.

3:00 A. M.

6:00 A. M.

6:15 A. M.

7:00 A. M.

9:00 A. M.

TD 10, 679'. Trip out

On bank with bit #79, dull, bearings loose, full gauge. Reamer under 11 & 1/32" gauge. No junk recovered. Picked up bit #80, W7R, new reamer, junk sub and start in hole. Eastman survey 3 3/4" at 10, 649'.

Broke circulation at 8, 000'. No apparent mud loss.

Resumed trip in.

On bottom, no fill-up, drilling ahead.

Pilot tested the drilling mud to determine what additions would be necessary in order to lower the water loss from the reading recorded last night and also to determine what might be causing the low reading.

		1/2#/bbl		
		Lime		
		1/4#/bbl.	1/4#/bbl.	1/4#/bbl.
	<u>Base mud</u>	<u>Lime</u>	<u>Driscose</u>	<u>Driscose</u>
Weight	9.3			
Vis.	68			
W. L.	8.0	8.0	6.4	6.8
Pl. Vis.	23	18	17	16
Yield	19	12	17	18
LCM	20%	20%	20%	20%
Pm	.2	.6	1.0	.3
Pf	.2	.3	.3	.2
pH	8.0	9.0	9.5	8.0
Ca	800	800	800	800
Cake	Soft	Med firm	Firm	Firm

The addition of 1/2#/bbl.lime and 1/4#/bbl.of driscose gives the most desirable properties from the standpoint of water loss, alkalinity and flow characteristics. Lime additions were commenced at 8:45 A. M. and driscose at 9:30 A. M.

The increase in the water loss and the reduction in alkalinity can be related to the high LCM concentration which would tend to cause the mud to sour, and therefore reduce the effectiveness of the driscose additions.

5:05 P. M.

TD 10, 722'. Shut down to repair rotary clutch.

2 July 1961
(Continued)

6:10 P. M.
8:30 P. M.

Resumed drilling.
TD 10, 729'. Began circulating for samples.

3 July 1961
12:01 A. M.

TD 10, 729'. Finished circulating samples, start trip out with bit #80, made 50 in 12 1/2 hrs. On bank with bit #80, medium dull, bearings slightly loose, to gauge. Reamer to gauge. Pipe was slightly tight the first 11 stands out and on the 33rd stand.

4:00 A. M.

Pick up DST tool and start in hole. Top of top packer to be set at 10, 510' with 17 stands water cushion.

9:24 A. M.
9:27 A. M.
9:57 A. M.
10:21 A. M.
10:20 A. M.
10:50 A. M.
12:50 P. M.
1:00 P. M.

Open test tool. Weak blow.
Close tool.
Open tool. No blow.
By pass tool.
Open tool. Weak blow.
Close tool.
Working packer.
Loose, pull DST #10. Additional pilot tests on the mud indicated the following:

<u>Base Mud</u>		<u>4#/Bbl. Starch</u>	
Water loss	9.2 cc.	Water loss	3.8 cc.
Pl. Vis.	24 cp.	Pl. Vis.	16 cp.
Yield	15	Yield	17
P. mud	65	P. mud	7.0

<u>1/2#/Bbl. Driscose</u> <u>1#/Bbl. Q-Broxin</u>		<u>1#/Bbl. Starch</u> <u>1#/Bbl. Q-Broxin</u>	
Water loss	5.6 cc.	Water loss	6.8 cc.
Pl. Vis.	20 cp.	Pl. Vis.	16 cp.
Yield	20	Yield	9
P. mud	.62	P. mud	.61

<u>2#/Bbl. Starch</u>	
Water loss	5.0 cc.
Pl. Vis.	20 cp.
Yield	12

Starch and preservative have been ordered for use in the mud. The preservative should prevent any additional decomposition of the driscose and will

3 July 1961

(Continued)

prevent the starch from fermenting. The starch will provide a greater particle size selection for water loss control, and although it is subject to temperature degradation, should allow for more economical water loss control than with driscose alone.

5:40 P.M.

On bank with DST #10 (10, 729-10, 517). Recovered 17 stands water cushion and 90' of mud.

6:15 P.M.

Trip in bit #81, W7R, and reamer and junk sub.

Field Pressures DST #10

	<u>Bomb #1376</u>	<u>Bomb #212</u>	<u>Bomb #193</u>
IHP	5193	5162	5276
ICIP	1043	1008	1126
IF	693	723	868
FF	693	743	868
FCIP	1278	1365	1476
FHP	5193	5142	5259

8:20 P.M.

Broke circulation at 8000'.

8:40 P.M.

Resumed trip in.

9:45 P.M.

Hit bridge at 10, 549'. Washing to bottom. Had approximately 80' fill-up.

11:00 P.M.

T.D. 10, 729'. Drilling ahead.

4 July 1961

12:01 A.M.

T.D. 10, 732'. Drilling ahead.

5:30 A.M.

Hit drilling break at 10, 760'.

6:35 A.M.

T.D. 10, 770'. Got 10' of fast drilling. Informed geologist. Began circulating samples.

10:30 A.M.

Commence drilling ahead.

4:10 P.M.

T.D. 10, 796'. Start circulating samples.

7:45 P.M.

Start out of hole to pick up core barrel. Mud check before starting out of hole:

Weight	9.5 #/gal.	Yield	28
Viscosity	119 Sec.	Filter cake	2/32
Water loss	7.2 cc.	Ca	1600 ppm
Pl. Vis.	32 cp.	Cl	700 ppm
pH	8		

11:30 P.M.

On bank with bit #81. Bit medium dull. 67' in 12.2 hrs.

5 July 1961

12:01 A.M. T.D. 10,796'. Making up core barrel.
12:30 A.M. Start in hole with corehead #R18674.
4:30 A.M. On bottom with core barrel, 3' of fill-up. Circulating to bottom. Rigging up kelly extension.
5:30 A.M. Starting to core.
9:00 A.M. Coring 10,804'. Mud check:
Wright 9.5 #/gal. Yield 18
Viscosity 128 Sec. LCM 18%
Water loss 6.0 cc. P. mud .8
Pl. Vis. 36 cp. Preservative .3
pH 9.5
Addition of starch and preservative to the mud system seems to have temporarily halted the fermenting process. Close observation will be made to assure that this condition does not become severe.
12:01 P.M. Mud check:
Weight 9.5 #/gal. Yield point 18
Viscosity 119 Sec. Ca 1260 ppm
Pl. Vis. 32 cp. LCM 20 %
Water loss 5.2 cc. Preservative .3 #/bbl.
pH 9.5
3:00 P.M. Coring 10,815'. Discussed cementing program with Bob Graham, Division Engineer for Howco, and J. W. Hall also of Howco. Final planning will be consummated after the last caliper logs are run.

6 July 1961

12:01 A.M. T.D. 10,840' coring ahead.
12:45 A.M. Repairing rotary chain
1:10 A.M. Resumed coring.
3:10 A.M. T.D. 10,846', 50' core cut, start trip out with core #19
7:00 A.M. On bank with core #19. Cored 10,796'-10,846' (50'). Recovered 48'. Core arkosic with some shale and occasional limestone inclusions. No appreciable porosity or permeability visible.
9:50 A.M. Cut drilling line.
10:30 A.M. Start in hole with bit #82, W7R, reamer and junk sub to ream corehole.
12:30 P.M. On bottom reaming ahead.
8:30 P.M. Reaming. Broke rotary chain. Repairing same.
9:15 P.M. Resumed reaming.

7 July 1961

12:01 A.M. T.D. 10,846'. Reaming corehole.
2:15 A.M. Corehole reamed. Drilling ahead.
9:00 A.M. 10,873'. Mud check:
Weight 9.5 #/gal. pH 9.0
Viscosity 124 Sec. Yield point 22
Water loss 7.0 cc. Ca 980 ppm
Pl. Vis. 32 cp. Preservative .15
11:00 A.M. T.D. 10,878'. Circulate samples.
12:15 P.M. Pull bit #82. Ream 50' in 13 3/4 hrs. Drill 32' in
8 3/4 hrs. Total 22 1/2 hrs.
4:45 P.M. On bank bit #82. Teeth green, bearings slightly
loose, bit and reamer in gauge. Pick up bit #83, W7,
and reamer and junk sub.
5:40 P.M. Dump shale pit.
5:40 P.M. Trip in with bit.
9:15 P.M. Circulating through 18' fill-up.
10:00 P.M. T.D. 10,846', drilling ahead.

8 July 1961

12:01 A.M. T.D. 10,893'. Drilling ahead. Mud check:
Weight 9.5 #/gal. Yield 15
Viscosity 105 Sec. Filter cake 2/32
Water loss 6.8 cc. Ca 2000 ppm
Pl. Vis. 30 cp. NaCl 700 ppm
pH 8.5
9:00 A.M. 10,942', drilling ahead.
12:01 P.M. 10,955' drilling ahead. Joe Peters, Cameron, in-
spected christmas tree assembly to ascertain that
all equipment was on hand and correct. Mud check:
Weight 9.5 #/gal. pH 9.0
Viscosity 81 Sec. Yield 14
Water loss 6.2 cc. Ca 1200 ppm
Pl. Vis. 26 cp. Preservative .25
2:00 P.M. T.D. 10,962'. Circulate samples prior to trip for test
tool. Bit #83 made 84' in 15 1/2 hrs.
7:00 P.M. Start out of hole with bit #83 to pick up DST tool.
Strapping pipe out.
11:15 P.M. On bank with bit #83, teeth dull, bearings medium
loose, to gauge. Reamer slightly under 11 and 1/32"
gauge. No junk recovered. Picking up DST tool and
run in hole.

9 July 1961

12:01 A. M.

TD 10,962'. Running DST tool in hole. Packer (bottom of top packer) to be set at 10,750'. Running 22 stands approximately 2,000' water cushion.

5:00 A. M.

On bottom with test tool.

8:00 A. M.

Pipe strap 10,959'. No correction.

8:32 A. M.

Pull DST #11 (10,962'-10,755'), initial open 2 min. Initial shut-in 20 minutes. Final open 60 minutes. Final shut-in 120 minutes.

12:30 P. M.

On bank with test tool. Recover 22 stands and 1 single of water cushion, 1 stand of drilling mud.

Mud samples:

Weight	9.5	#/gal.	C ₁	800
Water loss	7.6	cc.	C ₂	300
Pl. Vis.	23	cp.	C ₃	100
pH	7.5		C ₄	Trace
Yield	17		Rm	1.25
Ca	160	ppm	Rmf	1.2
Cl	800	ppm	Rmc	1.7

Water cushion Resistivity 10.0 ohms

1:45 P. M.

Pick up bit #84, OWC. Reamer and junk sub.

2:30 P. M.

Cut drilling line.

3:00 P. M.

Resume trip

5:10 P. M.

T. D. 10,962'. On bottom. Work on pumps.

5:45 P. M.

Finish work on pumps.

5:50 P. M.

On bottom. No fill. Drilling ahead.

6:00 P. M.

Field pressures from top recorder on DST #11:

IH	5350	FF	960
ICIP	1735	FCIP	1957
IF	904	FH	5350

9:00 P. M.

10,983' drilling. Mud check

Weight	9.4	#/gal.	Filter cake	2/32
Viscosity	76	Sec.	Ca	1400 ppm
Water loss	7.4	cc.	NaCl	1000 ppm
Pl. Vis.	24	cp.	LCM	8 %
pH	8.0		Preservative	.25 #/bbl.
Yield	15			

10 July 1961

12:01 A. M.

TD 11,006'. Drilling ahead.

5:45 A. M.

TD 11,044'. Began circulating samples.

10 July 1961

(Continued)

9:15 A. M.

Drop Eastman survey. Bit #84 made 82' in 11 3/4 hrs.

Mud check:

Weight	9.5 #/gal.	pH	9.0
Viscosity	66 Sec.	Yield	13
Water loss	7.2 cc.	Ca	1280 ppm
Pl. Vis.	22 cp.	Preservative	.2

10:00 A. M.

Trip out. Deviation $4\ 3/4^\circ$ at 11,044'. Trip in with corehead #R18675 (7 3/16" x 4 3/8").

6:10 P. M.

T. D. 11,044'. On bottom and coring.

11 July 1961

12:01 A. M.

T. D. 11,067'. Coring ahead.

5:30 A. M.

T. D. 11,080'. Lost circulation. Had drilling break at 11,078-80'. Lost 140 bbls. of mud. No returns. Broke off core, pulled up out of rathole and began mixing mud and lost circulation material.

8:24 A. M.

Start pump. No returns, pump mud at 500 psi.

9:00 A. M.

Stop pump after pumping 180 bbls. of mud.

9:05 A. M.

Pull core #20, cut 36' in 11 hrs.

12:45 P. M.

On bank. Lay down core. Recovered 34'.

1:30 P. M.

Finished laying down core. Mixing mud, will attempt to break circulation at 5000' at 2:00 A. M. Total mud loss: 320 bbls. Trip in bit #85, W7R.

12 July 1961

12:01 A. M.

T. D. 11,080'. Waiting until 2:00 A. M. to break circulation.

2:00 A. M.

Began pumping slowly, got returns after pumping 110 bbls. in hole. Kicked pump out, fluid level dropped about 4' and remained fairly steady for 15 min. Resumed trip in hole.

2:45 A. M.

Mud level falling in hole. Will run to 9000' slowly and try to break circulation.

4:00 A. M.

Tried to break circulation at 9000'. Returns after pumping 60 bbls. in hole. Mud volume low. Shut down to mix mud. Were losing mud at about 100 bbls./hr.

8:00 A. M.

Broke circulation at T. D. Returns in 5 min. (Partial returns). Lost complete returns after 30 min. Pumped in 200 bbls. Pulled up 30 stands. Pumped in 200 bbls. Pulled up 30 stands. Mixing pit of mud.

4:00 P. M.

Decision was made to spot slug of mud containing a high percentage of lost circulation material on bottom

12 July 1961

(Continued)

4:15 P. M.

6:45 P. M.

7:10 P. M.

and let set for 5 hours. Ran to TD. Gained full returns after 10 minutes. Pumped in about 40 barrels of mud.

Starting to ream core hole, getting full mud returns.

Losing some mud. Still reaming.

Had returned to 11,076'. Lost complete returns.

Pull out 15 stands. Mixing mud. Check on mud

running over shaker while getting returns.

Weight	9.5	#/gal.	Yield	20
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Viscosity	81	Sec.	Filter cake	2/32
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Water loss	10.4	cc.	Ca	1420	ppm
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Pl. Vis.	22	cp.	NaCl	1100	ppm
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pH	8.0		LCM	12	%
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11:20 P. M.

Ran back to bottom. Working on pump. Total mud loss for day is 550 barrels.

13 July 1961

12:01 A. M.

12:10 A. M.

1:00 A. M.

T. D. 11,080'. Working on pump. Had

reamed corehole to 11,076'.

Began pumping. Mud level visible about 200' down hole.

Coming up. Level rose to about 50' from top of hole

and remained steady. Pumped in 250 barrels mud and

got no returns. Pump pressure: 400 psi.

Pulling 20 stands. Will let hole stand for at least 8 hours

and will try to establish circulation 8 stands off bottom.

Mud check on mud just pumped in:

Weight	9.4	#/gal.	Yield	20
--------	-----	--------	-------	----

Viscosity	90	Sec.	Filter cake	2/32
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Water loss	6.0	cc.	Ca	1240	ppm
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Pl. Vis.	25	cp.	NaCl	1000	ppm
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pH	9.0		LCM	37	%
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2:00 A. M.

20 stands out, kelly on. Began mixing mud and LCM.

1:00 P. M.

Broke circulation with 350 pounds.

1:23 P. M.

Circulation after pumping 40 barrels.

1:25 P. M.

Start to bottom.

2:00 P. M.

Rotate pipe 10' off bottom for 6 minutes.

2:06 P. M.

Start pumping slowly. Pumped away 50 barrels of 35%

LCM mud. No returns.

2:55 P. M.

Pump mud, partial returns.

3:25 P. M.

Pump 130 barrels. Pull out to 5,000'. Met with Bill Gorham, Baroid; Fred Lang, Baroid; and O. E. Mechem, E. A. Columbus, Jr. & Assoc., Inc. to determine what new approach may prove expedient in solving the lost circulation last encountered.

13 July 1961

(Continued)

6:45 P. M.

Broke circulation at 5,000'. Adding water, Q-Broxin, lime, gypsum and preservative to obtain mud properties of:

Weight 9.2-9.3 #/gal. Water loss 6-8 cc.
Viscosity 70 Sec. Preservative 0.5 #/bbl.
Total mud loss 470 barrels.

14 July 1961

12:01 A. M.

TD 11,080'. Reamed to 11,076'. Circulating at 5,000' while conditioning mud.

1:00 A. M.

Lost 4" of mud in last 15 min. see, but leveling out.

1:30 A. M.

No mud loss since 1:00 A. M.

8:45 A. M.

Run in 20 stands. Mud check:

Weight 9.4 #/gal. Yield 12
Viscosity 78 Sec. pH 9.0
Water loss 6.4 cc. Ca 1,400 ppm
Pl. Vis. 25 cp. LCM 18%
Preservative .3 #/Bbl.

9:30 A. M.

Rotate pipe prior to circulating, 54 rpm.

9:42 A. M.

Break circulation.

11:07 A. M.

Bypass contaminated mud.

11:55 A. M.

Turn mud back in pits. Bypassed 160 barrels
Mix 126 barrels of new mud, circulate system, condition mud.

4:30 P. M.

Run 20 stands.

5:10 P. M.

Break circulation.

7:15 P. M.

Contaminated mud up. Began treating 2,000' contaminated mud.

8:50 P. M.

Run pipe to bottom.

9:50 P. M.

On bottom. No fill-up. Began circulating. Losing no mud.

15 July 1961

12:01 A. M.

TD 11,080'. Reamed to 11,076'. Circulating on bottom to condition mud.

2:20 A. M.

Began reaming remaining 4 feet of core rathole.

2:35 A. M.

Drilling ahead, no mud losses.

9:00 A. M.

Drilling 11,105. Mud check:

Weight 9.3 #/gal. Yield 10
Viscosity 89 Sec. pH 9.0
Water loss 6.4 cc. Ca 1,620 ppm
Pl. Vis. 22 Cp. LCM 12 %
Preservative .2 #/Bbl.

15 July 1961
(Continued)

Mud checks since 1:00 A. M. every 30 minutes indicate that the mud properties are uniform throughout the mud system. Bill Gorham, Baroid, checked preservative kit against a new kit and determined that the readings from the old kit were low.

3:00 P. M.

11, 112. Mud check:

Weight	9.3 #/gal.	Yield point	15	
Viscosity	75 Sec.	Ca	1,600	ppm
Water loss	6.4 cc.	LCM	15	%
Pl. Vis.	20 cp.	Preservative	.5	
pH	8.5			

5:21 P. M.

T. D. 11, 129'. Circulate for samples prior to trip.

9:45 P. M.

Start out of hole to pick up core barrel.

16 July 1961

12:01 A. M.

T. D. 11, 129'. Trip out bit #85.

1:50 A. M.

On bank with bit #85, cut 49' in 15 hrs. and reamed 36'. Medium green, bearings slightly loose, 1/16" under gauge. Reamer to gauge. Pick up core bbl. Service core bbl. Start trip in with corehead #R18675.

4:30 A. M.

Collars in hole. Shut down. Cut drilling line.

5:00 A. M.

Resume trip in hole.

6:00 A. M.

Break circulation 50 stands off bottom.

7:20 A. M.

Resume trip.

8:15 A. M.

Break circulation 17 stands off bottom.

8:45 A. M.

Resume trip.

9:00 A. M.

On bottom 15' fill up. Rig up kelly extension.

9:40 A. M.

10:45 A. M.

T. D. 11, 129'. Commence coring.

3:00 P. M.

11, 143. Coring mud check:

Weight	9.3 #/gal.	Yield	16	
Viscosity	78 Sec.	Ca	1,540	ppm
Water loss	7.6 cc.	LCM	15	%
Pl. Vis.	22 cp.	Preservative	.5	
pH	8.5			

17 July 1961

12:01 A. M.

TD 11, 162. Have cored a total of 33' in 13 hours.

5:20 A. M.

TD 11, 178. Finish coring. Broke off core with 40,000# plus jars. Cut 49' in 18 1/4 hours.

5:30 A. M.

Start out of hole.

9:25 A. M.

On bank lay down core #21, rec. 48'. Mr. Hall and Mr. Blakemore, Halliburton, inspected the downhole equipment.

17 July 1961
(Continued)

12:01 P. M.
2:30 P. M.
2:55 P. M.
3:45 P. M.
6:00 P. M.

to determine that all necessary equipment is available.
Es Lok Clamps were not available but will be ordered
Run bit #86, W7R. Reamer and junk sub.
Broke circulation 8,000'.
Resume trip.

On bottom. Reaming corehole.

Reaming 11, 146'. Mud check:

Weight	9.3 #/gal.	pH	7.5
Viscosity	70	Sec.	Yield point 15
Water loss	9.4 cc.	Ca	1,320 ppm
Pl. Vis.	20	cp.	

10:00 P. M.

T. D. 11, 178'. Reamed corehole. Began circulating samples.

18 July 1961

12:01 A. M.
12:45 A. M.
3:00 A. M.

T. D. 11, 178'. Circulating for samples.

Dropped Eastman survey.

Start out of hole with bit #86 to pick up DST tool. Bit #86
reamed 49' in 6 1/4 hours.

2:30 A. M.

Hole tight, working pipe. Have had to put kelly on and
circulate, and also pull up to 300,000# on string to free
pipe. Pipe tight on 36th and 37th stand out (7696' - 7786').
Freed pipe, pulled 5 stands with only slight trouble,
6th stand or 42nd stand out tight again (7156' - 7246').
Working stuck pipe and circulating through kelly.

6:10 A. M.

Working stuck pipe. Mud check:

Weight	9.3 #/gal.	Yield	18
Viscosity	74	Sec.	Filter cake 2/32
Water loss	8.6 cc.	Ca	1,420 ppm
Pl. Vis.	20	cp.	LCM 12 %
pH	8.0	Preservative	0.4 #/Bbl.

Pipe free. Waiting on key seat wiper and sub to use on
7" drill collars with 11" bit.

8:30 P. M.

Mud check:

Weight	9.3 #/gal.	Yield	10
Viscosity	78	Sec.	Filter cake 2/32
Water loss	4.4 cc.	Ca	1,440 ppm
Pl. Vis.	24	cp.	NaCl 1,000 ppm
pH	9.5	Preservative	0.3

Start trip out, first two joints free, 3rd tight, first two
on second stand (46th standoff bottom) tight, 3rd joint
will not come. Working stuck pipe.

19 July 1961

12:01 A. M. T. D. 11, 178'. Working stuck pipe, have 45 2/3 stands out of hole. Keyseat wiper and 11" bit to 7" drill collar sub are both on location.

6:00 A. M. Pipe free. Resume trip out.

9:00 A. M. On bank with bit #86, bit medium green, 1/8" under gauge, no damage to bit, reamer or collars. Cut drilling line, remove desander.

12:01 P. M. Start in hole with bit #87, W7R, reamer, 7" collars and Homco, keyseat reamer (7 3/8" O. D.) on top of collars.

2:00 P. M. Hit bridge at 6,950' ± , put on kelly and washing down slowly.

3:30 P. M. Kelly down, pulled up to make connection and kelly would not go down. Did this twice. Have 10' fill-up.

4:45 P. M. Got kelly down and new joint in. Washing down.

5:00 P. M. O. E. Mechem called and advised pulling up above trouble spot and circulating.

6:30 P. M. Back in and drilling on bridge.

9:15 P. M. Start trip out to remove reamer and replace W7R with shale bit. Run bit #88, OWC, and junk sub.

20 July 1961

12:01 A. M. T. D. 11, 178' Tripping.

3:20 A. M. Hit bridge 45 stands and one double off bottom (6933').

5:15 A. M. Make connection, 5' fill.

6:15 A. M. Make connection, 7' fill.

6:45 A. M. Run one stand.

7:00 A. M. Pick up kelly.

7:45 A. M. Make connection. Ream.

10:20 A. M. Connection, 15' fill.

11:00 A. M. Connection, 15' fill.

12:35 P. M. Reamed from 6933' to 7272'. Start short trip

2:05 P. M. Pulled 8 stands plus one double, 1st stand tight, layed down 2 joints on 2nd stand and picked up the kelly. Circulate till 1:45 P. M. Resumed trip, rest of pipe came free.

2:45 P. M. Resume trip in.

3:00 P. M. Hit fill-up 70' up (7200')

3:25 P. M. Made connection (7230')

3:40 P. M. Made connection (7260')

3:47 P. M. Made connection (7290')

4:05 P. M. Set back lelly.

4:10 P. M. Stand wouldn't go.

20 July 1961

(Continued)

4:15 P. M. Pick up kelly, wash down.
4:20 P. M. Connection and wash down. 7320.
4:27 P. M. Set back kelly. Run 5 stands, free 7320 - 7810.
5:00 P. M. Hit bridge. 7810'. Pick up single wash down.
5:30 P. M. Connection 7840'.
6:00 P. M. Connection 7873'.
6:20 P. M. Circulate hole at 7920'.
6:30 P. M. Pipe free. Circulate hole 34 stands and 2 singles off bottom. (7956')
8:20 P. M. Start short trip out.
9:50 P. M. Pulled 22 stands to 5888'. Put kelly on, circulating while cutting drilling line.
11:15 P. M. Start trip to bottom.
11:50 P. M. Hit bridge at 7140'. Put kelly on. Circulating and reaming through bridge.

21 July 1961

12:01 A. M. TD 11, 178'. Circulating and reaming bridge at 7140'.
12:10 A. M. Pipe free, resume trip in.
12:15 A. M. Hit bridge at 7264'. Put on kelly.
12:25 A. M. Pipe free, resume trip in.
1:05 A. M. Hit bridge at 8345'. Put on kelly.
1:30 A. M. Pipe free, resume trip in.
2:00 A. M. Hit bridge at 9075'. Put on kelly.
2:45 A. M. Pipe free. Resume trip in.
2:50 A. M. Hit bridge at 9134'. Put on kelly.
3:30 A. M. Pipe free, resume trip in.
4:45 A. M. On top of 4' fill up. Circulating to bottom.
5:00 A. M. T. D. 11, 178'. On bottom drilling ahead. Drilling string now 14.90' longer.
6:00 A. M. 11, 186'. Drilling. Mud check:
Weight 9.4 #/gal. Yield 16
Viscosity 98 Sec. Filter cake 2/32
Water loss 4.6 cc. Ca 1,900 ppm
Pl. Vis. 25 cp. NaCl 1,000 ppm
pH 9.5 LCM 14 %
2:30 P. M. T. D. 11, 225'. Bit #88 made 47' in 9 1/2 hrs. Circulate hole prior to short trip.
6:00 P. M. Mud check:
Weight 9.4 #/gal. pH 9.0
Viscosity 100 Sec. Yield 21
Water loss 4.0 cc. LCM 10 %
Pl. Vis. 32 cp. Preservative .35

21 July 1961

(Continued)

6:30 P. M. T. D. 11, 225'. Begin short trip out.
Tight at 10, 251'. Tight at 7, 608'
Tight at 8, 279'. Tight at 7, 588'
Tight at 8, 227'. Tight at 7, 549'
Tight at 8, 187'. Tight at 7, 514'
Very tight at 8, 137'. Verytight at 7, 445' -
Tight at 8, 097'. Pulled to 300, 000#, jumped free,
worked spot till free.
10:05 P. M. Tight spot at 7445'. Worked free.
10:20 P. M. End short trip. Let hole stand.
11:10 P. M. Start trip to bottom.
11:50 P. M. Hit bridge at 9014'. Pick up kelly, circulate and ream
through bridge.

22 July 1961

12:01 A. M. T. D. 11, 225'. Short trip in. Circulating and reaming
through bridge at 9014'.
12:50 A. M. Connection.
12:55 A. M. Set kelly back, resume trip.
1:20 A. M. Hit bridge at 9943', pick up kelly. Wash through bridge.
1:35 A. M. Set back kelly, resume trip.
1:50 A. M. Hit bridge at 10, 445'. Pick up kelly. Circulate and
ream bridge. Bit not making any headway.
2:50 A. M. Began trip out with bit #88. Strapping pipe out.
6:30 A. M. Tripping out bit #88 at 7" collars. Experienced no
tight hole on trip out to this point. Began laying down
3 stands off 7" collars. Bit dull 1/4" out of gauge. Lay
down 6-8" drill collars. Pipe strap 11, 228, 34, no
correction.
1:30 P. M. Trip in bit #89, W7. Tight spot 19 stands (9, 461) off
bottom.
1:55 P. M. Bridge 12 stands plus double (10, 112') Wash with kelly.
2:15 P. M. Set kelly back.
2:35 P. M. Bridge 6 stands plus 45' (10, 445'). Pick up kelly.
4:00 P. M. Connection.
4:10 P. M. Resume trip.
4:15 P. M. Bridge 4 stands plus single off bottom, pick up kelly,
wash down.
4:30 P. M. Set back kelly.
4:35 P. M. Bridge 3 stands off bottom, pick up kelly.
4:45 P. M. Set kelly back. Circulating to bottom.
5:00 P. M. 80' fill-up.
5:40 P. M. Pipe stuck at 11, 160'. Working free.
5:45 P. M. Pipe free, circulating through fill.

22 July 1961

(Continued)

6:12 P. M.	Pipe stuck at 11, 175'. Working free.
6:35 P. M.	Pipe free, circulating through fill.
9:30 P. M.	Pipe stuck at 11, 204'. Working free.
9:37 P. M.	Pipe free, circulating through fill.
11:15 P. M.	Pipe stuck at 11, 213'. Working free.
11:35 P. M.	Pipe free, circulating through fill.

23 July 1961

12:01 A. M.	TD 11, 225'. Circulating through fill to bottom; also reaming out of gauge hole.
3:00 A. M.	On bottom circulating. Hole clean for 4 hours.
9:50 A. M.	Start short trip.
10:30 A. M.	Title spot on 40th stand. Work key seated spot.
1:20 P. M.	Run 2 stands in attempt to reorient pipe.
1:30 P. M.	Pull pipe.
3:00 P. M.	Run 3 stands, hit bridge, pull up and work pipe.
6:00 P. M.	Run 4 stands - wiping up the hole.
9:25 P. M.	Pipe wiped, hit key seat, working pipe free. At 7, 513'.
11:05 P. M.	Pipe free, resume trip out. Had tight bump at 7, 487'.
11:13 P. M.	Pipe stuck at 7, 440'. Cannot go up or down. Working pipe.
11:25 P. M.	Pipe free to move down, picked up kelly, working pipe free. Pipe freed for 5', then 10', then stuck.

24 July 1961

12:01 A. M.	TD 11, 225'. Trip out of hole, pipe stuck at 7, 425'. Working pipe free.
12:45 A. M.	Pipe free, resume trip out of hole.
4:30 A. M.	On bank with bit #89, medium green, 1/8" under gauge, bit pinched. Picked up approximately 6 stands of drill pipe which was laid down while wiping hole.
5:00 A. M.	Pick up bit #90, OWC, and run in hole. Pick up 9-7" collars, total collars now 21-7". Ran in hole with key seat wiper and 2 stands drill pipe. Cleaned middle mud pit.
7:30 A. M.	Put kelly on, waiting on string reamer to arrive on location.
10:30 A. M.	String reamer arrived. Resumed trip in hole. Reamer will be placed 38 stands up.

24 July 1961

(Continued)

1:00 P. M.

Shut down to repair dynamatic.

Resume trip. Meeting with O. E. Mechem, J. H. Garrett, A. Samuels, (EAP) J. W. Hall, Blakemore and Northcutt (HOWCO) concerning cementing. Consideration was given to use of guide shoe rather than float shoe in order to reduce the possibility of lost circulation due to pressure surges. Called Connors (Lofland) to determine rig capabilities in terms of additional load due to not floating pipe.

3:25 P. M.

Hit bridge at 7,841'. Pick up kelly. Circulate and ream bridge.

6:25 P. M.

Finished reaming 3 joints through bridge. Pulled pipe through bridged zone free. Resume trip.

6:50 P. M.

Hit bridge at 8,499'. Pick up kelly. Ream and circulate through bridge.

7:00 P. M.

Set kelly back. Resumed trip.

7:14 P. M.

Hit bridge at 8,750'. Pick kelly up, circulate and ream bridge.

8:00 P. M.

Set kelly back. Resumed trip.

8:30 P. M.

Hit bridge at 10,191'. Pick up kelly. Does not act like a bridge, but like string reamer is grabbing. Began reaming key seat with string reamer at 6,619'. Reaming down one joint at a time, approximately one hour per joint with rotary turning at 52 rpm.

25 July 1961

12:01 A. M.

TD 11,225'. Reaming key seat with string reamer.

8:00 A. M.

Reaming key seat tight spot at 6,888' caused severe torque. Air line on brake broke. After reaming through tight spot 5 joints of drill pipe were laid down and 2 stands of drill pipe were run in. Slight binding was noted while pulling 5th joint. The two stands went in without further binding or excessive drag.

6:30 P. M.

Reaming key seat at about 6,970'. No more tight spots causing excessive torque were encountered during day. After kelly was down each time drill pipe was pulled or moved up and down about 50-60 feet before adding next joint.

6:45 P. M.

Hit tight spot, table torquing slightly, reaming slowly.

7:15 P. M.

Through tight spot 6,975-83'. Reaming ahead.

11:00 P. M.

Added 2,000 gal. of oil to mud system today.

26 July 1961

12:01 A. M. TD 11, 225'. Reaming key seat with string reamer at 7, 030'.

5:05 A. M. Lost returns while reaming at 7, 107', bit at 10, 679'. Broke off kelly, began pulling pipe. Conference with A. Samuels and Louis Brown about trying to spot heavy LCM mud on bottom before starting out. Decided to trip out without spotting pill because pipe was hard to pull and a good possibility of sticking the pipe exists.

5:15 A. M. Tripping out slowly, pipe trying to stick. Mud check prior to lost circulation:

Weight	9.4	#/gal.	pH	8.5
Viscosity	141	Sec.	Yield point	30
Water loss	3.4	cc.	LCM	8 %
Pl. Vis.	32	cp.	Preservative	.30

8:10 A. M. Pull 16 stands, mix mud and LCM.

10:45 A. M. Start pump.

10:55 A. M. Returns after pumping 35 bbls., displace 140 bbls.

11:55 A. M. Resume trip. Tite 28th stand.

12:55 P. M. Tite 38th stand 7, 037', 39th, 40th, 41st.

1:20 P. M. Finished working 38th stand.

4:30 P. M. On bank with bit #90, reamer and keyseat wiper all in good shape. Test BOP's and will run reamer between 15th and 16th stands above drill collars. Will start reaming 26 stands off bottom and stop 18 stands

4:45 P. M. Ran same reamer and bit #90 back in hole.

6:35 P. M. Broke circulation at 5, 000'.

6:45 P. M. Resumed trip in hole.

7:10 P. M. Hit bridge at 6, 880'. Pick up kelly.

7:15 P. M. Resumed trip in.

7:25 P. M. Hit bridge at 7, 183'. Pick up kelly.

7:40 P. M. Resumed trip in.

7:43 P. M. Hit bridge at 7, 214'. Pick up kelly.

8:00 P. M. Resumed trip in.

8:05 P. M. Hit bridge at 7, 245'. Pick up kelly.

8:40 P. M. Resumed trip in.

8:55 P. M. Hit bridge at 7, 685'. Pick up kelly.

9:25 P. M. Resumed trip in.

9:30 P. M. Hit bridge at 7, 873'. Pick up kelly.

10:15 P. M. Began reaming with string reamer at 6, 741'. Ream at least 1/2 hour per joint to 7, 107'. Added 2, 000 gal. of oil to mud today.

27 July 1961

12:01 A. M. TD 11, 225'. Reaming key seat with string reamer at 6, 810'.

3:00 A. M. Reaming with string reamer at 6, 970'. Observed only occasional slight torque.

5:30 A. M. Began reaming with 2, 000-4, 000# bit weight. Table torquing, but not excessively. Reaming depth 7, 086'.

7:30 A. M. Reaming with string reamer at 7100'.
Weight 9.2 #/gal. Pl. Vis. 27
Viscosity 119 sec. pH 8.5
Water loss 4.0 cc. Yield 26

8:30 A. M. Connection 7, 130'. Mud check:
Weight 9.2 #/gal. pH 9.0
Viscosity 99 sec. Ca 4, 000 ppm
Water loss 3.6 cc. LCM 12 %
Pl. Vis. 32 cp. Preservative .35#/bbl.
Yield point 16 Oil 9 %

10:20 A. M. Connection 7, 161'.

11:15 A. M. Connection 7, 191'.

12:01 P. M. Mud check:
Weight 9.2 #/gal. Yield 15
Viscosity 96 sec. Ca 4, 000 ppm
Water loss 3.8 cc. LCM 15 %
Pl. Vis. 25 cp. Preservative .35#/bbl.
pH 9.0

12:30 P. M. Connection 7, 221'.

9:30 P. M. Reaming at 7, 527'. Considerable torque.

11:30 P. M. Reamed 3' since 9:30 P. M.

11:45 P. M. Broke air line on rotary clutch.

28 July 1961

12:01 A. M. T. D. 11, 225'. Reaming at 7531'.

5:30 A. M. Reaming at 7, 550'.

8:30 A. M. Clean shale pit.

9:00 A. M. Resume reaming 7, 551'.

11:30 A. M. Clean middle pit.

11:50 A. M. Resume reaming 7, 560'. Mud check:
Weight 9.1 #/gal. Ca 4, 000 ppm
Viscosity 120 sec. LCM 10 %
Pl. Vis. 28 cp. Preservative .35#/bbl.
pH 8.0 Oil 11 %
Yield 29 Solids 19 %

28 July 1961

(Continued)

2:30 P. M.

Mud check:

Weight	9.1	#/gal.	Ca	3,600	ppm
Viscosity	117	sec.	LCM	10	%
Water loss	3.6	cc.	Oil	15	%
Pl. Vis.	28	cp.	Solids	17	%
Yield	29		Preservative	.25#	/bbl.

Reaming.

4:00 P. M.

Mud check:

Weight	8.9	#/gal.	pH	8.5	
Viscosity	105	sec.	Ca	4,000	ppm
Water loss	3.8	cc.	LCM	8	%
Pl. Vis.	30	cp.	Preservative	.15#	/bbl.
Yield	25				

6:00 P. M.

Ream 7565'. Pipe seemed to free up. Mud check:

Weight	9.0	#/gal.	pH	8.5	
Viscosity	101	sec.	LCM	8	%
Water loss	3.8	cc.	Oil	13	%
Pl. Vis.	24	cp.	Solids	15	%
Yield	22		Preservative	.4	#/bbl.

9:50 P. M.

Finished reaming to about 7,704'. Pipe appears to be free. Starting to circulate samples.

29 July 1961

12:01 A. M.

T. D. 11,225'. Circulate samples preparatory to coming out of hole.

12:15 A. M.

Start out of hole with string reamer and bit #90. First stand was tight. Next 15 stands pulled practically free. Strapping pipe out.

5:20 A. M.

On bank with bit #90. Bit pinched and slightly loose. Seven loose joints below reamer, 4 drill pipe joints, 2 drill collar joints, key seat wiper joint. Bit 3/16" out of gauge.

5:45 A. M.

Start in hole with bit 91, OWC.

8:30 A. M.

Hit bridge approximately 1,450' off bottom. Pulling loose, pulled one joint and circulating to 9:30 p.m.

9:30 P. M.

Reaming and washing 15, 14 and 13 stands. Mud check:

Weight	9.1	#/gal.	Gel	3	
Viscosity	86	sec.	Yield point	14	
Water loss	4.8	cc.	pH	8.5	
Pl. Vis.	26	cp.			

2:30 P. M.

Couldn't make connection. Began circulating and conditioning mud to raise viscosity.

4:30 P. M.

Made connection and got on 1 joint of 12th stand off bottom. Reaming and washing ahead.

29 July 1961

(Continued)

5:00 P.M.

With 9 stands out, pipe star running in freely. Ran pipe to within 300' of bottom setting on Kelly 7th and 5th stands out.

6:30 P.M.

Hit bridge or fill 300' off bottom. Washing and reaming to bottom.

30 July 1961

12:01 A.M.

TD 11, 225'. Reaming and washing at 11, 210'.

12:30 A.M.

On bottom and circulating to condition mud.

7:00 A.M.

Circulating at 11, 225 TD.

8:00 A.M.

Clean suction pit and shale pit.

9:30 A.M.

Circulating and conditioning mud. Mud check 7:00 A.M.

Weight	9.5	#/gal.	Yield	9	
Viscosity	108	sec.	Ca	3,800	ppm
Water loss	4.8	cc.	LCM	8	%
Pl. Vis.	33	cp.	Preservative	.30	#/bbl.
pH	9.5				

12:30 P.M.

Short trip. Mud check:

Weight	9.4	#/gal.	pH	9.5	
Viscosity	111	sec.	Ca	4,000	ppm
Water loss	4.6	cc.	Yield	12	
Pl. Vis.	36	cp.	Preservative	.3	#/bbl.

3:00 P.M.

Pulled 45 stands, tight 1st stand and 41st stand.

4:30 P.M.

Resume trip to bottom.

4:50 P.M.

Clean middle pit.

5:30 P.M.

Resume trip.

6:20 P.M.

70' fill-up.

7:00 P.M.

Circulating through fill. Began circulating 7 hours prior to short trip.

9:00 P.M.

Mud check:

Weight	9.5	#/gal.	Filter cake	2/32	
Viscosity	109	sec.	Ca	4,000	ppm
Water loss	4.8	cc.	NaCl	900	ppm
Pl. Vis.	34	cp.	LCM	8	%
Yield	16		Preservative	0.25	#/bbl.
pH	9.5				

9:20 P.M.

Called Rex Curtis with Schlumberger to have logging equipment on location at 12:00 noon tomorrow 7-31-61.

31 July 1961

12:01 A.M.

TD 11, 225'. Circulating hole.

2:00 A.M.

Start short trip out, 45 stands.

3:55 A.M.

Hit tight bump 39 stands plus single off bottom.

31 July 1961

(Continued)

3:57 A. M. Hit tight bump 40th stand off bottom.
4:01 A. M. Hit tight bump 41 stands plus double off bottom.
4:05 A. M. Hit tight bump 42 stands plus double off bottom.
4:10 A. M. On bank with 45 stands, wait 2 hrs. (6:10 A. M.) to trip to bottom.
6:10 A. M. Start trip to bottom.
7:15 A. M. On top of 40' fill-up. Circulating to bottom. No bridges encountered on trip in.
7:30 A. M. On bottom, circulating. Will circulate hole for 4 hrs.
10:00 A. M. Started filling water storage tank.
12:01 P. M. Trip out to log. Mud logging unit on stand by.
Mud check prior to trip:
Weight 9.3 #/gal. Ca 3,400 ppm
Viscosity 105 sec. Oil 14 %
Water loss 4.6 cc. Solids 19 %
Pl. Vis. 32 cp. LCM 8 %
Yield 14 Preservative .3 #/bbl.
pH 9.5 Rm 1.0 at 139°
Rf .8 at 78°
Rmc 1.75
3:30 P. M. On bank with bit #91. Green.
4:40 P. M. Run IES to 11,242'.
6:05 P. M. 11,242' pulling log.
7:05 P. M. On bank with IES. No bridges or tight spots encountered.
7:20 P. M. Start in with sonic log.
8:05 P. M. Hit bridge with tool at 8,755'. Working tool through bridge.
8:15 P. M. Resume run in.
8:23 P. M. Hit bridge at 9,900'. Working tool.
8:26 P. M. Resume run in.
8:45 P. M. Tool at 11,234', pulling log.
9:00 P. M. Power failure stops logging, hook up to rig power.
9:10 P. M. Resume logging.
9:25 P. M. Hitting some tight hole. Encountered tight hole between 6,700' to 6,500'. Pulled up to 1,000# to free. Tight spot at 6,360, pulled 1,000# to free. Very tight spot at 6,335', pulled to 2,000# to free.
10:15 P. M. On bank with sonic log tool. Ran free from 6,335'.
10:30 P. M. Inspection of sonic logging tool showed that one rubber torpedo covering was missing and lost in hole. It is 2 1/2' long and 1 1/2" O. D. It covered the upper plug connection between the logging line and the tool bridle. A conference between Bert Lear, Alvin Samuels and O. E. Mechem determined that probable trouble in hole was due to the logging line key seating itself in the

31 July 1961

(Continued)

10:30 P. M. (Contd. existing key seat trouble portion of the hole. It was decided to cease logging operations, run carbide lag to determine hole volume, and condition hole to run casing.

11:55 P. M. Began laying down core barrel.

1 August 1961

12:01 A. M.

TD 11,225'. Laying down core barrel.

1:00 A. M.

Core barrel laid down. Herb McKay, D & S, picked up two diamond core heads, serial Nos. R-18675 and R-18674 for salvage. Began laying down 9-7" drill collars

3:00 A. M.

Collars laid down, cutting drilling line.

4:00 A. M.

Began trip in hole with bit #91RR, 4 stands of 7" collars and key seat wiper.

5:15 A. M.

Bit at 4,500'. Working on D-700 pump. No bridges on trip in.

5:30 A. M.

Baroid mud logger on location.

5:55 A. M.

Began running carbide lag at 4,500' with D-500 pump, 650 psi 73 spm.

6:45 A. M.

Carbide lag up in 2,900 strokes, 50 minutes at 73 spm. Resume trip in.

8:05 A. M.

Bit at 9,000'. Circulating.

8:20 A. M.

Dropped carbide, circulating at 800 psi and 44 spm. No bridges encountered to this depth.

10:00 A. M.

Mud check:

Weight	9.2	#/gal.	Ca	4,000	ppm
Viscosity	115	sec.	NaCl	800	ppm
Water loss	5.8	cc.	LCM	10	%
Pl. Vis.	36	cp.	Oil	14	%
Yield	20		pH	9.0	
Filter cake	2/32		Preservative	.35	#/bbl.

10:25 A. M.

Carbide lag up in 5,980 strokes, 125 minutes at 48 spm. Pump rate of 44 spm lasted first 10 minutes of carbide lag.

10:40 A. M.

Resume trip to bottom.

11:15 A. M.

On top of 37' fill-up, circulating to bottom. Encountered no bridges during complete trip to bottom.

11:35 A. M.

Dropped carbide.

1:00 P. M.

Mud check:

Weight	9.0	#/gal.	Filter cake	2/32	
Viscosity	120	sec.	pH	9.0	
Water loss	6.0	cc.	Ca	3,600	ppm
Pl. Vis.	32	cp.	NaCl	900	ppm
Yield	16		Oil	14	%
Solids	16	%	Preservative	.3	#/bbl.

1 August 1961

(Continued)

3:15 P. M. Carbide lag up in 9880 strokes 220 minutes. First 120 minutes pump rate was 48 spm. next 40 minutes pump rate was 46 spm, last 60 minutes pump rate was 44 spm.

3:30 P. M. Cleaned Baroid sample catcher box. Circulating hole.

4:00 P. M. No cuttings in sample catcher box. Start short trip out of 45 stands. Baroid mud logging unit on stand by.

4:45 P. M. Shut down due to heavy rain.

5:15 P. M. Resume trip.

6:15 P. M. On bank with 45 stands. No tight spots encountered. Began filling back water tank with mud from pits. Clean all pits that need cleaning. Build mud volume.

8:00 P. M. All down-hole equipment, threads and plug seats were inspected and checked by Northcutt and Blackmore (Halliburton) and Alvin Samuels (E. A. Columbus). Cementing tool dimensions as follows:

Third stage:	Tool I. D.	7 15/16"
	Opening	5 7/8"
	Closing	6 3/4"
Second stage:	Opening	4 15/16"
	Closing	5 7/16"
First stage:	Baffel opening	4 7/16"

10:15 P. M. Start trip to bottom.

2 August 1961

12:01 A. M. T. D. 11, 225'. On top of 16' fill-up, circulating to bottom. Will circulate 6 hours to 6:00 A. M. prior to trip out to run casing. Encountered no bridges on trip in.

6:00 A. M. Dropped 12^o Eastman Survey. Laid 3" line from main sump at treatment plant to rig for use in cementing while circulating hole.

6:30 A. M. Start trip out. Strapping pipe. Mud check prior to trip (6:00 A. M.)

Weight	9.2	#/gal.	pH	9.0	
Viscosity	110	Sec.	Ca	4,000	ppm
Water loss	4.6	cc.	NaCl	900	ppm
Pl. Vis.	29	cp.	LCM	6	%
Yield	20		Preservative	0.3	#/bbl.

Filter cake 2/32

10:30 A. M. At drill collars on trip out began laying down 12-7" collars.

11:40 A. M. Finish laying down drill collars. Cut drilling line 300'. Install 8 5/8" rams in blowout preventers. Deviation 6^o. Pipe strap 11, 229', no correction. Rigging up to run casing.

5:50 P. M. Start in hole with first joint of casing.

3 August 1961

12:01 A. M. T. D. 11, 225'. Running casing.
2:15 P. M. Casing in position at 11, 156 (GL).
4:00 P. M. Broke circulation.
6:30 P. M. Mixing cement for 1st stage (11, 156' to 9, 000').
1, 440 sacks (including 30% excess).
7:35 P. M. Cement mixed and in pipe. Top plug placed in casing
(casing on vacuum).
9:35 P. M. Stop displacement. Drop plug to open 1st stage ports
(8, 997').
10:35 P. M. Apply 800 psi pump pressure to open tool. 500 psi
to break circulation.

4 August 1961

12:01 A. M. T. D. 11, 225'. Circulated 75 bbls. of cement that was
above 1st stage collar.
12:01 P. M. Circulating hole and conditioning mud while waiting
for Howco bulk trucks.
3:15 P. M. Last Halliburton truck arrived on location.
3:45 P. M. Injected 1000 gallons of mud acid.
3:50 P. M. Begin pumping cement. Second stage 9, 000'-4, 500'.
2, 500 sacks (includes 30% excess). 50-50 Pozmix-
Portland with 6% Bentonite and 0.4% HR4 retarder.
Cement properties: water 7.66 gal./sk., weight
13.3 #/bbl., volume 1.53 cu. ft./sk.
5:15 P. M. Cement displaced into casing.
5:25 P. M. Positioned plug in casing; begin displacing cement.
6:08 P. M. Plug positioned in stage tool (2500 psi).
6:30 P. M. Dropped bomb to open stage tool.
6:52 P. M. 800 psi opened tool. Circulated with 300 psi.
8:00 P. M. Circulated approximately 100 bbls. of cement. Waiting
to 6:00 A. M. to perform 3rd stage cementing job.
Waiting on cement.
11:15 P. M. While circulating through DV tool at 4500', the system
pressured up to 3000# and blew the nail on the pop valve
on the D-700 pump. Replaced nail, pressured to 1400#.
No returns, no pressure bleed-off. Called Halliburton
for pump truck operator.
11:30 P. M. Pressured to 2000#. Blew nail. Waiting on Halliburton.
Mud in suction pit seemed heavier than that which was
following the cement returns but did not contain any vis-
ible cement.

5 August 1961

12:01 A. M. T. D. 11, 225'. Called Lane-Wells to perforate above
stage collar. Pressured to 2000 psi with Halliburton,
no pressure bleed-off.

5 August 1961

(Continued)

9:00 A. M. Lane-Wells arrived on location.
9:30 A. M. Start in hole with perforating gun.
10:20 A. M. Fire #1 shot at 4502'.
10:23 A. M. Fire #2 shot.
10:26 A. M. Fire #3 shot.
10:29 A. M. Fire #4 shot.
10:32 A. M. Fire #5 shot.
10:35 A. M. Fire #6 shot. Density 6 shots/ft. at 4502'.
11:55 A. M. Broke circulation at 400 psi.
12:30 P. M. Pumping acid and cement, 1000 gals. MCA and 2020 sacks cement.
1:50 P. M. Circulated cement (70 bbls.)
2:05 P. M. Cement displaced. Closed pipe rams and pumped 10 bbls.
2:23 P. M. Cement job complete.
4:00 P. M. Casing landed 80,000#.

6 August 1961

12:01 A. M. T. D. 11, 225, waiting on cement.
7:00 A. M. - Waiting on cement - bleed pressure off 8 5/8" casing,
7:00 P. M. remove landing joint. Cut off 8 5/8" casing 5 3/4" above flange, remove Hydril type preventers. Install tubing spools.

7 August 1961

12:01 A. M. T. D. 11, 225'. Nipping up and pick up, caliper, weigh and strap string of 4 7/8" drill collars.
5:00 A. M. Pressure test blank rams on BOP. Held Ok.
5:30 A. M. Start in hole with bit #92, W7R, size 7 3/8", junk sub, no float to drill out plugs.
6:15 A. M. Pressure test 4 1/2" pipe rams on BOP.
9:10 A. M. Pressure to 2100 psi. 4" Cameron leaking.
10:30 A. M. Pressure to 1750, wing valve on choke manifold leaked.
11:40 A. M. Pressure to 1990 dropping slowly; repair wing valve.
1:20 P. M. Pressure to 2070. Lost 20 psi, filled valve with cement.
1:40 P. M. Pressure to 1940 holding.
2:10 P. M. Resume trip in hole. Installing rubbers every stand.
3:40 P. M. Hit bridge 4103' in. 404' of cement to perforations. Drilling top plug.
7:00 P. M. Plug drilled. Drilling ahead in cement.

8 August 1961

12:01 A. M. T. D. 11, 225'. Drilling cement at 4375'.
2:45 A. M. Hit 3' section with no cement from 4499' to 4501'.
3:00 A. M. Hit stage tool at 4507'. Drilling tool.
3:15 A. M. Drilled through tool, ran one stand in free. Circulating.
3:31 A. M. Pressured to 2,050 psi.
3:35 A. M. Lost 400 psi in 4 minutes. Slight leak in wing valve.
Repairing valve.
5:15 A. M. Changed out leaking valves, tested at 2,000 psi.
Stopped all leaks and saw no more. Lost 250 psi in
8 minutes, still losing. Notified Al Samuels.
5:45 A. M. Notified Halliburton of intent to squeeze. Estimate
Halliburton will be on location between 10:00 a.m.
and noon today with 200 sacks cement and retrievable
squeeze tool.
6:00 A. M. Continued trip in hole slowly with pipe strap. To rubber
remaining unrubbered drill pipe.
9:50 A. M. Pressured to 1,850 psi, slow leak through swivel.
11:00 A. M. Repacked swivel, pressured to 1,850 psi, slow leak.
11:15 A. M. Circulate out all mud to assure that perforations are
covered with water.
12:20 P. M. Circulate to water.
12:30 P. M. Pressure to 1,800, drop to 1,600 in 15 minutes.
(Valves leaking).
12:55 P. M. Pressure to 1,810, drop to 1,400 in 30 minutes.
(Valves leaking).
3:30 P. M. Repair valves. Pressure to 1,900, drop to 1,575
in 30 minutes. No apparent leaks.
4:00 P. M. Discussed pressure tests with Jim Garrett, E. A.
Polumbus and decision was reached to test casing
with Halliburton pump truck. Circulating hole.
9:15 P. M. Halliburton on location. Rigging up to pressure test.
10:20 P. M. Began pressure testing leak in X-hole sub on top joint
of drill pipe, tighten with tongs, held OK.
10:23 P. M. Pressure to 500 psi with 2 barrels of water. Check
connections. No leaks.
10:25 P. M. Pressure to 1,000 psi.
10:26 P. M. Pressure to 1,500 psi.
10:28 P. M. Pressure to 2,000 psi. 7 1/2 barrels of water to
2,000 psi.
10:30 P. M. 2,000 psi.
10:32 P. M. Leak in line.
10:33 P. M. 1,800 psi.
10:34 P. M. Bleed pressure off.

10:35 P. M. Repair leak.
 10:42 P. M. Resume test.
 10:45 P. M. 1,800 psi.
 10:46 P. M. 2,000 psi.
 10:51 P. M. 1,550 psi.
 10:56 P. M. 1,350 psi.
 11:01 P. M. 1,250 psi.
 11:30 P. M. Repressure to 2,000 psi. took 2 barrels.
 11:53 P. M. 1,200 psi.
 11:55 P. M. Rig down Halliburton, start trip out.

9 August 1961

12:01 A. M. T. D. 11,225'. Trip out of hole.
 2:00 A. M. On bank to pick up Halliburton RTTS tool.
 3:30 A. M. Trip in with RTTS tool. (Strap in).
 5:40 A. M. Set tool, 4532'. Pressure drill pipe to 2000 psi.
 union leaked.
 5:42 A. M. Repressured 2,000 psi.
 6:02 A. M. Pressure bled to 1,700. Set additional 5,000# on
 packer.
 6:07 A. M. Pressure to 2,000.
 6:37 A. M. Pressure to 1,600 psi.
 6:40 A. M. Pressure annulus 2,000 psi.
 6:43 A. M. Pressure to 1,200 psi.
 6:44 A. M. 1,000 psi.
 7:03 A. M. 1,000 psi.
 7:25 A. M. Pull 2 joints, set tool, 4470', pressure annulus.
 7:40 A. M. Break top connection to check for drill pipe leak.
 Installed pressure gauge on drill pipe. Noted that
 any drop in annular pressure was counteracted by
 increase in drill pipe pressure indicating communi-
 cation between drill pipe and annulus.
 8:45 A. M. Trip out prior to squeeze.
 11:30 A. M. Wait on repairs to Howco truck.
 12:35 P. M. Pressure test Howco lines to 4,000 psi.
 12:45 P. M. Pressured casing to be sure it was still taking pressure.
 1:15 P. M. Start mixing cement.
 1:22 P. M. Start displacing cement.
 1:40 P. M. Displace 60.75 bbls and 50 sks. Latex cement. Pull
 5 stands.
 1:50 P. M. Squeeze 5 3/4 bbls. to 2,500 psi, pressure dropping.
 Leak in blowout preventers.
 2:00 P. M. WOC. Drill pipe at 4,486 while displacing cement.
 cement weighed 14.6 #/gal.

10 August 1961

12:01 A. M. 11, 225' waiting on cement.
11:50 A. M. Trip in to drill cement, strapping in.
1:00 P. M. Hit cement top 4318', pressured top with Howco to 2000 psi. Cement should occupy 205' of casing.
1:30 P. M. Pressure 2000 psi. Released pressure and commenced drilling cement.
5:30 P. M. Drilled 145' cement, bottom of cement at 4466' which is above where cement was spotted. It appears that approximately 60' of cement fell out while cementing. Weighed cement, used total of 5150# which is 54.6 sacks. 4.6 sacks could have remained in hopper and tub. 50 sacks of cement weighing 15.1 would have occupied 192'. 50 sacks of cement weighing 14.6 would have occupied 215'. Therefore between 45 and 70' of cement fell out. Pipe strap coming out of hole showed that bottom of cement was actually at 4505' which is where it should have been.
10:15 P. M. Strap in hole to attempt squeeze #2.
11:45 P. M. Run in to 4494'. Strap in.

11 August 1961

12:01 A. M. T. D. 11, 225'. Run in.
12:15 A. M. Pressure up to determine formation taking fluid.
12:30 A. M. Mix Latex 45 gals.
12:45 A. M. Mix cement.
12:52 A. M. Displace cement with 60 bbls. of water.
1:10 A. M. Finish displacement, pull 5 stands.
1:20 A. M. Pressure to 2000 psi, 4 1/4 bbls.
1:30 A. M. Pressure to 2800 psi, 1 1/2 bbls. additional.
6:30 A. M. Release pressure after holding for 5 hrs. Start out of hole.
8:00 A. M. On bank. Waiting on cement.
11:00 P. M. Start trip in hole.

12 August 1961

12:01 A. M. T. D. 11, 225'. Trip in hole.
2:00 A. M. On top of cement at 4318.70'. Drilling ahead. Pressured to 2000#. No loss in 30 minutes.
6:45 A. M. Through cement at 4514'. Drilled 196' of cement. Rigged up Halliburton.
7:33 A. M. Pressure to 1000 psi.
7:48 A. M. Lost approximately 50 psi. Pressured to 1500 psi.
8:03 A. M. Lost approximately 125 psi. Pressured to 2000 psi. Slight leak in Howco head.
8:33 A. M. Lost approximately 450 psi. Bled off pressure. Tightened head.

12 August 1961

(Continued)

8:37 A. M. Repressured to 2,000 psi.
9:40 A. M. Bled to 1,500 psi. Took 1 barrel to build pressure to 2,000 psi.
10:10 A. M. Pressure bled to 1,775 psi. This pressure loss is probably due to air in the system as the pressure loss is less each time the pressure is bled off and built up. This allows any air in the system to bleed out. If the perforations had been taking fluid, the cement probably would have cut out and allowed an increase in pressure drop each time the system was pressured up.
Expansion of the casing temperature changes and air in the system could have accounted for the pressure drop recorded.
10:15 A. M. Resumes trip to drill 2nd stage collar at 8,997'.
12:05 P. M. Second stage collar hit cement at 8,944'.
3:00 P. M. Finished drilling plug and 80' cement.
3:15 P. M. Pressure test 2nd stage collar. The 80' of cement drilled could actually have been frictional drag in the casing.
3:45 P. M. Pressure bled to 1,900 psi while testing. This would seem to indicate that the pressure losses noted previously were due to air in the system.
4:00 P. M. Resume trip.
4:45 P. M. Hit cement 160' above baffle collar.
5:42 P. M. Hit baffle collar at approximately 11,102'. Drilling collar.
7:00 P. M. Baffle collar drilled, drilling ahead in cement.
7:35 P. M. Drilling float collar at approximately 11,136'.
7:55 P. M. Float collar drilled. Drilling ahead in cement.
8:30 P. M. Drilled float shoe at 11,167'. Drilling ahead in cement.
10:10 P. M. On bottom. Strap 11,232.48', no correction. Drilled approximately 30' cement below float shoe and 30' cement and fill. Began circulating on bottom. Circulating contaminated water up hole. Then will displace entire system with clean water, clean pits and begin mudding up.

13 August 1961

12:01 A. M. T. D. 12,225'. Displacing contaminated water in fluid system.
2:00 A. M. Displacement and pit cleaning completed. Start mixing mud.
3:00 A. M. D & S core engineer on location with 2 new coreheads.
Serial Nos. R18778, 6 11/16" x 3 1/2"
R18779, 6 11/16" x 3 1/2"

13 August 1961

6:45 A.M. Displacement of mud system 2 hrs.
10:00 A.M. Finished mudding up. Started trip out.
1:45 P.M. Pick up core bbl. Rec. considerable junk from broken bit teeth and DV collars. Will rerun bit and junk basket in order to recover additional junk.
3:45 P.M. Set back core bbl. Pick up bit #93, 6 3/4" W7RJ (3-3/8" jets), and junk sub.
6:30 P.M. On bottom fishing for junk.
7:30 P.M. Began drilling at 11,225'.
11:55 P.M. T.D. 11,249'. Began fishing for junk.

14 August 1961

12:01 A.M. T.D. 11,249'. Fishing for junk.
12:55 A.M. Start trip out for junk basket.
3:30 A.M. On bank with bit #93, made 24' in 4 1/2 hrs., medium green. Rec. some junk. Start in hole with Bowen junk basket.
7:50 A.M. On bottom, fish for junk.
8:50 A.M. Drilling with junk basket.
9:00 A.M. Mud check.
Weight 8.6 #/gal. Pl. Vis. 12 cp.
Viscosity 40 Sec. pH 10
Water loss 7.6 cc. Yield 6
12:01 P.M. T.D. 11,251', cut 2'. Circulate and fish for junk.
12:30 P.M. Trip out with junk basket.
3:30 P.M. On bank. No junk recovered in basket or sub.
4:15 P.M. Run corehead #R18778. Connections provided by D&S for the core bbl. were not the correct connections. Shut down to wait for proper sub to be flown in.
5:00 P.M. Found the proper connections to go from core barrel to jars to drill collars. Trip in core bbl.
9:30 P.M. Commence coring at 11,262' after cleaning 23' fill-up. Corrected T.D. to 11,262'.

15 August 1961

12:01 A.M. T.D. 11,275'. Coring.
9:00 A.M. Coring at 11,300'. Mud check:
Weight 8.6 #/gal. Pl. Vis. 13 cp.
Viscosity 39 Sec. Yield 6
Water loss 7.6 cc.
6:00 P.M. Mud check:
Weight 8.6 #/gal. Pl. Vis. 15 cp.
Viscosity 42 Sec. Yield 5
Water loss 7.8 cc.
Shut down to repair valve on pump. Coring ahead.

15 August 1961
(Continued)

9:30 P.M. T.D. 11, 326'. Start out with core bbl. Last 2' cored at 61 and 76 min. /ft. Cut total of 64' from 11, 262 to 11, 326'. Total coring time 23 hrs. Strapping out.

16 August 1961

12:01 A.M. T.D. 11, 326'. Trip out with core bbl.
1:30 A.M. On bank with core #22, corehead shows minor erosion at water courses. Core catcher came off with core-head. Top 1/2" of catcher worn off, inner bbl parted.
2:00 A.M. Began disassembly of bbl. and found top section of inner bbl. had backed off, threads worn and galled. Rec. 40' of 64' out. Core was tightly wedged in bbl. Had to lay bbl. sections on catwalk and ram core out with 2" pipe.
5:30 A.M. Start in hole with bit #94, W7R.
8:30 A.M. Top of corehole reaming to bottom.
11:30 A.M. T.D. 11, 326'. On bottom, drilling ahead.
8:00 P.M. Fish for junk. T.D. 11, 364'.
9:00 P.M. Drop Eastman survey.
9:30 P.M. Start trip out of hole. Wet string strap out. Bit #94 made 38' in 8 1/2 hrs.

17 August 1961

12:01 A.M. T.D. 11, 364'. Trip out bit #94.
2:00 A.M. On bank with bit #94, worn. Rec. a few small pieces of junk. Picked up new core bbl (50').
3:00 A.M. Start in hole with bbl. and diamond bit R18778.
7:00 A.M. On top of 12' fill-up. Wash to bottom and clean up hole. Pipe strap showed depth should be 11, 364'. Geolograph and pipe tally were corrected from 11, 351' to 11, 364'.
8:45 A.M. Commence coring 11, 364'.
3:00 P.M. 11, 385'. Mud check:
Weight 8.7 #/gal. Pl. Vis. 14 cp
Viscosity 42 Sec. Yield 5
Waterloss 6.6 cc.
3:20 P.M. Remove kelly extension.
6:50 P.M. T.D. 11, 394'. Pressure fluctuating. Start trip out. Cored 30' in 10 hrs. core #23.
10:45 P.M. On bank with core #23. Diamond corehead #R18778 badly ringed on outer portion of bit face. Lay down core. Rec. 26' of 30' out. Service core bbl. Replaced core catcher, otherwise bbl. in good shape.

17 August 1961

(Continued)

11:30 P. M.

Dump shale pit.

18 August 1961

12:01 A. M.

T. D. 11, 394'. Shale pit cleaned. Began trip in with bit #95, W7R, and junk sub.

3:00 A. M.

On top of corehole rearing ahead. On trip in bit hit something at approximately 11, 144'. Bit would not go. Turned rotary 1/2 turn, bit would fall free. Repeated this process and it did the same thing.

4:20 A. M.

Drilling ahead at 11, 402'.

9:00 A. M.

11, 414' drilling ahead

10:31 A. M.

11, 420', pull 4 stands off bottom in attempt to locate tight spot noticed above. No tight spot was noticed. Cement caving off the walls of the casing probably bridged over causing tight spot.

12:01 P. M.

Resume drilling.

4:00 P. M.

T. D. 11, 439'. Circulate samples.

6:00 P. M.

Fish for junk.

7:00 P. M.

Trip out.

10:45 P. M.

On bank with bit #95, drilled 45' in 9 3/4 hrs, medium dull. Cut drilling line.

19 August 1961

12:01 A. M.

T. D. 11, 439'. Drilling line cut. Began picking up DST tool. Run RTTS tool in hole with 3000' water cushion. Strap in.

6.00 A. M.

Pipe tally showed T. D. as 11, 440', no correction. Will set tool at 11, 090' in 3rd joint of casing off bottom. DST #12 (11, 439-11, 172' casing shoe). Open 32 min., SI 1 hr. and 2 min. Rec. 120' mud and 3040' water cushion.

Field Pressures

IHP 4962

ISIP 2008

IFP 1400

FFP 1400

BHT = 230°F

FSIP 1694

FHP 4942

Top water sample R = 7.0 at 80° F.

Bottom water sample Rm = 2.6 at 96° F.

Mud characteristics:

Weight 8.8 #/gal.

Filter cake 1/32

Water loss 6.8 cc.

Cl 1100 ppm

pH 9.5

Pl. Vis. 12 cp.

Yieldpt. 10

19 August 1961

9:15 A. M. Start out of hole with test tool.
1:30 P. M. On bank with test tool. Break down test tool, jet suction pit
3:05 P. M. Start in hole with bit #93 RR, W7RJ, 1-3/8" jets to condition hole and mud preparatory to coring.
5:40 P. M. On bottom 14' fill. Circulate to bottom - conditioning hole.
7:20 P. M. Mud volume built up, fill circulated, drilling ahead.
10:50 P. M. T. D. 11, 447'. Began circulating samples prior to trip out for core bbl.

20 August 1961

12:01 A. M. T. D. 11, 447'. Circulating.
12:20 A. M. Picked up off bottom. Hole tight, let stand for 15 min. Had 5' fill-up on bottom. Began circulating.
1:30 A. M. Picked up off bottom. No tight hole experienced. 1 1/2' fill on bottom.
1:45 A. M. Start trip out with bit #93 RR, made 8' in 3 1/2 hrs.
4:40 A. M. On bank with bit #93 RR, medium dull. Rec. 1 small piece of junk in junk sub. Began picking up core bbl. and Truco bit #R18796.
5:15 A. M. Start in hole with core bbl.
8:15 A. M. Hit 37' fill-up.
8:35 A. M. T. D. 11, 447' on bottom. Core string is 4 1/2' longer than drill string, coring ahead.
4:00 P. M. T. D. 11, 473'. Pressure increase to 1250 psi. Barrel appeared to have parted. Cored 26' in 8 hrs. Started trip out of hole with core #24.
8:15 P. M. On bank with core #24. Diamond corehead R18796 (6 11/16" x 3 1/2") badly ringed as was diamond corehead R18778. Inner barrel was partially backed off at swivel. Laid down core #24. Rec. 21' of 26' cut. Service core bbl. Replaced core catcher and sleeve.
9:30 P. M. Start in hole with Bowen junk basket.

21 August 1961

12:01 A. M. T. D. 11, 473'. Trip in with Bowen junk basket.
12:30 A. M. Circulate through 20' fill.
12:45 A. M. Drilling ahead with junk basket.
1:45 A. M. T. D. 11, 475', cut 2' with junk basket start trip out.
6:00 A. M. On bank with junk basket. Rec. 1' old core, 1' new core and some pieces of rubber.
7:00 A. M. Start in hole with bit #96, W7RJ, with 3-3/8" jets.
10:15 A. M. Wash and ream 16' to bottom.
11:55 A. M. T. D. 11, 475'. On bottom, drilling ahead.
4:15 P. M. Hit drilling break at 11, 505' for approximately 7'.

21 August 1961
(Continued)

10:00 P.M. T.D. 11,543'. Start out of hole to pick up Bowen junk basket. Dropped Eastco. Bit #96, HTC-W7RJ. Made 68' in 10 hrs. for an average of 6.8 ft./hr.

22 August 1961

12:01 A.M. T.D. 11,543'. Coming out of hole.
1:20 A.M. On bank with bit #96. Bit dull and out of gauge but bearings good. Eastco deviation showed 5 1/2° at 11,530'
2:20 A.M. Start in hole with Bowen junk sub. On bottom at 5:45 A.M. after washing and reaming to bottom through 21' of fill. Coring ahead.
7:00 A.M. 11,544'. Cutting core with junk sub.
8:20 A.M. T.D. 11,545'. Finished cutting 2'.
8:45 A.M. Start trip out, shut down to repair high clutch.
12:01 P.M. Resume trip out.
3:00 P.M. On bank with core #25 (11,543-11,545'), cut 2', recovered 2' of shale and arkose. Break down core bbl. to check if core had been left in bbl. after last run.
4:00 P.M. Resume trip in with bit #97, W7RJ, with 3-3/8" jets.
7:10 P.M. On top of 11' fill-up. Circulating to bottom.
7:20 P.M. Reaming 2' out of gauge hole caused by cutting core with Bowen basket.
7:25 P.M. T.D. 11,545'. Drilling ahead.
9:00 P.M.

Weight	8.9 #/gal.	pH	9.5
Viscosity	45 Sec.	Yield	12
Water loss	8.0 cc.	Filter cake	1/32
Pl. Vis.	20 cp.	NaCl	300 ppm

23 August 1961

12:01 A.M. T.D. 11,577'. Drilling ahead.
6:30 A.M. T.D. 11,609'. Began fishing for junk. Bit #97 made 64' in 11 hrs.
6:45 A.M. Dropped Eastman survey.
7:00 A.M. Start trip out of hole with bit #97.
11:00 A.M. On bank with bit #97. Bit full gauge, medium dull, cones slightly loose. No junk recovered. Deviation survey 7° at 11,609'.
11:30 A.M. Start trip in with bit #98, W7RJ, with 3-3/8" jets, and junk sub.
2:40 P.M. Hit bridge 145' off bottom. Washed down series of small bridges.
3:05 P.M. T.D. 11,609'. On bottom, drilling ahead.

23 August 1961
(Continued)

4:00 P. M. Shut down 15 min. to measure pump and drive sheaves.
4:15 P. M. Resume drilling.
7:00 P. M. Shut down to repair pump #1.
7:15 P. M. Resumed drilling.

24 August 1961

12:01 A. M. T. D. 11,671'. Drilling ahead.
1:10 A. M. T. D. 11,675'. Fish for junk.
1:40 A. M. Drop Eastman survey.
2:00 A. M. Start out of hole with bit #98, made 66' in 9 3/4 hrs.
5:00 A. M. On bank, bit medium dull, 1/8" out of gauge.
5:45 A. M. Trip in Bowen basket.
9:00 A. M. On bottom 46' fill, coring ahead. Checked with Loffland on amount of dry pipe on DST's. They agreed to 9,000'.
10:30 A. M. Mud check:
Weight 9.0 #/gal. pl. Vis. 23 cp.
Viscosity 50 Sec. pH 9.5
Water loss 5.6 cc. Yield 17
12:10 P. M. T. D. 11,677'. Finish coring with Bowen basket. Trip out. Accepted delivery of Baker casing scraper.
4:10 P. M. On bank with Bowen basket, no recovery.
4:25 P. M. Trip in bit #99, W7J, with 3-3/8" jets, Drilco reamer.
4:45 P. M. Run drill collars. Shut down to reline brakes on compound.
6:55 P. M. Finish brakes, dump mud pits.
7:30 P. M. Resume trip in.
9:40 P. M. 5' off bottom reaming. No tight spots encountered to this point.
10:00 P. M. T. D. 11,677' on bottom drilling ahead. Building mud volume and mixing mud.

25 August 1961

12:01 A. M. T. D. 11,693' drilling ahead. Mud check:
Weight 8.9 #/gal. pH 9.0
Viscosity 52 Sec. Yield 8
Water loss 5.4 cc. Filter cake 1/32
Pl. Vis. 25 cp. NaCl 300 ppm
7:15 A. M. T. D. 11,729'. Began circulating samples.

25 August 1961
(Continued)

9:15 A. M. Fish for junk. Bit #99 made 52' in 9.0 hrs. (5.8 ft. / hr.). Mud check prior to trip:
Weight 9.0 #/gal. pH 9.5
Viscosity 48 Sec. Yield point 10
Water loss 6.4 cc. Pl. Vis. 20 cp.

9:35 A. M. Drop Eastman survey.

10:00 A. M. Trip out.

1:40 P. M. On bank, bit dull, 5° at 11,720', bit and reamer in gauge.

2:00 P. M. Pick up bit #100, W7RJ, with 2 11/32 and 1-3/8" jets and 9 joints of 3 1/2" drill pipe.

5:45 P. M. T. D. 11,729'. On bottom. Drilling ahead.

8:00 P. M. Mud viscosity 42 seconds, weight 8.9 #/gal. Dumped some mud from shale pit. Will continue to add water to mud system. Began mixing gel, driscose, and Tannex.

9:00 P. M. T. D. 11,762'. Mud check:
Weight 8.8 #/gal. pH 8.5
Viscosity 43 Sec. Yield 2
Water loss 10.0 cc. Filter cake 1/32
Pl. Vis 17 cp. NaCl 350 ppm

10:30 P. M. Weight 8.9 #/gal., viscosity 48 seconds. Stopped mixing mud. Cut water out.

26 August 1961

12:01 A. M. T. D. 11,780'. Drilling ahead.

4:25 A. M. T. D. 11,798'. Circulate samples. Bit #100 made 69' in 10 3/4 hrs.

5:55 A. M. Trip out.

10:00 A. M. On bank. Bit dull, gauge teeth heeled off, in gauge. Pick up bit #101, W7RJ, with 3-3/8" jets and reamer. Pipe strap 11,811, no correction. Will restrap next trip. Survey 5° at 11,790'.

1:30 A. M. Hit bridge 11,485'.

2:10 A. M. T. D. 11,780'. On bottom. Drilling ahead.

8:10 P. M. T. D. 11,826'. Table torquing badly. Began circulating samples.

10:00 P. M. Samples circulated. No granite observed. Start trip out. Strapping pipe. Bit #101 made 28' in 6.2 hrs.

27 August 1961

12:01 A. M. T. D. 11,826'. Trip out bit.

2 00 A. M. On bank with bit #101. All cones missing from bit plus 2 shanks worn off. Bit 1" under gauge. Reamer full gauge. All collars tight. Reamer, junk sub and bit very tight. Trying to break tight jts. in reamer, junk sub

27 August 1961

(Continued)

2:00 A. M. and bit. Pipe strap 11,833.24, 7' long, no correction.
5:00 A. M. Start in hole with Bowen junk basket. Threads on bit
and junk sub were fouled when finally broken apart, so
did not run junk sub. Rec. 10 to 15 bearings in junk sub.
9:00 A. M. Received shipment of 6" magnet with 4 shoes and junk
sub from Acme Tool, Inc., Sterling, Colorado.
9:20 A. M. T. D. 11,826'. On bottom, no fill.
1:00 P. M. Finished milling with Bowen basket. Start out. Mud
check:
Weight 8.9 #/gal. Yield point 8
Viscosity 51 Sec. pH 8.5
Water loss 4.8 cc. Pl. Vis. 22 cp.
5:00 P. M. On bank. Recovered 1 cone and a few small pieces of
shale. Pick up bit #102, W7RJ, with 3-3/8" jets, ream-
er and junk sub. (Rental).
8:30 P. M. On bottom. Ream 3'.
11:00 P. M. Milling on junk.

28 August 1961

12:01 A. M. T. D. 11,826'. Milling on junk.
2:30 A. M. Drilled 1 1/2 feet of new hole. Commenced fishing
for junk.
3:30 A. M. T. D. 11,827'. Started trip out.
7:00 A. M. On bank with bit #102, made 1' milling on junk. Bit
had locked on junk and all 3 cones milled flat. One
cone milled to bearings. Bit 1/16" under gauge. Re-
covered half handful of very small metal pieces in
junk basket.
7:15 A. M. Clean shale and middle pits.
9:30 A. M. Start in hole with Bowen basket and junk sub. (Rental).
12:25 P. M. T. D. 11,827'. On bottom. Washed through 8' fill-up.
Pump pressure 550 psi-625 psi at 38 spm. Rotary
speed 30 rpm, engine speed 700 rpm.
5:15 P. M. T. D. 11,829'. Pump pressure increased to 1600 psi.
Core #26 cored 2', recovered 2' with Bowen basket,
broke the core and started out the hole.
9:15 P. M. On bank with Bowen junk basket. Recovered 2' core.
Bottom foot shale, top foot sand. No junk in basket.
Recovered 17 bearings plus a few pieces of junk in
junk sub. Picked up bit #103, W7RJ, with 3-3/8" jets.
Two junk subs (1 rental) and reamer and trip in hole.

29 August 1961

12:01 A.M. T. D. 11, 829'. Trip in hole with bit #103.
1:15 A.M. On bottom, fish for junk.
1:45 A.M. Drilling ahead.
3:00 A.M. T. D. 11, 837'. Mud check:
Weight 9.0 #/gal. Yield 2
Viscosity 37 Sec. pH 9.5
Water loss 6.0 cc. Filter cake 1/32
Pl. Vis 12 cp. NaCl 450 ppm
4:40 A.M. T. D. 11, 843'. Fish for junk.
5:00 A.M. Drop Eastman survey.
5:15 A.M. Start out of hole strapping with bit #103. Made 14' in
3 hrs.
9:30 A.M. On bank with bit #103. Bit dull and dubbed off. In gauge
and bearings good. Pipe strap out of hole indicated T. D.
at 11, 843.65 vs. 11, 843' on geolograph, no correction.
Deviation survey 5 1/2° at 11, 830'. Recovered about a
tablespoon of small junk pieces from junk subs.
10:30 A.M. Start in hole with bit #104, W7RJ, with 3-3/8" jets.
Junk subs (1 rental) located 1 between bit and reamer
and one above reamer.
1:40 P.M. T. D. 11, 843'. On bottom drilling ahead after circulating
and drilling through 18' of fill.
5:30 P.M. T. D. 11, 855'. Pulled up to circulate samples. Bit #104
drilled 12' in 3 hrs. 50 min.
7:45 P.M. Samples circulated. Began fishing for junk.
8:00 P.M. Start trip out with bit #104.
8:15 P.M. Hit tight spot at 11, 243'. Pulled loose with 25, 000#.
11:30 P.M. On bank with bit #104, bit dull, bit and reamer to gauge.
Rec. 6 very small pieces of junk. Shut down working on
drawworks.

30 August 1961

12:01 A.M. T. D. 11, 855'. On bank with bit #104. Working on draw-
works.
2:45 A.M. Drawworks repaired. Replaced water cooling hose in
break drum. Began trip in with Bowen baskets and 2
junk subs (1 rental).
5:45 A.M. On bottom. Circulating 5' fill.
6:45 A.M. T. D. 11, 855'. Commenced cutting core with Bowen
basket.
9:30 A.M. Cut approximately 2'. Will continue running basket
until pump pressure increases.
10:55 A.M. T. D. 11, 857'. Finished core.
1:10 P.M. Trip out.
2:30 P.M. On bank. No recovery from junk basket, rec. a con-
siderable quantity of cavings and cuttings from the
junk subs.

30 August 1961

4:00 P. M. Trip in with bit #105, W7RJ, with 3-3/8" jets and reamer and junk sub. Cut drilling line.
8:10 P. M. On bottom, no fill. Reaming corehole.
9:05 P. M. Began circulating 1 hr. on bottom. Mud check:
Weight 9.0 #/gal. Yield 1
Viscosity 41 Sec. Filter cake 2/32
Water loss 7.4 cc. pH 9.5
Pl. Vis. 17 cp. NaCl 400 ppm
10:00 P. M. T.D. 11,857'. Drilling ahead.

31 August 1961

12:01 A. M. T.D. 11,865'. Drilling ahead.
3:00 A. M. T.D. 11,872'. Began circulating samples.
4:45 A. M. Start out with bit #105. Bit made 15' in 5 hrs. plus reaming 2'.
8:05 A. M. On bank, bit dull, 1/16" out of gauge, reamer in gauge. Pick up bit #106, RG1J, with 3-3/8" jets, reamer and junk sub.
8:50 A. M. Trip in.
9:30 A. M. Geologists examined cuttings and determined possibility of granite. The decision was reached to pull the bit and run the core bbl. to cut a 20' core in order to verify that granite was observed.
10:10 A. M. On bank, pick up core bbl. and jars. Had to lay down 25' section as inner barrel was split.
11:45 A. M. Trip in to cut core #27, with diamond corehead #R18779.
3:00 P. M. On bottom, installed kelly extension. Commenced reaming out of gauge hole.
3:45 P. M. Finished reaming to bottom. Commenced circulating hole prior to coring.
4:05 P. M. T.D. 11,872'. Commence coring.
7:25 P. M. Shut down to remove kelly extension.
7:35 P. M. Resumed coring.
8:55 P. M. Pressure jumped to 1200 psi from 900 psi. Began bleeding back to 1050, then back up to 1200 psi.
9:13 P. M. Quit rotating.
9:20 P. M. T.D. 11,885'. Core #27 (11,872-11,885') cored 13'. Broke core off and began trip out. Strapping pipe out. Cut 13' in 4.8 hrs.
9:45 P. M. Shut down to repair, break out cat head controls.
10:10 P. M. Resumed trip out.

1 September 1961

12:01 A. M. T.D. 11,885'. Tripping out core #27.
1:45 A. M. On bank with core #27. Diamond corehead R18779 was worn over 1/2 the face of the corhead. Rec. 13' of 13' cut. Core bbl. ok. Service core bbl.

1 September 1961
(Continued)

2:45 A.M. Pick up bit #106, RG1J, with 3-3/8" jets, junk sub and reamer and start in hole.

6:00 A.M. T.D. 11,885'. Began drilling. Discussed injection testing with Loffland engineer, and he said that 5000 psi would be entirely safe and 7500 psi would be considered a maximum pressure.

8:30 A.M. Hit shale break at 11,903'.

3:00 P.M. Drilling at 11,910'. Still in shale. Mud check:
Weight 8.8 #/gal. Water loss 5.4 cc.
Viscosity 46 Sec. Yield 4
Pl. Vis. 18 cp. pH 9.0

6:30 P.M. 11,916'. Hit fast drilling break for 6'.

8:00 P.M. T.D. 11,926'. Began circulating samples.

9:50 P.M. Samples up, no granite. Began fishing for junk.

10:20 P.M. Start trip out of hole with bit #106, made 41' in 14 hrs. 2.9 ft./hr.

2 September 1961

12:01 A.M. T.D. 11,926'. Trip out bit #106.

1:35 A.M. On bank with bit #106, medium dull to gauge. Pick up bit #107, RG1J, with 3-3/8" jets, junk sub and reamer. Trip in hole.

4:00 A.M. T.D. 11,926'. On bottom. Drilling ahead.

9:00 A.M. 11,942'. Mud check:
Weight 9.1 #/gal. Water loss 6.0 cc.
Viscosity 41 Sec. Yield 3
Pl. Vis. 17 cp. pH 9.5
Geologists have tentatively picked the bottom of the Fountain at 11,873'.

9:00 P.M. T.D. 11,976'. Drilled 50' in 17 hrs. with bit #107 for rate of 2.9 ft./hr. Circulating samples before coming out of hole.

11:20 P.M. Start out of hole to pick up core bbl.

3 September 1961

12:01 A.M. T.D. 11,976'. Tripping out for core bbl.

3:10 A.M. On bank with bit #107, bit green.

4:00 A.M. Start in hole with corehead R18779.

7:30 A.M. On bottom and coring at 11,976'.

11:15 A.M. Lost circulation at 11,985'. Drilling break to 10 min./ft. on last 3'. Lost 200 bbls. Pulled up 30', regained some circulation with pump idling. Went to bottom, lost circulation again.

3 September 1961

(Continued)

12:01 P.M. T.D. 11,985'. Start out with core #28.
2:00 P.M. Shut down 45 min. to repair drive chain.
4:00 P.M. On bank with core #28, cut 9', rec. 6.7'. Core #28:
(11,976-85'). Core was Pre-Cambrian granite.
6:35 P.M. Advised G. D. Haugse that granite had been reached
at 11,970', and the completion phase of the operation
was commenced. Waiting on Schlumberger.
9:20 P.M. Began filling hole with mud. Pumped approximately
50 bbls. to fill hole. Pulled 6 stands that were in hole
and tried to fill hole. Pumped approximately 150 bbls.
mud in hole. No returns. Total mud loss 200 bbls.
10:15 P.M. Schlumberger on location. Rigging up and running IES
log.

4 September 1961

12:01 A.M. T.D. 11,985'. Running IES log.
1:00 A.M. On bank with IES log. Run sonic log.
3:00 A.M. On bank with sonic log. Running microcaliper log.
6:00 A.M. On bank with microcaliper log. Running temperature log.
8:00 A.M. On bank with temperature log, misrun.
8:30 A.M. Rerun temperature log. Schlumberger logs have in-
dicated T.D. to be 11,991'.

5 September 1961

12:01 A.M. T.D. 11,985'. Begin picking up DST tool.
12:25 A.M. Begin trip in with DST tool - strap in - will set pack-
er at 11,000'. Fill drill collars plus 15 stands of drill
pipe as water cushion.
3:30 A.M. Differential valve tripped, opening bottom of drill pipe.
4:00 A.M. Trip out DST tool and reset valve.
5:15 A.M. Trip in DST tool with no water cushion.
8:15 A.M. On bottom with DST tool.
8:20 A.M. Open tool.
8:24 A.M. Close tool.
8:50 A.M. Open tool.
9:50 A.M. Close tool.
11:57 A.M. Pull DST #13 (11,985-11,171'). Pipe weight had in-
creased 23,000# which would indicate that 2700 gals.
of fluid had been produced. The fluid level in the
annulus remained static. While pulling the DST, the
hole was kept full with water so as to lessen the pos-
sibility of losing any of the fluid which had been
produced during the test.

5 September 1961

(Continued)

11:57 A. M.

The BOP's were tested prior to pulling the tool. Test tool set in 8 5/8" casing at 9660'. Rec. 5330' of drilling mud.

4:25 P. M.

On bank with DST #13. Start in hole with drill collars and 5 stands drill pipe. Field Pressures:

	<u>Pressure Chart #221</u>	<u>Pressure #193</u>
IH	3883	4078
ICIP	3824	3842
IF	602	645
FF	2480	2572
FCIP	3687	3714
FH	4242	4262

5:00 P. M.

Waiting on DST #14.

10:45 P. M.

Starting out of the hole.

11:30 P. M.

On bank. Wait on DST #14.

6 September 1961

12:01 A. M.

T. D. 11,985'. Wait on DST #14.

12:50 A. M.

Making up tool.

1:45 A. M.

Start in the hole with DST tool.

3:30 A. M.

Packer stopped at 1800' (DC's plus 13 stands). Starting out of the hole.

4:55 A. M.

On bank with DST tool. Tool all right but pieces of rubber in the slips and perforations.

5:35 A. M.

Starting in the hole with used bit.

7:15 A. M.

On bank. No bridges encountered. Pick up DST tool.

8:45 A. M.

Fill drill collars and 15 stands of water cushion. Test tool has 1/4" bottom-hole choke.

12:45 P. M.

On bottom. Set packer in 8 5/8" casing at 11,020'. Initial opening of tool resulted in a very weak blow which would indicate the possibility that partial plugging of the tool had occurred.

3:30 P. M.

SI tool. Still had weak blow.

5:00 P. M.

Start out with tool.

9:30 P. M.

On bank with tool. Rec. 2000' water cushion, 5400' of salt water.

10:50 P. M.

Trip in W7R RR to check bottom. DST #14. Field Pressures:

	<u>Chart #221</u>	<u>Pressure #193</u>
IH	4902 psi	4910 psi
ICIP	None taken.	None taken.
IF	1597	1642
FF	3370	3417
FCIP	4022	4042
FH	4822	4910

(temperature 250° F)

7 September 1961

12:01 A. M. T. D. 11,985'. Trip in with used W7R bit to clean fill-up.
1:35 A. M. Tight hole at 11,340' - stuck.
2:10 A. M. Put kelly on.
2:30 A. M. Broke circulation. Working on tight spot.
4:00 A. M. Salt water started to come out of the hole. Start mixing mud.
5:00 A. M. Finished by-passing salt water. Mixing gel, driscose, and water to raise viscosity and build volume.
8:00 A. M. Pipe free, trip out with bit.
11:30 A. M. On bank. Pick up bit #107 RR, RG1J. Removed all jets from bit.
11:45 A. M. Trip in.
1:30 P. M. Notified mud logging unit that they have been released.
2:55 P. M. Hit bridge 11,685'.
3:30 P. M. Hit bridge 11,835. Appears to be fill-up. Condition hole and mud.
4:30 P. M. Mud check:
Weight 8.5 #/gal. Pl. Vis. 14
Viscosity 42 Sec. Yield 4
Water loss 7.4 cc. Cl 2,200 ppm
7:00 P. M. Mud check:
Weight 8.5 #/gal. pH Vis. 8.0
Viscosity 46 Sec. Cl 3,000 ppm
Water loss 7.6
9:00 P. M. On bottom. Circulate hole.

8 September 1961

12:01 A. M. T. D. 11,985'. Start short trip out to 11,100'.
12:35 A. M. Pulled out 10 stands. Waiting 30 minutes.
1:05 A. M. Going down the hole.
1:30 A. M. 30' fill-up. Broke circulation.
1:40 A. M. Lost 1' of mud from pits. Pump pressure down to 150 psi. Put water in the tanks.
2:10 A. M. Pressure up to 750 psi. Start mixing mud.
3:40 A. M. Still losing mud. Condition hole and mud.
4:15 A. M. Stop supplying water. Level in the pits remains constant.
5:55 A. M. Start short trip out, 10 stands.
6:20 A. M. Waiting half an hour at 11,100'.
6:50 A. M. Start trip down.
7:00 A. M. Hit bridge 200' off bottom. Mud check: Weight 8.6 #/gal.
Viscosity 46 Sec.
7:30 A. M. Drill on bridge and wait on orders.
8:30 A. M. Circulating hole and drilling bridge.
9:00 A. M. On bottom, 20' fill-up.

8 September 1961

(Continued)

9:30 A. M.

Mud check:

Weight	8.6 #/gal.	Pl. Vis.	20 cp.
Viscosity	51 Sec.	Yield	7
Water loss	6.0 cc.	pH	7.6
		Cl	2,400 ppm

Circulate hole.

12:01 P. M.

Lost partial returns of 40 bbls.

12:45 P. M.

Started displacing mud in drill pipe with water.

1:07 P. M.

Finished displacing mud with 144 bbls. of water.

1:18 P. M.

Pull 12 stands.

2:00 P. M.

Prepare to run injection tests.

4:00 P. M.

Decision was reached to run radioactive tracer survey prior to injection water so as to avoid the possibility of sticking the tool.

4:30 P. M.

Run to bottom after displacing the water in the drill pipe with mud. 15' of fill-up.

6:45 P. M.

Commence running surveys.

8:00 P. M.

Couldn't get instrument through drill collars, pulled out.

9:00 P. M.

Took out 12 stands prior to injection test.

9:45 P. M.

Start injection test. Closed rams and pressured up to 1,000 psi. Injected 134 gpm water at 1,000 psi for 5 minutes. Stopped pump, pressure fell to 300 psi in 1 minute, 100 psi in 2 minutes, 25 psi in 4 minutes. Start pumping maximum capacity of D-700 pump. Injected 256 gpm water for 5 minutes. Stop pump. Pressured to 400 psi in 1 minute; 30# in 4 minutes.

11:00 P. M.

Start out of hole.

9 September 1961

12:01 A. M.

T. D. 11,985'. Trip out.

2:00 A. M.

On bank with bit. Start changing liners on both pumps.

9:30 A. M.

Trip in open ended.

12:15 P. M.

In hole with 11,058' of 4 1/2" drill pipe open ended.

Rig up to run spinner survey.

1:45 P. M.

Hit bridge with logging tool at 11,270'.

2:07 P. M.

Displaced mud in drill pipe with 160 bbls. water.

2:33 P. M.

Finished displacing mud, pressured to 1,250 psi in attempt to break down formation. Formation would not take fluid.

2:50 P. M.

Pulling spinner survey.

3:30 P. M.

Trip out.

7:15 P. M.

On bank. Pick up bit #108, RG1J, with 3-3/8" jets plus reamer, junk sub and 3 additional jets. of 3 1/2" DP.

9 September 1961

(Continued)

8:10 P. M. Trip in.
11:15 P. M. T. D. 11,985'. On bottom, 15' loose fill-up.
Corrected total depth 11,990', drilling ahead.

10 September 1961

12:01 A. M. TD 11,994'. Drilling ahead.
2:40 A. M. 12,002' drilling ahead. Made a connection. Mud check:
Weight 8.5 #/gal., Viscosity 36 Sec.
6:00 A. M. TD 12,017'. Drilling ahead. Lost a total of 10" of
mud in the pits since started drilling.
11:30 A. M. Lost 40 bbls. of mud last hr.
11:45 A. M. TD 12,045'. Bit #108 made 55' in 12.5 hrs.
12:15 P. M. Pull 12 stands to run injection tests. 1st stand tight.
1:10 P. M. Rig up to run injection tests.
1:30 P. M. Began testing. Pressured to 1,500 psi. Pressure bled
off very slowly. Pressure to 2,000 psi, bled off slowly.
Hole appears to be bridged.
2:30 P. M. Displaced water to mud prior to trip in to check for
bridging.
3:15 P. M. Resume trip to bottom.
3:40 P. M. Hit bridge 160' off bottom.
6:00 P. M. Circulating at 12,025'. 20' of fill-up re-
maining.
7:00 P. M. Lost returns - 350 bbls lost at 6 bbls./min.
7:30 P. M. Pull out 12 stands - 1 slightly tight spot 6 stands off
bottom.
8:15 P. M. Injection test. Closed rams. Pressured up to 2,000
psi, released three times. Pressure bled off slowly.
No injection.
9:40 P. M. Start mixing mud.

11 September 1961

12:01 A. M. T. D. 12,045' circulating, conditioning mud.
2:00 A. M. Mud viscosity, 34 Sec.
3:00 A. M. Mud viscosity, 37 Sec.
6:00 A. M. Mud check:
Weight 8.5 #/gal.
Viscosity 43 Sec.
pH 9.5
Lost about 20 bbls. mud since started mixing.
7:00 A. M. Mud check:
Weight 8.5 #/gal. Yield 8
Viscosity 49 Sec. Filtercake 1/32
Pl. Vis. 18 cp. pH 9.5
Water loss 5.2 cc. Cl 1,600 ppm

11 September 1961

(Continued)

8:15 A. M. Viscosity 58 Sec.
8:20 A. M. Resume trip in to 11, 970' with bit #108.
8:40 A. M. Hit bridge at 11, 246'. Pick up kelly. Drill bridge.
8:45 A. M. Resume trip in.
8:50 A. M. Hit bridge at 11, 306'. Pick up kelly. Drill bridge.
Also drill bridge at 11, 351'.
9:05 A. M. Resume trip in.
9:10 A. M. Hit bridge at 11, 394'. Pick up kelly. Drill bridge.
9:30 A. M. Resume trip in.
9:40 A. M. Hit bridge at 11, 817'. Pick up kelly, drill bridge. Bit
plugged. Unplugging bit.
10:00 A. M. Began circulating and washing to bottom.
12:01 P. M. Circulating at 11, 970'. Had to wash down last 5 joints.
Can wash kelly to 11, 970'. Pull up kelly, go back and
have 5' fill-up.
1:00 P. M. Mud check:
Weight 8.6 #/gal. Filter cake 1/32
Viscosity 62 Sec. Yield 10
Pl. Vis. 20 cp. pH 9.0
Water loss 5.0 cc. Cl 1,600 ppm
3:00 P. M. Mud check:
Weight 8.6 #/gal. Filter cake 1/32
Viscosity 52 Sec. pH 9.0
Pl. Vis. 18 cp. Yield 8
Water loss 5.2 cc. Cl 1,400 ppm
3:20 P. M. Start short trip out. Pulled 50' up from 11, 970'
(11, 920') and pipe stuck. Let pipe down and would not
go freely. Put kelly on. Broke circulation.
Conference with O. E. Mechem and Lewis Brown. De-
cided to trip out bit #108 as possibility for pipe to get
stuck is eminent.
3:30 P. M. Start trip out with bit #108. First 8 stands were dragging.
Tight spots noted on 2nd, 4th and 7th stands. Pipe free
after 8th stand out from 11, 970'.
7:00 P. M. On bank with bit #108, green, bearings slightly loose,
to gauge. Removed 3/8 jets on bit #108.
7:15 P. M. Trip in with bit #108 RR.
7:40 P. M. Cut line 100'.
8:40 P. M. Resume trip in.
10:35 P. M. Down at 11, 300'. Broke circulation. Condition hole
and mud.

12 September 1961

12:01 A. M. T. D. 12,045'. Circulating at 11,300'. Mud check:
Weight 8.0 #/gal., Viscosity 59 Sec.

1:05 A. M. Made one connection.

3:35 A. M. Made one connection. Mud viscosity 52 - start mixing
to raise it up to 60.

6:40 A. M. Made one connection. Hit bridge 11,580'. Mud check:
Weight 8.8 #/gal., Viscosity 59 Sec.

8:00 A. M. Conditioning mud at 11,590'.

9:30 A. M. Ran in one more stand to 11,685'. Pipe dragged when
stand was lowered.

10:00 A. M. Mud check:
Weight 8.8 #/gal. Filter cake 2/32
Viscosity 91 Sec. Yield 54
Pl. Vis. 38 cp. pH 8.0
Water loss 4.0 cc. Cl 1,400 ppm

10:15 A. M. Larger sizes of particles coming over shaker.

12:15 P. M. Run additional stand. Circulating at 11,790'.

3:00 P. M. Circulating at 11,880'. Mud weight: 8.8 #/gal.,
Viscosity 60 Sec.

6:00 P. M. Circulating at 11,940'. Losing partial returns.
Mud check:
Weight 8.8 #/gal. Filter cake 2/32
Viscosity 60 Sec. pH 8.0
Pl. Vis. 22 cp. Water loss 4.0
Yield 12 Cl 1,500 ppm

8:00 P. M. Short trip. Pull 11 stands, tight 40, 60, 80 feet on
1st stand. Free rest of way.

8:40 P. M. Wait 30 minutes.

9:10 P. M. Trip back to bottom. Hit bridge at 11,880'. Circu-
late down last 3 joints.

9:50 P. M. Lost all mud in pits with bit at 11,890'. Lost 200 bbls.
of mud. Pull 12 stands and mixing mud.

11:30 P. M. Start mixing oil.

13 September 1961

12:01 A. M. T. D. 12,045'. Mixing oil in the mud.

3:45 A. M. Finish adding oil, 3580 gals. Start trip in.

5:00 A. M. Hit 96' of fill-up.

8:15 A. M. Start short trip (12 stands) out.

8:45 A. M. Start cleaning mud pits.

10:15 A. M. Start in the hole.

10:30 A. M. Broke circulation, 25' fill-up above 11,910'.

12:30 P. M. Oil Well Perforators on location.

1:20 P. M. Added 60 bbls. diesel oil to the mud. Mud check:
Weight 8.7 #/gal., Viscosity 72 Sec. Circulating.

13 September 1961

(Continued)

4:00 P. M. Mud check:
Weight 8.5 #/gal. Filter cake 1/32
Viscosity 71 Sec. pH 8
Water loss 2.5 cc. Cl 1100 ppm
Pl. Vis. 38 cp. Oil 14 %
Yield 14 Solids 6 %
Start conditioning hole from 11,910' down,
11,970'. Tight hole going down on last 30'. Circu-
lating.
4:30 P. M.
5:20 P. M. Still not free on last 6'. Driller says it feels like a
piece of rubber dragged by the bit.
7:05 P. M. Short trip. Tight let stand.
8:20 P. M. At 11,970' with no fill-up. Circulate up
bottom.
11:00 P. M. Start out with short trip.
11:30 P. M. Complete short trip of 12 stands. Cleaning mud pits.

14 September 1961

12:01 A. M. T. D. 12,045'. Cleaning pits.
12:10 A. M. Trip in.
12:40 A. M. Circulating at 11,970'. Had 4' of fill-up.
3:00 A. M. Made connection.
3:30 A. M. Circulating at 12,000'. Intermittent mud losses. Have
lost total of 20 bbls. since midnight.
5:00 A. M. Loss increased to 20 bbls. per hr. Pulling up to mix
slug of lost circulation material and build mud volume.
7:10 A. M. Start trip in. Hit 30' loose fill.
7:50 A. M. At 12,000'. Pumping lost circulation material.
8:20 A. M. Pull up 12 stands.
8:50 A. M. In casing - will wait one hour.
9:50 A. M. Trip in.
10:10 A. M. Hit 40' fill-up. Broke circulation at 11,960'.
10:50 A. M. Lost 12 bbls. of mud in 30 min. Start mixing lost circu-
lation material.
11:10 A. M. Lost 15 bbls in 20 min. Start to pull 12 stands out.
11:45 A. M. In casing - start mixing lost circulation material and
build mud volume.
1:10 P. M. Trip in.
1:40 P. M. Had 40' fill-up. Mud check:
Weight 8.6 #/gal.
Viscosity 78 Sec.
LCM 45 %
2:15 P. M. Pull out 12 stands.

14 September 1961

(Continued)

2:45 P. M. 12 stands out.
4:45 P. M. Start short trip in.
5:05 P. M. Kelly on. Hit 2 easy bridges 60' and 40' above 12,000'.
3' fill-up. Circulating.
5:20 P. M. Lost 4 bbls. mud in 5 minutes.
5:45 P. M. Gained back 3 bbls.
7:30 P. M. Start out of hole. Lost total of 45 bbls. of mud in 2 1/2
hrs. Mud check: Weight 8.9 #/gal., Viscosity 75 sec.
10:45 P. M. On bank with bit #108 RR. Bit and reamer in same
condition as when run. Rig up Oilwell Perforators to
run Baker bridge plug.
11:00 P. M. Start in with Baker bridge plug.
11:15 P. M. Ken Kurtz-Baker on location.
11:50 P. M. Tagged bottom with bridge plug at 11,994'. Set top of
bridge plug at 11,984'. Apparent good set. Came
loose from bridge plug and started out of hole.

15 September 1961

12:01 A. M. T. D. 12,045. Trip out.
12:20 A. M. Out of hole with hydraulic setting tool. Fluid level in-
dicated at 2,600'.
12:45 A. M. Start in hole with bailer and 1 sack of Pozmix 140 "A"
cement. Baker representative left location.
1:30 A. M. Dumped bailer at 11,984'.
2:00 A. M. On bank with bailer. Rig down Oil Well Perforators.
2:10 A. M. Start in hole with bit #108 RR. Strapping in hole.
2:30 A. M. Oil Well Perforators left location.
6:30 A. M. Circulating at 11,950'.
8:25 A. M. Tagged top fill-up at 11,977', had 3' of fill-up. Circulating.
10:00 A. M. Notification given to the Colorado Oil & Gas Commission
of the intention to run casing (Mr. Art Jersin).
10:15 A. M. Notified Franklin Supply of intent to run Extremeline
liner (Mr. Jim Blaine).
10:25 A. M. Notified Baker of intent to run float shoe.
11:30 A. M. Start trip out, strapping.
12:05 P. M. Broke chain and oil line on main shaft. Repairing.
1:10 P. M. Baroid arrived on location.
1:15 P. M. Halliburton arrived on location.
1:20 P. M. Chain and oil line repaired. Resume trip out.
4:00 P. M. Franklin Supply Co. on location.
5:00 P. M. On bank with bit #108 RR. Tally shows 11,975' as
top of cement.
5:50 P. M. Start running 1st joint liner in, shoe and 2
centralizers.

15 September 1961

6:00 P. M. 2nd joint in.
6:15 P. M. 3rd joint in.
6:20 P. M. 4th joint in. - 1 centralizer 5' above joint.
6:23 P. M. 5th joint in.
6:25 P. M. 6th joint in.
6:28 P. M. 7th joint in. - 1 centralizer 5' above joint.
6:30 P. M. 8th joint in.
6:33 P. M. 9th joint in.
6:37 P. M. 10th joint in. - 1 centralizer 5' above jt.
6:39 P. M. 11th joint in.
6:42 P. M. 12th joint in.
6:45 P. M. 13th joint in.
6:47 P. M. 14th joint in.
6:48 P. M. 15th joint in. - Depth 480'.
6:52 P. M. 16th joint in. - 1 centralizer 5' above joint.
6:54 P. M. 17th joint in.
6:56 P. M. 18th joint in.
6:59 P. M. 19th joint in. - 1 centralizer 5' above joint (581')
7:01 P. M. 20th joint in.
7:03 P. M. 21st joint in.
7:07 P. M. 22nd joint in. - 1 centralizer 5' above joint.
7:09 P. M. 23rd joint in - Depth 740'.
7:11 P. M. 24th joint in.
7:15 P. M. 25th joint in. - 1 centralizer 5' above joint.
7:17 P. M. 26th joint in.
7:19 P. M. 27th joint in.
7:22 P. M. 28th joint in.
7:24 P. M. 29th joint in.
7:27 P. M. 30th joint in. - Liner length: 964.04'.
8:15 P. M. Tried to put casing hanger (4.10') and setting tool (3.74')
on top of 30th joint but rubber packer on bottom of
stinger does not fit in. 23 lb./ft. 5 1/2 casing - will
try to get right size rubber and ring.
10:30 P. M. Filed on liner packing cups but could not achieve adequate
clearance. Will pull liner and get new tool rather than
run the risk of sticking the tool due to temperature changes.

16 September 1961

12:01 A. M. T. D. 12,045'. Trip in hole to check fill-up.
2:30 A. M. On bottom. No fill-up, no bridges.
5:00 A. M. Trip out to run liner.
9:00 A. M. On bank and preparing to run 5 1/2" liner.

16 September 1961

(Continued)

9:30 A.M. Start running liner. Making up with 2500-3000 ft./lb. torque.

10:15 A.M. Put on casing hanger setting tool.

10:30 A.M. Put on kelly, fill and weigh liner.

11:00 A.M. Liner, setting tools and one stand drill pipe, weigh 40,000#. Start running drill pipe.

2:30 P.M. Pipe tally: 11,022'. Need 11,002' to tag bottom. Tag bottom ok with 20' drill pipe up. Measured 17.40' up. Bottom checks at 11,978'.

2:45 P.M. Complete string weight 180,000# on indicator.

3:00 P.M. Hook up circulating head. Check BOP, blocks weigh 22,000#. Liner weight = 40,000 - 22,000 = 18,000#. Set packer.

3:15 P.M. Pressure test lines. Leak in head, install new bull plug.

3:50 P.M. Circulate hose and pump in 10 bbl. water spacer.

3:55 P.M. Pump in 500 gal. acid followed by 10 bbl. water spacer.

4:15 P.M. Pump in 250 sacks 140 "A" Cement with 0.590 HR-4 retarder.

4:30 P.M. Drop plug and displace cement.

4:55 P.M. Bumped plug with 2000#

5:00 P.M. Bottom plug down at 1000 psi. Pulled string free of liner and began reversing out.

6:00 P.M. No cement, water or acid returns after circulating 1 hr. Start out of hole.

9:45 P.M. Truck from Casper (Loffland) on location with 4 1/4" hole drilling equipment.

10:50 P.M. On bank with Baash Ross tool. Tool complete and in good shape.

11:15 P.M. Baash Ross left location. Cutting line 100 ft. WOC.

17 September 1961

12:01 A.M. T. D. 12,045'. Waiting on cement.

9:00 A.M. Pick up 31 joints of 2 7/8 drill pipe and 4 joints of 3 3/4" x 1 1/2" drill collars, bit #109, W7, (4 1/4"). 1,083' of drill pipe and drill collars.

11:15 A.M. Trip in with bit #109.

2:30 P.M. Run in to 9,838'. Wait till 4:30 P.M. to proceed further.

4:30 P.M. Resume trip.

4:50 P.M. Hit top of liner at 11,007'.

6:10 P.M. Hit top cement 11,908'.

7:15 P.M. Drilling casing shoe after 64' of cement.

18 September 1961

12:01 A. M. T. D. 12,045'. Drilling casing shoe at 11,975'.
1:05 A. M. Blew up the nail on pump.
1:20 A. M. Drilling magnesium plug 11,982'.
6:15 A. M. Plug drilled. Corrected bottom magnesium plug 11,982'.
8:00 A. M. 12,005', washing to bottom.
12:30 P. M. Washed to 12,038'. Broke through bridge plug approxi-
mately 12:25. Have lost 90 bbls. of mud since 9:30 A. M.
2:30 P. M. Short trip, tight spot at 12,000'. Could be plug.
3:15 P. M. On bottom from short trip, no fill.
3:40 P. M. Clean suction pit.
4:30 P. M. No fill-up after short trip. Circulating hole with partial
returns.
5:25 P. M. Adding water to mud.
6:05 P. M. Displace mud with water, pump 9,100 gals. in 38 min.
6:50 P. M. Commence injection test at 1,500 psi. Pump 16" out
of back tank in 5 min. (260 gpm).
7:50 P. M. Start displacing mud remaining in the annulus with
water. Pressure dropped down to 250 psi, lost 280
bbls. in 40 min.
8:45 P. M. Tagged bottom, no fill-up. Start trip out, strapping.
11:30 P. M. Baker on location.

19 September 1961

12:01 A. M. T. D. 12,045'. Trip out.
12:35 A. M. On bank with bit #109, dull, bearings loose. Rigging
up for Baker, laid down kelly extension and core barrel.
Changed rings on Baker tool to fit in 44 lb./ft. 8 5/8
casing.
3:20 A. M. Trip in with Baker retrievable packer, strapping
3:30 A. M. Dowell on location.
5:45 A. M. Depth of Baker tool 9,983.95'.
8:05 A. M. Commence pumping 500 gals. mud acid. Displace with
100 bbls. water.
8:30 A. M. Set Baker packer.
8:35 A. M. Squeeze acid with 110 bbls. of water.
8:55 A. M. Pump 110 bbls. water at 700 psi and 5 BPM.
9:35 A. M. Pump 2 bbls. of water and disconnect Dowell.
Rig up to run injection tests with rig pump.
10:25 A. M. Commence injection tests with rig pump. Pump 360
bbls. in 45 min. for an injection rate of 336 GPM at 975 psi.

Pressure Fail Off Test

<u>Time</u>	<u>Pressure</u>	<u>Time</u>	<u>Pressure</u>
10 sec.	825	60 sec.	205
20	525	70	205
30	250	100	190
40	220	130	175
50	210	160	125
		5 min.	110

19 September 1961

(Continued)

10:47 A. M.

Finish test. Commence filling all tanks with water.

1:30 P. M.

Run five-minute injection test at 250 psi, 216 GPM

Fall Off Test

0	250
10	175
20	90
30	25
40	0

1:45 P. M.

Run injection test with pumps compounded. Pump total of 8,220 gallons in 18 minutes for an injection rate of 538 GPM at 1,450 psi.

Fall Off Test

<u>Time</u>	<u>Pressure</u>	<u>Time</u>	<u>Pressure</u>
0 sec.	1,475	90 sec.	110
10	225	120	100
20	225	150	80
30	210	180	75
40	190	210	50
50	175	5 min.	0
60	160		

Increase in fall off rate may be due to increased radius at which acid has penetrated.

3:20 P. M.

Unseat packer and start out of hole.

6:30 P. M.

Out of hole with packer.

7:30 P. M.

Pick up 6 3/4" RG1J RR bit and casing scraper and trip in. Strapping in.

20 September 1961

12:01 A. M.

T. D. 12,045'. Trip in with casing scraper.

12:30 A. M.

10,700 feet in. "Cable" on location.

2:00 A. M.

Start in the hole with Amerada pressure bomb.

3:10 A. M.

On bank with pressure bomb. Depth to fluid: 615', weight of fluid: 0.434 psi per ft. The pressure was measured at 8,000' (3,207 psi), 7,000' (2,773 psi) 4,000' (1,488 psi) and 2,000' (609 psi).

3:45 A. M.

Trip in with Amerada bomb and 12-hr. clock. Set at 8,000'.

4:20 A. M.

Injection test - pressure up to 500 psi, leak on line. Pulled Amerada bomb to 7,000'.

4:35 A. M.

Injection test, 475 psi, 245 GPM, 5 minutes.

4:55 A. M.

Amerada bomb pulled to 6,000'. Pressure 800 psi. 213 GPM, 15 minutes.

5:16 A. M.

Injection test, 215 GPM, 800 psi, 6 minutes.

5:55 A. M.

Injection test, 250 GPM, 700 psi, 1 hr. 50 minutes.

7:45 A. M.

Shut in after injecting 498 barrels. Pressure down to 200 psi in 1 minute, 100 psi in 10 minutes, 0 psi in 20 minutes. Will shut in 4 hours. Acc. injection 1,472 barrels to date.

20 September 1961

(Continued)

11:45 A.M. Start out with bomb.
12:15 P.M. Bomb on bank.
1:45 P.M. Start in hole with bomb.
2:20 P.M. On bottom at 6,000'.
3:08 P.M. On bank
3:45 P.M. Start in hole with bomb.
4:15 P.M. On bank with bomb.
5:00 P.M. Strap tanks. Start source pump.
5:25 P.M. Start in hole with pressure bomb.
5:32 P.M. Bomb at 5,000'.
5:37 P.M. Start injection test.
8:01 P.M. Stop injection at 1,100 psi and 41 spm.
8:31 P.M. Open drill pipe to atmosphere, therefore approx 0 psi at surface
Injection total of 939.8 bbls. of water in 2 hrs 24 min.
average rate 263 gpm. Acc. injection volume now approx.
2,500 bbls.

21 September 1961

12:01 A.M. T.D. 12,045'. Taking pressure test.
3:30 A.M. Pull pressure bomb from 5,000'. Chart shows static
pressure at 1,994 # prior to injection; half-hour after
start of injection test pressure at 3,094# maximum
2,887# minimum, 2,991# average. At end of injection test
(144 minutes) pressure at 3,053# maximum, 2,930#
minimum, 2,991# average. After injection test:

<u>SI Time, Min.</u>	<u>Pressure</u>
2	2807
10	2783
20	2524
30	2390
40	2287
60	2202
120	2143
180	2116
240	2105
300	2090
360	2084
420	2073

4:50 A.M. Reran pressure bomb to 5,000' for penultimate reading.
After 540 minutes, pressure at 2,050#.
7:00 A.M. Rerun bomb to 5,000'. Reading 2,027# after 660 minutes.

21 September 1961

(Continued)

8:00 A. M. Trip out to run logs
11:20 A. M. On bank with casing scraper and 6 3/4" bit. No metal missing from scraper or bit. Scraper blades had scattered scores
1:25 P. M. Lane Wells arrived on location rigging up to run logs
3:40 P. M. Start in hole with sonde
Top of liner 11,006'
Ind. Bottom of liner 11,985' (B. P.)
Total Depth 12,041'
5:50 P. M. Out of hole with sonde
7:20 P. M. Lane Wells rigged down logs.
7:40 P. M. Rigging up to run swab tests with air compressors
8:00 P. M. Well Completions on location.
11:10 P. M. Well Completions rigged up. Waiting on welder to finish bloody line.

22 September 1961

12:01 A. M. T. D. 12,045'
1:15 A. M. Welder finished.
2:00 A. M. Run in 32 stands.
3:14 A. M. Commence air injection along with rig pump
3:35 A. M. Hole began to unload at 300 psi.
3:42 A. M. Kick out rig pump.
3:50 A. M. Pressure increased to 750 psi, hole unloaded.
4:10 A. M. Measured mud pits
4:45 A. M. Injection pressure, 300 psi
5:10 A. M. Produced 61 bbls. of fluid last hr, lost considerable fluid over mud pit.
5:30 A. M. Pressure 290 (steady)
6:10 A. M. Produced 78 bbls. last hr, all fluid retained in pits
Started pumping fluid to Pond F, 28 spn. Injecting 2 gals. of well foam #1 plus 2 quarts Kronox 211 in 20 bbls. of fluid every 4 hrs. Will stop use of foaming agent but continue Kronox 211. Total fluid produced 266 bbls., 110 bbls. unload hole. Air equipment consists of 1 Joy rated at 750 cfm, 1 at 900 cfm at 125# and 1 booster at 2800 cfm at 1,000 psi
6:30 A. M. Pressure down to 260 psi. Booster 700 rpm. #1 compressor 1,350 rpm, #2 compressor 900 rpm
6:55 A. M. Pressure 250, measure pits
7:40 A. M. Pressure 190, stop injection foaming agent
7:55 A. M. Pressure 210, produce 80 bbls. of fluid last hr
Total prod. assume 4 hrs. at 75 BPH = 300

22 September 1961

(Continued)

8:30 A.M. Flow in heads may be due to stopping the foaming agent.
8:50 A.M. Measure pits.
9:50 A.M. Flowed 70 bbls last hr. Total flow 456 bbls.
10:50 A.M. Flowed 65 bbls. last hr. Total flow 521 bbls.
12:30 P.M. Mud check: CI 1600.
12:40 P.M. Pressure 280, producing 70 BPH, cumulative 661 bbls.
Pressure of 280 was taken from compressor gauge.
1:40 P.M. Pressure 280 psi. Producing at rate of 70 BPH.
Cumulative recovery is 731 bbls.
3:35 P.M. Pressure 280 psi. Had been 210 psi at 2:00 p.m. and
250 psi at 3:00 p.m. Producing rate 51 BPH cumu-
lative production 831 bbls.
5:35 P.M. Pressure 260 psi. Producing rate 61 BPH. Cumulative
production 940 bbls.
6:40 P.M. Shut air down. Pressure was 280 psi.
6:44 P.M. Bleed off pressure.
6:48 P.M. Break off kelly, start in hole with 11 more stands of
4 1/2" drill pipe. Will have a total of 43 stands in hole.
7:10 P.M. Compressors on - pressure 1000 psi.
10:30 P.M. Pressure 325 - Production rate 486, cumulative 1038.
11:30 P.M. Pressure 250, production rate 62, cumulative 1100.

23 September 1961

12:01 A.M. T.D. 12,045'. Pressure 250.
12:30 A.M. Pressure 250.
1:30 A.M. Pressure 250. Prod. rate 53 bbls., cumulative prod. 1214.
2:30 A.M. Pressure 250. Prod. rate 46 bbls., cumulative prod. 1260.
3:30 A.M. Pressure 275. Prod. rate 32 bbls., cumulative prod. 1292.
4:30 A.M. Pressure 275.
5:30 A.M. Pressure 275. Prod. rate 41 bbls., cumulative prod. 1369.
6:00 A.M. Pressure 225.
6:30 A.M. Pressure 230. Prod. rate 46.5, cumulative prod. 1416.
7:00 A.M. Pressure 260.
7:30 A.M. Pressure 250. Prod. rate 41 bbls., cumulative prod.
1457 bbls.
8:00 A.M. Pressure 280.
8:30 A.M. Pressure 260, Prod. rate 31 bbls., cumulative prod.
1488 bbls.
9:15 A.M. Pressure 260.
9:30 A.M. Prod. rate 27 bbls., but hole was heading up.
11:00 A.M. Pressure 210. Prod. 48 bbls., cumulative 1859.

23 September 1961

(Continued)

12:01 P.M. T.D. 12,045'. Pressure 210, Prod. 18 bbls., cumulative 1877.
1:00 P.M. Pressure 200, Prod. 18 bbls., cumulative 1895.
1:20 P.M. Hole appears to be plugging off. Will run in with a
bit to clean up.
2:15 P.M. Out of hole. Cut drilling line and replace slip buttons.
4:50 P.M. Start in hole with bit #110, OW (4 1/4").
7:40 P.M. On bottom 5' of fill-up.
8:15 P.M. Attempt to break circulation. Would not circulate.
Wait on Dowell.
11:30 P.M. Dowell on location.

24 September 1961

12:01 A.M. T.D. 12,045'.
1:15 A.M. Pressure test Dowell line, 4100 psi.
1:35 A.M. Displaced 72 bbls. (3000 gals.) acid, no returns.
1:57 A.M. Displaced 80 bbls. of water, got returns after 20 bbls.
water have been displaced. Snut the rams.
2:20 A.M. Pumped 80 bbls. water, pressure 1200 psi.
2:45 A.M. Starting out of the hole, strapping.
3:15 A.M. Dowell left location.
6:45 A.M. On bank with bit #110, green.
6:55 A.M. Started trip in with 4 1/2" drill pipe, open ended. Run
40 stands.
8:05 A.M. Start injecting air along with pump.
8:35 A.M. Stopped rig pump. Hole started unloading at 650 psi.
9:30 A.M. Pressure 250 and fluctuating.
11:00 A.M. Production 125 bbls. last hr., 90 of which was pumped
from reserve pit. Will eliminate pumping from reserve
pit next test CI 4000 ppm.
1:00 P.M. Production 40 bbls., pressure 210. Cumulative pro-
duction 2075 bbls.
1:15 P.M. Run in 45 stands to 7990'.
2:30 P.M. Start injecting air. Pressure to 1100 psi at 3:00 p.m.
Kick in rig pump.
3:20 P.M. Head on booster went out. Wait on mechanic to fix air
compressor.
4:45 P.M. Compressor fixed. Start air.
5:45 P.M. Hole started to unload.
6:10 P.M. Pump out.
7:20 P.M. Hole unloading in heads. Pressure 580 to 950.
9:30 P.M. Pressure 620 psi. Flow seems to get steadier. Will
make a production test at 10:00 p.m.
11:00 P.M. Pressure 800, production rate 23 bbls./hr. Cumulative 1945.
Conference with J. Garrett and A. Samuels. Will pull up
20 stands and see if the slow rate we had was not due to
overloading the compressors.

25 September 1961

12:01 A. M. . D. 12,045'. Pressure 500, rate 55 bbls./hr.
Cumulative production 2,000 bbls.

12:15 A. M. Production died. Pull 20 stands.

1:15 A. M. Open ended 4 1/2 drill pipe at 6,100'. Start rig pump
and air.

2:15 A. M. Hole started to unload. Put rig pump out. Pressure
350 - fluctuating.

3:50 A. M. Pressure 350. Flow begins to remain constant.

5:00 A. M. Will make a production test from 4:00 a.m. to 5:00 a.m.
Pressure 325, production rate 22 bbls./hr. Cumulative
production 2,060 bbls.

6:00 A. M. Pressure 350, production rate 30 bbls./hr. Cumulative
production 2,090 bbls., Cl 13,000 ppm.

7:00 A. M. Pressure 350, production rate 21 bbls./hr. Cumulative
production 2,115 bbls., Cl 13,000 ppm.

8:00 A. M. Pressure 250, production rate 22 bbls./hr. Cumulative
production 2,137 bbls.

9:00 A. M. Pressure 225, production rate 26 bbls./hr. Cumulative
production 2,163 bbls.

10:00 A. M. Pressure 225, production rate 26 bbls./hr. Cumulative
production 2,199 bbls.

10:30 A. M. Pull 35 stands in order to check for corrosion of drill
pipe.

11:40 A. M. Start air, no returns. 125 psi. Will stand back 5 stands
of bottom pipe to be inspected by Kronox representative.

12:10 P. M. Rerun 20 stands of drill pipe to 5,054'.

1:35 P. M. Start air.

2:00 P. M. Fluid returns 225 psi.

3:00 P. M. Production rate 10 bbls. Cumulative production 2,377 bbls.

4:30 P. M. Production rate 18 bbls. Cumulative production 2,404 bbls.
Run in 10 stands.

5:05 P. M. Air on.

6:20 P. M. Hole unloaded 900 psi.

7:30 P. M. Pressure 300.

7:45 P. M. Welder on location.

8:30 P. M. Stopped Well Completion compressors.

9:05 P. M. Start in the hole to lay down drill pipe.

12:00 P. M. 100 joints of 4 1/2 drill pipe laid down.

26 September 1961

12:01 A. M. T. D. 12,045'. Laying down 4 1/2 drill pipe.

3:00 A. M. Baker and Oil Well Perforators on location.

3:30 A. M. Casper rental tool Co. on location.

26 September 1961

7:30 A. M. Breaking kelly down. Install 5 1/2" rams in blowout preventors. Run gauge ring on wireline.

12:01 P. M. Run Baker Model D packer #3665, 127-38 DCM.

2:00 P. M. Set Baker packer @ 998'.

3:30 P. M. Baroid hauled 78 sacks of gel from location.
Baker packer dimensions:
O. D. 7.375"
I. D. 3.875"
Length 3' 10"

Seal nipples.
O. D. 3 3/4"
I. D. 2 7/8"
Total length 12.935'

Production tube:
Collar O. D. 3.75"
Tube O. D. 2 7/8"
Tube I. D. 2 5/16"
Length 5'

Overall length of stinger:
Prod. Tube 5.00
Seal Nipples 12.93
Shoulder 0.83
Total 18.76'

3:40 P. M. Commence running 5 1/2" tubing.

9:45 P. M. Have 5 1/2" tubing in hole to 8991'. Hit packer with stinger. Set 20,000# on packer, filling hole with water.

10:20 P. M. Hole full, closed pipe rams. Pressured to 410 psi. Held pressure for 5 minutes. Lost 20 psi. No apparent surface leaks.

10:30 P. M. Released pressure. Jetting cellar prior to removing BOP's.

27 September 1961

12:01 A. M. T. D. 12,045'. Removing BOP's.

12:30 A. M. Landed tubing in slips with 65,000# on packer. Broke out landing joint.

1:00 A. M. Began removing rotary table, BOP's and installed adapter flange on top of 5 1/2" tubing spool.

9:20 A. M. Cut 5 1/2" tubing 8 1/2" above slips. Nipple up flange.

Although the tubing was not landed until 12:15 P. M. on the 28th, some rigging down could proceed along with the other operations. As a result, the rig was released as of 6:00 A. M. on 9-28-61.

28 September 1961

1:00 P. M.

John Neighbours called in. Chloride ion test of samples dropped off at Government lab. this morning.

ppm

City Water

38

Rig Water

36

Circulated annulus sample 37

1:45 P. M.

Pressured up and held okay at 350 psi.

2:30 P. M.

Contractor lowered derrick.

A review of operations for the past few days indicated that salt water was in the casing-tubing annulus. Due to the fact that this can prove to be a corrosive medium, the decision was reached to circulate the salt water with fresh water. A Bowen circulating spear was secured for this purpose. Checks were made on the salt content of the circulated fluid and fresh water was obtained at the surface for 1 1/2 hrs. before the tubing was relanded with 65,000#.

2 October 1961

Contractor finished moving rig off location. Tuboscope inspecting pipe for damage due to corrosion.

3 October 1961

Tuboscope inspecting pipe.

4 October 1961

Tuboscope finished pipe inspection. Ordered tubing and rods for pumping installation. Tubing arrived on location.

5 October 1961

8:00 A. M.

Commence rigging up pulling unit to run tubing.

12:01 P. M.

Run mud anchor, 1 jt. tubing. Tubing anchor 34' up and landing nipple 65' up.

3:15 P. M.

Hit fluid at 2,180'. Accepted delivery of 1,700'-1" rods, 2,000'-7/8" rods, 4,250'-3/4" rods, and 1,000' line pipe.

5 October 1961

(Continued)

8:00 P. M. Finished running tubing.

6 October 1961

6:00 A. M. Commence running tubing.

7:30 A. M. Finish running tubing.

9:00 A. M. Rig up to run bottom-hole pressure bomb after setting tubing anchor with 30,000 pounds weight. Hit fluid with Anerada bomb at 2,187'. Tagged bottom at 8,006'. Seating nipples are located at 7,938'.

10:15 A. M. Run Oilmaster 2 1/2" x 1 1/2" x 12' x 17'. Improved insert pump to 4,280'.

4:30 A. M. Rods run to 6,550' due to extreme difficulty in making up 1" rods. It will prove expedient to set the pump at this depth. Oilmaster representatives supervised the proper setting of the pump.

6:00 P. M. Released pulling unit.

7 October 1961

7:00 A. M. Accepted delivery of 18 yds. of sand for foundation. Roustabout crew began preparation of foundation for pumping unit.

10:00 A. M. Set substructure of pumping unit.

10:30 A. M. Set Pitman and engine.

11:30 A. M. Finish setting pumping unit except for engine. Released crane. Lay 3" pipeline to Pond F. Hook up engine to butane.

6:00 P. M. Roustabout crew released.

10 October 1961

8:00 A. M. Pumper and helper finished hooking up engine and adjusted stroke and speed on pump.

11:00 A. M. The regulator on the butane tank was not functioning properly, and it was necessary to procure connections to bypass the regulator.

12:45 P. M. New connections were installed, motor started.

1:15 P. M. Pump started, extreme vibration of motor unit noted.

2:20 P. M. Fluid to surface. Crew finishing staking of engine.

3:15 P. M. Pumping unit ready. Bulldozer stuck in path of water line.

5:00 P. M. Released 2-man roustabout crew. Bulldozer still stuck. Start meter reading 5290204 gallons.

10 October 1961

(Continued)

6:30 P.M. Start pumping 10 spm.
11:30 P.M. Pump running 10 spm. Had pumped 880 gallons since 6:30 P.M.

11 October 1961

8:30 A.M. Meter reading 5293538. 3,334 gallons or 79 barrels in 14 hours or a rate of 136 bbls./day. The governor on the engine will not allow for a speed over 10 spm, butane 67%.
3:30 P.M. Meter reading 5296041. 11 spm, 2,500 gallons in 7 hours or 358 gals./hr. = 204 bbls./day. Additional speed due to increased pressure of supply gas. Original problem of slow speed was caused by low gas pressure. Installed 1,000-gallon propane tank.
4:00 P.M. Started unit. The addition of the 1,000-gallon tank seemed to eliminate any of the problems associated with the slow pumping speeds. Present pump speed 12 spm.
4:30 P.M.

12 October 1961

8:30 A.M. Meter reading 5304711 gallons. 54% propane 65 psi 12 spm, 11,173 gallons last 24 ours or 264 barrels, 11 bbls./hr. Pump is operating at 100% efficiency, cumulative production 346 bbls, Cl 10,000 ppm.
9:45 A.M. Shut down pump to install heat safety switch and walking beam safety switch.
10:30 A.M. Start pump.
3:30 P.M. Meter 5308125. Propane 48% 80 psi, pump 12 spm, cumulative production 17,921 gallons, 427 bbls. 11.7 bbls./hr. Sample #2 Cl 13,000 ppm.

13 October 1961

8:30 A.M. Meter reading 5312605. Produced last 24 hours 11,173 gallons or 188 bbls. Propane 40%, cumulative production 534 bbls, Cl 12,000 ppm. Pump had died during the night.
10:00 A.M. Shut down pump in order to finish dirt work.
4:15 P.M. Start pump. Propane 36%, 95 psi, 11 spm. Meter reading 5313500, Cl 12,000 ppm.
4:30 P.M. Engine stopped. Partially covered radiator and restarted engine.
9:00 P.M. Motor died. Cannot seem to supply an adequate amount of gas and air.

13 October 1961

(Continued)

10:00 P. M. Motor and pump running. Engine running very rough.
11:00 P. M. Motor stopped.

14 October 1961

7:00 A. M. Call National Supply to send mechanic to adjust timing and regulator.
10:00 A. M. National Supply checking on mechanic. Started motor. Still seems to be running rough.
10:30 A. M. Meter reading 5314674. Motor died. Have pumped 49 bbls. since 8:30 A. M. yesterday. Cumulative production 583 bbls.
3:50 P. M. Mechanic on the way from Ft. Morgan.
6:00 P. M. Mechanic arrived on location.
10:00 P. M. Adjustments on the inlet pressures and volumes of gas still has not produced a satisfactory running condition. It will be necessary to hook up a volume tank in order to adequately control the gas supply.

15 October 1961

10:00 A. M. Install volume tank and attempt to adjust fuel regulator.
1:00 P. M. Motor still would not run. Mechanic not available until Monday morning.

16 October 1961

8:00 A. M. Wait on mechanic. Meter reading 5315361. Cumulative production 600 bbls.
9:15 A. M. Mechanic on location. Had to disconnect waterline in order to finish dirt work.
2:30 P. M. Pump started.
4:00 P. M. Meter reading 5316239. #5 sample Cl 15,000 ppm, propane 26%, 100 psi; pump 14 spm.
6:00 P. M. Motor stopped.
7:00 P. M. Could not get motor started. Called Mr. Hull with National Supply, and they will send a man out in the morning.

17 October 1961

8:00 A. M. Waiting on National Supply representative.
10:00 A. M. Representative not available. Obtained additional gas regulator and hooked into system.
1:30 P. M. Motor started. Meter reading 5317570. Pump speed 12 spm, propane 87% 155 psi, pressure to volume tank 15 psi.
4:00 P. M. Motor died. Mechanic has not arrived.

18 October 1961

8:30 A. M.

Ajax representative arrived to repair engine. The governor was not operating properly as a part was broken.

11:30 A. M.

Governor repaired, motor started.

19 October 1961

8:30 A. M.

Meter reading 5327100, cumulative production 876 bbls., propane 75%, 55 psi, volume tank 40 psi, and #6 sample Cl 15,000 ppm, 11 spm.

9:30 A. M.

Had to shut down pump to finish dirt work.

11:00 A. M.

Pump started.

3:30 P. M.

Meter reading 5329830, 2,730 gals. in 5 1/2 hrs. = 11.8 bbls./hr., propane 72%, 90 psi, volume tank 40 psi; #7 sample Cl 17,000 ppm.

20 October 1961

8:30 A. M.

Meter reading 5339060, 11 spm, 285 bbls. yesterday, cumulative production 1,157 bbls., propane 58%, 60 psi, #8 sample Cl 17,000 ppm.

12:30 P. M.

Dirt Contractor finished.

3:00 P. M.

Meter reading 5342690, cumulative production 1,240 bbls., propane 55%, 60 psi, #9 sample Cl 17,500 ppm.

21 October 1961

12:01 P. M.

Meter reading 5349443, cumulative production 1,401 bbls., propane 46%, 80 psi, 13 spm, sample #10 Cl 21,000 ppm.

5:00 P. M.

Meter reading 5352776, cumulative production 1,490 bbls., propane 43%, 90 psi, 13 spm, sample #11 Cl 18,000 ppm.

23 October 1961

3:00 A. M.

Unit stopped. Meter reading 5367055, cumulative production 1,825 bbls., propane 20%, 55 psi.

8:30 A. M.

Unit started. Would not pump fluid

10:30 A. M.

Pump still not pumping. Pump acts as if formation has pumped off. Called for pulling unit in order to check the pump.

24 October 1961

8:00 A. M.

Rig up pulling unit.

10:30 A. M.

Picked up to unseat pump. Rods have parted. Began pulling rods.

23 October 1961

(Continued)

12:30 P. M. Rods had unscrewed at 5,625'. Waiting on fishing tools. 225 joints.

2:00 P. M. Trip in with overshot.

3:30 P. M. Slips hanging up over fish, start out of hole 1st & 2nd stands.

4:30 P. M. Slips freed up on 2nd stand.

6:00 P. M. On bank, no recovery.

25 October 1961

8:00 A. M. Trip in with jars and overshot.

10:00 A. M. Over fish.

11:00 A. M. Overshot pulled loose and could not be reset. Start out of hole.

11:30 A. M. Floorman injured hand when elevators were set down.

1:45 P. M. On bank, no recovery. Fishing tool okay.

1:50 P. M. Trip in hole with jars 1 stand up in attempt to screw into rod.

3:45 P. M. Screw into rods, jarred to 30,000# then 35,000#. Would not come free.

5:00 P. M. Jarring did not free pump. Will have to pull rods and tubing.

27 October 1961

2:00 P. M. Pulling unit arrived on location.

4:00 P. M. Began jarring on rods.

4:45 P. M. Jarred free, pulled 50'. Stuck.

5:00 P. M. Pulled free, but dragging.

28 October 1961

8:30 A. M. Started pulling rods.

10:30 A. M. Recovered pump. Some damage was noted to the slips and mandrel, although the pump seemed to be operating satisfactorily. Waiting on pump manufacturer representative to inspect pump.

11:45 A. M. Checked balls and seat in travelling valve and standing valve. Okay.

12:15 P. M. Start in with pump.

4:45 P. M. Finished running rods. Had to tighten every joint.

5:30 P. M. Commence pumping.

29 October 1961

10:00 A. M. Pump down. No fluid pumped. Trying to start motor.

4:00 P. M. Could not get engine started. Mechanic arrived on location 5:30 P. M. Worked till 7:30 P. M. Could not start engine.

30 October 1961

7:30 A. M. Took starter motor to Wisconsin engines to be repaired.
10:30 A. M. Engine repaired and pump running.
12:15 P. M. Fluid to surface. Meter reading 536700, cumulative production 1,830 bbls., propane 34%, 65 psi, 13 ppm, sample #11 Cl 26,000 ppm.
3:30 P. M. Meter reading 5369320, cumulative production 1,885 bbls., propane 30%, sample #12 Cl 25,000 ppm.

31 October 1961

8:15 A. M. Meter reading 5370386, cumulative production 1,910 bbls., propane 28%, sample #13 Cl 25,000 ppm. Unit stopped 9:00 P. M. last night.
2:15 P. M. Meter reading 5374240, cumulative production 2,002 bbls., sample #14 Cl 25,000 ppm.
4:00 P. M. Meter reading 5374676, cumulative production 2,010 bbls., Cl 21,000 ppm. Unit not pumping fluid.

1 November 1961

8:00 A. M. Pump started. No fluid. Called for pulling unit.

2 November 1961

6:00 A. M. Started pump, no fluid. Waiting on pulling unit.
7:00 A. M. Rigging up pulling unit.
8:30 A. M. Rods have parted. Couldn't screw in.
9:00 A. M. Started out with rods.
2:00 P. M. On bank rods parted, 157 doubles plus 1 single, approximately 7875'. Start in hole with BJ overshot 3/4" slips.
5:30 P. M. Shut down for night; 12 stands up.

3 November 1961

6:15 A. M. Run 12 stands.
7:15 A. M. Pulled pump loose. Start out.
10:30 A. M. Recovered pump. Seals damaged. Waiting on Cable.
2:00 P. M. Run bottom-hole pressure bomb.
2:50 P. M. Retrieve bomb. Hit fluid at 4980'.
3:00 P. M. Trip in with pump.
5:30 P. M. Shut down for night.

4 November 1961

6:00 A. M. Finish running rods.
7:30 A. M. Hook up pump and polish rod.
8:30 A. M. Commence pumping.

4 November 1961

(Continued)

8:35 A. M. Stop pump to rig down.
9:05 A. M. Start pump.
11:00 A. M. Fluid to surface.
6:00 P. M. Stopped pump to allow build-up over night. #15
28,000 ppm Cl, meter reading 5378746, cumulative
production 2110 barrels.

5 November 1961

10:00 A. M. Unit started.
6:00 P. M. Meter reading 5379255. Shut unit down for night.
Substructure cracked through welds, cumulative
production 2120 barrels. Take sample #15, #2 and #11.

6 November 1961

8:00 A. M. Welder called to repair subbase.
11:45 A. M. Commence pumping. Meter reading 5379275, cumu-
lative production 2121 barrels, sample #16 32,000
ppm.
3:15 P. M. Meter reading 5381706, cumulative production 2175
barrels, propane 27% 90 psi, sample #17 Cl 29,500 ppm.
11:00 P. M. Meter reading 5384092, Cumulative production 2231
barrels, sample #18 29,500 ppm, belts thrown off.

7 November 1961

8:00 A. M. Started motor, belts would not hold.
3:15 P. M. Installed new belts, started pump.

8 November 1961

8:15 A. M. Belts thrown off pumps. Meter reading 5385464,
cumulative production 2266 barrels, sample #19
29,500 ppm.
9:45 A. M. Reinstalled belts, unit running.
3:00 P. M. Meter reading 5388050. cumulative production 2327
barrels, propane 11%, 50 psi, sample #20 33,500 ppm
12 spm.

9 November 1961

8:30 A. M. Meter reading 5389542, cumulative production 2363
barrels. Unit would not pump fluid. Called for pulling
unit.

10 November 1961

10:30 A. M. Pulling unit on location.
12:01 P. M. Screw onto rods seem to be pumping okay. Caught sample #21 Cl 33,500 ppm.
2:00 P. M. Reseated pump and hooked up unit.
2:15 P. M. Shut down for welder.
3:00 P. M. Finished rigging down pulling unit. Install 24" sheave on engine belts, too short.
4:30 P. M. Wait on new belts.
7:00 P. M. Reinstalled old belts, cut sub base to allow additional movement.
10:15 P. M. Start pump.

11 November 1961

9:45 A. M. Unit stopped during night. Had not pumped fluid. Re-started pump.
1:30 P. M. No fluid pumped. Apparently seating rings were damaged on the pump when the pump was unseated to install polish rod. Operations will have to be suspended until Monday as pulling units cannot travel from Saturday noon till Monday at daylight.

13 November 1961

8:00 A. M. Wait on orders from Corps of Engineers.
2:45 P. M. Corps of Engineers representative gave orders to proceed with pumping operation

14 November 1961

9:30 A. M. Pulling unit arrived on location.
10:45 A. M. Started pulling rods, pump did not appear to be seated or else rods had parted.
2:00 P. M. On bank. Seals on pump had torn off. Put on new seals.
2:15 P. M. Start in hole.
4:30 P. M. On bottom. Move counter balance.
5:30 P. M. Commence pumping.

15 November 1961

7:30 A. M. Pump stopped during night. Did not pump up. Started pump.
9:30 A. M. Shut down to change 1/4" propane line to 1".
10:00 A. M. Resumed pumping.
11:30 A. M. Reset pump to pound bottom in order to clear valves and seats.
12:10 P. M. Fluid to surface.
1:45 P. M. Caught 10-gallon sample. Cumulative production 2375 barrels, meter reading 5390040, sample #22 28,400 ppm.

15 November 1961

2:45 P. M. Meter reading 5390395, 8.5 barrels last hour.
3:45 P. M. Meter reading 5390780, 9.2 barrels last hour, cumulative production 2393 barrels, Cl check at 1.45 P. M. made with new mix of AgNO₃ solution.
4:00 P. M. Sample #23 Cl 24, 526 ppm, meter reading 5390840, cumulative production 2393 barrels.
4:45 P. M. Meter reading 5391153, 8.9 barrels, cumulative production 2402 barrels.
Mechanic arrived on location in attempt to keep unit running through the night.

16 November 1961

8:30 A. M. Meter reading 5391426 pumped 6.9 barrels through the night. Unit would not continue running except spasmodically, cumulative production 2409 barrels.

17 November 1961

Began installation of electric motor.

18 November 1961

1:45 P. M. Completed motor installation. Started pump, meter reading 5392345.
2:30 P. M. Shut down to respace pump.
3:30 P. M. Restarted pump.
5:30 P. M. Meter reading 5393675, cumulative production 2440 barrels, sample #25 27,000 ppm Cl.
7:30 P. M. Meter reading 5394555, cumulative production 2461 barrels.
9:30 P. M. Cumulative production 2483 barrels.

19 November 1961

12:30 A. M. Cumulative production 2517 barrels.
4:30 A. M. Cumulative production 2554 barrels, sample #26 26,000 ppm.
5:30 A. M. Cumulative production 2562 barrels.
6:30 A. M. Cumulative production 2570 barrels.
7:30 A. M. Cumulative production 2580 barrels, sample #27, 26,000 ppm.
8:30 A. M. Cumulative production 2589 barrels.
9:30 A. M. Cumulative production 2595 barrels.
10:30 A. M. Cumulative production 2602 barrels.
11:30 A. M. Cumulative production 2609 barrels, sample #28 27,000 ppm.
Shut down to space pump.
12:01 P. M. Start pump.
2:00 P. M. Cumulative production 2626 barrels.
3:00 P. M. Cumulative production 2653 barrels, sample #29 26,000 ppm.
3:30 P. M. Cumulative production 2654 barrels. Shut in well, pumped off and pounding fluid.

20 November 1961

7:00 A. M. Start pump, flow line and meter frozen.
7:30 A. M. Start pumping on ground while repairing flange.
9:30 A. M. Well pumped off.
10:00 A. M. Shut well down.
12:01 P. M. Start pump.
1:00 P. M. Meter reading 5402315, cumulative production 2664 barrels.

1:15 P. M. Shut down to respace pump.
1:45 P. M. Start pump.
2:00 P. M. Meter reading 5402510, cumulative production 2668 barrels, sample #30 (5-gal.) 29,000 ppm Cl.
3:00 P. M. Meter reading 5402710, cumulative production 2673 bbls.
4:00 P. M. Meter reading 5402900, cumulative production 2678 bbls.
5:00 P. M. Meter reading 5403115, cumulative production 2683 barrels, Sample #31 31,000 ppm Cl.
6:00 P. M. Meter reading 5403340, cumulative production 2688 bbls.
7:00 P. M. Meter reading 5403545, cumulative production 2693 bbls.
8:30 P. M. Meter reading 5403830, cumulative production 2700 bbls. shut down pump, sample #32, 31,000 ppm.

21 November 1961

5:00 A. M. Start pump.
6:00 A. M. Meter reading 5404150, cumulative production 2708 bbls.
7:00 A. M. Meter reading 5404435, cumulative production 2714 bbls.
8:00 A. M. Meter reading 5404696, cumulative production 2721 bbls. Well pumped off.
9:00 A. M. Meter reading 5404940, cumulative production 2725 bbls. Sample #33 31,000 ppm; pounding fluid.
10:00 A. M. Meter reading 5405132, cumulative production 2730 bbls.
12:01 P. M. Meter reading 5405557, cumulative production 2740 bbls., sample #34 32,700 ppm.
1:00 P. M. Meter reading 5405723, cumulative production 2744 bbls.
2:00 P. M. Meter reading 5405870, cumulative production 2748 bbls.
3:00 P. M. Meter reading 5406020, cumulative production 2751 bbls.
4:00 P. M. Meter reading 5406165, cumulative production 2754 bbls.
5:00 P. M. Meter reading 5406275, cumulative production 2757 bbls., sample #35 34,250 ppm.
5:15 P. M. Meter reading 5406299, cumulative production 2758 barrels, shut down.

22 November 1961

8:00 A. M. Shorten stroke from 84" to 54".
4:00 P. M. Start pump.
5:00 P. M. Meter reading 5406482, cumulative prod. 2762 bbls.
6:00 P. M. Meter reading 5406685, cumulative prod. 2767 bbls.
7:00 P. M. Meter reading 5406885, cumulative prod. 2772 bbls.
8:00 P. M. Meter reading 5407080, cumulative prod. 2776 bbls., sample #36 32,500 ppm.

<u>22 November 1961</u> (Continued)	<u>Meter Reading</u>	<u>Cumulative Prod. (bbls.)</u>	<u>Sample No.</u>	<u>Cl-ppm</u>
9:00 P.M.	5407275	2781		
11:00 P.M.	5407640	2790		
<u>23 November 1961</u>				
5:00 A.M.	5408580	2795		
6:00 A.M.	5408697	2798	37	31,500
7:00 A.M.	5408810	2800		
8:00 A.M.	5408920	2803		
9:00 A.M.	5409020	2806		
10:00 A.M.	5409074	2807	38	31,500
10:35 A.M.	5409107	2808		
	Shut well in.			
<u>24 November 1961</u>				
2:30 A.M.	Start pump.			
3:30 A.M.	5409310	2812		
4:30 A.M.	5409520	2817		
5:30 A.M.	5409725	2822		
6:30 A.M.	5409925	2827		
7:30 A.M.	5410095	2830		
8:30 A.M.	5410210	2833	39	32,000
9:30 A.M.	5410303	2835		
10:30 A.M.	5410430	2838		
11:30 A.M.	5410530	2840		
1:30 P.M.	5410690	2844		
2:30 P.M.	5410749	2845	40	31,000
3:30 P.M.	5410791	2846		
4:30 P.M.	5410844	2848		
5:30 P.M.	5410911	2849		
6:30 P.M.	5410967	2851		
7:30 P.M.	5411022	2852		
8:30 P.M.	5411072	2853	41	31,500
	Shut well in.			
<u>25 November 1961</u>				
7:00 A.M.	5411619	2866		
8:00 A.M.	5411665	2867	42	33,000
9:00 A.M.	5411696	2868		
10:00 A.M.	5411740	2869		
11:00 A.M.	5411776	2870		
12:01 P.M.	5411817	2871	43	31,500
2:00 P.M.	5411915	2873		
3:00 P.M.	5411965	2874		

<u>25 November 1961</u>	<u>Meter Reading</u>	<u>Cumulative Prod. (bbls.)</u>	<u>Sample No.</u>	<u>Cl-ppm</u>
(Continued)				
4:00 P. M.	5412017	2875		
5:00 P. M.	5412074	2877	44	31,000
6:00 P. M.	5412120	2878		
8:00 P. M.	5412214	2880		
9:00 P. M.	5412225	2881		
10:00 P. M.	5412291	2882		
11:00 P. M.	5412334	2883		
11:59 P. M.	5412368	2884		
<u>26 November 1961</u>				
7:00 A. M.	5412713	2892	45	31,250
8:00 A. M.	5412755	2893		
9:00 A. M.	5412786	2894		
10:00 A. M.	5412832	2895		
11:00 A. M.	5412863	2896		
12:01 P. M.	5412893	2896		
2:00 P. M.	5412958	2896	46	32,000
3:00 P. M.	5413000	2897		
4:00 P. M.	5413030	2898		
5:00 P. M.	5413062	2899		
6:00 P. M.	5413093	2899		
7:00 P. M.	5413130	2900		
8:00 P. M.	5413164	2901	47	32,500
9:00 P. M.	5413201	2902		
<u>27 November 1961</u>				
7:00 A. M.	5413566	2911		
8:00 A. M.	5413605	2911	48	32,500
10:00 A. M.	5413674	2913		
10:30 A. M.	5413689	2914		(10-gal. sample)
				Shut pump down to pull rods and tubing.
10:45 A. M.				Pulling unit stuck in mud.
4:00 P. M.				Unit rigged up to pull rods.
5:00 P. M.				Pulled 17 rods and shut down for night.
<u>28 November 1961</u>				
6:30 A. M.				Commence pulling rods.
12:01 P. M.				Finish pulling rods.
12:30 P. M.				Rig up to pull tubing.
5:00 P. M.				Tubing would not unseat, pulled to 75,000#, but unable to pull more due to soft sub base. Shut down for night.
<u>29 November 1961</u>				
6:30 A. M.				Move pulling unit to other side of the well in order to secure firmer footing for pulling unit.

29 November 1961

(Continued)

7:45 A. M.	Trucks arrived to move pumping unit.
10:45 A. M.	Pulling unit rigged up.
2:30 P. M.	Prepare foundation and rigged up work space around well head.

30 November 1961

7:00 A. M.	Pulling tubing.
1:30 P. M.	Finished pulling tubing.
1:45 P. M.	Install christmas tree.
3:30 P. M.	Tear down pulling unit.

W-10 (Rev. 1-25-59)

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

PROJECT: 11 March 1961

REPORT NO. 11
DATE: 11 March 1961

Time of Day	Pig Label	Mud Properties	Solids		Flow Rate		Mud Level	Remarks
			Wt. %	Sp. G.	Flow Rate	Flow Rate		
12:00 pm	156 374	...	...	...	...	...	...
1:00 pm	156 374	...	...	...	...	...	...
2:00 pm	156 374	...	...	...	...	...	...
3:00 pm	156 374	...	...	...	...	...	...
4:00 pm	156 374	...	...	...	...	...	...
5:00 pm	156 374	...	...	...	...	...	...
6:00 pm	156 374	...	...	...	...	...	...

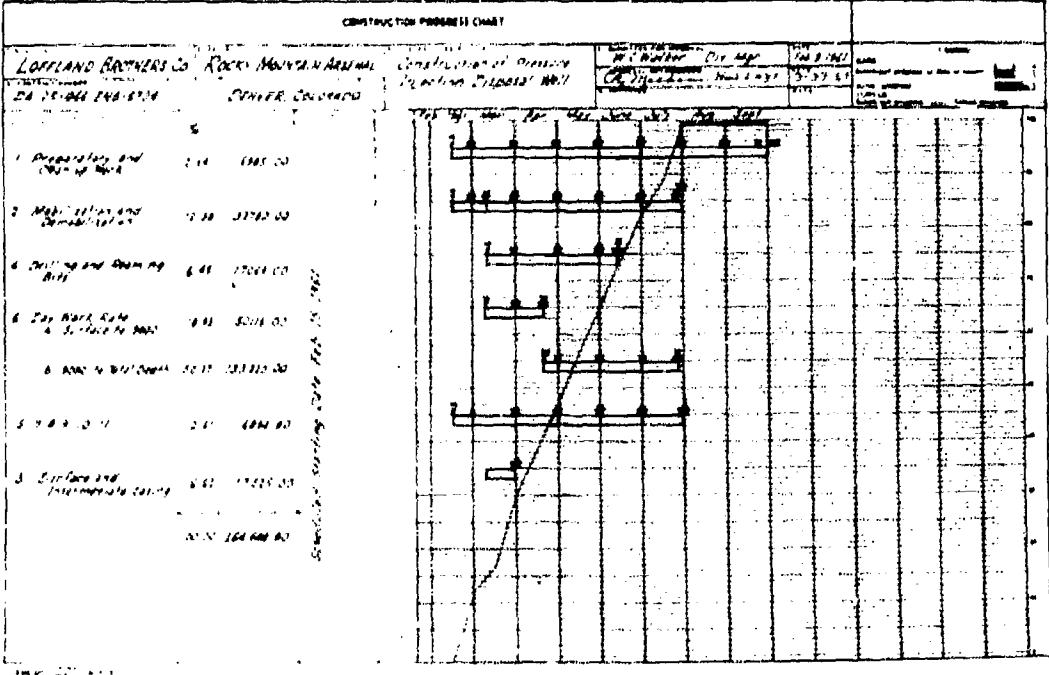
W-10 (Rev. 1-25-59)

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

PROJECT: 18 March 1961

REPORT NO. 12
DATE: 18 March 1961

Time of Day	Pig Label	Mud Properties	Solids		Flow Rate		Mud Level	Remarks
			Wt. %	Sp. G.	Flow Rate	Flow Rate		
7:00 am		...	...	...	...	...	...
8:00 am	50 0 1	...	...	...	...	...	...
9:00 am	100 0 1	...	...	...	...	...	...
10:00 am	100 374 2	...	...	...	...	...	...
11:00 am	156 374 2	...	...	...	...	...	...
12:00 pm	156 374 2	...	...	...	...	...	...
1:00 pm	156 374 2	...	...	...	...	...	...
2:00 pm	156 374 2	...	...	...	...	...	...
3:00 pm	156 374 2	...	...	...	...	...	...



Well Name
 Chng 23 06110 N
 Date 12/18/54

WELL LOG - COMPLETION REPORT
 PREPARED BY THE BUREAU OF OIL FIELD
 SURVEYING - MISSOURI

Well No.
 Date 12 March 1955
 Date of Report

Log Type
 Pump No.
 Pump No.

Time of Day	Rig Deck	Mud Properties				Solids				Pump Test				Mud Level		Remarks	Well Log		
		Depth, Feet	Temperature, Degrees F	Viscosity, Centipoise	Specific Gravity	Wt. % Solids	Wt. % Sand	Wt. % Silt	Wt. % Clay	Pressure, PSI	Stroke, Min	Stroke, Max	Stroke, Avg	Pressure, PSI	Stroke, Min			Stroke, Max	Stroke, Avg
10:00 am	145 1 4'	24	220	0.8	1.0				1	100	17	15	17.5	100	100	100	100	Mud plunger Plugged	
1:00 pm	140 1 4'	10	190	0.9	1.0				1	175	14	12	15.5	100	100	100	100		
4:00 pm	140 1 4'	10	190	0.9	1.0				1	275	10	8	13.0	100	100	100	100	Mud plunger Plugged Mud level Rounded off & not used in flow log at above location	
6:30 pm	140 1 4'	10	190	0.9	1.0				1	275	10	8	13.0	100	100	100	100		
10:00 pm	1310 1 4'	10	160	0.9	1.0				1	375	10	8	13.0	100	100	100	100	Mud plunger Plugged Mud level Rounded off & not used in flow log at above location	
1:00 pm	1260 1 4'	10	140	0.9	1.0				1	475	10	8	13.0	100	100	100	100		
4:00 pm	1207 1 4'	10	130	0.9	1.0				1	675	10	8	13.0	100	100	100	100	Mud plunger Plugged Mud level Rounded off & not used in flow log at above location	
6:00 pm	1215 1 4'	10	130	0.9	1.0				1	675	10	8	13.0	100	100	100	100		

Well Name
 Chng 23 06110 N
 Date 12/18/54

WELL LOG - COMPLETION REPORT
 PREPARED BY THE BUREAU OF OIL FIELD
 SURVEYING - MISSOURI

Well No.
 Date 12 March 1955
 Date of Report

Log Type
 Pump No.
 Pump No.

Time of Day	Rig Deck	Mud Properties				Solids				Pump Test				Mud Level		Remarks	Well Log		
		Depth, Feet	Temperature, Degrees F	Viscosity, Centipoise	Specific Gravity	Wt. % Solids	Wt. % Sand	Wt. % Silt	Wt. % Clay	Pressure, PSI	Stroke, Min	Stroke, Max	Stroke, Avg	Pressure, PSI	Stroke, Min			Stroke, Max	Stroke, Avg
9:00 am	121 1 4'	3	180	0.9	1.0				1	100	10	8	13.0	100	100	100	100	Mud plunger Plugged	
1:00 pm	121 1 4'	3	180	0.9	1.0				1	175	10	8	13.0	100	100	100	100		
4:00 pm	121 1 4'	3	180	0.9	1.0				1	275	10	8	13.0	100	100	100	100	Mud plunger Plugged	
6:00 pm	121 1 4'	3	180	0.9	1.0				1	275	10	8	13.0	100	100	100	100		
10:00 pm	121 1 4'	3	180	0.9	1.0				1	375	10	8	13.0	100	100	100	100	Mud plunger Plugged	
1:00 pm	121 1 4'	3	180	0.9	1.0				1	375	10	8	13.0	100	100	100	100		
4:00 pm	121 1 4'	3	180	0.9	1.0				1	475	10	8	13.0	100	100	100	100	Mud plunger Plugged	
6:00 pm	121 1 4'	3	180	0.9	1.0				1	475	10	8	13.0	100	100	100	100		

Well Name
 Chng 23 06110 N
 Date 12/18/54

WELL LOG - COMPLETION REPORT
 PREPARED BY THE BUREAU OF OIL FIELD
 SURVEYING - MISSOURI

Well No.
 Date 12 March 1955
 Date of Report

Log Type
 Pump No.
 Pump No.

Time of Day	Rig Deck	Mud Properties				Solids				Pump Test				Mud Level		Remarks	Well Log		
		Depth, Feet	Temperature, Degrees F	Viscosity, Centipoise	Specific Gravity	Wt. % Solids	Wt. % Sand	Wt. % Silt	Wt. % Clay	Pressure, PSI	Stroke, Min	Stroke, Max	Stroke, Avg	Pressure, PSI	Stroke, Min			Stroke, Max	Stroke, Avg
10:00 am	126 1 4'	3	180	0.9	1.0				1	100	10	8	13.0	100	100	100	100	Mud plunger Plugged	
1:00 pm	126 1 4'	3	180	0.9	1.0				1	175	10	8	13.0	100	100	100	100		
4:00 pm	126 1 4'	3	180	0.9	1.0				1	275	10	8	13.0	100	100	100	100	Mud plunger Plugged	
6:00 pm	126 1 4'	3	180	0.9	1.0				1	275	10	8	13.0	100	100	100	100		
10:00 pm	126 1 4'	3	180	0.9	1.0				1	375	10	8	13.0	100	100	100	100	Mud plunger Plugged	
1:00 pm	126 1 4'	3	180	0.9	1.0				1	375	10	8	13.0	100	100	100	100		
4:00 pm	126 1 4'	3	180	0.9	1.0				1	475	10	8	13.0	100	100	100	100	Mud plunger Plugged	
6:00 pm	126 1 4'	3	180	0.9	1.0				1	475	10	8	13.0	100	100	100	100		

Well Name
 Chng 23 06110 N
 Date 12/18/54

WELL LOG - COMPLETION REPORT
 PREPARED BY THE BUREAU OF OIL FIELD
 SURVEYING - MISSOURI

Well No.
 Date 12 March 1955
 Date of Report

Log Type
 Pump No.
 Pump No.

Time of Day	Rig Size	Mud Properties					Mud Data					Pump Data					Hydraulics					Remarks
		Sp. Grav.	Viscosity	Plastic Viscosity	Yield Point	Filter Loss	Wt. Solids	Wt. % Solids	Wt. % Solids	Wt. % Solids	Wt. % Solids	Wt. % Solids	Wt. % Solids	Wt. % Solids	Wt. % Solids	Wt. % Solids	Wt. % Solids	Wt. % Solids	Wt. % Solids			
7:00 am	15-123-11																					
7:30 am	15-123-11																					
8:00 am	15-123-11																					
8:30 am	15-123-11																					
9:00 am	15-123-11																					
9:30 am	15-123-11																					
10:00 am	15-123-11																					
10:30 am	15-123-11																					
11:00 am	15-123-11																					
11:30 am	15-123-11																					
12:00 pm	15-123-11																					

Time of Day	Rig Size	Mud Properties					Mud Data					Pump Data					Hydraulics					Remarks
		Sp. Grav.	Viscosity	Plastic Viscosity	Yield Point	Filter Loss	Wt. Solids	Wt. % Solids	Wt. % Solids	Wt. % Solids	Wt. % Solids	Wt. % Solids	Wt. % Solids	Wt. % Solids	Wt. % Solids	Wt. % Solids	Wt. % Solids	Wt. % Solids				
12:30 pm	15-123-11																					Reading 123
1:00 pm	15-123-11																					Reading 123
1:30 pm	15-123-11																					Reading 123
2:00 pm	15-123-11																					Reading 123
2:30 pm	15-123-11																					Reading 123
3:00 pm	15-123-11																					Reading 123
3:30 pm	15-123-11																					Reading 123
4:00 pm	15-123-11																					Reading 123
4:30 pm	15-123-11																					Reading 123
5:00 pm	15-123-11																					Reading 123
5:30 pm	15-123-11																					Reading 123

Time of Day	Rig Size	Mud Properties					Mud Data					Pump Data					Hydraulics					Remarks
		Sp. Grav.	Viscosity	Plastic Viscosity	Yield Point	Filter Loss	Wt. Solids	Wt. % Solids	Wt. % Solids	Wt. % Solids	Wt. % Solids	Wt. % Solids	Wt. % Solids	Wt. % Solids	Wt. % Solids	Wt. % Solids	Wt. % Solids					
6:00 pm	15-123-11																					Tip 123
6:30 pm	15-123-11																					Tip 123
7:00 pm	15-123-11																					Tip 123
7:30 pm	15-123-11																					Tip 123
8:00 pm	15-123-11																					Tip 123
8:30 pm	15-123-11																					Tip 123
9:00 pm	15-123-11																					Tip 123
9:30 pm	15-123-11																					Tip 123

TIME	DESCRIPTION	DEPTH	TEMPERATURE	WIND	WAVE	SEA STATE	WAVE PERIOD	WAVE DIRECTION	WAVE VELOCITY	WAVE HEIGHT	WAVE PERIOD	WAVE DIRECTION	WAVE VELOCITY	WAVE HEIGHT
0000														
0100														
0200														
0300														
0400														
0500														
0600														
0700														
0800														
0900														
1000														
1100														
1200														
1300														
1400														
1500														
1600														
1700														
1800														
1900														
2000														
2100														
2200														
2300														
2400														

WIND
 WAVE
 SEA STATE
 WAVE PERIOD
 WAVE DIRECTION
 WAVE VELOCITY
 WAVE HEIGHT

TIME	DESCRIPTION	DEPTH	TEMPERATURE	WIND	WAVE	SEA STATE	WAVE PERIOD	WAVE DIRECTION	WAVE VELOCITY	WAVE HEIGHT	WAVE PERIOD	WAVE DIRECTION	WAVE VELOCITY	WAVE HEIGHT
0000														
0100														
0200														
0300														
0400														
0500														
0600														
0700														
0800														
0900														
1000														
1100														
1200														
1300														
1400														
1500														
1600														
1700														
1800														
1900														
2000														
2100														
2200														
2300														
2400														

WIND
 WAVE
 SEA STATE
 WAVE PERIOD
 WAVE DIRECTION
 WAVE VELOCITY
 WAVE HEIGHT

TIME	DESCRIPTION	DEPTH	TEMPERATURE	WIND	WAVE	SEA STATE	WAVE PERIOD	WAVE DIRECTION	WAVE VELOCITY	WAVE HEIGHT	WAVE PERIOD	WAVE DIRECTION	WAVE VELOCITY	WAVE HEIGHT
0000														
0100														
0200														
0300														
0400														
0500														
0600														
0700														
0800														
0900														
1000														
1100														
1200														
1300														
1400														
1500														
1600														
1700														
1800														
1900														
2000														
2100														
2200														
2300														
2400														

WIND
 WAVE
 SEA STATE
 WAVE PERIOD
 WAVE DIRECTION
 WAVE VELOCITY
 WAVE HEIGHT

1238 2204

REPORT DATE: 27 March 1961

LOG TYPE: IDICO
D700
D500

Log No.	Pig Data		Hydraulics		Flow		Remarks
	Depth	Time	Pressure	Flow Rate	Pressure	Flow Rate	
1238	15	02	15	02	15	02	...
1239	15	02	15	02	15	02	...
1240	15	02	15	02	15	02	...
1241	15	02	15	02	15	02	...
1242	15	02	15	02	15	02	...
1243	15	02	15	02	15	02	...
1244	15	02	15	02	15	02	...
1245	15	02	15	02	15	02	...
1246	15	02	15	02	15	02	...
1247	15	02	15	02	15	02	...
1248	15	02	15	02	15	02	...
1249	15	02	15	02	15	02	...
1250	15	02	15	02	15	02	...

NYC Reg. NYC 5147

Trap for size #10
On bottom 12 50 P.M.

Trap for size #10
On bottom 12 50 P.M.

1238 2204

REPORT DATE: 27 March 1961

LOG TYPE: IDICO
D700
D500

Log No.	Pig Data		Hydraulics		Flow		Remarks
	Depth	Time	Pressure	Flow Rate	Pressure	Flow Rate	
1251	15	02	15	02	15	02	...
1252	15	02	15	02	15	02	...
1253	15	02	15	02	15	02	...
1254	15	02	15	02	15	02	...
1255	15	02	15	02	15	02	...
1256	15	02	15	02	15	02	...
1257	15	02	15	02	15	02	...
1258	15	02	15	02	15	02	...
1259	15	02	15	02	15	02	...
1260	15	02	15	02	15	02	...
1261	15	02	15	02	15	02	...
1262	15	02	15	02	15	02	...
1263	15	02	15	02	15	02	...
1264	15	02	15	02	15	02	...
1265	15	02	15	02	15	02	...
1266	15	02	15	02	15	02	...
1267	15	02	15	02	15	02	...
1268	15	02	15	02	15	02	...
1269	15	02	15	02	15	02	...
1270	15	02	15	02	15	02	...

Trap for size #10
On bottom 12 50 P.M.

Trap for size #10
On bottom 12 50 P.M.

1238 2204

REPORT DATE: 27 March 1961

LOG TYPE: IDICO
D700
D500

Log No.	Pig Data		Hydraulics		Flow		Remarks
	Depth	Time	Pressure	Flow Rate	Pressure	Flow Rate	
1271	15	02	15	02	15	02	...
1272	15	02	15	02	15	02	...
1273	15	02	15	02	15	02	...
1274	15	02	15	02	15	02	...
1275	15	02	15	02	15	02	...
1276	15	02	15	02	15	02	...
1277	15	02	15	02	15	02	...
1278	15	02	15	02	15	02	...
1279	15	02	15	02	15	02	...
1280	15	02	15	02	15	02	...
1281	15	02	15	02	15	02	...
1282	15	02	15	02	15	02	...
1283	15	02	15	02	15	02	...
1284	15	02	15	02	15	02	...
1285	15	02	15	02	15	02	...
1286	15	02	15	02	15	02	...
1287	15	02	15	02	15	02	...
1288	15	02	15	02	15	02	...
1289	15	02	15	02	15	02	...
1290	15	02	15	02	15	02	...

Trap for size #10
On bottom 12 50 P.M.

Trap for size #10
On bottom 12 50 P.M.

Case No. 2004
Date 11/11

DAKOTA
ENGINEERING

Report No. 11
Date 11/11

1993
1994

Date	Time	Drilling	Spud	Rotary	Pressure	Flow	Remarks
11/11	00:00	20	10	20	10	20	10

11/11	00:00	20	10	20	10	20	10
11/11	00:00	20	10	20	10	20	10

DAKOTA ENGINEERING REPORT
PRESSURE INJECTION DISPOSAL WALL
ROCKY MOUNTAIN ARSENAL

Date	Time	Drilling	Spud	Rotary	Pressure	Flow	Remarks
11/11	00:00	20	10	20	10	20	10

11/11	00:00	20	10	20	10	20	10
11/11	00:00	20	10	20	10	20	10

DAKOTA ENGINEERING REPORT
PRESSURE INJECTION DISPOSAL WALL
ROCKY MOUNTAIN ARSENAL

Date	Time	Drilling	Spud	Rotary	Pressure	Flow	Remarks
11/11	00:00	20	10	20	10	20	10

11/11	00:00	20	10	20	10	20	10
11/11	00:00	20	10	20	10	20	10

WASH STATE
 CASE NO. 158
 DATE 4/21/51

WATER CONTROL DISTRICT
 PROJECT NO. 158
 WASH STATE

DATE 2 April 1951
 DAY 12

NO. 158
 DATE 2/28
 NAME

Time of Day	Rig No.	Mud Progress	Mud Data	Pump Data	Hydraulics	Remarks							
							Depth, Feet	Discharge, CFS	Flow, Thousands of Gals	Water, GPM	Pressure, PSI	Stroke, Min	Length, Feet	Rate, GPM	Volume of Mud	Pressure, PSI	Stroke, Min	Length, Feet	Rate, GPM	Volume of Mud
12:00 PM	1211	60	172	17	1300	Short trip. Pulled & stands.							
1:00 PM	1211	60	172	17	1300	Clm. prior to trip out.							
2:00 PM	1211	60	172	17	1300	Trip							
3:00 PM	1211	60	172	17	1300	On bottom at 10:00 A.M.							
4:00 PM	1211	60	172	17	1300	Short trip. Stand through Muckers							
5:00 PM	1211	60	172	17	1300	Drilling							
6:00 PM	1211	60	172	17	1300	Drilling							

Alvin Bannock
 Engineer
 J. Hardy Construction Co.
 148 1/2 1st St. N.E.

VAL 6000

Flowing 12 7/8 x 2000
Date 04-11-53

QUALITY ENGINEERING REPORT
WELLS RE-EXAMINATION GENERAL WELLS
WYOMING MINING AND REFINING COMPANY

12 April 1953
Wells from April 1953

Page 10 of 17
2798

Time of Day	Rig Date	Mud Properties					Sol. Data	Flow Data	Hydrostatic		Remarks										
		Weight of Solids lb/100 gal	Volume of Solids % on Wt. of Solids	Water Absorbed % on Wt. of Solids	Plastic Viscosity cP	Shear Loss at 10 RPM % at 1 min.			Pressure PSI	Stroke Volume cu ft per min.		Annular Velocity ft/min	Flow Rate cu ft per min.								
12:05 PM	0417	30	24	17	7.2	172	0.0	0	2.0	2.7	2.8	1	1200	44	10	6.72	170	26			Core 2000
12:20 PM	0417	30	24	17	6.8	172	0.0	0	2.0	2.7	2.8	1	1200	44	10	6.72	170	26			Core 2000
12:35 PM	0417	30	24	17	7.0	174	0.0	0	2.2	2.8	2.7	1	1200	44	10	6.576	170	26			Core 2000
12:50 PM	0417	30	24	17	7.8	174	0.0	0	3.0	3.0	2.5	1	1400	30	10	6.576	160	25			Core 2000
1:05 PM	0417	30	24	17	7.8	174	0.0	0	3.0	3.0	2.5	1	1400	30	10	6.576	160	25			Trap to pull core #1
1:20 PM	0417	30	24	17	7.8	174	0.0	0	3.0	3.0	2.5	1	1400	30	10	6.576	160	25			Trap #1
1:35 PM	0417	30	24	17	7.8	174	0.0	0	3.0	3.0	2.5	1	1400	30	10	6.576	160	25			Trap
1:50 PM	0417	30	24	17	7.8	174	0.0	0	3.0	3.0	2.5	1	1400	30	10	6.576	160	25			Trap
2:05 PM	0417	30	24	17	7.8	174	0.0	0	3.0	3.0	2.5	1	1400	30	10	6.576	160	25			Trap
2:20 PM	0417	30	24	17	7.8	174	0.0	0	3.0	3.0	2.5	1	1400	30	10	6.576	160	25			Trap
2:35 PM	0417	30	24	17	7.8	174	0.0	0	3.0	3.0	2.5	1	1400	30	10	6.576	160	25			Trap
2:50 PM	0417	30	24	17	7.8	174	0.0	0	3.0	3.0	2.5	1	1400	30	10	6.576	160	25			Trap

HTC Reg. 078

12 3/4 1204 12 April 1953

Time of Day	Rig Date	Mud Properties					Sol. Data	Flow Data	Hydrostatic		Remarks										
		Weight of Solids lb/100 gal	Volume of Solids % on Wt. of Solids	Water Absorbed % on Wt. of Solids	Plastic Viscosity cP	Shear Loss at 10 RPM % at 1 min.			Pressure PSI	Stroke Volume cu ft per min.		Annular Velocity ft/min	Flow Rate cu ft per min.								
12:05 PM	0422	30	24	17	6.8	172	0.0	0	2.0	2.7	2.8	1	1200	44	10	6.72	170	26			Trap
12:20 PM	0422	30	24	17	6.8	172	0.0	0	2.0	2.7	2.8	1	1200	44	10	6.72	170	26			Trap
12:35 PM	0422	30	24	17	6.8	172	0.0	0	2.0	2.7	2.8	1	1200	44	10	6.72	170	26			Trap
12:50 PM	0422	30	24	17	6.8	172	0.0	0	2.0	2.7	2.8	1	1200	44	10	6.72	170	26			Trap
1:05 PM	0422	30	24	17	6.8	172	0.0	0	2.0	2.7	2.8	1	1200	44	10	6.72	170	26			Trap
1:20 PM	0422	30	24	17	6.8	172	0.0	0	2.0	2.7	2.8	1	1200	44	10	6.72	170	26			Trap
1:35 PM	0422	30	24	17	6.8	172	0.0	0	2.0	2.7	2.8	1	1200	44	10	6.72	170	26			Trap
1:50 PM	0422	30	24	17	6.8	172	0.0	0	2.0	2.7	2.8	1	1200	44	10	6.72	170	26			Trap
2:05 PM	0422	30	24	17	6.8	172	0.0	0	2.0	2.7	2.8	1	1200	44	10	6.72	170	26			Trap

HTC Reg. 078

12 3/4 1204 12 April 1953

Time of Day	Rig Date	Mud Properties					Sol. Data	Flow Data	Hydrostatic		Remarks										
		Weight of Solids lb/100 gal	Volume of Solids % on Wt. of Solids	Water Absorbed % on Wt. of Solids	Plastic Viscosity cP	Shear Loss at 10 RPM % at 1 min.			Pressure PSI	Stroke Volume cu ft per min.		Annular Velocity ft/min	Flow Rate cu ft per min.								
1:20 PM	0516	30	24	17	6.8	172	0.0	0	2.0	2.7	2.8	1	1200	44	10	6.72	170	26			Core 2000
1:35 PM	0516	30	24	17	6.8	172	0.0	0	2.0	2.7	2.8	1	1200	44	10	6.72	170	26			Core 2000
1:50 PM	0516	30	24	17	6.8	172	0.0	0	2.0	2.7	2.8	1	1200	44	10	6.72	170	26			Core 2000
2:05 PM	0516	30	24	17	6.8	172	0.0	0	2.0	2.7	2.8	1	1200	44	10	6.72	170	26			Core 2000
2:20 PM	0516	30	24	17	6.8	172	0.0	0	2.0	2.7	2.8	1	1200	44	10	6.72	170	26			Core 2000
2:35 PM	0516	30	24	17	6.8	172	0.0	0	2.0	2.7	2.8	1	1200	44	10	6.72	170	26			Core 2000
2:50 PM	0516	30	24	17	6.8	172	0.0	0	2.0	2.7	2.8	1	1200	44	10	6.72	170	26			Core 2000

HTC Reg. 078

12 3/4 1204 12 April 1953

Case No. 117

Date: 11/11/54

DAILY ENGINEERING REPORT
PREMIER (NFC) TOWER DRILLING WELL
MOUNTAIN SPRINGS

Date: 11/11/54

DRSCO
DTPG
D&M

Time of Day	Well Properties				Well Logs				Flow Data				Remarks			
	Depth - Feet	Core Depth - Feet	Core Length - Feet	Core Weight - Pounds	Density of Coll.	Viscosity - Centipoise	Plasticity - Percent	Water Content - Percent	Flow Rate - GPM	Pressure - PSI	Temperature - Degrees F	Flow Direction		Flow Velocity - Feet/Min		
12:00 PM	60	54	6.0	75	20	6.0	37.5	6.5	10	2.0	2.0	2.0	100	100	100	100
1:00 PM	70	64	6.0	85	20	6.0	37.5	6.5	10	2.0	2.0	2.0	100	100	100	100
2:00 PM	80	74	6.0	95	20	6.0	37.5	6.5	10	2.0	2.0	2.0	100	100	100	100
3:00 PM	90	84	6.0	105	20	6.0	37.5	6.5	10	2.0	2.0	2.0	100	100	100	100
4:00 PM	100	94	6.0	115	20	6.0	37.5	6.5	10	2.0	2.0	2.0	100	100	100	100
5:00 PM	110	104	6.0	125	20	6.0	37.5	6.5	10	2.0	2.0	2.0	100	100	100	100

Case No. 117

Date: 11/11/54

DAILY ENGINEERING REPORT
PREMIER (NFC) TOWER DRILLING WELL
MOUNTAIN SPRINGS

Date: 11/11/54

DRSCO
DTPG
D&M

Time of Day	Well Properties				Well Logs				Flow Data				Remarks			
	Depth - Feet	Core Depth - Feet	Core Length - Feet	Core Weight - Pounds	Density of Coll.	Viscosity - Centipoise	Plasticity - Percent	Water Content - Percent	Flow Rate - GPM	Pressure - PSI	Temperature - Degrees F	Flow Direction		Flow Velocity - Feet/Min		
7:00 AM	60	54	6.0	75	20	6.0	37.5	6.5	10	2.0	2.0	2.0	100	100	100	100
8:00 AM	70	64	6.0	85	20	6.0	37.5	6.5	10	2.0	2.0	2.0	100	100	100	100
9:00 AM	80	74	6.0	95	20	6.0	37.5	6.5	10	2.0	2.0	2.0	100	100	100	100
10:00 AM	90	84	6.0	105	20	6.0	37.5	6.5	10	2.0	2.0	2.0	100	100	100	100
11:00 AM	100	94	6.0	115	20	6.0	37.5	6.5	10	2.0	2.0	2.0	100	100	100	100
12:00 PM	110	104	6.0	125	20	6.0	37.5	6.5	10	2.0	2.0	2.0	100	100	100	100

Case No. 117

Date: 11/11/54

DAILY ENGINEERING REPORT
PREMIER (NFC) TOWER DRILLING WELL
MOUNTAIN SPRINGS

Date: 11/11/54

DRSCO
DTPG
D&M

Time of Day	Well Properties				Well Logs				Flow Data				Remarks			
	Depth - Feet	Core Depth - Feet	Core Length - Feet	Core Weight - Pounds	Density of Coll.	Viscosity - Centipoise	Plasticity - Percent	Water Content - Percent	Flow Rate - GPM	Pressure - PSI	Temperature - Degrees F	Flow Direction		Flow Velocity - Feet/Min		
1:00 PM	60	54	6.0	75	20	6.0	37.5	6.5	10	2.0	2.0	2.0	100	100	100	100
2:00 PM	70	64	6.0	85	20	6.0	37.5	6.5	10	2.0	2.0	2.0	100	100	100	100
3:00 PM	80	74	6.0	95	20	6.0	37.5	6.5	10	2.0	2.0	2.0	100	100	100	100
4:00 PM	90	84	6.0	105	20	6.0	37.5	6.5	10	2.0	2.0	2.0	100	100	100	100
5:00 PM	100	94	6.0	115	20	6.0	37.5	6.5	10	2.0	2.0	2.0	100	100	100	100
6:00 PM	110	104	6.0	125	20	6.0	37.5	6.5	10	2.0	2.0	2.0	100	100	100	100

Case No. 117

Date: 11/11/54

DAILY ENGINEERING REPORT
PREMIER (NFC) TOWER DRILLING WELL
MOUNTAIN SPRINGS

Date: 11/11/54

DRSCO
DTPG
D&M

11378 2204
11

11 April 1961

DECO
D760
D760

Time	Fig. 1000	Med. Properties	Rad. Data	Temp. Form	Hydro. Data	Remarks
11378 2204	10	11 0.0 12 0.0 13 0.0 14 0.0	11 0.0 12 0.0 13 0.0 14 0.0	11 0.0 12 0.0 13 0.0 14 0.0	11 0.0 12 0.0 13 0.0 14 0.0	11 0.0 12 0.0 13 0.0 14 0.0
11378 2204	10	11 0.0 12 0.0 13 0.0 14 0.0	11 0.0 12 0.0 13 0.0 14 0.0	11 0.0 12 0.0 13 0.0 14 0.0	11 0.0 12 0.0 13 0.0 14 0.0	11 0.0 12 0.0 13 0.0 14 0.0
11378 2204	10	11 0.0 12 0.0 13 0.0 14 0.0	11 0.0 12 0.0 13 0.0 14 0.0	11 0.0 12 0.0 13 0.0 14 0.0	11 0.0 12 0.0 13 0.0 14 0.0	11 0.0 12 0.0 13 0.0 14 0.0
11378 2204	10	11 0.0 12 0.0 13 0.0 14 0.0	11 0.0 12 0.0 13 0.0 14 0.0	11 0.0 12 0.0 13 0.0 14 0.0	11 0.0 12 0.0 13 0.0 14 0.0	11 0.0 12 0.0 13 0.0 14 0.0

HTC
WFB Reg. Break in BH

Start to hold
1:30 P.M.
On 11/11/61 P.M.
11, 11, 110 ppm
11, 11, 110 ppm

11 April 1961

DECO
D760
D760

Time	Fig. 1000	Med. Properties	Rad. Data	Temp. Form	Hydro. Data	Remarks
11378 2204	10	11 0.0 12 0.0 13 0.0 14 0.0	11 0.0 12 0.0 13 0.0 14 0.0	11 0.0 12 0.0 13 0.0 14 0.0	11 0.0 12 0.0 13 0.0 14 0.0	11 0.0 12 0.0 13 0.0 14 0.0
11378 2204	10	11 0.0 12 0.0 13 0.0 14 0.0	11 0.0 12 0.0 13 0.0 14 0.0	11 0.0 12 0.0 13 0.0 14 0.0	11 0.0 12 0.0 13 0.0 14 0.0	11 0.0 12 0.0 13 0.0 14 0.0
11378 2204	10	11 0.0 12 0.0 13 0.0 14 0.0	11 0.0 12 0.0 13 0.0 14 0.0	11 0.0 12 0.0 13 0.0 14 0.0	11 0.0 12 0.0 13 0.0 14 0.0	11 0.0 12 0.0 13 0.0 14 0.0
11378 2204	10	11 0.0 12 0.0 13 0.0 14 0.0	11 0.0 12 0.0 13 0.0 14 0.0	11 0.0 12 0.0 13 0.0 14 0.0	11 0.0 12 0.0 13 0.0 14 0.0	11 0.0 12 0.0 13 0.0 14 0.0

HTC
WFB Reg. Break in BH

Start to hold
1:30 P.M.
On 11/11/61 P.M.
11, 11, 110 ppm
11, 11, 110 ppm

11 April 1961

DECO
D760
D760

Time	Fig. 1000	Med. Properties	Rad. Data	Temp. Form	Hydro. Data	Remarks
11378 2204	10	11 0.0 12 0.0 13 0.0 14 0.0	11 0.0 12 0.0 13 0.0 14 0.0	11 0.0 12 0.0 13 0.0 14 0.0	11 0.0 12 0.0 13 0.0 14 0.0	11 0.0 12 0.0 13 0.0 14 0.0
11378 2204	10	11 0.0 12 0.0 13 0.0 14 0.0	11 0.0 12 0.0 13 0.0 14 0.0	11 0.0 12 0.0 13 0.0 14 0.0	11 0.0 12 0.0 13 0.0 14 0.0	11 0.0 12 0.0 13 0.0 14 0.0
11378 2204	10	11 0.0 12 0.0 13 0.0 14 0.0	11 0.0 12 0.0 13 0.0 14 0.0	11 0.0 12 0.0 13 0.0 14 0.0	11 0.0 12 0.0 13 0.0 14 0.0	11 0.0 12 0.0 13 0.0 14 0.0
11378 2204	10	11 0.0 12 0.0 13 0.0 14 0.0	11 0.0 12 0.0 13 0.0 14 0.0	11 0.0 12 0.0 13 0.0 14 0.0	11 0.0 12 0.0 13 0.0 14 0.0	11 0.0 12 0.0 13 0.0 14 0.0

HTC
WFB Reg. Break in BH

Start to hold
1:30 P.M.
On 11/11/61 P.M.
11, 11, 110 ppm
11, 11, 110 ppm

11 April 1961

DECO
D760
D760

13218 N 2004 S
20 S 2

DAILY ENGINEERING REPORT
PREMURE DISTRIBUTION DISHWASH WATER
KELLY MOUNTAIN ARSENAL

Report No. 46
Date: 24 April 1961
Last Form Issue Date: 47

P. S. Type: LMGCD
Form No. 2-158
Page No. 1

Time (min)	Dig Data	Mud Properties		Dig Data			Temp Data	Air Data	Remarks
		Viscosity (cP)	Specific Gravity	Pressure (PSI)	Stroke (inches)	Flow (gpm)			
00:00									Out of hole at 11:30 P.M.
01:00									Working on bottom and milling tool
02:00									Trip in 200
03:00									Milling on job
04:00									Milling on job
05:00									3:00 P.M. Parted milling tool.
06:00									Ann. No. 118. Drilling on job.
07:00									Drilling on job.
08:00									Drilling on job.

MTC
13 WTR Reg

13218 N 2004 S
20 S 2

DAILY ENGINEERING REPORT
PREMURE DISTRIBUTION DISHWASH WATER
KELLY MOUNTAIN ARSENAL

Report No. 47
Date: 25 April 1961
Last Form Issue Date: 48

P. S. Type: LMGCD
Form No. 2-158
Page No. 1

Time (min)	Dig Data	Mud Properties		Dig Data			Temp Data	Air Data	Remarks
		Viscosity (cP)	Specific Gravity	Pressure (PSI)	Stroke (inches)	Flow (gpm)			
00:00									Milling on job
01:00									Trip out at 01:00
02:00									Trip in at 02:00
03:00									14" bottom at 4:00 A.M.
04:00									Milling on job.
05:00									Milling on job
06:00									Washed at 5:00 A.M. Milled at 02:00
07:00									Trip

Head
17 IC Reg

MTC
21 WTR

13218 N 2004 S
20 S 2

DAILY ENGINEERING REPORT
PREMURE DISTRIBUTION DISHWASH WATER
KELLY MOUNTAIN ARSENAL

Report No. 48
Date: 26 April 1961
Last Form Issue Date: 49

P. S. Type: LMGCD
Form No. 2-158
Page No. 1

Time (min)	Dig Data	Mud Properties		Dig Data			Temp Data	Air Data	Remarks
		Viscosity (cP)	Specific Gravity	Pressure (PSI)	Stroke (inches)	Flow (gpm)			
00:00									Working
01:00									Milling on job
02:00									Drilling on job
03:00									Drilling on job
04:00									Trip in at 03:00
05:00									Trip in at 03:00
06:00									Trip in at 03:00
07:00									Trip in at 03:00

MTC
13 WTR Reg

Head
17 IC Reg

MTC
21 WTR

WDH 3298
Casing 13 7/8" x 2000'
Date Apr 11

WELL LOG REPORT
APRIL 1961
WELL NO. 3298

Report No. 91
Date from Spot Date 91

Log Type
Pump No. 1
Pump No. 2

IDECO
D-100
D-150

Time of Day	Log Date	Well Depth	Well Temperature	Well Pressure	Well Sp. Gr.	Well Log No.	Well Log Type	Well Log Date	Well Log Description	Well Log Remarks																
11:00	4/11/61	64	9.9	27.32	8.9	61	CS	Reg.	46	3.6	6.91	7.47	3	1150	67	16	6.376	822	126	Drilling						
11:10	4/11/61	61				61	CS	Reg.	1		17.6	7.41									Trip out bit 8:41 AM					
11:20	4/11/61	61				61	CS	Reg.	1		17.6	7.41									Drilling					
11:30	4/11/61	62	9.9	27.32	8.9	62	IC	Reg.													Trip					
11:40	4/11/61	68	9.9	27.32	8.9	68			15	3.59	6.80	6.80	1	1150	67	16	6.376	822	126	1000 ft of Fall						
11:50	4/11/61	70	9.9	27.32	8.9	70			15	3.59	6.85	6.19	1	1150	68					2000 ft of Fall						
12:00	4/11/61	80	9.9	27.32	8.9	80			22	3.60	7.34	6.68	1	1150	63					400 119	Drilling					
12:10	4/11/61	80	9.9	27.32	8.9	80			19	3.60	6.35	6.52	1	1200	69					305 120	Drilling					
12:20	4/11/61	86	9.9	27.32	8.9	86			15	2.29	6.67	6.55									Trip out bit 6:41 AM					
										38 April 1961		IDECO		D-100		D-150										
01	1022	8155	40	45	8.9	54	18	7.1	27.32	8.9	68	HTC	OWC Reg.	27	3.7	5.63	6.15	1	1102	67	16	6.376	822	126	Drilling	
	9068		60	46	8.9	52	20	7.6	27.32	7.6	60	HTC	OWC Reg.	18	3.0	6.0	6.25		1300	64	16	6.376	820	130	Drilling	
	9049											HTC	OWC Reg.	9	3.3	6.0	6.25									Drilling
	9045						40				60	6.67	6.40													Circulation 1 hr, prior to trip out with bit 9:00 AM
	9041						41	C2	Reg.																	Bit 8:00 am, drill bearing tight, MP joint removed, Cut drilling line, Trip in bit 8:01 AM
	9063		60	50	9.7	57		5.8		6.3	13	2.15	5.8	5.8	1	1250	63	16	6.376	820	130				On bottom 12:45 of falllog.	
	9053		85	60	8.8	52		6.0		6.0	21	3.80	7.0	6.5	1	1150	64	16	6.376	822	126				Drilling	
	9105		90	45	9.7	50	18	6.6	7.5	8.1	41	2.87	6.29	7.81	1	1200	68	16	6.376	822	126				1000 ft of Fall	
										38 April 1961		IDECO		D-100		D-150										
01	908	8155																								Trip out bit 8:38
	8566		18	45	9.9	51		5.2	12	7.5																Trip out bit 8:59
	8561		18	45	9.9	51		5.2	12	7.5																On bottom 11:00 of 11:10 A.M. Trip w/ bit 8:59 AM, with mud, drill, bearing good.
	8557		18	45	9.9	51		5.2	12	7.5																On bottom drilling at 9:00 P.M.
	8572		61	45	11.6	76	10	8.3	14	7.5	60	2	2	7.8	7.0	6.4	1	1200	62	16	6.376	820	130		1000 ft of Fall	

Well Name: 13-175-2-2004
 Comp: 111
 Hole Base: 111'

DAILY ENGINEERING REPORT
 PRESSURE INJECTION DISPOSAL WELL
 ROCKY MOUNTAIN APPENDAL

Report No: 51
 Date: 11 May 1961
 Interval: 11-12 Date: 51

Rig Type: 1000
 Pump No: 1000
 Pump No: 1000

INOCO
 D-100
 D-100

Time of Day	Rig Data	Shot Properties				Shot Data				Pump Data				Hydraulics				Remarks	
		Shot No.	Depth (Feet)	Weight (Lbs)	Velocity (FPS)	Shot No.	Depth (Feet)	Weight (Lbs)	Velocity (FPS)	Pressure (PSI)	Stroke (Inches)	Length (Inches)	Level (Inches)	Injection Rate (GPM)	Pressure (PSI)	Stroke (Inches)	Length (Inches)		Level (Inches)
12:00 pm 13-175-2-2004	111	43	10.0	50	17	6.4	2732	8.9	44	1100	60	16	6.314	64	120				Co 1000 ppm
1:00 pm 13-175-2-2004	111	44	10.0	50	17	6.4	2732	8.9	44	1100	60	16	6.314	64	120				Try out bit
2:00 pm 13-175-2-2004	111	45	10.0	50	17	6.4	2732	8.9	45	1100	60	16	6.314	64	120				Try out bit 1000
3:00 pm 13-175-2-2004	111	46	10.0	50	17	6.4	2732	8.9	46	1100	60	16	6.314	64	120				Drilling
4:00 pm 13-175-2-2004	111	47	10.0	50	17	6.4	2732	8.9	47	1100	60	16	6.314	64	120				Drilling
5:00 pm 13-175-2-2004	111	48	10.0	50	17	6.4	2732	8.9	48	1100	60	16	6.314	64	120				Start out of hole
6:00 pm 13-175-2-2004	111	49	10.0	50	17	6.4	2732	8.9	49	1100	60	16	6.314	64	120				Bit 1000 ppm
7:00 pm 13-175-2-2004	111	50	10.0	50	17	6.4	2732	8.9	50	1100	60	16	6.314	64	120				On bottom of

Well Name: 13-175-2-2004
 Comp: 111
 Hole Base: 111'

DAILY ENGINEERING REPORT
 PRESSURE INJECTION DISPOSAL WELL
 ROCKY MOUNTAIN APPENDAL

Report No: 51
 Date: 11 May 1961
 Interval: 11-12 Date: 51

Rig Type: 1000
 Pump No: 1000
 Pump No: 1000

INOCO
 D-100
 D-100

Time of Day	Rig Data	Shot Properties				Shot Data				Pump Data				Hydraulics				Remarks	
		Shot No.	Depth (Feet)	Weight (Lbs)	Velocity (FPS)	Shot No.	Depth (Feet)	Weight (Lbs)	Velocity (FPS)	Pressure (PSI)	Stroke (Inches)	Length (Inches)	Level (Inches)	Injection Rate (GPM)	Pressure (PSI)	Stroke (Inches)	Length (Inches)		Level (Inches)
12:00 pm 13-175-2-2004	111	51	10.0	50	17	6.4	2732	8.9	51	1100	60	16	6.314	64	120				Try
1:00 pm 13-175-2-2004	111	52	10.0	50	17	6.4	2732	8.9	52	1100	60	16	6.314	64	120				Try out
2:00 pm 13-175-2-2004	111	53	10.0	50	17	6.4	2732	8.9	53	1100	60	16	6.314	64	120				1000 ppm
3:00 pm 13-175-2-2004	111	54	10.0	50	17	6.4	2732	8.9	54	1100	60	16	6.314	64	120				Drilling
4:00 pm 13-175-2-2004	111	55	10.0	50	17	6.4	2732	8.9	55	1100	60	16	6.314	64	120				Drilling
5:00 pm 13-175-2-2004	111	56	10.0	50	17	6.4	2732	8.9	56	1100	60	16	6.314	64	120				1000 ppm
6:00 pm 13-175-2-2004	111	57	10.0	50	17	6.4	2732	8.9	57	1100	60	16	6.314	64	120				Drilling
7:00 pm 13-175-2-2004	111	58	10.0	50	17	6.4	2732	8.9	58	1100	60	16	6.314	64	120				1000 ppm

Well Name: 13-175-2-2004
 Comp: 111
 Hole Base: 111'

DAILY ENGINEERING REPORT
 PRESSURE INJECTION DISPOSAL WELL
 ROCKY MOUNTAIN APPENDAL

Report No: 51
 Date: 11 May 1961
 Interval: 11-12 Date: 51

Rig Type: 1000
 Pump No: 1000
 Pump No: 1000

INOCO
 D-100
 D-100

Time of Day	Rig Data	Shot Properties				Shot Data				Pump Data				Hydraulics				Remarks	
		Shot No.	Depth (Feet)	Weight (Lbs)	Velocity (FPS)	Shot No.	Depth (Feet)	Weight (Lbs)	Velocity (FPS)	Pressure (PSI)	Stroke (Inches)	Length (Inches)	Level (Inches)	Injection Rate (GPM)	Pressure (PSI)	Stroke (Inches)	Length (Inches)		Level (Inches)
12:00 pm 13-175-2-2004	111	59	10.0	50	17	6.4	2732	8.9	59	1100	60	16	6.314	64	120				Try
1:00 pm 13-175-2-2004	111	60	10.0	50	17	6.4	2732	8.9	60	1100	60	16	6.314	64	120				Co Bottom 1000
2:00 pm 13-175-2-2004	111	61	10.0	50	17	6.4	2732	8.9	61	1100	60	16	6.314	64	120				Drilling
3:00 pm 13-175-2-2004	111	62	10.0	50	17	6.4	2732	8.9	62	1100	60	16	6.314	64	120				1000 ppm
4:00 pm 13-175-2-2004	111	63	10.0	50	17	6.4	2732	8.9	63	1100	60	16	6.314	64	120				Drilling
5:00 pm 13-175-2-2004	111	64	10.0	50	17	6.4	2732	8.9	64	1100	60	16	6.314	64	120				1000 ppm
6:00 pm 13-175-2-2004	111	65	10.0	50	17	6.4	2732	8.9	65	1100	60	16	6.314	64	120				Drilling
7:00 pm 13-175-2-2004	111	66	10.0	50	17	6.4	2732	8.9	66	1100	60	16	6.314	64	120				1000 ppm

Well Name
 Casing 117 1/2 x 2 1/2 O.D.
 Hole Size 11"

DAILY ENGINEERING REPORT
 PRESSURE INJECTION DISPOSAL WELL
 ROCKY MOUNTAIN ARSENAL

Report No. 11
 Date May 1961
 Days from Spud Date 55

Rig Type IDECO
 Pump No. 1 D-100

Time of Day	Rig Logs	Well Properties	Bit Data	Pump Data	Mechanics	Remarks
01 am 1000 1000						Preparing to run. Stripped casing at 22 3/4 ft. Casing 18" Last connections at 1 55 a.m.
2 00 am 1010			10 1.33 2.3 7.3	1000 37 10 0 3/4 318 74		
3 00 am						
4 00 am						
5 00 am						
6 00 am						
7 00 am						
8 00 am						
9 00 am 1020 1010				1000 60 15 0 3/4 465 121		Casing in hole w bit 465. Started running at 9 05.

Well Name
 Casing 117 1/2 x 2 1/2 O.D.
 Hole Size 11"

DAILY ENGINEERING REPORT
 PRESSURE INJECTION DISPOSAL WELL
 ROCKY MOUNTAIN ARSENAL

Report No. 12
 Date May 1961
 Days from Spud Date 55

Rig Type IDECO
 Pump No. 1 D-100

Time of Day	Rig Logs	Well Properties	Bit Data	Pump Data	Mechanics	Remarks
1 00 am 1030						Trip out for bit 487
2 00 am 1040						Trip in bit 486.
3 00 am 1050						Trip in circulating through bit 487
4 00 am 1100						Drilling.
5 00 am 1110						Drill to 1004. Circulate & prepare to stop for barrel.
6 00 am 1120						Circ. for sample. Circ. to 1000 ppm. CA. Trip out bit 487.
7 00 am 1130						487. Trip in for bit and barrel.
8 00 am 1140						Prepare to run.

Well Name
 Casing 117 1/2 x 2 1/2 O.D.
 Hole Size 11"

DAILY ENGINEERING REPORT
 PRESSURE INJECTION DISPOSAL WELL
 ROCKY MOUNTAIN ARSENAL

Report No. 13
 Date May 1961
 Days from Spud Date 55

Rig Type IDECO
 Pump No. 1 D-100

Time of Day	Rig Logs	Well Properties	Bit Data	Pump Data	Mechanics	Remarks
9 55 am 1150						Drilling.
10 00 am 1200						Circulate for sample.
11 00 am 1210						Circulate for sample.
12 00 am 1220						Trip with bit 486.
1 00 am 1230						Trip.
2 00 am 1240						On bottom. 12 15 P.M.
3 00 am 1250						Drilling break at 4,500' top Lymex.
4 00 am 1300						Circulate sample.

Well 2400a
 County of ...
 State of ...

DAVEY ENGINEERING REPORT
 PRESSURE INJECTION DISPOSAL WELL
 ROCKY MOUNTAIN ASSESSMENT

Report No. 63
 Date 11 Mar 1961
 Draw from Report Page 24

Rig Type 10000
 Pump No. 1 D-190
 Pump No. 2 D-120

Time of Day	Rig Data	Well Properties	Drill Data	Pump Data	Hydraulics	Remarks
12:00 AM	10000	...	...	...	...	Trip in.
1:00 AM	10000	...	...	...	...	Preparation of ...
2:00 AM	10000	...	...	...	...	...
3:00 AM	10000	...	...	...	...	...
4:00 AM	10000	...	...	...	...	...
5:00 AM	10000	...	...	...	...	...
6:00 AM	10000	...	...	...	...	...
7:00 AM	10000	...	...	...	...	...
8:00 AM	10000	...	...	...	...	...
9:00 AM	10000	...	...	...	...	...
10:00 AM	10000	...	...	...	...	...
11:00 AM	10000	...	...	...	...	...
12:00 PM	10000	...	...	...	...	...

Well 2400a
 County of ...
 State of ...

DAVEY ENGINEERING REPORT
 PRESSURE INJECTION DISPOSAL WELL
 ROCKY MOUNTAIN ASSESSMENT

Report No. 64
 Date 11 Mar 1961
 Draw from Report Page 24

Rig Type 10000
 Pump No. 1 D-190
 Pump No. 2 D-120

Time of Day	Rig Data	Well Properties	Drill Data	Pump Data	Hydraulics	Remarks
1:00 AM	10000	...	...	...	...	...
2:00 AM	10000	...	...	...	...	...
3:00 AM	10000	...	...	...	...	...
4:00 AM	10000	...	...	...	...	...
5:00 AM	10000	...	...	...	...	...
6:00 AM	10000	...	...	...	...	...
7:00 AM	10000	...	...	...	...	...
8:00 AM	10000	...	...	...	...	...
9:00 AM	10000	...	...	...	...	...
10:00 AM	10000	...	...	...	...	...
11:00 AM	10000	...	...	...	...	...
12:00 PM	10000	...	...	...	...	...

Well 2400a
 County of ...
 State of ...

DAVEY ENGINEERING REPORT
 PRESSURE INJECTION DISPOSAL WELL
 ROCKY MOUNTAIN ASSESSMENT

Report No. 65
 Date 11 Mar 1961
 Draw from Report Page 24

Rig Type 10000
 Pump No. 1 D-190
 Pump No. 2 D-120

Time of Day	Rig Data	Well Properties	Drill Data	Pump Data	Hydraulics	Remarks
1:00 AM	10000	...	...	...	...	...
2:00 AM	10000	...	...	...	...	...
3:00 AM	10000	...	...	...	...	...
4:00 AM	10000	...	...	...	...	...
5:00 AM	10000	...	...	...	...	...
6:00 AM	10000	...	...	...	...	...
7:00 AM	10000	...	...	...	...	...
8:00 AM	10000	...	...	...	...	...
9:00 AM	10000	...	...	...	...	...
10:00 AM	10000	...	...	...	...	...
11:00 AM	10000	...	...	...	...	...
12:00 PM	10000	...	...	...	...	...

Form 13 276 206 11
Date Recd: 11

DAILY ENGINEERING REPORT
PRESSURE INJECTION DISPOSAL WELL
ROCKY MOUNTAIN ARSENAL

Report No. 66
Date: 12 May 1961
Days from Spot Date: 34

Rig Type: 4000
Pump No.: 1070
Pump No.: 1070

Time of Day	Rig Cap	Well Properties	Well Data	Pump Data	Activities	Well Data	Remarks
11:00 am	1070	1070	1070	1070	1070	1070	Mixing mud & setting in 10-1/2 inch circulation Pump hole 2 1/2 feet of pressure 1100 psi. (1100) New (10) added Top of hole 2 1/2 feet. (1100) (1100) 1100 psi. (1100) 1100 psi. (1100)
1:00 pm	1070	1070	1070	1070	1070	1070	Trip to hole 2 1/2
3:00 pm	1070	1070	1070	1070	1070	1070	Trip to hole 2 1/2
5:00 pm	1070	1070	1070	1070	1070	1070	On bottom casing at 100 A.M. Casing Co 1000 NACI 1000 Vial 11
7:00 pm	1070	1070	1070	1070	1070	1070	Casing Co 1000 NACI 1000 Vial 11

Well Status: Running
Casing 13 1/2 x 106 11
Hole Size: 12

DAILY ENGINEERING REPORT
PRESSURE INJECTION DISPOSAL WELL
ROCKY MOUNTAIN ARSENAL

Report No. 66
Date: 12 May 1961
Days from Spot Date: 34

Rig Type: 4000
Pump No.: 1070
Pump No.: 1070

Time of Day	Rig Cap	Well Properties	Well Data	Pump Data	Activities	Well Data	Remarks
12:01 am	1070	1070	1070	1070	1070	1070	Mixing mud.
1:00 am	1070	1070	1070	1070	1070	1070	Mixing mud and circulating.
3:00 am	1070	1070	1070	1070	1070	1070	Trip out.
5:00 am	1070	1070	1070	1070	1070	1070	Trip in Bit 2 1/2
7:00 am	1070	1070	1070	1070	1070	1070	Trip in Bit 2 1/2 and Bottom hole.
9:00 am	1070	1070	1070	1070	1070	1070	Run core hole and drill ahead.
11:00 am	1070	1070	1070	1070	1070	1070	Lost circulation at 1 30 P.M. Mixing mud.
1:00 pm	1070	1070	1070	1070	1070	1070	Mixing mud.

Well Status: Running
Casing 13 1/2 x 106 11
Hole Size: 12

DAILY ENGINEERING REPORT
PRESSURE INJECTION DISPOSAL WELL
ROCKY MOUNTAIN ARSENAL

Report No. 66
Date: 12 May 1961
Days from Spot Date: 34

Rig Type: 4000
Pump No.: 1070
Pump No.: 1070

Time of Day	Rig Cap	Well Properties	Well Data	Pump Data	Activities	Well Data	Remarks
14:01 am	1070	1070	1070	1070	1070	1070	Tripping out with 2 1/2
1:00 pm	1070	1070	1070	1070	1070	1070	Preparing rig to hole 2 1/2
3:00 pm	1070	1070	1070	1070	1070	1070	
5:00 pm	1070	1070	1070	1070	1070	1070	
7:00 pm	1070	1070	1070	1070	1070	1070	
9:00 pm	1070	1070	1070	1070	1070	1070	
11:00 pm	1070	1070	1070	1070	1070	1070	

Well Status: Running
Casing 13 1/2 x 106 11
Hole Size: 12

DAILY ENGINEERING REPORT
PRESSURE INJECTION DISPOSAL WELL
ROCKY MOUNTAIN ARSENAL

Report No. 66
Date: 12 May 1961
Days from Spot Date: 34

Rig Type: 4000
Pump No.: 1070
Pump No.: 1070

Well No. 11
 Case No. 11
 Date 11/11/55

DAILEY ENGINEERING REPORT
 PRESSURE INJECTION DISPOSAL WELL
 ROCKY MOUNTAIN ARSENAL

Report No. 11
 Date 11/11/55
 Days from Spent Date 11

Rig Type
 Pump No. 1
 Head
 11/11/55

Time of Day	Rig Data	Well Properties	Bit Data	Pump Data	Hydraulics	Remarks
14:00	11/11/55	11	11	11	11	...
14:05	11/11/55	11	11	11	11	...
14:10	11/11/55	11	11	11	11	...
14:15	11/11/55	11	11	11	11	...
14:20	11/11/55	11	11	11	11	...
14:25	11/11/55	11	11	11	11	...
14:30	11/11/55	11	11	11	11	...
14:35	11/11/55	11	11	11	11	...
14:40	11/11/55	11	11	11	11	...
14:45	11/11/55	11	11	11	11	...
14:50	11/11/55	11	11	11	11	...
14:55	11/11/55	11	11	11	11	...
15:00	11/11/55	11	11	11	11	...

Well No. 11
 Case No. 11
 Date 11/11/55

DAILEY ENGINEERING REPORT
 PRESSURE INJECTION DISPOSAL WELL
 ROCKY MOUNTAIN ARSENAL

Report No. 11
 Date 11/11/55
 Days from Spent Date 11

Rig Type
 Pump No. 1
 Head
 11/11/55

Time of Day	Rig Data	Well Properties	Bit Data	Pump Data	Hydraulics	Remarks
14:55	11/11/55	11	11	11	11	...
15:00	11/11/55	11	11	11	11	...
15:05	11/11/55	11	11	11	11	...
15:10	11/11/55	11	11	11	11	...
15:15	11/11/55	11	11	11	11	...
15:20	11/11/55	11	11	11	11	...
15:25	11/11/55	11	11	11	11	...
15:30	11/11/55	11	11	11	11	...
15:35	11/11/55	11	11	11	11	...
15:40	11/11/55	11	11	11	11	...
15:45	11/11/55	11	11	11	11	...
15:50	11/11/55	11	11	11	11	...
15:55	11/11/55	11	11	11	11	...
16:00	11/11/55	11	11	11	11	...

Well No. 11
 Case No. 11
 Date 11/11/55

DAILEY ENGINEERING REPORT
 PRESSURE INJECTION DISPOSAL WELL
 ROCKY MOUNTAIN ARSENAL

Report No. 11
 Date 11/11/55
 Days from Spent Date 11

Rig Type
 Pump No. 1
 Head
 11/11/55

Time of Day	Rig Data	Well Properties	Bit Data	Pump Data	Hydraulics	Remarks
15:55	11/11/55	11	11	11	11	...
16:00	11/11/55	11	11	11	11	...
16:05	11/11/55	11	11	11	11	...
16:10	11/11/55	11	11	11	11	...
16:15	11/11/55	11	11	11	11	...
16:20	11/11/55	11	11	11	11	...
16:25	11/11/55	11	11	11	11	...
16:30	11/11/55	11	11	11	11	...
16:35	11/11/55	11	11	11	11	...
16:40	11/11/55	11	11	11	11	...
16:45	11/11/55	11	11	11	11	...
16:50	11/11/55	11	11	11	11	...
16:55	11/11/55	11	11	11	11	...
17:00	11/11/55	11	11	11	11	...

Well Name
 Camp 11 (A) 1961
 Hole No. 11

DAILY SHOWN-READING REPORT
 PARAMETER SECTION (DISPENSAL WELL)
 KATY MOUNTAIN AERIAL

Report No. 11
 Date 25 May 1961
 Days from Spud Date 11

Rig Type
 Pump No. 2
 Motor
 2-700
 2-500

Time of Day	Rig Data	Mud Properties	Bit Data		Pump Data		Mechanics	Remarks
			Bit Size	Bit Type	Pressure PSI	Stroke		
11:00 AM	1101	...	...	...	...	...	...	Went up 10 stands, to check trip.
11:15 AM	1102	...	...	...	...	...	...	VIA for pump Trip out at 1102
11:30 AM	1103	...	...	...	...	...	...	Pump in 1103 on hook 121. Recovered 3 pieces of fish
11:45 AM	1104	...	...	...	...	...	...	3.34 Trip in with magnet stick
12:00 PM	1105	...	...	...	...	...	...	115 on hook, not plugged with coverage
12:15 PM	1106	...	...	...	...	...	...	Trip in with 101 AT&R.
12:30 PM	1107	...	...	...	...	...	...
12:45 PM	1108	...	...	...	...	...	...
1:00 PM	1109	...	...	...	...	...	...	Circulating through 1109.

Well Name
 Camp 11 (A) 1961
 Hole No. 11

DAILY SHOWN-READING REPORT
 PARAMETER SECTION (DISPENSAL WELL)
 KATY MOUNTAIN AERIAL

Report No. 11
 Date 25 May 1961
 Days from Spud Date 11

Rig Type
 Pump No. 2
 Motor
 2-700
 2-500

Time of Day	Rig Data	Mud Properties	Bit Data		Pump Data		Mechanics	Remarks
			Bit Size	Bit Type	Pressure PSI	Stroke		
1:00 PM	1110	...	...	...	...	...	...	Drilling MCC 1100 Ca 1100
1:15 PM	1111	...	...	...	...	...	...	Drilling MCC 1100 Ca 1100
1:30 PM	1112	...	...	...	...	...	...	Drilling MCC 1100 Ca 1100
1:45 PM	1113	...	...	...	...	...	...	Drilling MCC 1100 Ca 1100
2:00 PM	1114	...	...	...	...	...	...	Drilling MCC 1100 Ca 1100
2:15 PM	1115	...	...	...	...	...	...	Drilling MCC 1100 Ca 1100
2:30 PM	1116	...	...	...	...	...	...	Drilling MCC 1100 Ca 1100
2:45 PM	1117	...	...	...	...	...	...	Drilling MCC 1100 Ca 1100
3:00 PM	1118	...	...	...	...	...	...	Drilling MCC 1100 Ca 1100
3:15 PM	1119	...	...	...	...	...	...	Drilling MCC 1100 Ca 1100
3:30 PM	1120	...	...	...	...	...	...	Drilling MCC 1100 Ca 1100

Well Name
 Camp 11 (A) 1961
 Hole No. 11

DAILY SHOWN-READING REPORT
 PARAMETER SECTION (DISPENSAL WELL)
 KATY MOUNTAIN AERIAL

Report No. 11
 Date 25 May 1961
 Days from Spud Date 11

Rig Type
 Pump No. 2
 Motor
 2-700
 2-500

Time of Day	Rig Data	Mud Properties	Bit Data		Pump Data		Mechanics	Remarks
			Bit Size	Bit Type	Pressure PSI	Stroke		
3:45 PM	1121	...	...	...	...	...	...	Drilling MCC 1100 Ca 1100
4:00 PM	1122	...	...	...	...	...	...	Drilling MCC 1100 Ca 1100
4:15 PM	1123	...	...	...	...	...	...	Drilling MCC 1100 Ca 1100
4:30 PM	1124	...	...	...	...	...	...	Drilling MCC 1100 Ca 1100
4:45 PM	1125	...	...	...	...	...	...	Drilling MCC 1100 Ca 1100
5:00 PM	1126	...	...	...	...	...	...	Drilling MCC 1100 Ca 1100
5:15 PM	1127	...	...	...	...	...	...	Drilling MCC 1100 Ca 1100
5:30 PM	1128	...	...	...	...	...	...	Drilling MCC 1100 Ca 1100
5:45 PM	1129	...	...	...	...	...	...	Drilling MCC 1100 Ca 1100
6:00 PM	1130	...	...	...	...	...	...	Drilling MCC 1100 Ca 1100

Project: **ROCKY MOUNTAIN ARSENAL**
 Location: **ROCKY MOUNTAIN ARSENAL**
 Date: **10 May 76**
 Report No.: **1000**

Time	Activity	Remarks
0700	Start of shift	
0800	Check equipment	
0900	Begin pumping	
1000	Monitor flow	
1100	Adjust valves	
1200	Lunch	
1300	Resume pumping	
1400	Check pressure	
1500	End of shift	

DAILY ENGINEERING REPORT
PRESSURE INJECTION DISPOSAL WELL
ROCKY MOUNTAIN ARSENAL

Report No.: **1000**
 Date: **10 May 76**
 Days from Start Date: **10**
 Rig Type: **MECO**
 Pump No.: **1000**
 Pump Size: **1000**

Time	Well	Flow (GPM)	Pressure (PSI)	Temp (°F)	Viscosity (cP)	Solids (ppm)	pH	Remarks
0700	MTC-178	100	100	100	100	100	100	Trip out bit 900.
0800	HTC	100	100	100	100	100	100	Bit 900 green, trip out at 1000 MTC 178.
0900	HTC	100	100	100	100	100	100	On return to 1000, circulate through 1000.
1000	HTC	100	100	100	100	100	100	Dumping
1100	HTC	100	100	100	100	100	100	
1200	HTC	100	100	100	100	100	100	
1300	HTC	100	100	100	100	100	100	
1400	HTC	100	100	100	100	100	100	
1500	HTC	100	100	100	100	100	100	

DAILY ENGINEERING REPORT
PRESSURE INJECTION DISPOSAL WELL
ROCKY MOUNTAIN ARSENAL

Report No.: **1000**
 Date: **10 May 76**
 Days from Start Date: **10**
 Rig Type: **MECO**
 Pump No.: **1000**
 Pump Size: **1000**

Time	Well	Flow (GPM)	Pressure (PSI)	Temp (°F)	Viscosity (cP)	Solids (ppm)	pH	Remarks
0700	HTC	100	100	100	100	100	100	850 rpm Reading Ca. 1000 at 700' MeCl 1000
0800	HTC	100	100	100	100	100	100	850 rpm Reading Ca. 1000 at 900' MeCl 1500
0900	HTC	100	100	100	100	100	100	850 rpm Reading Ca. 1000 at 900' MeCl 1500
1000	HTC	100	100	100	100	100	100	850 rpm Reading Ca. 1000 at 900' MeCl 1500
1100	HTC	100	100	100	100	100	100	850 rpm Reading Ca. 1000 at 900' MeCl 1500
1200	HTC	100	100	100	100	100	100	850 rpm Reading Ca. 1000 at 900' MeCl 1500
1300	HTC	100	100	100	100	100	100	850 rpm Reading Ca. 1000 at 900' MeCl 1500
1400	HTC	100	100	100	100	100	100	850 rpm Reading Ca. 1000 at 900' MeCl 1500
1500	HTC	100	100	100	100	100	100	850 rpm Reading Ca. 1000 at 900' MeCl 1500

**DAILY ENGINEERING REPORT
PRESSURE DATA FOR DISPOSAL WELL
ROCKY MOUNTAIN ARSENAL**

Report No. 17
Date 12/22/54
Area Rocky Mountain Arsenal

Dig Type
Pump No.
Pump Size

Date	Time	Well No.	Well Name	Well Depth	Well Type	Well Status	Well ID	Well Remarks	Pump Data		Hydraulics		Notes
									Flow Rate	Pressure	Head	Efficiency	
12-22-54	08:00	1014	1014	1014	1014	1014	1014	1014					
12-22-54	09:00	1014	1014	1014	1014	1014	1014	1014					
12-22-54	10:00	1014	1014	1014	1014	1014	1014	1014					
12-22-54	11:00	1014	1014	1014	1014	1014	1014	1014					
12-22-54	12:00	1014	1014	1014	1014	1014	1014	1014					
12-22-54	13:00	1014	1014	1014	1014	1014	1014	1014					
12-22-54	14:00	1014	1014	1014	1014	1014	1014	1014					
12-22-54	15:00	1014	1014	1014	1014	1014	1014	1014					
12-22-54	16:00	1014	1014	1014	1014	1014	1014	1014					
12-22-54	17:00	1014	1014	1014	1014	1014	1014	1014					
12-22-54	18:00	1014	1014	1014	1014	1014	1014	1014					
12-22-54	19:00	1014	1014	1014	1014	1014	1014	1014					
12-22-54	20:00	1014	1014	1014	1014	1014	1014	1014					
12-22-54	21:00	1014	1014	1014	1014	1014	1014	1014					
12-22-54	22:00	1014	1014	1014	1014	1014	1014	1014					
12-22-54	23:00	1014	1014	1014	1014	1014	1014	1014					

**DAILY ENGINEERING REPORT
PRESSURE DATA FOR DISPOSAL WELL
ROCKY MOUNTAIN ARSENAL**

Report No. 18
Date 12/23/54
Area Rocky Mountain Arsenal

Dig Type
Pump No.
Pump Size

Date	Time	Well No.	Well Name	Well Depth	Well Type	Well Status	Well ID	Well Remarks	Pump Data		Hydraulics		Notes
									Flow Rate	Pressure	Head	Efficiency	
12-23-54	08:00	1014	1014	1014	1014	1014	1014	1014					
12-23-54	09:00	1014	1014	1014	1014	1014	1014	1014					
12-23-54	10:00	1014	1014	1014	1014	1014	1014	1014					
12-23-54	11:00	1014	1014	1014	1014	1014	1014	1014					
12-23-54	12:00	1014	1014	1014	1014	1014	1014	1014					
12-23-54	13:00	1014	1014	1014	1014	1014	1014	1014					
12-23-54	14:00	1014	1014	1014	1014	1014	1014	1014					
12-23-54	15:00	1014	1014	1014	1014	1014	1014	1014					
12-23-54	16:00	1014	1014	1014	1014	1014	1014	1014					
12-23-54	17:00	1014	1014	1014	1014	1014	1014	1014					
12-23-54	18:00	1014	1014	1014	1014	1014	1014	1014					
12-23-54	19:00	1014	1014	1014	1014	1014	1014	1014					
12-23-54	20:00	1014	1014	1014	1014	1014	1014	1014					
12-23-54	21:00	1014	1014	1014	1014	1014	1014	1014					
12-23-54	22:00	1014	1014	1014	1014	1014	1014	1014					
12-23-54	23:00	1014	1014	1014	1014	1014	1014	1014					

**DAILY ENGINEERING REPORT
PRESSURE DATA FOR DISPOSAL WELL
ROCKY MOUNTAIN ARSENAL**

Report No. 19
Date 12/24/54
Area Rocky Mountain Arsenal

Dig Type
Pump No.
Pump Size

Date	Time	Well No.	Well Name	Well Depth	Well Type	Well Status	Well ID	Well Remarks	Pump Data		Hydraulics		Notes
									Flow Rate	Pressure	Head	Efficiency	
12-24-54	08:00	1014	1014	1014	1014	1014	1014	1014					
12-24-54	09:00	1014	1014	1014	1014	1014	1014	1014					
12-24-54	10:00	1014	1014	1014	1014	1014	1014	1014					
12-24-54	11:00	1014	1014	1014	1014	1014	1014	1014					
12-24-54	12:00	1014	1014	1014	1014	1014	1014	1014					
12-24-54	13:00	1014	1014	1014	1014	1014	1014	1014					
12-24-54	14:00	1014	1014	1014	1014	1014	1014	1014					
12-24-54	15:00	1014	1014	1014	1014	1014	1014	1014					
12-24-54	16:00	1014	1014	1014	1014	1014	1014	1014					
12-24-54	17:00	1014	1014	1014	1014	1014	1014	1014					
12-24-54	18:00	1014	1014	1014	1014	1014	1014	1014					
12-24-54	19:00	1014	1014	1014	1014	1014	1014	1014					
12-24-54	20:00	1014	1014	1014	1014	1014	1014	1014					
12-24-54	21:00	1014	1014	1014	1014	1014	1014	1014					
12-24-54	22:00	1014	1014	1014	1014	1014	1014	1014					
12-24-54	23:00	1014	1014	1014	1014	1014	1014	1014					

Report No. 99
 Date: 12/15/61
 Pump No. 100
 Trip No. 100

Time of Day	Fig. Data	Prog. Progress	At Data	Prog. Data	Remarks
10:00					
10:15					
10:30					
10:45					
11:00					
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24:00					

DAILY ENGINEERING REPORT
 PRESSURE INJECTION (SIGNAL WELL)
 ROCKY MOUNTAIN Arsenal

Time of Day	Fig. Data	Prog. Progress	At Data	Prog. Data	Remarks
10:00					
10:15					
10:30					
10:45					
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24:00					

DAILY ENGINEERING REPORT
 PRESSURE INJECTION (SIGNAL WELL)
 ROCKY MOUNTAIN Arsenal

Time of Day	Fig. Data	Prog. Progress	At Data	Prog. Data	Remarks
10:00					
10:15					
10:30					
10:45					
11:00					
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24:00					

DAILY ENGINEERING REPORT
 RAINY MOUNTAIN ARSENAL

Report No. 44
 Date 12 June 1953
 Date from Spec Date 73

Sig Type WDCO
 Pump No. D-17
 Date 12 June 1953

Time of Day	Flow Rate	Pressure	Temp	Remarks
7:00 AM	1.2	100	60	Drilling
7:30 AM	1.5	110	60	Drilling
8:00 AM	1.8	120	60	Drilling
8:30 AM	2.0	130	60	Drilling
9:00 AM	2.2	140	60	Drilling
9:30 AM	2.5	150	60	Drilling
10:00 AM	2.8	160	60	Drilling
10:30 AM	3.0	170	60	Drilling
11:00 AM	3.2	180	60	Drilling
11:30 AM	3.5	190	60	Drilling
12:00 PM	3.8	200	60	Drilling
12:30 PM	4.0	210	60	Drilling
1:00 PM	4.2	220	60	Drilling
1:30 PM	4.5	230	60	Drilling
2:00 PM	4.8	240	60	Drilling
2:30 PM	5.0	250	60	Drilling
3:00 PM	5.2	260	60	Drilling
3:30 PM	5.5	270	60	Drilling
4:00 PM	5.8	280	60	Drilling
4:30 PM	6.0	290	60	Drilling
5:00 PM	6.2	300	60	Drilling
5:30 PM	6.5	310	60	Drilling
6:00 PM	6.8	320	60	Drilling
6:30 PM	7.0	330	60	Drilling
7:00 PM	7.2	340	60	Drilling
7:30 PM	7.5	350	60	Drilling
8:00 PM	7.8	360	60	Drilling
8:30 PM	8.0	370	60	Drilling
9:00 PM	8.2	380	60	Drilling
9:30 PM	8.5	390	60	Drilling
10:00 PM	8.8	400	60	Drilling
10:30 PM	9.0	410	60	Drilling
11:00 PM	9.2	420	60	Drilling
11:30 PM	9.5	430	60	Drilling
12:00 AM	9.8	440	60	Drilling

DAILY ENGINEERING REPORT
 RAINY MOUNTAIN ARSENAL

Report No. 44
 Date 12 June 1953
 Date from Spec Date 73

Sig Type WDCO
 Pump No. D-17
 Date 12 June 1953

Time of Day	Flow Rate	Pressure	Temp	Remarks
7:00 AM	1.2	100	60	Drilling
7:30 AM	1.5	110	60	Drilling
8:00 AM	1.8	120	60	Drilling
8:30 AM	2.0	130	60	Drilling
9:00 AM	2.2	140	60	Drilling
9:30 AM	2.5	150	60	Drilling
10:00 AM	2.8	160	60	Drilling
10:30 AM	3.0	170	60	Drilling
11:00 AM	3.2	180	60	Drilling
11:30 AM	3.5	190	60	Drilling
12:00 PM	3.8	200	60	Drilling
12:30 PM	4.0	210	60	Drilling
1:00 PM	4.2	220	60	Drilling
1:30 PM	4.5	230	60	Drilling
2:00 PM	4.8	240	60	Drilling
2:30 PM	5.0	250	60	Drilling
3:00 PM	5.2	260	60	Drilling
3:30 PM	5.5	270	60	Drilling
4:00 PM	5.8	280	60	Drilling
4:30 PM	6.0	290	60	Drilling
5:00 PM	6.2	300	60	Drilling
5:30 PM	6.5	310	60	Drilling
6:00 PM	6.8	320	60	Drilling
6:30 PM	7.0	330	60	Drilling
7:00 PM	7.2	340	60	Drilling
7:30 PM	7.5	350	60	Drilling
8:00 PM	7.8	360	60	Drilling
8:30 PM	8.0	370	60	Drilling
9:00 PM	8.2	380	60	Drilling
9:30 PM	8.5	390	60	Drilling
10:00 PM	8.8	400	60	Drilling
10:30 PM	9.0	410	60	Drilling
11:00 PM	9.2	420	60	Drilling
11:30 PM	9.5	430	60	Drilling
12:00 AM	9.8	440	60	Drilling

DAILY ENGINEERING REPORT
 RAINY MOUNTAIN ARSENAL

Report No. 44
 Date 12 June 1953
 Date from Spec Date 73

Sig Type WDCO
 Pump No. D-17
 Date 12 June 1953

Time of Day	Flow Rate	Pressure	Temp	Remarks
7:00 AM	1.2	100	60	Drilling
7:30 AM	1.5	110	60	Drilling
8:00 AM	1.8	120	60	Drilling
8:30 AM	2.0	130	60	Drilling
9:00 AM	2.2	140	60	Drilling
9:30 AM	2.5	150	60	Drilling
10:00 AM	2.8	160	60	Drilling
10:30 AM	3.0	170	60	Drilling
11:00 AM	3.2	180	60	Drilling
11:30 AM	3.5	190	60	Drilling
12:00 PM	3.8	200	60	Drilling
12:30 PM	4.0	210	60	Drilling
1:00 PM	4.2	220	60	Drilling
1:30 PM	4.5	230	60	Drilling
2:00 PM	4.8	240	60	Drilling
2:30 PM	5.0	250	60	Drilling
3:00 PM	5.2	260	60	Drilling
3:30 PM	5.5	270	60	Drilling
4:00 PM	5.8	280	60	Drilling
4:30 PM	6.0	290	60	Drilling
5:00 PM	6.2	300	60	Drilling
5:30 PM	6.5	310	60	Drilling
6:00 PM	6.8	320	60	Drilling
6:30 PM	7.0	330	60	Drilling
7:00 PM	7.2	340	60	Drilling
7:30 PM	7.5	350	60	Drilling
8:00 PM	7.8	360	60	Drilling
8:30 PM	8.0	370	60	Drilling
9:00 PM	8.2	380	60	Drilling
9:30 PM	8.5	390	60	Drilling
10:00 PM	8.8	400	60	Drilling
10:30 PM	9.0	410	60	Drilling
11:00 PM	9.2	420	60	Drilling
11:30 PM	9.5	430	60	Drilling
12:00 AM	9.8	440	60	Drilling

W-10 9074
Casing 15 3/8 x 1990 ft.
Date 5-11-61

DAILY ENGINEERING REPORT
PRESSURE SUSTAINING DISPOSAL WELL
ROCKY MOUNTAIN ARSENAL

Report No. 36
Date 15 June 1961
Days from April 1961 61

Rig Type
Pump No. 1
D-100
D-100

Time of Day	Rig Log	Well Properties				Well Data				Pump Data				Mechanics				Remarks
		Depth (ft.)	Flow Rate (gpm)	Pressure (psi)	Temperature (°F)	Well No.	Log No.	Flow Rate (gpm)	Pressure (psi)	Stroke (ft.)	Length (ft.)	Weight (lb)	Length (ft.)	Weight (lb)	Length (ft.)	Weight (lb)		
9:00 AM	100110640	32				HTC										Trap set at 775 at 7:30 P.M.		
10:00 AM	0111															10:00 AM - 10:30 AM No pump, no gas, no water, no gas, no water, no gas.		
11:00 AM	0111															11:00 AM - 11:30 AM No pump, no gas, no water, no gas.		
12:00 PM	0111															12:00 PM - 12:30 PM No pump, no gas, no water, no gas.		
1:00 PM	0111															1:00 PM - 1:30 PM No pump, no gas, no water, no gas.		
2:00 PM	0111															2:00 PM - 2:30 PM No pump, no gas, no water, no gas.		
3:00 PM	0111															3:00 PM - 3:30 PM No pump, no gas, no water, no gas.		
4:00 PM	0111															4:00 PM - 4:30 PM No pump, no gas, no water, no gas.		
5:00 PM	0111															5:00 PM - 5:30 PM No pump, no gas, no water, no gas.		

W-10 9074
Casing 15 3/8 x 1990 ft.
Date 5-11-61

DAILY ENGINEERING REPORT
PRESSURE SUSTAINING DISPOSAL WELL
ROCKY MOUNTAIN ARSENAL

Report No. 37
Date 15 June 1961
Days from April 1961 62

Rig Type
Pump No. 1
D-100
D-100

Time of Day	Rig Log	Well Properties				Well Data				Pump Data				Mechanics				Remarks
		Depth (ft.)	Flow Rate (gpm)	Pressure (psi)	Temperature (°F)	Well No.	Log No.	Flow Rate (gpm)	Pressure (psi)	Stroke (ft.)	Length (ft.)	Weight (lb)	Length (ft.)	Weight (lb)	Length (ft.)	Weight (lb)		
9:00 AM	100110640	32				HTC										Drilling. Even down to 7 pump Ca 1000 NoC1 1000		
10:00 AM	0111															Drilling Ca 1000 NoC1 1000		
11:00 AM	0111															Drilling Ca 1000 NoC1 1000		
12:00 PM	0111															Drilling Ca 1000 NoC1 1000		
1:00 PM	0111															Drilling Ca 1000 NoC1 1000		
2:00 PM	0111															Drilling Ca 1000 NoC1 1000		
3:00 PM	0111															Drilling Ca 1000 NoC1 1000		
4:00 PM	0111															Drilling Ca 1000 NoC1 1000		
5:00 PM	0111															Drilling Ca 1000 NoC1 1000		

W-10 9074
Casing 15 3/8 x 1990 ft.
Date 5-11-61

DAILY ENGINEERING REPORT
PRESSURE SUSTAINING DISPOSAL WELL
ROCKY MOUNTAIN ARSENAL

Report No. 38
Date 15 June 1961
Days from April 1961 63

Rig Type
Pump No. 1
D-100
D-100

Time of Day	Rig Log	Well Properties				Well Data				Pump Data				Mechanics				Remarks
		Depth (ft.)	Flow Rate (gpm)	Pressure (psi)	Temperature (°F)	Well No.	Log No.	Flow Rate (gpm)	Pressure (psi)	Stroke (ft.)	Length (ft.)	Weight (lb)	Length (ft.)	Weight (lb)	Length (ft.)	Weight (lb)		
9:00 AM	100110640	32				HTC										Drilling Ca 1000 NoC1 1000		
10:00 AM	0111															Drilling Ca 1000 NoC1 1000		
11:00 AM	0111															Drilling Ca 1000 NoC1 1000		
12:00 PM	0111															Drilling Ca 1000 NoC1 1000		
1:00 PM	0111															Drilling Ca 1000 NoC1 1000		
2:00 PM	0111															Drilling Ca 1000 NoC1 1000		
3:00 PM	0111															Drilling Ca 1000 NoC1 1000		
4:00 PM	0111															Drilling Ca 1000 NoC1 1000		
5:00 PM	0111															Drilling Ca 1000 NoC1 1000		

Time of Day	Fig. Log	Well Properties	Drill Logs	Pump Data	Hydraulics	Remarks
08:00	0100	78 NYC RR RUCB/250	7.0 2.0 2.0 2.0	700 50 10 0 100 40	On bottom with bit 775	
08:15	0105	78 NYC RR RUCB/250	7.4 2.0 2.0 2.0	900 50 10 0 100 40	On bottom with bit 775	
08:30	0110	78 NYC RR RUCB/250	7.7 2.0 2.0 2.0	1100 50 10 0 100 40	On bottom with bit 775	
08:45	0115	78 NYC RR RUCB/250	8.1 2.0 2.0 2.0	1300 50 10 0 100 40	On bottom with bit 775	
09:00	0120	78 NYC RR RUCB/250	8.5 2.0 2.0 2.0	1500 50 10 0 100 40	On bottom with bit 775	
09:15	0125	78 NYC RR RUCB/250	8.9 2.0 2.0 2.0	1700 50 10 0 100 40	On bottom with bit 775	
09:30	0130	78 NYC RR RUCB/250	9.3 2.0 2.0 2.0	1900 50 10 0 100 40	On bottom with bit 775	
09:45	0135	78 NYC RR RUCB/250	9.7 2.0 2.0 2.0	2100 50 10 0 100 40	On bottom with bit 775	
10:00	0140	78 NYC RR RUCB/250	10.1 2.0 2.0 2.0	2300 50 10 0 100 40	On bottom with bit 775	
Total Total:					47 18.0 2.0 2.0	

Time of Day	Fig. Log	Well Properties	Drill Logs	Pump Data	Hydraulics	Remarks
08:00	0100	78 NYC RR RUCB/250	7.0 2.0 2.0 2.0	700 50 10 0 100 40	On bottom with bit 775	On bottom with bit 775
08:15	0105	78 NYC RR RUCB/250	7.4 2.0 2.0 2.0	900 50 10 0 100 40	On bottom with bit 775	On bottom with bit 775
08:30	0110	78 NYC RR RUCB/250	7.7 2.0 2.0 2.0	1100 50 10 0 100 40	On bottom with bit 775	On bottom with bit 775
08:45	0115	78 NYC RR RUCB/250	8.1 2.0 2.0 2.0	1300 50 10 0 100 40	On bottom with bit 775	On bottom with bit 775
09:00	0120	78 NYC RR RUCB/250	8.5 2.0 2.0 2.0	1500 50 10 0 100 40	On bottom with bit 775	On bottom with bit 775
09:15	0125	78 NYC RR RUCB/250	8.9 2.0 2.0 2.0	1700 50 10 0 100 40	On bottom with bit 775	On bottom with bit 775
09:30	0130	78 NYC RR RUCB/250	9.3 2.0 2.0 2.0	1900 50 10 0 100 40	On bottom with bit 775	On bottom with bit 775
09:45	0135	78 NYC RR RUCB/250	9.7 2.0 2.0 2.0	2100 50 10 0 100 40	On bottom with bit 775	On bottom with bit 775
10:00	0140	78 NYC RR RUCB/250	10.1 2.0 2.0 2.0	2300 50 10 0 100 40	On bottom with bit 775	On bottom with bit 775

Time of Day	Fig. Log	Well Properties	Drill Logs	Pump Data	Hydraulics	Remarks
08:00	0100	78 NYC RR RUCB/250	7.0 2.0 2.0 2.0	700 50 10 0 100 40	On bottom with bit 775	On bottom with bit 775
08:15	0105	78 NYC RR RUCB/250	7.4 2.0 2.0 2.0	900 50 10 0 100 40	On bottom with bit 775	On bottom with bit 775
08:30	0110	78 NYC RR RUCB/250	7.7 2.0 2.0 2.0	1100 50 10 0 100 40	On bottom with bit 775	On bottom with bit 775
08:45	0115	78 NYC RR RUCB/250	8.1 2.0 2.0 2.0	1300 50 10 0 100 40	On bottom with bit 775	On bottom with bit 775
09:00	0120	78 NYC RR RUCB/250	8.5 2.0 2.0 2.0	1500 50 10 0 100 40	On bottom with bit 775	On bottom with bit 775
09:15	0125	78 NYC RR RUCB/250	8.9 2.0 2.0 2.0	1700 50 10 0 100 40	On bottom with bit 775	On bottom with bit 775
09:30	0130	78 NYC RR RUCB/250	9.3 2.0 2.0 2.0	1900 50 10 0 100 40	On bottom with bit 775	On bottom with bit 775
09:45	0135	78 NYC RR RUCB/250	9.7 2.0 2.0 2.0	2100 50 10 0 100 40	On bottom with bit 775	On bottom with bit 775
10:00	0140	78 NYC RR RUCB/250	10.1 2.0 2.0 2.0	2300 50 10 0 100 40	On bottom with bit 775	On bottom with bit 775

10-10-1961
 10-11-1961
 10-12-1961

ENGINEERING REPORT
 PROGRESS REPORT ON SPECIAL WELL
 AT MOUNTAIN ARSENAL

Report No. 100
 Date 11/20/1961
 100-100-100-100

Time of Day	Fig. No.	Mud Properties		Mud Loss		Pump Data		Mechanics		Remarks
		Specific Gravity	Viscosity (cP)	Water Loss (cc)	Filter Cake (in)	Pressure (PSI)	Stroke (ft/min)	Stroke (in/min)	Stroke (in/min)	
10:00 AM	100	1.05	20	0.5	0.1	100	10	10	10	Run core hole.
10:15 AM	101	1.05	20	0.5	0.1	100	10	10	10	Run core hole.
10:30 AM	102	1.05	20	0.5	0.1	100	10	10	10	Drilling at 4.50 ft.
10:45 AM	103	1.05	20	0.5	0.1	100	10	10	10	Drilling Co. 1200
11:00 AM	104	1.05	20	0.5	0.1	100	10	10	10	Drilling.

10-13-1961
 10-14-1961
 10-15-1961

ENGINEERING REPORT
 PROGRESS REPORT ON SPECIAL WELL
 AT MOUNTAIN ARSENAL

Report No. 100
 Date 11/20/1961
 100-100-100-100

Time of Day	Fig. No.	Mud Properties		Mud Loss		Pump Data		Mechanics		Remarks
		Specific Gravity	Viscosity (cP)	Water Loss (cc)	Filter Cake (in)	Pressure (PSI)	Stroke (ft/min)	Stroke (in/min)	Stroke (in/min)	
10:00 AM	100	1.05	20	0.5	0.1	100	10	10	10	Run core hole.
10:15 AM	101	1.05	20	0.5	0.1	100	10	10	10	Run core hole.
10:30 AM	102	1.05	20	0.5	0.1	100	10	10	10	Drilling at 4.50 ft.
10:45 AM	103	1.05	20	0.5	0.1	100	10	10	10	Drilling Co. 1200
11:00 AM	104	1.05	20	0.5	0.1	100	10	10	10	Drilling.

10-16-1961
 10-17-1961
 10-18-1961

ENGINEERING REPORT
 PROGRESS REPORT ON SPECIAL WELL
 AT MOUNTAIN ARSENAL

Report No. 100
 Date 11/20/1961
 100-100-100-100

Time of Day	Fig. No.	Mud Properties		Mud Loss		Pump Data		Mechanics		Remarks
		Specific Gravity	Viscosity (cP)	Water Loss (cc)	Filter Cake (in)	Pressure (PSI)	Stroke (ft/min)	Stroke (in/min)	Stroke (in/min)	
10:00 AM	100	1.05	20	0.5	0.1	100	10	10	10	Run core hole.
10:15 AM	101	1.05	20	0.5	0.1	100	10	10	10	Run core hole.
10:30 AM	102	1.05	20	0.5	0.1	100	10	10	10	Drilling at 4.50 ft.
10:45 AM	103	1.05	20	0.5	0.1	100	10	10	10	Drilling Co. 1200
11:00 AM	104	1.05	20	0.5	0.1	100	10	10	10	Drilling.

NO. 5754

DATE 11/10/54

WATER ENGINEERING REPORT
TREATMENT PLANT AND PROCESS DESIGN
AT ST. LOUIS, MISSOURI

REVISIONS

Table with columns: No., Description, Quantity, Unit, Remarks. Rows include items like 'Water', 'Sludge', 'Chemicals', etc.

Trip to St. Louis
with Mr. G. H. ...
Trip to St. Louis
with Mr. J. E. ...
Trip to St. Louis
with Mr. J. E. ...
Summary of work
done.

DISTRICT
CHICAGO DISTRICT
COLUMBIA UNIVERSITY
AT 9:00 P.M. LOCAL TIME
ON 11/10/54

NO. 5754

DATE 11/10/54

WATER ENGINEERING REPORT
TREATMENT PLANT AND PROCESS DESIGN
AT ST. LOUIS, MISSOURI

REVISIONS

Table with columns: No., Description, Quantity, Unit, Remarks. Rows include items like 'Water', 'Sludge', 'Chemicals', etc.

Summary of work
done.
Approved drawings
at 10:00 P.M.
Using mud and
LCM.

Using mud and
LCM.
Using mud and
LCM.
Using mud and
LCM.

NO. 5754

DATE 11/10/54

WATER ENGINEERING REPORT
TREATMENT PLANT AND PROCESS DESIGN
AT ST. LOUIS, MISSOURI

REVISIONS

Table with columns: No., Description, Quantity, Unit, Remarks. Rows include items like 'Water', 'Sludge', 'Chemicals', etc.

Summary of work
done.
Using mud and
LCM.

Summary of work
done.

Time	Pressure	Temp	Flow	Remarks
08:00	120	100	100	Normal
08:15	115	95	95	
08:30	110	90	90	
08:45	105	85	85	
09:00	100	80	80	
09:15	95	75	75	
09:30	90	70	70	
09:45	85	65	65	
10:00	80	60	60	
10:15	75	55	55	
10:30	70	50	50	
10:45	65	45	45	
11:00	60	40	40	
11:15	55	35	35	
11:30	50	30	30	
11:45	45	25	25	
12:00	40	20	20	
12:15	35	15	15	
12:30	30	10	10	
12:45	25	5	5	
13:00	20	0	0	

DATE: 10/10/54
 TIME: 10:00
 PRESSURE INJECTION DISPOSAL UNIT
 ROOM: 1000
 OPERATOR: [Name]
 SUPERVISOR: [Name]

Time	Pressure	Temp	Flow	Remarks
13:15	15	0	0	
13:30	10	-5	-5	
13:45	5	-10	-10	
14:00	0	-15	-15	
14:15	5	-10	-10	
14:30	10	-5	-5	
14:45	15	0	0	
15:00	20	5	5	
15:15	25	10	10	
15:30	30	15	15	
15:45	35	20	20	
16:00	40	25	25	
16:15	45	30	30	
16:30	50	35	35	
16:45	55	40	40	
17:00	60	45	45	
17:15	65	50	50	
17:30	70	55	55	
17:45	75	60	60	
18:00	80	65	65	
18:15	85	70	70	
18:30	90	75	75	
18:45	95	80	80	
19:00	100	85	85	
19:15	105	90	90	
19:30	110	95	95	
19:45	115	100	100	
20:00	120	105	105	
20:15	125	110	110	
20:30	130	115	115	
20:45	135	120	120	
21:00	140	125	125	
21:15	145	130	130	
21:30	150	135	135	
21:45	155	140	140	
22:00	160	145	145	
22:15	165	150	150	
22:30	170	155	155	
22:45	175	160	160	
23:00	180	165	165	
23:15	185	170	170	
23:30	190	175	175	
23:45	195	180	180	
00:00	200	185	185	

DATE: 10/10/54
 TIME: 15:00
 PRESSURE INJECTION DISPOSAL UNIT
 ROOM: 1000
 OPERATOR: [Name]
 SUPERVISOR: [Name]

Time	Pressure	Temp	Flow	Remarks
00:15	200	190	190	
00:30	205	195	195	
00:45	210	200	200	
01:00	215	205	205	
01:15	220	210	210	
01:30	225	215	215	
01:45	230	220	220	
02:00	235	225	225	
02:15	240	230	230	
02:30	245	235	235	
02:45	250	240	240	
03:00	255	245	245	
03:15	260	250	250	
03:30	265	255	255	
03:45	270	260	260	
04:00	275	265	265	
04:15	280	270	270	
04:30	285	275	275	
04:45	290	280	280	
05:00	295	285	285	
05:15	300	290	290	
05:30	305	295	295	
05:45	310	300	300	
06:00	315	305	305	
06:15	320	310	310	
06:30	325	315	315	
06:45	330	320	320	
07:00	335	325	325	
07:15	340	330	330	
07:30	345	335	335	
07:45	350	340	340	
08:00	355	345	345	
08:15	360	350	350	
08:30	365	355	355	
08:45	370	360	360	
09:00	375	365	365	
09:15	380	370	370	
09:30	385	375	375	
09:45	390	380	380	
10:00	395	385	385	
10:15	400	390	390	
10:30	405	395	395	
10:45	410	400	400	
11:00	415	405	405	
11:15	420	410	410	
11:30	425	415	415	
11:45	430	420	420	
12:00	435	425	425	
12:15	440	430	430	
12:30	445	435	435	
12:45	450	440	440	
13:00	455	445	445	
13:15	460	450	450	
13:30	465	455	455	
13:45	470	460	460	
14:00	475	465	465	
14:15	480	470	470	
14:30	485	475	475	
14:45	490	480	480	
15:00	495	485	485	
15:15	500	490	490	
15:30	505	495	495	
15:45	510	500	500	
16:00	515	505	505	
16:15	520	510	510	
16:30	525	515	515	
16:45	530	520	520	
17:00	535	525	525	
17:15	540	530	530	
17:30	545	535	535	
17:45	550	540	540	
18:00	555	545	545	
18:15	560	550	550	
18:30	565	555	555	
18:45	570	560	560	
19:00	575	565	565	
19:15	580	570	570	
19:30	585	575	575	
19:45	590	580	580	
20:00	595	585	585	
20:15	600	590	590	
20:30	605	595	595	
20:45	610	600	600	
21:00	615	605	605	
21:15	620	610	610	
21:30	625	615	615	
21:45	630	620	620	
22:00	635	625	625	
22:15	640	630	630	
22:30	645	635	635	
22:45	650	640	640	
23:00	655	645	645	
23:15	660	650	650	
23:30	665	655	655	
23:45	670	660	660	
00:00	675	665	665	

Time of Day	PS. Desc.	Use	Prep. / Inj.	RT. DATA	Pump Data	Hydraulics	LA
01:00-01:00				NYC 30 W78 Reg.			Waiting to break circulation at 1:00 A.M.
02:00-02:00							Probe circulation at 2:00 P.M. Trap in to tank.
03:00-03:00							Mixing mud.
04:00-04:00							Mixing mud Ca 1,000 ppm Cl 1,000 ppm LSCM 22.5
05:00-05:00							Waiting to break circulation at 5:00 P.M.
06:00-06:00				NYC 30 W78 Reg. 3000			Probe circulation at 6:00 P.M. Trap in to tank.
07:00-07:00							Waiting to break circulation at 7:00 P.M.

DAILY ENGINEERING REPORT
 PRESSURE INJECTION DISPOSAL WELL
 ROCKY MOUNTAIN ARSENAL
 Report No. 139
 Date 11 June 1964
 Date Rec'd 11 June 1964
 Page No. 1
 Pump No. 3047

Time of Day	PS. Desc.	Use	Prep. / Inj.	RT. DATA	Pump Data	Hydraulics	LA
08:00-08:00				NYC 30 W78 Reg.			Waiting to break circulation at 8:00 A.M.
09:00-09:00							Probe circulation at 9:00 A.M. Trap in to tank.
10:00-10:00							Mixing mud Ca 1,000 ppm Cl 1,000 ppm LSCM 22.5
11:00-11:00							Waiting to break circulation at 11:00 A.M.
12:00-12:00				NYC 30 W78 Reg. 3000			Probe circulation at 12:00 P.M. Trap in to tank.
13:00-13:00							Waiting to break circulation at 1:00 P.M.

DAILY ENGINEERING REPORT
 PRESSURE INJECTION DISPOSAL WELL
 ROCKY MOUNTAIN ARSENAL
 Report No. 139
 Date 11 June 1964
 Date Rec'd 11 June 1964
 Page No. 1
 Pump No. 3047

Time of Day	PS. Desc.	Use	Prep. / Inj.	RT. DATA	Pump Data	Hydraulics	LA
14:00-14:00				NYC 30 W78 Reg.			Waiting to break circulation at 2:00 P.M.
15:00-15:00							Probe circulation at 3:00 P.M. Trap in to tank.
16:00-16:00							Mixing mud
17:00-17:00							Waiting to break circulation at 5:00 P.M.
18:00-18:00							Probe circulation at 6:00 P.M. Trap in to tank.
19:00-19:00							Waiting to break circulation at 7:00 P.M.

Time	Temp	Pressure	Flow	Remarks
2:00 PM	1128	1128	20	Begin trip out with 3000 lbs of 2000 p.p.m.
2:15 PM	1128	1128	20	In room with 4000 lbs of 1000 p.p.m. 2000 p.p.m. 3000 p.p.m. 4000 p.p.m. 5000 p.p.m. 6000 p.p.m. 7000 p.p.m. 8000 p.p.m. 9000 p.p.m. 10000 p.p.m.
2:30 PM	1128	1128	20	Turn on No. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100
2:45 PM	1128	1128	20	Continue LCM 100 Ca 1100
3:00 PM	1128	1128	20	Continue LCM 100 Ca 1100
3:15 PM	1128	1128	20	Continue LCM 100 Ca 1100
3:30 PM	1128	1128	20	Continue LCM 100 Ca 1100
3:45 PM	1128	1128	20	Continue LCM 100 Ca 1100
4:00 PM	1128	1128	20	Continue LCM 100 Ca 1100

MR. [Name] CAUTION: NO REPORT POSITION: [Title] DATE: [Date] SIGNATURE: [Signature] NO. [Number] DATE: [Date] SIGNATURE: [Signature] NO. [Number]

Time	Temp	Pressure	Flow	Remarks
2:00 PM	1128	1128	20	Begin trip out with 3000 lbs of 2000 p.p.m.
2:15 PM	1128	1128	20	In room with 4000 lbs of 1000 p.p.m. 2000 p.p.m. 3000 p.p.m. 4000 p.p.m. 5000 p.p.m. 6000 p.p.m. 7000 p.p.m. 8000 p.p.m. 9000 p.p.m. 10000 p.p.m.
2:30 PM	1128	1128	20	Turn on No. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100
2:45 PM	1128	1128	20	Continue LCM 100 Ca 1100
3:00 PM	1128	1128	20	Continue LCM 100 Ca 1100
3:15 PM	1128	1128	20	Continue LCM 100 Ca 1100
3:30 PM	1128	1128	20	Continue LCM 100 Ca 1100
3:45 PM	1128	1128	20	Continue LCM 100 Ca 1100
4:00 PM	1128	1128	20	Continue LCM 100 Ca 1100

MR. [Name] CAUTION: NO REPORT POSITION: [Title] DATE: [Date] SIGNATURE: [Signature] NO. [Number] DATE: [Date] SIGNATURE: [Signature] NO. [Number]

Time	Temp	Pressure	Flow	Remarks
2:00 PM	1128	1128	20	Begin trip out with 3000 lbs of 2000 p.p.m.
2:15 PM	1128	1128	20	In room with 4000 lbs of 1000 p.p.m. 2000 p.p.m. 3000 p.p.m. 4000 p.p.m. 5000 p.p.m. 6000 p.p.m. 7000 p.p.m. 8000 p.p.m. 9000 p.p.m. 10000 p.p.m.
2:30 PM	1128	1128	20	Turn on No. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100
2:45 PM	1128	1128	20	Continue LCM 100 Ca 1100
3:00 PM	1128	1128	20	Continue LCM 100 Ca 1100
3:15 PM	1128	1128	20	Continue LCM 100 Ca 1100
3:30 PM	1128	1128	20	Continue LCM 100 Ca 1100
3:45 PM	1128	1128	20	Continue LCM 100 Ca 1100
4:00 PM	1128	1128	20	Continue LCM 100 Ca 1100

No. 1111
 Date 11/11/55
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No. 1111
 Date 11/11/55
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Line No.	Part	QTY	Unit Price	Total Price	Remarks
1000	1000	10	10.00	100.00	1000
1001	1001	10	10.00	100.00	1001
1002	1002	10	10.00	100.00	1002
1003	1003	10	10.00	100.00	1003
1004	1004	10	10.00	100.00	1004
1005	1005	10	10.00	100.00	1005
1006	1006	10	10.00	100.00	1006
1007	1007	10	10.00	100.00	1007
1008	1008	10	10.00	100.00	1008
1009	1009	10	10.00	100.00	1009
1010	1010	10	10.00	100.00	1010

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 Date 11/11/55
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No. 1111
 Date 11/11/55
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No. 1111
 Date 11/11/55
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Line No.	Part	QTY	Unit Price	Total Price	Remarks
1011	1011	10	10.00	100.00	1011
1012	1012	10	10.00	100.00	1012
1013	1013	10	10.00	100.00	1013
1014	1014	10	10.00	100.00	1014
1015	1015	10	10.00	100.00	1015
1016	1016	10	10.00	100.00	1016
1017	1017	10	10.00	100.00	1017
1018	1018	10	10.00	100.00	1018
1019	1019	10	10.00	100.00	1019
1020	1020	10	10.00	100.00	1020

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 Date 11/11/55
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No. 1111
 Date 11/11/55
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No. 1111
 Date 11/11/55
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Line No.	Part	QTY	Unit Price	Total Price	Remarks
1021	1021	10	10.00	100.00	1021
1022	1022	10	10.00	100.00	1022
1023	1023	10	10.00	100.00	1023
1024	1024	10	10.00	100.00	1024
1025	1025	10	10.00	100.00	1025
1026	1026	10	10.00	100.00	1026
1027	1027	10	10.00	100.00	1027
1028	1028	10	10.00	100.00	1028
1029	1029	10	10.00	100.00	1029
1030	1030	10	10.00	100.00	1030

Time	Location	Remarks	Altitude	Temperature	Pressure	Wind	Visibility	Clouds	Other
07:00
07:15
07:30
07:45
08:00

07:00 07:15 07:30 07:45 08:00
 08:15 08:30 08:45 09:00 09:15
 09:30 09:45 10:00 10:15 10:30
 10:45 11:00 11:15 11:30 11:45
 12:00 12:15 12:30 12:45 13:00
 13:15 13:30 13:45 14:00 14:15
 14:30 14:45 15:00 15:15 15:30
 15:45 16:00 16:15 16:30 16:45
 17:00 17:15 17:30 17:45 18:00
 18:15 18:30 18:45 19:00 19:15
 19:30 19:45 20:00 20:15 20:30
 20:45 21:00 21:15 21:30 21:45
 22:00 22:15 22:30 22:45 23:00
 23:15 23:30 23:45 00:00 00:15
 00:30 00:45 01:00 01:15 01:30
 01:45 02:00 02:15 02:30 02:45
 03:00 03:15 03:30 03:45 04:00
 04:15 04:30 04:45 05:00 05:15
 05:30 05:45 06:00 06:15 06:30
 06:45 07:00 07:15 07:30 07:45

Time	Location	Remarks	Altitude	Temperature	Pressure	Wind	Visibility	Clouds	Other
07:00
07:15
07:30
07:45
08:00

07:00 07:15 07:30 07:45 08:00
 08:15 08:30 08:45 09:00 09:15
 09:30 09:45 10:00 10:15 10:30
 10:45 11:00 11:15 11:30 11:45
 12:00 12:15 12:30 12:45 13:00
 13:15 13:30 13:45 14:00 14:15
 14:30 14:45 15:00 15:15 15:30
 15:45 16:00 16:15 16:30 16:45
 17:00 17:15 17:30 17:45 18:00
 18:15 18:30 18:45 19:00 19:15
 19:30 19:45 20:00 20:15 20:30
 20:45 21:00 21:15 21:30 21:45
 22:00 22:15 22:30 22:45 23:00
 23:15 23:30 23:45 00:00 00:15
 00:30 00:45 01:00 01:15 01:30
 01:45 02:00 02:15 02:30 02:45
 03:00 03:15 03:30 03:45 04:00
 04:15 04:30 04:45 05:00 05:15
 05:30 05:45 06:00 06:15 06:30
 06:45 07:00 07:15 07:30 07:45

Time	Location	Remarks	Altitude	Temperature	Pressure	Wind	Visibility	Clouds	Other
07:00
07:15
07:30
07:45
08:00

07:00 07:15 07:30 07:45 08:00
 08:15 08:30 08:45 09:00 09:15
 09:30 09:45 10:00 10:15 10:30
 10:45 11:00 11:15 11:30 11:45
 12:00 12:15 12:30 12:45 13:00
 13:15 13:30 13:45 14:00 14:15
 14:30 14:45 15:00 15:15 15:30
 15:45 16:00 16:15 16:30 16:45
 17:00 17:15 17:30 17:45 18:00
 18:15 18:30 18:45 19:00 19:15
 19:30 19:45 20:00 20:15 20:30
 20:45 21:00 21:15 21:30 21:45
 22:00 22:15 22:30 22:45 23:00
 23:15 23:30 23:45 00:00 00:15
 00:30 00:45 01:00 01:15 01:30
 01:45 02:00 02:15 02:30 02:45
 03:00 03:15 03:30 03:45 04:00
 04:15 04:30 04:45 05:00 05:15
 05:30 05:45 06:00 06:15 06:30
 06:45 07:00 07:15 07:30 07:45

DATE	DESCRIPTION	MEASUREMENTS	ANALYSIS	TEST DATA		
				TEMP. (°F)	PRESS. (PSI)	TIME (min)
8-2-54
8-2-54
8-3-54
8-3-54
8-4-54
8-4-54
8-5-54
8-5-54
8-6-54
8-6-54

DATE	DESCRIPTION	MEASUREMENTS	ANALYSIS	TEST DATA		
				TEMP. (°F)	PRESS. (PSI)	TIME (min)
8-7-54
8-7-54
8-8-54
8-8-54
8-9-54
8-9-54
8-10-54
8-10-54
8-11-54
8-11-54

DATE	DESCRIPTION	MEASUREMENTS	ANALYSIS	TEST DATA		
				TEMP. (°F)	PRESS. (PSI)	TIME (min)
8-12-54
8-12-54
8-13-54
8-13-54
8-14-54
8-14-54
8-15-54
8-15-54

DRILLING
 COMPANY
 REPORT

DRILLING ENGINEERING REPORT
 PRESSURE TEST ON CEMENT
 IN CONCRETE

Report No. 133
 Date August 1951
 Well No. 248

W. G. Tabor
 Pump No. 2
 D-130

Time of Day	Log Data	Well Properties	Bit Data	Pressure Data	Remarks
1:00 PM - 1:20 PM			HTC WTA No.		Testing performed. Pressure held at 1000 psi for 15 minutes. No leakage observed.
1:20 PM - 1:40 PM					
1:40 PM - 2:00 PM					
2:00 PM - 2:20 PM					
2:20 PM - 2:40 PM					
2:40 PM - 3:00 PM					
3:00 PM - 3:20 PM					
3:20 PM - 3:40 PM					
3:40 PM - 4:00 PM					
4:00 PM - 4:20 PM					
4:20 PM - 4:40 PM					

DRILLING
 COMPANY
 REPORT

DRILLING ENGINEERING REPORT
 PRESSURE TEST ON CEMENT
 IN CONCRETE

Report No. 134
 Date August 1951
 Well No. 248

W. G. Tabor
 Pump No. 2
 D-130

Time of Day	Log Data	Well Properties	Bit Data	Pressure Data	Remarks
7:00 AM - 7:20 AM			HTC WTA No.	80	Drilling cement at 4,150 psi.
7:20 AM - 7:40 AM				100	No temperature at 4,150 psi. Drilling cement.
7:40 AM - 8:00 AM				100	Pressure held performed, see log. No leakage observed.
8:00 AM - 8:20 AM				100	Testing performed.
8:20 AM - 8:40 AM				100	Testing performed.
8:40 AM - 9:00 AM				100	Testing performed.
9:00 AM - 9:20 AM				100	Testing performed.
9:20 AM - 9:40 AM				100	W. G. Tabor.
9:40 AM - 10:00 AM				100	Run up to level with cement.

DRILLING
 COMPANY
 REPORT

DRILLING ENGINEERING REPORT
 PRESSURE TEST ON CEMENT
 IN CONCRETE

Report No. 135
 Date August 1951
 Well No. 248

W. G. Tabor
 Pump No. 2
 D-130

Time of Day	Log Data	Well Properties	Bit Data	Pressure Data	Remarks
10:00 AM - 10:20 AM			HTC WTA No.	100	Run up to level with cement.
10:20 AM - 10:40 AM				100	Pressure held performed, see log. No leakage observed.
10:40 AM - 11:00 AM				100	Testing performed.
11:00 AM - 11:20 AM				100	Testing performed.
11:20 AM - 11:40 AM				100	Testing performed.
11:40 AM - 12:00 PM				100	Testing performed.
12:00 PM - 12:20 PM				100	Testing performed.
12:20 PM - 12:40 PM				100	Testing performed.
12:40 PM - 1:00 PM				100	Testing performed.
1:00 PM - 1:20 PM				100	Testing performed.
1:20 PM - 1:40 PM				100	Testing performed.
1:40 PM - 2:00 PM				100	Testing performed.
2:00 PM - 2:20 PM				100	Testing performed.
2:20 PM - 2:40 PM				100	Testing performed.
2:40 PM - 3:00 PM				100	Testing performed.
3:00 PM - 3:20 PM				100	Testing performed.
3:20 PM - 3:40 PM				100	Testing performed.
3:40 PM - 4:00 PM				100	Testing performed.
4:00 PM - 4:20 PM				100	Testing performed.
4:20 PM - 4:40 PM				100	Testing performed.
4:40 PM - 5:00 PM				100	Testing performed.

BLANK
Date 11/11/50
Well No. 1234

UNITED STATES GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
WASHINGTON, D. C.

Report No. 123
Date 11/11/50
Well No. 1234
Pump No. 1
Pump No. 2

Well No.	Well Name	Loc. or Station	Obs. Date	Pump Date	Water	Notes
1234					WATER	Disposing water and reworking M&B.
1234						Shutting up.
1234						Conditioning test.
1234					10 374 8.5 1.11 9.3	Conditioning test. Co. 1000 M&B. see 804, 800
1234					8.1 62 744 8.5 1.11 9.3	Trip out M&B.
1234						On pump 7/11/50 Trip out M&B. M&B. see 804, 800
1234						Trip in M&B 8.1, 9.
1234					14 744 8.5 1.11 9.3	Trip in M&B 8.1, 9. Trip out M&B 8.1, 9.

Alvin Bennett
George C. Black

U.S. GOVERNMENT PRINTING OFFICE

NO. 5712
 Name: A. A. & A. H. H.
 Date: 12-11-1961

DAILY ENGINEERING REPORT
 PRESSURE INJECTION DISPOSAL WELL
 ROCKY MOUNTAIN ORIGINAL

Report No. 166
 Date: 12-11-1961
 Case From Spud Date: 130

Well Type: IMCCO
 Pump No.: 2-100
 Pump No.: 2-100

Time of Day	Sp. Gr.	Well Pressure				BT Data				Pump Data				Remarks	
		Surface	Depth	Pressure	Temp	Flow	Temp	Pressure	Temp	Flow	Temp	Pressure	Temp		
7:00 am - 11218	10	66	8.0	10	11	2.0	3.0	2.0	1150	64	16	5	200	200	Trip out with 2000 lbs. weight.
8:00 am - 11218	10	66	8.0	10	11	2.0	3.0	2.0	1150	64	16	5	200	200	7000 lbs. weight on bit.
9:00 am - 11218	10	66	8.0	10	11	2.0	3.0	2.0	1150	64	16	5	200	200	8000 lbs. weight on bit.
10:00 am - 11218	10	66	8.0	10	11	2.0	3.0	2.0	1150	64	16	5	200	200	9000 lbs. weight on bit.
11:00 am - 11218	10	66	8.0	10	11	2.0	3.0	2.0	1150	64	16	5	200	200	10000 lbs. weight on bit.

NO. 5713
 Name: A. A. & A. H. H.
 Date: 12-11-1961

DAILY ENGINEERING REPORT
 PRESSURE INJECTION DISPOSAL WELL
 ROCKY MOUNTAIN ORIGINAL

Report No. 167
 Date: 12-11-1961
 Case From Spud Date: 130

Well Type: IMCCO
 Pump No.: 2-100
 Pump No.: 2-100

Time of Day	Sp. Gr.	Well Pressure				BT Data				Pump Data				Remarks	
		Surface	Depth	Pressure	Temp	Flow	Temp	Pressure	Temp	Flow	Temp	Pressure	Temp		
7:00 am - 11218	10	66	8.0	10	11	2.0	3.0	2.0	900	64	16	5	100	100	7000 lbs. weight on bit.
8:00 am - 11218	10	66	8.0	10	11	2.0	3.0	2.0	900	64	16	5	100	100	8000 lbs. weight on bit.
9:00 am - 11218	10	66	8.0	10	11	2.0	3.0	2.0	900	64	16	5	100	100	9000 lbs. weight on bit.
10:00 am - 11218	10	66	8.0	10	11	2.0	3.0	2.0	900	64	16	5	100	100	10000 lbs. weight on bit.
11:00 am - 11218	10	66	8.0	10	11	2.0	3.0	2.0	900	64	16	5	100	100	11000 lbs. weight on bit.

NO. 5714
 Name: A. A. & A. H. H.
 Date: 12-11-1961

DAILY ENGINEERING REPORT
 PRESSURE INJECTION DISPOSAL WELL
 ROCKY MOUNTAIN ORIGINAL

Report No. 168
 Date: 12-11-1961
 Case From Spud Date: 131

Well Type: IMCCO
 Pump No.: 2-100
 Pump No.: 2-100

Time of Day	Sp. Gr.	Well Pressure				BT Data				Pump Data				Remarks	
		Surface	Depth	Pressure	Temp	Flow	Temp	Pressure	Temp	Flow	Temp	Pressure	Temp		
7:00 am - 11218	10	66	8.0	10	11	2.0	3.0	2.0	900	64	16	5	100	100	7000 lbs. weight on bit.
8:00 am - 11218	10	66	8.0	10	11	2.0	3.0	2.0	900	64	16	5	100	100	8000 lbs. weight on bit.
9:00 am - 11218	10	66	8.0	10	11	2.0	3.0	2.0	900	64	16	5	100	100	9000 lbs. weight on bit.
10:00 am - 11218	10	66	8.0	10	11	2.0	3.0	2.0	900	64	16	5	100	100	10000 lbs. weight on bit.
11:00 am - 11218	10	66	8.0	10	11	2.0	3.0	2.0	900	64	16	5	100	100	11000 lbs. weight on bit.

Time	Pressure (PSI)	Flow Rate (GPM)	Temperature (°F)	Notes
08:00	100	100	100	Start of shift
08:30	105	105	105	Normal operation
09:00	110	110	110	Pressure increasing
09:30	115	115	115	Flow rate stable
10:00	120	120	120	Temperature rising
10:30	125	125	125	Minor fluctuations
11:00	130	130	130	Pressure peak
11:30	135	135	135	Flow rate decreasing
12:00	140	140	140	End of shift

WFO 12745
 DATE: 18 August 1961
 TIME: 11:00 AM
 PRESSURE INJECTION DISPOSAL WELL
 ROCKY MOUNTAIN ARSENAL
 REPORT NO. 102
 DATE: 18 August 1961
 TIME: 11:00 AM
 INSGO
 D-700
 B-500

Time	Pressure (PSI)	Flow Rate (GPM)	Temperature (°F)	Notes
08:00	100	100	100	Start of shift
08:30	105	105	105	Normal operation
09:00	110	110	110	Pressure increasing
09:30	115	115	115	Flow rate stable
10:00	120	120	120	Temperature rising
10:30	125	125	125	Minor fluctuations
11:00	130	130	130	Pressure peak
11:30	135	135	135	Flow rate decreasing
12:00	140	140	140	End of shift

WFO 12745
 DATE: 18 August 1961
 TIME: 11:00 AM
 PRESSURE INJECTION DISPOSAL WELL
 ROCKY MOUNTAIN ARSENAL
 REPORT NO. 102
 DATE: 18 August 1961
 TIME: 11:00 AM
 INSGO
 D-700
 B-500

Time	Pressure (PSI)	Flow Rate (GPM)	Temperature (°F)	Notes
08:00	100	100	100	Start of shift
08:30	105	105	105	Normal operation
09:00	110	110	110	Pressure increasing
09:30	115	115	115	Flow rate stable
10:00	120	120	120	Temperature rising
10:30	125	125	125	Minor fluctuations
11:00	130	130	130	Pressure peak
11:30	135	135	135	Flow rate decreasing
12:00	140	140	140	End of shift

WFO 12745
 DATE: 18 August 1961
 TIME: 11:00 AM
 PRESSURE INJECTION DISPOSAL WELL
 ROCKY MOUNTAIN ARSENAL
 REPORT NO. 102
 DATE: 18 August 1961
 TIME: 11:00 AM
 INSGO
 D-700
 B-500

NO.	DATE	DESCRIPTION	TIME	REMARKS
1	10/10/52	...	...	...
2	10/11/52	...	...	...
3	10/12/52	...	...	...
4	10/13/52	...	...	...
5	10/14/52	...	...	...
6	10/15/52	...	...	...
7	10/16/52	...	...	...
8	10/17/52	...	...	...
9	10/18/52	...	...	...
10	10/19/52	...	...	...
11	10/20/52	...	...	...
12	10/21/52	...	...	...
13	10/22/52	...	...	...
14	10/23/52	...	...	...
15	10/24/52	...	...	...
16	10/25/52	...	...	...
17	10/26/52	...	...	...
18	10/27/52	...	...	...
19	10/28/52	...	...	...
20	10/29/52	...	...	...
21	10/30/52	...	...	...
22	10/31/52	...	...	...

No. 5702
 DATE 10/31/52
 NAME ...
 TITLE ...
 REPORT NO. 153
 DATE 10/31/52
 NAME ...
 TITLE ...
 PROJECT NO. 153

NO.	DATE	DESCRIPTION	TIME	REMARKS
1	10/10/52	...	...	...
2	10/11/52	...	...	...
3	10/12/52	...	...	...
4	10/13/52	...	...	...
5	10/14/52	...	...	...
6	10/15/52	...	...	...
7	10/16/52	...	...	...
8	10/17/52	...	...	...
9	10/18/52	...	...	...
10	10/19/52	...	...	...
11	10/20/52	...	...	...
12	10/21/52	...	...	...
13	10/22/52	...	...	...
14	10/23/52	...	...	...
15	10/24/52	...	...	...
16	10/25/52	...	...	...
17	10/26/52	...	...	...
18	10/27/52	...	...	...
19	10/28/52	...	...	...
20	10/29/52	...	...	...
21	10/30/52	...	...	...
22	10/31/52	...	...	...

No. 5702
 DATE 10/31/52
 NAME ...
 TITLE ...
 REPORT NO. 153
 DATE 10/31/52
 NAME ...
 TITLE ...
 PROJECT NO. 153

NO.	DATE	DESCRIPTION	TIME	REMARKS
1	10/10/52	...	...	...
2	10/11/52	...	...	...
3	10/12/52	...	...	...
4	10/13/52	...	...	...
5	10/14/52	...	...	...
6	10/15/52	...	...	...
7	10/16/52	...	...	...
8	10/17/52	...	...	...
9	10/18/52	...	...	...
10	10/19/52	...	...	...
11	10/20/52	...	...	...
12	10/21/52	...	...	...
13	10/22/52	...	...	...
14	10/23/52	...	...	...
15	10/24/52	...	...	...
16	10/25/52	...	...	...
17	10/26/52	...	...	...
18	10/27/52	...	...	...
19	10/28/52	...	...	...
20	10/29/52	...	...	...
21	10/30/52	...	...	...
22	10/31/52	...	...	...

No. 5702
 DATE 10/31/52
 NAME ...
 TITLE ...
 REPORT NO. 153
 DATE 10/31/52
 NAME ...
 TITLE ...
 PROJECT NO. 153

MEMORANDUM

TO: DIRECTOR, BUREAU OF MINES
FROM: ...

DAILY ENGINEERING REPORT
FARMINE INJECTION DISPOSAL WELL
MOUNTAIN AREA

Report No. 100
Date 22 August 1951
Days from Spec Date 262

Dr. Type
Plant No.
Pump No.

Table with multiple columns for time intervals (e.g., 0800-0900, 0900-1000) and various engineering parameters like flow rate, pressure, etc. Includes handwritten notes and a small table on the right side of the page.

TO: DIRECTOR, BUREAU OF MINES
FROM: ...

DAILY ENGINEERING REPORT
FARMINE INJECTION DISPOSAL WELL
MOUNTAIN AREA

Report No. 100
Date 22 August 1951
Days from Spec Date 262

Dr. Type
Plant No.
Pump No.

Detailed engineering table with columns: Time, Rig Job, Prod Progress, Mud Flow, Gas Flow, Pump Job, Minimums, and Remarks. Contains extensive handwritten data for each time slot.

Continuation of the detailed engineering table from the previous section, covering a later time period with similar columns for time, rig job, and various flow and pressure measurements.

WILLIAMS
 COMPANY
 1000 10th St
 New York, N.Y.

DEPT. OF ENGINEERING REPORT
 PRESSURE INSPECTION REPORT ON
 STEEL WOLFRAM CARTRIDGE

FILE NO. 100-10000
 DATE OF REPORT 10/10/50

PROJECT NO. 100-10000
 DRAWING NO. 100-10000

NO. OF TESTS	TEST NO.	TEST DATE	TEST TIME	TEST PRESSURE (PSI)	TEST RESULT	TESTER	REMARKS
1	100-10000-1	10/10/50	10:00 AM	1000	OK	J. J. Williams	
2	100-10000-2	10/10/50	10:15 AM	2000	OK	J. J. Williams	
3	100-10000-3	10/10/50	10:30 AM	3000	OK	J. J. Williams	
4	100-10000-4	10/10/50	10:45 AM	4000	OK	J. J. Williams	
5	100-10000-5	10/10/50	11:00 AM	5000	OK	J. J. Williams	
6	100-10000-6	10/10/50	11:15 AM	6000	OK	J. J. Williams	
7	100-10000-7	10/10/50	11:30 AM	7000	OK	J. J. Williams	
8	100-10000-8	10/10/50	11:45 AM	8000	OK	J. J. Williams	
9	100-10000-9	10/10/50	12:00 PM	9000	OK	J. J. Williams	
10	100-10000-10	10/10/50	12:15 PM	10000	OK	J. J. Williams	

WILLIAMS
 COMPANY
 1000 10th St
 New York, N.Y.

DEPT. OF ENGINEERING REPORT
 PRESSURE INSPECTION REPORT ON
 STEEL WOLFRAM CARTRIDGE

FILE NO. 100-10000
 DATE OF REPORT 10/10/50

PROJECT NO. 100-10000
 DRAWING NO. 100-10000

NO. OF TESTS	TEST NO.	TEST DATE	TEST TIME	TEST PRESSURE (PSI)	TEST RESULT	TESTER	REMARKS
1	100-10000-11	10/10/50	12:30 PM	11000	OK	J. J. Williams	
2	100-10000-12	10/10/50	12:45 PM	12000	OK	J. J. Williams	
3	100-10000-13	10/10/50	1:00 PM	13000	OK	J. J. Williams	
4	100-10000-14	10/10/50	1:15 PM	14000	OK	J. J. Williams	
5	100-10000-15	10/10/50	1:30 PM	15000	OK	J. J. Williams	
6	100-10000-16	10/10/50	1:45 PM	16000	OK	J. J. Williams	
7	100-10000-17	10/10/50	2:00 PM	17000	OK	J. J. Williams	
8	100-10000-18	10/10/50	2:15 PM	18000	OK	J. J. Williams	
9	100-10000-19	10/10/50	2:30 PM	19000	OK	J. J. Williams	
10	100-10000-20	10/10/50	2:45 PM	20000	OK	J. J. Williams	

WILLIAMS
 COMPANY
 1000 10th St
 New York, N.Y.

DEPT. OF ENGINEERING REPORT
 PRESSURE INSPECTION REPORT ON
 STEEL WOLFRAM CARTRIDGE

FILE NO. 100-10000
 DATE OF REPORT 10/10/50

PROJECT NO. 100-10000
 DRAWING NO. 100-10000

NO. OF TESTS	TEST NO.	TEST DATE	TEST TIME	TEST PRESSURE (PSI)	TEST RESULT	TESTER	REMARKS
1	100-10000-21	10/10/50	3:00 PM	21000	OK	J. J. Williams	
2	100-10000-22	10/10/50	3:15 PM	22000	OK	J. J. Williams	
3	100-10000-23	10/10/50	3:30 PM	23000	OK	J. J. Williams	
4	100-10000-24	10/10/50	3:45 PM	24000	OK	J. J. Williams	
5	100-10000-25	10/10/50	4:00 PM	25000	OK	J. J. Williams	
6	100-10000-26	10/10/50	4:15 PM	26000	OK	J. J. Williams	
7	100-10000-27	10/10/50	4:30 PM	27000	OK	J. J. Williams	
8	100-10000-28	10/10/50	4:45 PM	28000	OK	J. J. Williams	
9	100-10000-29	10/10/50	5:00 PM	29000	OK	J. J. Williams	
10	100-10000-30	10/10/50	5:15 PM	30000	OK	J. J. Williams	

Time	Activity	Remarks
08:00	Start of shift	
08:30	Check equipment	
09:00	Begin work	
09:30	...	
10:00	...	
10:30	...	
11:00	...	
11:30	...	
12:00	End of shift	

DATE: 11/15/54
 TIME: 11:00 AM
 LOCATION: ...
 BY: ...
 CHECKED BY: ...

Time	Activity	Remarks
08:00	Start of shift	
08:30	Check equipment	
09:00	Begin work	
09:30	...	
10:00	...	
10:30	...	
11:00	...	
11:30	...	
12:00	End of shift	

DATE: 11/15/54
 TIME: 11:00 AM
 LOCATION: ...
 BY: ...
 CHECKED BY: ...

Time	Activity	Remarks
08:00	Start of shift	
08:30	Check equipment	
09:00	Begin work	
09:30	...	
10:00	...	
10:30	...	
11:00	...	
11:30	...	
12:00	End of shift	

DATE: 11/15/54
 TIME: 11:00 AM
 LOCATION: ...
 BY: ...
 CHECKED BY: ...

MEMORANDUM
TO THE SECRETARY OF DEFENSE
DATE: 10/10/54

OFFICE OF THE SECRETARY OF DEFENSE
WASHINGTON, D. C.

ATTENTION: [illegible]
[illegible]

[illegible text]

[illegible text]

[illegible text]

[illegible text]

[illegible text]

[illegible text]

[illegible text]

[illegible text]

[illegible text]

[illegible text]

[illegible text]

[illegible text]

[illegible text]

DAILY ENGINEERING REPORT
PRESSURE INJECTION DISPOSAL WELL
ROCKY MOUNTAIN ARSENAL

TIME OF DAY	7:00 am	8:00 am	9:00 am	10:00 am	11:00 am	12:00 pm	1:00 pm	2:00 pm	3:00 pm	4:00 pm
Pressure	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000
Flow	100	100	100	100	100	100	100	100	100	100
Temp	70	70	70	70	70	70	70	70	70	70
Notes	Pressure injection well, Rocky Mountain Arsenal. All parameters within normal limits.									

REPORT NO. 123
DATE: 18 SEPTEMBER 1951
WELL FROM WHICH DATA: 123
WELL NO. 2-123

DAILY ENGINEERING REPORT
PRESSURE INJECTION DISPOSAL WELL
ROCKY MOUNTAIN ARSENAL

TIME OF DAY	7:00 am	8:00 am	9:00 am	10:00 am	11:00 am	12:00 pm	1:00 pm	2:00 pm	3:00 pm	4:00 pm
Pressure	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000
Flow	100	100	100	100	100	100	100	100	100	100
Temp	70	70	70	70	70	70	70	70	70	70
Notes	Pressure injection well, Rocky Mountain Arsenal. All parameters within normal limits.									

REPORT NO. 124
DATE: 18 SEPTEMBER 1951
WELL FROM WHICH DATA: 124
WELL NO. 2-124

DAILY ENGINEERING REPORT
PRESSURE INJECTION DISPOSAL WELL
ROCKY MOUNTAIN ARSENAL

TIME OF DAY	7:00 am	8:00 am	9:00 am	10:00 am	11:00 am	12:00 pm	1:00 pm	2:00 pm	3:00 pm	4:00 pm
Pressure	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000
Flow	100	100	100	100	100	100	100	100	100	100
Temp	70	70	70	70	70	70	70	70	70	70
Notes	Pressure injection well, Rocky Mountain Arsenal. All parameters within normal limits.									

REPORT NO. 125
DATE: 18 SEPTEMBER 1951
WELL FROM WHICH DATA: 125
WELL NO. 2-125

DAILY ENGINEERING REPORT
PRESSURE INJECTION DISPOSAL WELL
ROCKY MOUNTAIN ARSENAL

TIME OF DAY	7:00 am	8:00 am	9:00 am	10:00 am	11:00 am	12:00 pm	1:00 pm	2:00 pm	3:00 pm	4:00 pm
Pressure	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000
Flow	100	100	100	100	100	100	100	100	100	100
Temp	70	70	70	70	70	70	70	70	70	70
Notes	Pressure injection well, Rocky Mountain Arsenal. All parameters within normal limits.									

REPORT NO. 126
DATE: 18 SEPTEMBER 1951
WELL FROM WHICH DATA: 126
WELL NO. 2-126

DAILY ENGINEERING REPORT
PRESSURE INJECTION DISPOSAL WELL
ROCKY MOUNTAIN ARSENAL

TIME OF DAY	7:00 am	8:00 am	9:00 am	10:00 am	11:00 am	12:00 pm	1:00 pm	2:00 pm	3:00 pm	4:00 pm
Pressure	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000
Flow	100	100	100	100	100	100	100	100	100	100
Temp	70	70	70	70	70	70	70	70	70	70
Notes	Pressure injection well, Rocky Mountain Arsenal. All parameters within normal limits.									

REPORT NO. 127
DATE: 18 SEPTEMBER 1951
WELL FROM WHICH DATA: 127
WELL NO. 2-127

DAILY ENGINEERING REPORT
PRESSURE INJECTION DISPOSAL WELL
ROCKY MOUNTAIN ARSENAL

TIME OF DAY	7:00 am	8:00 am	9:00 am	10:00 am	11:00 am	12:00 pm	1:00 pm	2:00 pm	3:00 pm	4:00 pm
Pressure	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000	12.000
Flow	100	100	100	100	100	100	100	100	100	100
Temp	70	70	70	70	70	70	70	70	70	70
Notes	Pressure injection well, Rocky Mountain Arsenal. All parameters within normal limits.									

REPORT NO. 128
DATE: 18 SEPTEMBER 1951
WELL FROM WHICH DATA: 128
WELL NO. 2-128