

DRILLING AND COMPLETION HISTORY

CONSOLIDATED OIL & GAS, INC.

NCRA NO. 1-22

Rio Arriba County, New Mexico

February 22, 1961

Location: 990' F/NL, 990' F/WL
of Section 22-T26N-R7W, N. M. P. M.

Elevation: 6165' Ground
6176' KB - all measurements from KB

Spud: November 13, 1960

Drilling Completed: December 5, 1960
Well Completed: February 2, 1961

Total Depth: 6820' Drilled
6725' Plug Back

Casing: Surface: 10 3/4", 32.75# H-40 cemented at 199'
W/200 sx 2% CaCl₂ cement w/HA-5

Production: 7 5/8", 26.4# J-55 cemented at 2740' with
211 sx 5% CaCl₂ cement w/85 sx Diacel
in first 111 sx.

5 1/2", 14#, 15.5# and 17# J-55 liner
cemented at 6551' (top at 2518') w/79
sx 6% gel cement thru shoe, and 100 sx
cement thru stage collar at 4446'.

4" Hydril F J liner 6480' to 6798' w/60 sx
2% gel cement.

Tubing: 1 1/2" EUE J-55 hung at 6560'.

Logs: Welex - Elec. Induction and Gamma Ray Neu-
tron, McCullough Cement.

Cores and Drillstem Tests: None

Formation Tops: (Log)

Pictured Cliffs	2215'	(+ 3961')
Mesaverde		
Menefee	3910'	(+ 2266')
Pt. Lookout	4463'	(+ 1713')
Greenhorn	6464'	(- 288')
Dakota	6576'	(- 400')

Producing Perforations: 6630' - 6652' 6577' - 6595'
Notched at 6588', 6635', 6676' and 6714'

Treatment: Sand-water frac w/125,000 # (20-40 and
40-60) mesh sand, 164,000 gal. water,
6,500 gal. acid.

Initial Potential: Flow volume thru 3/4" choke 1230 MCFD
Cal. Absolute Open Flow Potential 1248 MCFD.

WELL: NCRA NO. 1-22
(990' F/NL & 990' F/WL of Section 22 - T26N-R7W, N.M.P.M.)

FIELD: South Blanco

COUNTY: Rio Arriba STATE: New Mexico

ELEVATIONS: 6165' GD
6176' KB

11/10/60

Rigging up rotary tools.

11/11/60

Rigging up rotary tools.

11/12/60

Mixing spud mud.

11/13/60

Drilling at 47'. Spudded at 4:00 a.m. Drilled rat and mouse hole.

11/14/60

Drilled 200'. Set 186' of 10-3/4" casing set at 199' K.B. Cemented with 200 sacks regular 2% CaCl₂ with HA-5 additive. Deviation 1/2 degree at 100'. Plug down at 5:30 p.m.

11/15/60

Total Depth 1110'. Drilled 910', shale and sand. Presently tripping for Bit No. 2. Mud 8.9 - 35 - deviation 1/2 degree at 900'. Pressured up on surface 700 lbs. for 30 minutes - held OK.

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11/16/60

Drilling at 1700' with Bit No. 3. Drilled 590', shale and sand. Mud 9.1 - 38 - deviation 1 1/2 degree at 1400'.

11/17/60

Drilling at 2100' with Bit No. 4. Drilled 400', shale and sand. Mud 9.4 - 40. Deviation 3/4 degree at 1800'.

11/18/60

Total Depth 2519'. Drilled 419', shale and sand. Presently tripping for Bit No. 6. Mud 9.5 - 42. Deviation 3/4 degree at 2300'.

11/19/60

Total Depth of 9-7/8" hole 2740'. Drilled 221', shale and sand. Presently laying down drillpipe. Mud 9.6 - 70.

11/20/60

WOC. Total Depth 2740'. Ran 82 joints 26.4 39-3 lb., 7-5/8" J-55 casing - 2738' set at 2740' KB. Float collar at 2706' KB. Cemented with 111 sacks regular treated with 85 sacks Diacel and 5 sacks CaCl₂, followed by 100 sacks regular cement with 5% CaCl₂. Bumped plugs with 3,000 psig - checked floats OK. Cement did not circulate to surface, but indications are that it came up into surface casing since a previous surface casing channel cement indication was repaired by the cementing of the 9-5/8", as indicated by loss of circulation behind surface casing.

11/21/60

Picking up 3-1/2" drillpipe and blowing casing dry in preparation for gas drilling.

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11/22/60

Drilling at 2810'. Drilled 70' with gas. 17-1/4 hours Picking up drillpipe and blowing hole dry. 1-3/4 hours Drilling cement and plug. 5 hours Drilling and blowing to get to dust.

11/23/60

Drilling at 3160' with Bit No. 8, using gas. Drilled 340'. Deviation 3/4 degree at 2950'.

11/24/60

Drilling at 3710' with Bit No. 8. Drilled 550', using gas. Deviation 1 degree at 3350'.

11/25/60

Drilling at 4330' with Bit No. 8. Drilled 670', using gas. Deviation 3/4 degree at 3780' and 3/4 degree at 4220'. No natural gas shows encountered as yet.

11/26/60

Drilling at 4834' with Bit No. 9. Drilled 504', using gas. Deviation 3/4 degree at 4735'. (Drilled 1644' with Bit No. 8, ran 57-1/4 hours.) No natural gas shows noted throughout Mesa Verde section.

11/27/60

Drilling at 5510' with Bit No. 9. Drilled 676', using gas. Deviation 1-1/2 degree at 5265'.

11/28/60

Drilling at 6061' with Bit No. 10. Drilled 676', using gas.

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11/29/60

Total Depth 6812'. Presently logging. Drilled 729' with gas. The following shows were encountered:

1. A show of oil was encountered at 6125', as indicated by black smoke from the returning flare and some slight free oil spray. This sustained until 6245'. Some dusting was lost from 6125' to 6300'. An estimated 25 MCFD natural was encountered at 6125'.
2. The top of the Dakota was penetrated at 6576'. An additional 50 MCFD natural gas flow was encountered throughout the top 100' of Dakota section and prevailed throughout.

11/30/60

Total Depth 6812'. Presently beginning to run 5-1/2" casing.
6-3/4 hours logging
5-1/4 hours WOC
2 hours Trips
6 hours Laying down drillpipe & drill collars
4 hours Stripping cellar and nipping up

75 MCFD natural flow, 50 MCFD of which is believed to be coming from the Dakota has continued.

12/1/60

Total Depth 6812'. Waiting on rig repairs. Started in hole with 5-1/2" casing. When 450' off bottom, casing hit bridge. Attempted to blow out bridge with gas and during manipulation of casing, it parted and dropped. Top of casing found 317' from rotary table. Ran in with casing and screwed into collar. Attempted to pull casing but it jumped out of collar at 100,000 lbs. Pulled out fishing string. Threads were OK, but could not screw into fish. Found fish had dropped 16' to present depth of 333'. Came out of hole and ran packoff spear on 3-1/2" drillpipe. Set in casing. Worked fish with 200,000 lbs. pull and 500 lbs. circulating gas pressure injected into fish. Moved fish uphole 1 ft. Rig broke down at 1:00 a.m. 12/1/60 (compound bearing out). Rig repairs estimated to be completed at 6:00 p.m. today.

Have held 200,000 lbs. pull on casing since breakdown. Fish has not moved or slacked off. Fish is as follows:

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12/1/60 - (Continued)

Top - 333' Bottom - 6551'. From bottom to top, fish consists of:

2103'	17#	(65 joints)
429'	15.5#	(13 joints)
220'	14#	(7 joints)
3466'	17#	(103 joints)

Total of 188 joints - 6218' of New J-55 ST&C casing.

12/2/60

Total Depth 6812'. Attempting to cut 6' off top of fish in order to provide clean casing fishing neck.

Rig repairs completed at 12:00 midnight. Released casing spear and retrieved fishing string. Rerun fishing string with spear, but without backoff joint and jars, which were in string. Attempted to back off casing a few joints below top of fish in order to provide new collar looking up. Unsuccessful in backing off after 52 turns to the left - turned back to the right 56 turns and released spear - pulled same. Went in hole with inside Bowen casing cutter.

Fish, as reported in 12/1/60 report remains the same; there has been no movement. The well continues to make about 25 MCFD natural through the 5-1/2" casing and about this same amount behind the 5-1/2" casing.

12/3/60

Total Depth 6812'. WOC, after cementing lower end of 5-1/2" casing at 6551' - about 20' above the Dakota.

After three unsuccessful attempts with Bowen casing cutter, a Homco cutter was run and the cut successfully made 8' below the top of fish or at 341' K.B. Retrieved 8' piece which showed the top collar to be slightly cocked - this explains the reason for not being able to screw into top of fish. Went in hole with additional casing with Bowen casing bowl - latched on to top of casing fish and set packoff assembly in casing bowl. This procedure converted the casing fish to a full and complete casing string.

Rigged up McCullough wireline truck and ran casing gauge ring successfully to stage collar at 4445'. This indicated string to be intact and in good shape to the stage collar. Ran 1-3/4" OD sinker bar with magnetic collar locator from surface to float collar at 6516' with no indicated casing ob-

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12/4/60 - (Continued)

was going away through the shoe at the bottom of the casing as a result of the over displacement on the first cement job because of the failure of the top cement plug. While pumping away, a Halliburton wireline with cat tail was lubricated down. There was absolutely no indication of casing leakage until float collar was reached. This further proved that the casing string was intact and in good shape all the way.

Opened stage collar at 4445' and pumped in under conditions almost identical to the previous pump-in rate through the casing shoe, i.e. 7 bpm at 1700 psig. Pumped away 200 barrels water at these conditions. At this time, it was noted that the natural gas flare of about 25 MCFD returned after having been completely dissipated as an indicated result of the lower cement job. This suggested that essentially the same zone or zones might be taking fluid as during the previous job. Displaced 100 sx regular cement with 6% gel through stage collar at 1700 psig. Unable to close stage collar with pressure on top plug as high as 3500 psig. This then tested all casing successfully above the stage collar. Bled off pressure and allowed cement to bleed back through stage collar and up into casing at 4400'. Shut in wellhead for 8 hours WOC, before proceeding with additional operations.

Cut 5-1/2" casing at 2518' with McCullough jet cutter and pulled casing from that depth.

12/5/60

Total Depth 6812'. WOC after squeezing top of 5-1/2" liner. Released rig at 10:00 a.m.

Pumped down the back side of 5-1/2" casing through the cutoff point at 2518' and presumably to the bridge at 4300'. Pumped in at 5 to 7 bpm at 1500 psig. Displaced 125 sx regular cement with 6% gel to 2493', or 25' above the top of 5-1/2" liner. Shut in casinghead with 1000 psig for WOC.

At this time, we have succeeded in installing a thoroughly cemented and tested 5-1/2" (new J-55 ST&C) casing liner from 2518' to 6551', consisting of the following from bottom to top:

2103'	of	17#	(65 joints)
429'		15.5#	(13 joints)
220'		14#	(7 joints)
1281'		17#	(37-2/3 joints)

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12/3/60 - (Continued)

structions. Casing collar survey also checked the casing tally, as did the depth reached. Concluded that casing string was intact and unharmed throughout.

Ran Magnetector survey and found casing string to be stuck at 4300' and free at 4250'. Concluded that dropping of the casing occurred not as a result of a bridge under the shoe but because of hole sloughings around the stage collar and metal petal baskets while running in.

Rigged up Halliburton cementing truck and injected 40 barrels gel mud and 550 barrels water in an attempt to break circulation and/or establish conditions under which cement might be displaced. Except for a small pressure increase at the time the casing was first filled, indicating a bridge around or close to the shoe or a plugged float, all of the fluid was pumped in at about 7 bpm at 1700 psig. During the latter phase of this operation, it was noted that the natural gas flare diminished significantly, indicating that the zones taking fluid were the same, or communicated with the zones supplying the natural gas flow. No circulation to surface established.

Displaced 75 sx regular cement with 6% gel at 5 to 7 bpm at 1500 to 1700 psig. Unable to get top cement plug to hold pressure and as a result, the cement was slightly over displaced - 1 to 3 barrels. The float valve held OK. Shut in casinghead with 1000 psig for WOC.

12/4/60

Total Depth 6812'. WOC after cementing through stage collar.

Released pressure on lower cement job after 6 hours WOC. Ran temperature survey and located cement top behind casing at about 6,000'. Checked PBTD of 6510' with bomb.

Attempted to test casing string by pressuring against float collar and cement plug. Pumped away at 3 to 6 bpm at 1000 to 1700 psig. Upon releasing the pressure, it was noted that it bled immediately to 0, indicating good float valve action. It was therefore concluded that the fluid

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12/5/60 - (Continued)

Total 4033' - (122-2/3 joints)

The 5-1/2" casing is hung in the 7-5/8" casing which was set and cemented at 2740' K.B. (see report 11/20/60).

Completion procedure will consist of drilling out all cement and testing the liner top and the stage collar. If necessary, recementing will be effected at these points. The shoe will then be drilled out and the open hole section through the Dakota cleaned and conditioned for running a 4-1/2" flush joint liner, to be hung from the bottom of the 5-1/2" liner. Routine completion operations for Dakota gas production will then be effected.

12/12/60

Waiting on completion rig. Completion will be begun immediately coincident with favorable weather conditions.

12/13/60

Moving on completion rig.

12/14/60

Moving on and rigging up completion rig.

12/15/60

Waiting on rig repairs.

12/16/60

Picking up completion tubing.

12/20/60

Rigging up Signal Oil Company's completion rig. There has been no progress made toward completion due to difficulties encountered by Cunningham in attempting to rig up a new Franks workover rig.

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12/20/60

Because of the indicated additional delays, we chose to move off Cunningham and move on Signal.

12/21/60

Drilling hard cement at 2475'. Found top of cement at 2428'.

Completed rigging up completion rig. Picked up 2-7/8" EUE workover tubing and went in hole with 4-3/4" bit.

12/22/60

Waiting on rig repairs. Continued to drill cement yesterday to 2483', at which time rig broke down.

12/23/60

Waiting on rig repairs. Because of indicated major overhaul needed on rig, suspended operations until December 26th.

12/26/60

Preparing to resume operations. Rig repairs completed.

12/27/60

Preparing to lower tubing and bit to float collar. Completed drilling out first cement plug. Drilled out with 6-3/4" bit to top of 5-1/2" liner at 2520' (top of liner by previous tally at 2518' - see report of 12/5/60). Tripped for 4-3/4" bit and drilled 15' of hard cement on top of liner. Closed rams and tested with rig pump to 1,000 psig - held OK.

Lowered tubing and bit to second cement plug. Found top of cement at 4407', which was proven to be good, hard cement to 4449' K.B., at which point the stage collar was drilled (stage collar by previous tally at 4445' K.B. - see report of 12/4/60). After drilling stage collar, closed rams and tested with rig pump to 850 psig - held OK.

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12/30/60 - (Continued)

2,000 to 2,500 psig to displace wiping plug to float collar. A good plug bump was not obtained, but it is not felt that the cement was overdisplaced.

Attempted to release liner running tool but were unsuccessful. The whole string, including liner, was reciprocated about 20 ft. in an attempt to get loose - unsuccessful. Pressured up backside to 1700 psig, where pressure held steady, in an attempt to reverse circulate tool free - unsuccessful. Attempted to back off left hand safety joint - unsuccessful. Pulled whole string uphole, apparently including liner, pulling out to 80,000 lbs. (The weight of string, including liner, was 45,000 lbs.). The liner running tool and tubing string finally came free at the time the bottom of the liner was at 6740' K.B. Continued to pull tubing string, which backflowed water for approximately 200 ft., indicating cement slurry above liner about 200'. The tool was released approximately 1 hour after cement had been in place. Notwithstanding these difficulties, it is believed that a good liner cement job was obtained. Will now drill out and test cement job.

While running liner yesterday, well continued to make gas heads with good show of green oil.

1/3/61

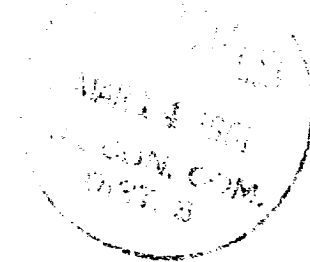
Preparing to drill out cement after second squeeze opposite stage collar. A chronological summary of events since 12/30/60 report follows:

Drilled and washed hole clean to top of 4 in. liner, which is indicated to be at 6480' K.B. Note that this is the point at which it was originally hung. This now indicates that the liner was never moved after its original setting as indicated by report of 12/30/60. Apparently the difficulty was encountered in getting the running tool free of cement. Pulled workover tubing and bit and went in with HOWCO RITS packer and established small liner leak of 3/4 bpm at 2,000 psig, and established stage collar leak at 3 bpm at 2200 psig.

Set packer above 4 in. liner and squeezed with 40 sx regular cement with water loss additive. Obtained final squeeze pressure of 3,500 psig.

Set packer above stage collar and squeezed with 100 sx regular cement with water loss additive. Staged over a period of 2 hours and obtained final squeeze pressure of 2,300 psig.

Went in hole with 4-3/4" bit and drilled out 80 ft. of hard cement above stage collar. Tested stage collar with indicated leak of 1 1/2 to 2 bpm at 2000 to 2500 psig.



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12/28/60

Pulling workover tubing and 4-3/4" bit in preparation for running 4-1/2" hydril flush joint liner.

Lowered tubing and bit to cement plug on top of float collar at 6520' K.B. (wired line previously established this depth at 6516' K.B. - see report of 12/3/60).

Tested full casing string, including stage collar and 5-1/2" liner top to 1300 psig - held OK. In the range of 1350 to 2000 psig, could pump away at rates as high as 4 bpm. (This believed to be going away by the float collar and through the shoe as a result of overdisplacement on the first cement job - see report of 12/4/60).

Drilled float collar and found no cement from there to cleanout total depth of 6820' K.B. (Original total depth 6812' K.B.). Encountered only one bridge at 6660' while cleaning out.

Well kicked heavily with gas while drilling float collar and cleaning out to bottom. Well now attempting to unload naturally while coming out of hole with workover tubing. Circulating medium is water.

12/29/60

Preparing to go in hole with about 310' of 4" Hydril FJ liner.

Finished pulling workover tubing and bit. Went in hole with 370' of 4-1/2" Hydril FJ liner but could not get it to go freely beyond 150' inside of 5-1/2" liner. Pulled 4-1/2".

Well continued to show considerable natural life, apparently from Dakota.

12/30/60

Preparing to drill cement above 4" liner with 4-3/4" bit to clear 5-1/2" casing to liner top. Went in hole with 4" Hydril FJ liner on 2-7/8" workover tubing with Baash Ross liner hanger and set at 6797'. Had little difficulty in lowering liner except had to wash last 30'. Displaced 60 sx regular cement with 2% gel. Inserted go-devil, which converts hollow liner wiping plug to blank wiping plug. Go-devil seated after about 1 barrel overdisplacement. It took 2500 psig to release wiping plug and

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1/3/61 - (Continued)

Resqueezed stage collar with 100 sx (25 sx regular and 75 sx with walnut shells, all with water loss additive), obtaining final squeeze pressure of 3600 psig.

1/4/61

Coming out of hole with 4-3/4" bit. Will pick up 3-3/8" bit to drill cement out of inside of liner before performing AbrasiJet and frac job. Drilled 200' of hard cement opposite stage collar. Pressure tested to 2500 psig - held OK. Drilled 40' of hard cement inside 5-1/2" casing above top of 4" liner. Pressure tested top of liner to 2500 psig.

1/5/61

Running correlation and cement logs. Went in hole with 3-3/8" bit and cleaned out inside 4" liner to float collar at 6766' PBTD (4" liner from 6798' to 6480'). Tested hole string from surface to PBTD to 2500 psig - held OK.

1/6/61

Preparing to perform first stage of Dakota frac. Ran logs. Cut casing notches with Howco sand jet at 6714' and 6676'. Broke down first notch at 1,800 psig and well kicking gas heavily after cutting second notch.

Will spot acid on bottom - displace into formation - come out of hole with work-over tubing and proceed with frac.

1/8/61

Preparing to perforate upper 18' Dakota interval and perform second frac stage.

After notching for first frac stage, displaced 500 gals. 15% HCl on bottom and staged slowly away at 1400 to 1500 psig. Pulled tubing and notching tool.

PERFORMED FIRST FRAC STAGE:

45,000 lbs. sand (20-40 mesh)	Summary
71,000 gals. gelled water	
25 bpm	
2500-2900 psig	

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1/7/61 (Cont'd)

Started injecting at 2800 psig with 1/2 lb. sand per gal., increasing slowly to 3/4 lb. sand per gal. Pressure decreased slowly to 2500 psig, when 30,000 lbs. sand in, then increased slowly but steadily to 2900 psig. Overflushed with 100 bbls. Standing pressure 2300 psig immediately and 2000 psig after 15 minutes.

Wellhead pressure 1400 psig after 12 hours, and well ready to come in by itself. Lubricated in bridge plug and set at 6670'. Perforated with 4 jets per foot 6630' to 6652'. Had communication immediately after perforating to 1400 psig and blew gun uphole and kinked wireline. Well very lively. Left 1-3/4" x 42" McCullough rope socket in hole.

1/8/61

Going in hole with workover tubing with float valve sub and overshot to retrieve rope socket fish, attempt to remove perforation junk and bridge plug by acidizing, and attempt to break down upper 2 sets of perforations for second stage frac.

Perforated with 4 jets per foot the following interval: 6577' - 6595' (upper 2 perforated intervals not yet fraced are 6577' - 95' and 6630' - 52'.)

Attempted to frac perforations above bridge plug set at 6670', but could not adequately break down and pump in. Established pump-in rate at 3,000 psig, decreasing to 2800 psig with 8 bpm. After about 1 hour of rocking back and forth, was able to pump in at 17 bpm at 1800 psig. This higher rate effective only briefly. Was never able to again get above 8 bpm.

Conclude that bridge plug not holding and that well life resulted from communication around bridge plug. Bridge plug probably seated as a result of exposure to pressure in attempting to break down upper zones.

1/9/61

Pulling workover tubing.

Went in hole and found top of perforation junk at 6638'. Displaced 500 gal. 15% HCl opposite upper 2 perforated intervals and staged away at 1-1/2 to 6 bpm at 1,000 to 2,800 psig - no breakdown established.

Lowered tubing and found top of perforation junk at 6648'. Unable to wash and clear further because of inability to get returns via extremely tight annulus. (Overshot and float valve sub has a 3.25" OD and liner has a 3.4" ID).

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1/9/61 (Cont'd)

Pulled tubing above junk and displaced additional 500 gal. 15% HCl and staged away at same conditions as above. Bled back 500 gals. water at surface in order to attempt to leave acid soaking opposite perforations. Shut down for 8 hours.

Plan to go back in hole without float valve sub or overshot and reverse circulate to clean hole and retrieve small fish.

1/10/61

Preparing to attempt to clean hole, retrieve fish and drill bridge plug by reverse circulation.

Completed pulling workover tubing, removed overshot and float valve sub and re-entered hole with small washover shoe.

1/11/61

Going in hole with wireline overshot to attempt to recover McCullough fish.

Cleaned junk from 6648' to 6657' by reverse circulation. It is believed the bridge plug was partially drilled from 6657' to 6658', because of indicated increases in gas flow and oil showings. Because of extreme pump pressures, it was felt that fish had been recovered and workover tubing was pulled. No fish recovery in tubing.

1/12/61

Shut down for rig repairs.

Cleaned junk by reverse circulating to 6666'. Will resume cleanout operations this morning.

1/13/61

Preparing to displace acid in an attempt to clean up bottom hole perforating junk.

Successful in cleaning out as low as 6668', but bridge plug apparently continues to move up and down hole. Unsuccessful in attempts to circulate with gas because of plugging of tubing.

1/14/61

Coming out with tubing after plugging same.

Cleaned out to 6674' via drilling, circulating and generally agitating junk with acid. Top of bridge plug was apparently drilled at 6674' - dropped

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1/14/61 - (Continued)

thru for 6 in. and plugged. Believe McCullough fish is in tubing now. Quite a bit of formation cuttings noted also in returns. Little well life past 24 hrs.

1/15/61

Blowing Dakota for initial clean up.

Pulled tubing and retrieved McCullough fish. Reran tubing with disc because of well threatening to blow out. Finished drilling bridge plug and cleaned to 6760'. Pulled tubing out to point above 4-in. liner - flanged up wellhead and allowed well to blow in naturally.

1/16/61

Shut in. Allowed well to blow and clean up approximately 12 hours - shut in for pressure build up.

1/17/61

Blowing well for initial clean up. Tubing plugged yesterday at 6402'. Perforated tubing with two 5 gram jets per foot - interval 6392' to 6402'.

Combination 2 1/2" EUE - 2" EUE tubing string set at 6465 KB (lower 285' is 2").

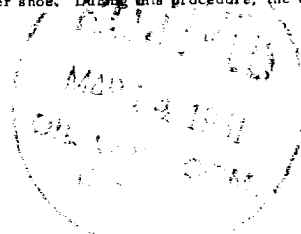
Well unloading lots of frac water and oil. A good strong well is indicated. Now flowing 1,500 MCFD in early stages of clean up, with 1,000 PSIG casing pressure.

1/24/61

Preparing to land 1 1/2" EUE tubing.

A summary of events since 1/17/61 follows:

Immediately following the blowing period as recorded on 1/17/61, the well died off almost completely, apparently as a result of some down-hole obstruction. Lowered tubing and found fillup to 6708'. Pulled 2 1/2" - 2" tubing and re-entered well with 1 1/2" tubing with small washover shoe. During this procedure, the well remained essentially dead.



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1/24/61 (Cont'd)

Washed 3' of sand and junk to 6411' - because of indicated tubing plugging attempted to pull up-hole but found tubing string stuck. Pulled tubing in two at about 2900'. Pulled out of hole - layed down small tubing and picked up 2 1/2" tubing and retrieved remainder of 1 1/2" tubing with overshot. During this procedure, the well again blew in and remained lively.

Re-entered well with 2 1/2" - 2" tubing string and 3 3/8" washover shoe - washed and cleaned sand and junk to 6730'. Note that this is below the lowest casing notch at 6714'.

Pulled out 2 1/2" - 2" tubing and reran 1 1/2" completion tubing. Well has remained very lively.

1/25/61

Shut in. Preparing to blow well for additional initial clean up. Had 1300 PSIG tubing pressure and 700 PSIG casing pressure this a.m. after 8 hours shut in.

Landed 1 1/2" J-55 EUE production tubing as follows:

Well came in of its own accord without swabbing.

1/26/61

Blowing and cleaning up frac water. Well has flowed continuously for 24 hours to this time - casing pressure now 350 PSIG. The flow stream now appears to be about 75% green oil and 25% water, believed to be frac water. Estimate 500 MCFD of accompanying gas production.

1/27/61

Testing well through portable Rollo well checker.

Well continued to flow throughout yesterday - oil cut increased to 95% while frac water cut decreased accordingly. Shut well in 12 hours during which time well head pressure built to 1300 PSIG - tubing and casing. Have now had well testing for 3 hours after blowing head off.

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1/27/61 (Cont'd)

Has made 17 bbls. of oil, 1 1/2 bbls. water with indicated 700 MCFD gas.

Will continue testing.

1/30/61

Shut well in yesterday following 48 hour period of continuous testing through Rollo Well Tester. During the first 24 hours the well made 27 bbls. oil and 4 3/4 bbls water, with about 500 MCFD continuous gas flow. During the first 8 hours of this period well made 18.6 bbls. oil and 3 bbls. water. Casing pressure 360 PSIG at end of 24 hour period.

Following the first 24 hour test period the well was shut in for 8 hours. Tubing and casing pressures built to 750 PSIG. Opened well and made 6 bbls. oil and 3/4 bbls. water during first 1/2 hour, made 10 1/2 bbls. oil and .8 bbls. water during first two hours, made 13 bbls. oil and .8 bbls. water during 12 hours. Well made steady gas flow of about 250 MCFD. Casing pressure varied from 300 to 350 PSIG.

1/31/61

Pulled tubing. Ran in with combination 2 1/2" - 1 1/2" string with Abrasijet notching tool. Cut notch at 6676'. Pulled up 120' and washing excess sand out of hole.

2/3/61

Shut in after frac job.

A summary of operations since 1/31/61 follows:

Washed sand to 6685' after cutting notch at 6676'. Acidized with 1,000 gallons 15% HCl, soaking in over a 2 1/2 hour period. Initial pressure 1,800 PSIG - final pressure 1,700 PSIG at one to two bpm, then gave zone slight water frac with about 500 pounds sand - finally broke to 2,200 PSIG at 10 bpm.

Notched at 6635'. Cleaned out to 6645'. Acidized with 1,000 gallons 15% HCl and attempted small water frac but could never break below 3,000 PSIG at 5 bpm. Attempted a second break down with additional

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2/3/61 (Cont'd)

1,000 gallons acid but were unsuccessful. Pulled tubing and found split joint at 2,900' which indicated that acid and our attempted break-down frac never reached notch.

Pulled out of hole, repaired tubing and notched at 6588'. Cleaned out to 6640' below upper two notches and displaced 1000 gallons 15% HCl. Allowed acid to soak and displaced away slowly over a two-hour period. Finally obtained slight break down to 9 bpm at 2600 PSIG.

Cleaned casing to 6725' and displaced 1000 gallons 15% HCl opposite all notches - pulled tubing and prepared to frac.

Frac Summary:

80,000 pounds sand (40,000 pounds 40-60 and 40,000 pounds 20-40 mesh)
93,000 gallons gelled water
33.5 bpm average
2400 to 2700 PSIG.

Put acid away at 1 - 2 bpm at 1550 to 1000 PSIG at a slow soaking rate. Started injecting at 2800 PSIG at 29 bpm, with 1/2 pound sand per gallon - these conditions continued for 12,000 pounds - pressure to 2700 PSIG after 20,000 pounds sand in - pressure to 2600 PSIG after 30,000 pounds sand in. Increased sand to one pound per gallon with slow pressure decline to 2500 PSIG after 50,000 pounds sand. Increased sand to 1 1/4 pound per gallon. After 60,000 pounds sand in pressure broke to 2300 PSIG for 2 1/2 minutes. Increased sand to 1 1/2 pounds per gallon and finally to two pounds per gallon with final pressure of 2400 PSIG after 80,000 pounds in formation. Flushed with clear water at 2500 PSIG. Standing pressure was 1800 PSIG immediately and 1450 PSIG in 15 minutes (the 40-60 mesh sand was used ahead of the 20-40 mesh sand).

Will allow well to stand approximately four hours before opening up for back flowing and running completion tubing.

2/7/61

Shut well in for brief build up period and subsequent additional blowing and testing.

At noon on 2/3/61, about four hours following the frac job, the well was opened and allowed to back flow while running completion

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2/7/61 (Cont'd)

tubing. About 200 feet of frac sand was washed from the bottom of the hole; cleaned out to 6725' and completion tubing landed. The well had been back flowing on its own continuously.

Well was opened through 1 1/2" completion tubing at 11 p.m. on 2/3/61. It has continued to flow since that time at a relatively steady rate of about 12 barrels frac water per hour. The oil cut has increased to approximately 10% during the last 24 hours. The free gas volume appears to be about 500 MCFD. Casing pressure has built to 250 PSIG.

2/8/61

Blowing and testing well. Shut well in yesterday for nine hours - wellhead pressures after eight hours were 750 PSIG and 800 PSIG after nine hours. Well flowing steadily this morning with 450 PSIG casing pressure, making 500 MCFD free gas and six barrels per hour of heavily gas cut frac water with about 10% oil.

2/9/61

Well flowing essentially the same as reported yesterday except frac water volume now only about four barrels per hour with 10% to 15% oil cut. Casing pressure 460 PSIG.

2/10/61

Well has been flowing on a controlled intermittent period of six hours on and six hours off for the past 24 hours. At the end of each six hour period the surface pressures have built to about 780 PSIG. During flow period the well makes 500 MCFD with two to four barrels frac water per hour with small oil cut.

2/12/61

Shut in for initial seven-day pressure build up and subsequent potential testing.

Well continued making about 500 MCFD with about three barrels liquid per hour (75% frac water - 25% oil). Casing pressure 450 PSIG. Shut in at 8 a.m. today.



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2/15/61

Shut in. Note: 1 1/2" EUE - J 55 new completion tubing landed as follows:

206 joints at 6560' KB. Jet holes at 4997', 5326' and 5755'.

2/19/61

Preparing to run initial potential test. Surface pressures after seven-day shut in period: 1732 PSIA - casing; 1862 PSIA - tubing.

2/20/61

Testing well through portable Graver separating unit.

Results of three hour test yesterday were as follows:

Time After Opening	Casing PSIA	Tubing PSIA	Temp.	
1 hr.	1177	337	57°	Making lots liquid
2 hrs.	864	232	57°	Dry
3 hrs.	662	*82	57°	Making liquid
*1100 MCFD				

After three hour test, well turned thru test unit with 100 PSIG back pressure. Casing pressure declined to 500 PSIG to 3 a.m., at which time well was logged and making 300 MCFD. It then unloaded and casing pressure increased to 550 PSIG and was making 550 MCFD at 8 a.m. Well has made 1 1/2 - 2 1/2 barrels liquid per hour varying from 50 to 100% oil.

2/22/61

Testing. Well has been quite settled @ 350 - 450 MCFD with 2 BFPH - 50% - 60% oil. Will shut in today and blow spasmodically for further frac water cleanup.