

DRILLING AND COMPLETION HISTORY

CONSOLIDATED OIL & GAS, INC.

GOVERNMENT NEUMAN NO. 1-20

San Juan County, New Mexico

August 18, 1960

Location: 990' F/NL & 1750' F/EL of Section 20,
T31N, R12W, N.M.P.M.

Elevation: 6049' Ground
6061' K.B. - all measurements from K.B.

Spud: April 18, 1960

Drilling Completed: July 10, 1960
Well Completed: August 4, 1960

Total Depth: 7109' Drilled
7082' Plug Back

Casing:
Surface: 9-5/8", 36#, H-40 cemented at 185' w/150 sx
2% CaCl₂ cement.

Production: 5-1/2", 17# J-55 cemented at 7102' w/225 sx
6% gel cement thru shoe, and 190 sx 50% Pozmix,
12% Gilsonte cement thru stage collar at 5071'.
Top of cement 5820' first stage, 3955' second
stage.

Tubing: 1-1/2" EUE CW hung at 6790'

Logs: Lane Wells Gamma Ray-Neutron & Cementron

Cores and Drillstem Tests: None

Formation Tops: (Log)

Pictured Cliffs	2417'	(/ 3643)
Mesa Verde	3937'	(/ 2123)
Cliffhouse	3997'	(/ 2063)
Menefee	4200'	(/ 1860)
Pt. Lookout	4780'	(/ 1280)
Mancos	5120'	(/ 940)
Greenhorn	6817'	(- 757)
Dakota	6947'	(- 887)

Producing Perforations: 6949' - 6992'
6997' - 7002'
7011' - 7039'
7060' - 7069'

Treatment: Sand-Water Frac w/56,000 lbs. (20-40 mesh)
sand, 64,000 gal. Water, 1,750 gal. MCA acid.

Initial Potential: Flow volume thru 3/4" choke, 2740 MCFD;
Calculated Absolute Open Flow Potential 3740 MCFD.

WELL: GOVERNMENT NEUMAN NO. 1 - 20 -
990' F/NL & 1750' F/EL of Section 20 - T31N - R12W
FIELD: Undesignated Dakota
COUNTY: San Juan STATE: New Mexico
ELEVATIONS: 6049' GD
6060' KB

6/15/60

Moving on rotary tools.

6/16/60

WOC - Nipping up: Spudded in at 3:30 p.m. Drilled 185' 13-3/4" hole. Ran 175' of 9-5/8" casing set at 185' KB. Cemented with 125 sacks Portland with 2% CaCl. Plug down at 9:30 p.m. Deviation 3/4 degree at 90'.

6/17/60

Total Depth 1,121' in shale and sand. Presently tripping for Bit No. 3. Still drilling with water. Deviation 3/4 degree at 520' and 1/2 degree at 1050'.

6/18/60

Drilling at 2,395' with Bit No. 4. Drilled 1274', shale and sand. Mud 8.8 - 42. Deviation 3/4 degree at 1350' and 3/4 degree at 1950'.

6/19/60

Drilling at 3,040' with Bit No. 5. Drilled 645', shale and sand. Mud 9.9 - 42. Deviation 3/4 degree at 2600'.

6/20/60

Total depth 3,561'. Drilled 511', shale and sand. Presently tripping for Bit No. 7. Mud 9.1 - 42 - 9. Deviation 3/4 degree at 3350'.

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6/28/60

Total Depth 4969'. Drilled 112' with Bit No. 20. Mud 9.5 - 50. Made trip and had full returns.

6/29/60

Drilling at 5107' with Bit No. 21. Drilled 138', sand and shale. Mud 9.2 - 58 - 9 - 2/32nds - 9.5 - 4% oil. Bit No. 20 made 741' in 7-1/4 hours.

6/30/60

Drilling at 5287' with Bit No. 22. Drilled 180', sand and shale. Mud 9.2 - 60 - 8.8.

7/1/60

Total depth 5494'. Drilled 207' with Bit No. 23, shale and sand. Present operation mixing mud. Lost circulation at 5486' - 7-1/4 hours down time. Bit No. 22 made 186' in 14-3/4 hours.

7/2/60

Total depth 5583'. Drilled 96', shale and sand. Presently tripping for Bit No. 23. Mud 8.9 - 65 - 10. 12-1/2 hours down on lost circulation.

7/4/60

Drilling at 6080' with Bit No. 26. Drilled 220', shale and sand. Mud 9.1 - 70 - 8.8. Total depth on this well will be 7200'.

7/5/60

Drilling at 6370' with Bit No. 27. Drilled 290', shale and sand. Mud 9.2 - 70 - 8.8. Deviation 1 degree at 5900'. Anticipated tops: Pt. Lookout - 4770' Dakota - 6950'

7/6/60

Total depth 6,660'. Drilled 290', sand and shale. Presently tripping for Bit No. 29. Mud 9.2 - 75 - 2/32nds - 9.

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6/21/60

Drilling at 3807' with Bit No. 8. Drilled 246', sand and shale. Mud 9.2 - 52.

6/22/60

Drilling at 4,014' with Bit No. 10. Drilled 207', sand and shale. Mud 9.2 - 55.

6/23/60

Drilling at 4165' with Bit No. 12. Drilled 151', sand and shale. Mud 9.3 - 56 - 8.8 - 3/4 degree at 4007'. Bit No. 10 made 56' in 5-1/2 hours, Bit No. 11 made 58' in 8-1/4 hours.

6/24/60

Total Depth 4316'. Drilled 151', sand and shale. Presently tripping for Bit No. 15. Mud 9.3 - 57 - 8.8.

Bit No. 12 made 109' in 8-1/2 hours; Bit No. 13 made 8' in 2-3/4 hours; Bit No. 14 made 114' in 9-3/4 hours.

6/25/60

Drilling at 4585' with Bit No. 16. Drilled 269' in sand and shale. Mud 9.4 - 60 - 8.6. Bit No. 15 drilled 128' in 9 hours.

6/26/60

Total Depth 4785'. Drilled 200' in sand and shale. Presently tripping for Bit No. 18. Mud 9.4 - 58 - 8.6 - 1/2 degree at 4700'.

6/27/60

Total Depth 4857'. Drilled 72' in sand and shale. Present operation - circulating 3 stands off bottom. Mixing pit of mud. Mud 9.2 - 49. Fishing yesterday. Lost 14 drill collars and 12 joints of pipe in hole. Recovered same.

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7/7/60

Drilling at 6950' with Bit No. 30. Drilled 290', shale and sand. Mud 9.2 - 65 - 9.

7/8/60

Drilling at 7015' with Bit No. 32. Drilled 65' in sand. Mud 9.2 - 100.

7/9/60

Drilling at 7,075' with Bit No. 33. Drilled 60' in sand. Mud 9.2 - 96 - 8.

7/10/60

Total Depth 7109' - drillers. Laying down drillpipe. Ran radioactivity log with indicated total depth of 7107'. Found top of Dakota at 6947' (-886'). Log indicates very good pay sand development with about 100' of gross pay interval.

7/11/60

WOC. Moving off rotary rig. Ran 7108' of 5-1/2" casing and set at 7106'. Casing string design from bottom to top:

62 joints (1999') 15.5# - J-55 - ST&C
156 joints (4982') 14# - J-55 - ST&C
4 joints (126') 15.5# - J-55 - ST&C

Stage collar at 5071'. Centralizers at 7077', 7044', 6949', 6852', 5107', 4780', 4753'. Umbrellas at 5106', 4779', 4752'.

Stage 1 of Cement Job:

225 sacks regular cement with 6% gel. Good returns throughout job. Bumped plugs with 3,000 psig and checked floats OK.

Stage 2 of Cement Job:

After 4 hours WOC, cemented through stage collar with 190 sacks (50% Pozmix) with 4% gel with 12-1/2 lbs. Gilsonite per sack. Good returns throughout job.

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7/27/60

Moving on completion rig.

7/28/60

Preparing to drill cement plugs. Completed rigging up completion rig. Picked up 2-1/2" completion tubing and found top of Mesa Verde cement in casing at 5040'.

7/29/60

Cleaning up cement and remnants of stage collar at 7072'. Found top of lower cement at 7072'. Plan to perforate and frac tomorrow.

7/30/60

Preparing to frac first stage Lower Dakota. Cleaned out to 7082' PBTD. Perforated with 2 bullets and 2 jets per foot as follows: 7060' to 7069', 7011' to 7039'.

7/31/60

Preparing to frac second stage - Upper Dakota. Sand-water fraced lower stage as follows: Acidized with 750 gallons 15% HCl breakdown acid. Pumped acid in slowly at 600 psig with intermittent soaking.

Stage Summary:

22,000 lbs. (20-40 mesh) sand (14,000 lbs. in formation)
22,000 gal. Water
750 gal. 15% HCl
25 Balls (Not effective)
2,000 Psig (3800 psig sandout)
40 Bpm

Began injecting at 40 bpm at 2,000 psig, dropping to 1900 psig when sand started, with gradual increase in pressure to 2100 psig after 22,000 lbs. sand injected. At this point a sandout occurred, causing rapid pressure increase to 3500 psig. While 25 balls had been dropped, the sandout occurred before the balls were effective. Sandout pressure bled to 200 psig within 10 minutes.

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7/31/60 - (Continued)

Cleaned cut sand from 6600' to PBTD. Lost approximately 200 barrels opposite the perforations while washing sand.

8/1/60

Cleaning out sand after second stage frac. Had approximately 700' sand fillup.

Perforated with 2 bullets and 2 jets per foot as follows: 6997' to 7002', 6949' to 6992'. Sand-water fraced all perforations as follows: Acidized with 1,000 gallons 15% breakdown acid in 4 soaking stages. Acid went away at 100 psig with slight vacuum toward end.

Began injecting at 43 bpm at 2100 psig. These conditions continued with steady pressure rise to 2100 psig until 20,000 lbs. sand were injected. Dropped 25 balls - no response, but slow pressure increase to 2300 psig after 30,000 lbs. sand. Dropped 25 balls with pressure increase to 2400 psig after 37,000 lbs. sand injected. Dropped 25 balls, but sandout occurred before these balls effective.

Stage Summary:

42,000 gallons water
42,000 lbs. (20-40 mesh) sand. (34,000 lbs. in formation)
1,000 gal. 15% HCl
75 Balls (50 effective)
2100 to 2400 psig (3800 psig sandout)
40 bpm

8/2/60

Swabbing. Cleaned out frac sand to PBTD of 7082'. Pulled and laid down 2-1/2" workover tubing. Picked up and ran 1-1/2" EUE completion tubing and landed at 6820' KB. Jet collars placed at 6325', 5788', 5252'.

8/3/60

Swabbing. Pulled 2200' tubing yesterday to replace flat joint. Reran tubing and commenced swabbing at 4:00 p.m. Now have 125 psig on casing with good gas shows.

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8/4/60

Shut in for initial pressure buildup and additional frac water cleanup. Well came in yesterday noon flowing at a rate of 2.5 to 3 MMCF/D, bringing lots of frac water. Well continued to blow until this morning, at which time it appeared fairly dry and was flowing through tubing at a rate of 2.2 MMCF/D, with 700 psig on casing.

Tubing now landed at 6790' KB with jet collars at 6295', 5758', and 5232'.

8/5/60

Shut in for pressure buildup and additional frac water cleanup.

8/7/60

Shut in for 7-day pressure buildup and official potential testing. Blew well yesterday with indications of fairly good frac water cleanup. After 24 hours shut in, wellhead pressures were as follows:
1968 psig - tubing 1997 psig - casing. After three hours blowing through 3/4-in. choke, flow rate was 2660 MCFD.

8/14/60

Shut in. Ran routine 7-day potential test yesterday with following results:

Time	Casing Pressure	Tubing Pressure	Temperature
7 Days	2019	2013	-
90 Minutes	1240	212	79
180 Minutes	1169	** 197	81

** 2740 MCF/D

OPEN FLOW TEST DATA

DATE August 15, 1960

Operator CONSOLIDATED OIL & GAS, INC.		Lease GOVERNMENT NEUMAN	
Location 990' F/NL & 1750' F/EL 20 - T31N-R12W		County San Juan	State New Mexico
Formation Dakota		Pool Undesignated	
Casing: Diameter 5-1/2"	Set At: Feet 7106'	Tubing: Diameter 1-1/2	Set At: Feet 6790'
Pay Zone: From 6949'	To 7069'	Total Depth:	
Stimulation Method Sand-Water Frac		Flow Through Casing	Flow Through Tubing X

Choke Size, Inches 3/4"		Choke Constant: C 14.1605	
Shut-In Pressure, Casing, PSIG 2019	+ 12 = PSIA 2031	Days Shut-In 7	Shut-In Pressure, Tubing PSIG 2013
Flowing Pressure: P 197	+ 12 = PSIA 209		Working Pressure: P _w PSIG 1169
Temperature: T 87	n = 0.75		F _{pv} (From Tables) 1.021
			Gravity 0.70

$$\text{CHOKE VOLUME} = Q = C \times P_i \times F_i \times F_g \times F_{pv}$$

$$Q = 14.1605 \times 209 \times .9804 \times .9258 \times 1.021 = 2740 \text{ MCF/D}$$

$$\text{OPEN FLOW} = Aof = Q \left(\frac{P_c^2}{P_c^2 - P_w^2} \right)^n$$

$$Aof = Q \left(\frac{4100625}{2705864} \right)^n = Q (1.515459)^n$$

$$Aof = 3740 \text{ MCF/D}$$

TESTED BY Case

WITNESSED BY Phillips

B. G. Jarama