

DRILLING AND COMPLETION HISTORY

CONSOLIDATED OIL & GAS, INC.

NORTHWEST FEDERAL NO. 3-6

Rio Arriba County, New Mexico

July 24, 1964

LOCATION:	895' FNL, 1850' FWL, Section 6 T26N-R4W, NMPM		
ELEVATION:	7192' GL 7204' KB (All measurements from KB)		
SPUD:	May 31, 1964		
DRILLING COMPLETED:	June 16, 1964		
WELL COMPLETED:	July 1, 1964		
TOTAL DEPTH:	8390' 8351' PBTD		
CASING: Surface	12 3/4" set at 196' with 195 sx. regular 2% CaCl ₂ cement.		
Intermediate	7 5/8" 26.40# set at 4154' with 75 sx. Class C with 12% gel and 25 sx. regular 2% CaCl ₂ .		
Production	5 1/2" 15.50# set at 8390', top of liner at 4092', cemented with 290 sx. Class C, 50/50 Pozmix with 4% gel.		
TUBING:	1 1/2" upset set at 8078', Model D packer at 8060'. 1" regular set at 7631'.		
LOGS:	Lane Wells Gamma Ray/Neutron		
CORES & DRILLSTEM:	None		
FORMATION TOPS: (Log)	Pictured Cliffs	3934'	(+3270)
	Cliffhouse	5605'	(+1599)
	Point Lookout	6104'	(+1100)
	Tocito	7654'	(- 450)
	Graneros	8122'	(- 918)
	Dakota	8234'	(-1030)
PRODUCING PERFS:	DK	Gallup	
	8126' - 8164'	7656' - 7659'	
	8242' - 8252'	7664' - 7666'	
	8270' - 8284'	7672' - 7676'	
	8315' - 8321'		
TREATMENT: DK	Sand water frac with 87,000# sand and 123,522 gal. water in two stages.		
Gallup	Sand oil frac with 25,000# sand and 39,984 gal. oil.		
INITIAL POTENTIAL: DK	Flow volume thru 3/4" choke: 1040 MCFD		
Gallup	Flow volume thru 3/4" choke: 622 MCFD		
	Calculated Absolute Open Flow Potential: 642 MCFD		

WELL: NORTHWEST FEDERAL NO. 3-6
895' FNL, 1850' FWL, Sec. 6-T26N-R4W
FIELD: Basin Dakota, Undesignated Gallup
COUNTY: Rio Arriba STATE: New Mexico
ELEVATIONS: 7192' GL
7204' KB

5/30/64

Moving in rotary rig.

5/31/64

Rigged up. Drilled rat hole and mouse hole. Drilled 70'. Swivel went out. Present operation, waiting on swivel.

6/1/64

Drilled 206' of 17 1/2" hole. Ran 10 joints of 12 3/4" surface casing set at 196' KB. Cemented with 195 sx. regular 2% CaCl₂ cement. Plug down 8:45 p.m. 5/31/64. Good returns on cement. Nippling up, preparing to drill.

6/2/64

Depth 1460'. Drilled 1254' of sand and shale. Dev. 1/4° at 500', 1/2° at 900', 1/2° at 900', 1/2° at 1400'. Present operation, waiting on pump motor.

6/3/64

Depth 2096'. Drilled 636' of sand and shale. Mud 9.0. Vis. 42. Dev. 1° at 1950'. Present operation, drilling with Bit 2.

6/4/64

Depth 2745'. Drilled 648' of sand and shale. Drilling with Bit 3. Mud 9.2. Vis. 46. Water loss 8. Dev. 1/4° at 2288'.

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6/5/64

Depth 3100'. Drilled 355' of sand and shale. Drilling with Bit 4. Mud 9.2. Vis. 44. Water loss 10. Dev. 3/4° at 2900'.

6/6/64

Depth 3361'. Drilled 261' of sand and shale. Present operation, drilling with Bit 5. Dev. 3/4° at 3100'. Mud 9.5. Vis. 48. Water loss 9. Mud cake 2/32. PH 7.5.

6/7/64

Depth 3666'. Drilled 305' of sand and shale. Mud 9.5. Vis. 45. Water loss 10.4. Dev. 3/4° at 3580'. Present operation, drilling with Bit 9.

6/8/64

Depth 4007'. Drilled 341' of sand and shale. Mud 9.5. Vis. 50. Water loss 9.5. Dev. 3/4° at 3580'. Present operation, drilling with Bit 7.

6/9/64

Depth 4150'. Drilled 147' of sand and shale. Mud 9.4. Vis. 70. Water loss 6. Dev. 1° at 4080'. Present operation, running 7 5/8" casing.

6/10/64

Depth 4205'. Drilled 55' of sand and shale. Drilling with Bit 9. Ran 103 joints of 7 5/8" 26.40# for total of 4157.50' set at 4153.50' KB. Float collar at 4113.50' KB. Pretreated 200 bbls. of mud with 0.06 gal. Hydrazine per bbl. and one gal./bbl. Bactrine No. 2. Cemented with 75 sx. Class C with 12% gel, tailed in with 25 sx. regular CaCl₂. Plug down 8:15 a.m. 6/9/64. Bumped plug with 2000#, held OK. Note: lost all circulation after 60 bbls. of displacement.

6/11/64

Depth 5153'. Drilled 948' of sand and shale. Present operation, drilling with Bit 9. Dev. 3/4° at 4340', 3/4° at 5165'.

6/12/64

Depth 5895'. Drilled 742' of sand and shale. Drilling with Bit 10. Dev. 1° at 5480'. Picked up small amount of gas at 5709'.

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6/13/64

Depth 6380'. Drilled 485' of sand and shale. Dev. 1 1/4° at 6360'. Had visible moisture to surface after trip at 6378'. Blew hole 3 1/2 hours. Present operation, drilling with Bit 11.

6/14/64

Depth 7470'. Drilled 1090' of sand and shale. Dev. 1 1/2° at 6840', 2° at 7380'. Present operation, drilling with Bit 9.

6/15/64

Depth 8110'. Drilled 640' of sand and shale. Dev. 2 3/4° at 7925'. Present operation, drilling with Bit 12. Had oil on bottom two stands of drill pipe when making trip at 7850'. Had to blow well 3 3/4 hours to start dusting.

6/16/64

Depth 8385' TD. Drilled 275' of sand and shale. Present operation, running 5 1/2" liner. Picked up small amount of natural in the DK.

6/17/64

Ran 126 joints of 5 1/2", 15.50# total of 4297.50' set at 8389.54' KB. Float collar at 8355.43' KB, top of liner at 4092.4' KB, cemented with 290 sx. of Class "C", 50/50 Pozmix with 4% gel. Plug down at 9:15 a.m. 6/16/64. Bumped plug with 2000#, held OK.

6/20/64

Cleaned out to float collar at 8351'. Pressured up to 2000 psi. Held OK. Rigged up Lane Wells. Ran Gamma-ray neutron log. Released rig

6/24/64

Moving in completion rig.

6/25/64

Rigged up, went in hole blowing down. Perforated 8242'-8252', 8270'-8284', 8315'-8321', four jets per foot. Loaded hole with water, attempted to break down formation. Perforations held 4000#. Present operation, waiting on acid. Will spot acid, perforate Graneros and frac entire section.

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6/26/64

Spotted 1000 gal. of regular 15% acid. Pressure up to 1750 psi. Formation broke, put away 8 bbls. of acid, came out, hooked up Western. Treated with 37,000# 20-40 sand. Average treating pressure 2800#, average injection rate 35.6 BPM. Job complete at 9:16 p.m. Set Baker magnesium bridge plug at 8210'. Perforated four per foot from 8126'-8164', treated with 50,000# 20-40 sand. Average treating pressure 2500#, average injection rate 37.9 BPM. Flushed with 290 bbls. oil. Job completed at 1:08 a.m. Set Baker bridge plug at 8030'. Perforated two per foot from 7656'-7659', 7664'-7666', 7672'-7686'. Treated with 25,000# 20-40 sand. Average treating pressure 2500#, average injection rate 37.4 BPM. Job completed at 5:22 a.m. Present operation, preparing to flow Gallup oil back.

Dakota

Perforated 8242'-8252', 8270'-8284', 8315'-8321', four per foot. Put 15 bbls. of acid away.

Broke	1750 psi	Initial injection rate	37 BPM
Initial treating pressure	2000 psi	Maximum injection rate	37.5 BPM
Maximum treat. press.	3150 psi	Minimum injection rate	32 BPM
Minimum treat. press.	2000 psi	Final injection rate	32 BPM
Final treating pressure	3150 psi	Average injection rate	35.6 BPM
Average treat. press.	2800 psi	sand	37,000# 20-40
Instant shut in press.	2550 psi	Total fluid	52,080 gallons
10 min. shut in press.	2200 psi	Treat. fluid	37,422 gallons
Hydraulic HP	2443	Additives	365 lbs. J-2
Job complete 9:16 p.m.		Balls	45 in 120 holes

Dakota - Second Stage

Perforated 8126'-8164', four per foot. Bridge plug at 8210', pressured to 3400 psi. Bled back to 2800 psi, start pumps:

Broke	2850 psi	Initial injection rate	40 BPM
Initial treat. pressure	2300 psi	Maximum injection rate	40 BPM
Maximum treat. press.	3100 psi	Minimum injection rate	35 BPM
Minimum treat. press.	2300 psi	Final injection rate	35 BPM
Final treating pressure	3100 psi	Average injection rate	37.9 BPM
Average treating press.	2500 psi	Sand	50,000 lbs. 20-40
Instant shut in press.	2650 psi	Total fluid	71,442 gal.
10 min. shut in press.	2200 psi	Treat. fluid	55,692 gal.
Hydraulic HP	2322	Oil flush	12,180 gal.
Job complete 1:08 a.m.		Additives	500 lbs. J-2
		Balls	90 in 152 holes

OPEN FLOW TEST DATA

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6/26/64 Cont'd.

Gallup - Third Stage

Bridge plug at 8020'. Perforations 7656'-7659', 7664'-7666', 7672'-7676', two per foot. Five FM 600's.

Broke	1500 psi	Initial injection rate	37 BPM
Initial treating pressure	2000 psi	Maximum injection rate	38 BPM
Maximum treat. press.	2800 psi	Minimum injection rate	32 BPM
Minimum treat. press.	2400 psi	Final injection rate	32 BPM
Final treating press.	2800 psi	Average injection rate	37.4 BPM
Average treating press.	2500 psi	Sand	25,000 lbs. 20-40
Instant shut in press.	1850 psi	Total fluid (oil)	39,984 gallons
10 minute shut in press.	1700 psi	Treat. fluid (oil)	26,712 gallons
Hydraulic HP	2291	Additives	1200 lbs. Mark II
Job completed 5:22 a.m.		Balls	25 in 38 holes

6/27/64

Started flowing well back. Flowed back until 3:00 p.m. Went in blowing down. Kicked off at 8:00 p.m. blowing at 2550'. Well unloaded and started cleaning up. Gauged well at 1500 MCFD. Blew down to 7915'. Cleaned out sand down to 8030'. Recovered total of 487 BO. Gauged well at 1250 MCFD. Present operation, blowing at 8030', preparing to drill bridge plug.

6/28/64

Gauged well at 700 MCFD. Drilled bridge plug at 8030'. Well did not log off. Pushed plug to 8110'. Hit sand. Cleaned out to 8210'. Well making large amount of sand with 1 1/2" stream of water. Cleaned up and gauged at 1000 MCFD with 1" stream of water and oil. Drilled plug at 8210'. Well unloaded. On bottom at 2:30 a.m. Gauged at 1300 MCFD at 5:30 a.m. Making 1" to 1 1/2" stream of water with trace of oil. Quite a bit of sand. Gauged well at 1300 MCFD at 7:30 a.m. with 1/2" to 3/4" stream of fluid. Estimated 50% oil. Sand decreasing.

6/29/64

Laid down completion string. Rigged up Lane Wells. Set Model D packer at 8060', ran 249 joints of 1 1/2" upset tubing for 8054.43', set at 8078.43' KB. Ran 242 joints of 1" regular tubing for 7619', set at 7631.20' KB. Present operation, preparing to pump out pumpout plug out of Dakota tubing.

Operator Consolidated Oil & Gas, Inc.		Lease Northwest Federal No. 3-6	
Location 895' FNL & 1850' FWL, Sec. 6-26N-4W		County Rio Arriba	State New Mexico
Formation Dakota		Pool Basin	
Casing Diameter 5-1/2"	Set At: Feet 8390	Tubing Diameter 1-1/2"	Set At: Feet 8078
Pay Zone: From 8126	To 8321	Total Depth 8390	
Stimulation Method Sand Water Frac		Flow Through Casing	Flow Through Tubing X

Choke Size, inches 0.75	Choke Constant, C 14,1605		
Shut-in Pressure, Casing, PSIG Gallup	- 12 = PSIA 7	Shut-in Pressure, Tubing, PSIG 1503	- 12 = PSIA 1512
Flowing Pressure, P, PSIG 65	- 12 = PSIA 77	Working Pressure, P _w , PSIG	- 12 = PSIA
Temperature, T, °F 42	n = 0.75	F _{pw} (From Tables) 1.013	Gravity 0.7 (est.)

$$\text{CHOKE VOLUME} = Q = C \times P_1 \times F_1 \times F_2 \times F_3$$

$$Q = 14,1605 \times 77 \times 1.0178 \times .9258 \times 1.013 = 1040 \text{ MCF/D}$$

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

$$Aof = \left(\frac{P_s}{P_s - P_w} \right)^n$$

$$Aof \text{ ----- MCF D}$$

TESTED BY: John Walker

WITNESSED BY: Clyde Phillips

W. H. Williams
W. H. Williams, Chief Engineer

OPEN FLOW TEST DATA

DATE: July 20, 1964

WELL:

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6/30/64

Pumped plug out of Dakota string, well went on vacume, shut both zones in before landing Dakota tubing. Well gauged 1200 MCFD after landing DK tubing. Gallup gauged 525 MCFD this a.m. DK 1800 psi, Gallup 1360 psi tubing, 1120 psi casing.

7/1/64

Will test both zones today.

7/11/64

Pulling unit got lost and had to wait on unit. Rigged up Rota-Cone unit. Pulled up to 4283' and blew around. Ran into 5133' and logged off. Pulled up to 5000' and blew around. Started bringing spray in one hour and fluid in 1 hr. 15 min. Small slugs of fluid. Unloading oil and forming agent. Left blowing over night. This a.m. has dry gas. Preparing to lower tubing. Will try to unload tubing going down casing.

7/12/64

Blew around at 5447'. No fluid. Blew around at 5761', no fluid, 800 MCFD. Light spray of oil. Gauged at 800 MCFD with supply gas on. Blew around at 6526'. Gauged at 450 MCFD. Logged off at 7000'. Turned supply gas down casing. Had to pull up to 5000' to break circulation. Recovered approximately 1 bbl. of water cut oil. Present operation, pulling 1" to run 1 1/2" IJ.

7/13/64

Pulled total of 242 joint of 1" upset. Started running 1 1/2" IJ at 5840'. Blew estimated 10 bbls. slightly oil cut water. Blew down to 7688'. Had heavy spray for 30 minutes, blew for 2 hours with steady spray of water and condensate. Shut in, gauged at 350 MCFD. This a.m. gauged at 250 MCFD. Turned on supply gas, have heavy spray of oil cut water - 70% water in sample. Present operation, preparing to land 1 1/2" IJ.

Operator Consolidated Oil & Gas, Inc.		Lease Northwest Federal No. 3-6	
Location 895' FNL, 1850' FWL, Sec. 6-26N-4W		County Rio Arriba	State New Mexico
Formation Gallup		Pool Undesignated	
Casing Diameter 5-1/2"	Set At: Feet 8390	Tubing Diameter 1"	Set At: Feet 7631
Pay Zone: From 7656	To 7676	Total Depth 8390	
Stimulation Method Sand Oil Frac		Flow Through Casing	Flow Through Tubing X

Choke Size, inches 0.75	Choke Constant, C 14,1605		
Shut-in Pressure, Casing, PSIG 1689	- 12 = PSIA 1701	Shut-in Pressure, Tubing, PSIG 1681	- 12 = PSIA 1693
Flowing Pressure, P, PSIG 34	- 12 = PSIA 46	Working Pressure, P _w , PSIG 333	- 12 = PSIA 345
Temperature, T, °F 42	n = 0.75	F _{pw} (From Tables) 1.013	Gravity 0.70 (est.)

$$\text{CHOKE VOLUME} - Q = C \times P_1 \times F_1 \times F_2 \times F_3$$

$$Q = 14,1605 \times 46 \times 1.0178 \times .9258 \times 1.013 = 622 \text{ MCF/D}$$

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

$$Aof = \left(\frac{2,893,401}{2,774,376} \right)^n \cdot 1.043^{.75} = 1.032$$

$$Aof \text{ ----- 642 MCF D}$$

TESTED BY: John Walker

WITNESSED BY: Clyde Phillips

W. H. Williams
W. H. Williams, Chief Engineer