

DRILLING AND COMPLETION HISTORY

CONSOLIDATED OIL & GAS, INC.

GOVERNMENT GROSS NO. 1-7

San Juan County, New Mexico

June 13, 1960

Location: 845' F/SL, 1650' F/WL
Section 7, T31N, R12W, N.M.P.M.

Elevation: 5900' Ground
5912' K.B. - all measurements from K.B.

Spud: April 15, 1960

Drilling Completed: May 15, 1960
Well Completed: May 25, 1960

Total Depth: 6860' Drilled
6843' Plug Back

Casing:

Surface: 9-5/8", 36# H-40 cemented at 210' w/150 sx
2% CaCl₂ cement

Production: 5-1/2", 17# J-55 cemented at 6859' w/225 sx
6% gel cement thru shoe, and 175 sx 50% pozmix,
12% Gilsonite cement thru stage collar at 4868'.
Top of cement - 5475' first stage, 3795' second
stage.

Tubing: 1-1/4" EUE CW hung at 6720'

Logs: Lane Wells Gamma Ray-Neutron & Cementon

Cores and Drillstem Tests: None

Formation Tops: (Log)

| | | |
|-----------------|-------|-----------|
| Pictured Cliffs | 2250' | (/ 3662') |
| Mesa Verde | 3797' | (/ 2115') |
| Cliffhouse | 3857' | (/ 2055') |
| Menefee | 4046' | (/ 1866') |
| Pt. Lookout | 4584' | (/ 1328') |
| Mancos | 4945' | (/ 967') |
| Greenhorn | 6610' | (- 698') |
| Dakota | 6736' | (- 824') |

Producing Perforations: 6740' - 6763' 6804' - 6820'
6768' - 6796' 6828' - 6836'
6782' - 6787'

Treatment: Sand-Water Frac w/50,000 lbs. 20-40 mesh
sand, 50,000 gal. water, 750 gal. MCA acid

Initial Potential: Flow volume thru 3/4" choke, 1795 MCFD;
Calculated Absolute Open Flow Potential
2730 MCFD.

WELL: GOVERNMENT GROSS NO. 1-7 (845' F/SL & 1650' F/WL of Sec. 7,
T31N, R12W, N.M.P.M.)

FIELD: Undesignated
COUNTRY: San Juan STATE: New Mexico
SPUD DATE: April 15, 1960
ELEVATIONS: 5900' GD
5912' KB

4/5/60

Drilling at 50'.

4/16/60

Drilling at 360'. Drilled 210' of 13-3/4" hole. Ran 7 joints (200') 9-5/8" casing set at 210' KB. Cemented with 150 sacks regular cement with 2% CaCl. Plug down 3:30 p.m. Deviation on surface hole 1/4 degree at 90' and 1/2 degree at 180'. Pressured up 700 psig for 15 minutes - held OK.

4/17/60

Drilling at 1832'. Drilled 1472'. Presently drilling with Bit No. 2 using water. Deviation 1/2 degree at 500', 1/2 degree at 975' and 3/4 degree at 1430'.

4/18/60

Drilling at 2640'. Drilled 818', sand and shale. Presently drilling with Bit No. 3. Mud 8.8 - 39. Deviation 3/4 degree at 2000' and 3/4 degree at 2520'.

4/19/60

Drilling at 3266'. Drilled 626', sand and shale. Presently tripping for Bit No. 5. Mud 9.1 - 42. Deviation 1/2 degree at 2880'.

4/20/60

Drilling at 3507'. Drilled 241', sand and shale. Mud 9.3 - 49. Deviation 3/4 degree at 3400'.

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4/21/60

Drilling at 3728'. Drilled 221', sand and shale. Presently tripping for Bit No. 9. Mud 9.3 - 40. Water loss 9.2%. Deviation 1/2 degree at 3500'.

4/22/60

Drilling at 3859'. Drilled 131', sand and shale. Presently tripping for Bit No. 11. Mud 9.3 - 40. Water loss 9.6. 3/4 degree deviation at 3600'.

4/23/60

Drilling at 3971'. Drilled 112', sand and shale, using Bit No. 12. Mud 9.5 - 49. Water loss 9.6.

4/25/60

Drilling at 4290'. Drilled 233', sand and shale. Present operation drilling with Bit No. 14. Mud 9.4 - 46. Water loss 10%. Deviation 3/4 degree at 4225'.

4/26/60

Drilling at 4485'. Drilled 195', sand and shale, with Bit No. 16. Mud 9.4 - 44. Water loss 8.2%.

4/27/60

Drilling at 4627'. Drilled 142', sand and shale. Tripping for Bit No. 17. Mud 9.6 - 60. Water loss 8.9%. Lost 350 barrels mud at 4600'.

4/28/60

Drilling at 4778'. Drilled 151', sand and shale. Presently drilling with Bit No. 19. Mud 9.7 - 50. Water loss 8%.

4/29/60

Drilling at 4907'. Drilled 129', sand and shale, using Bit No. 20. Mud 9.7 - 50. Deviation 3/4 degree at 4845'. Present operation mixing mud.

Lost circulation for 6-3/4 hours. Lost 300 lbs. at 4901', got back and lost again at 4907'.

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4/20/60

Drilling at 5,007'. Drilled 100', sand and shale, using Bit No. 21. Mud 9.2 - 47. Water loss 8.2%. Lost circulation from 4109' to 4945'.

5/1/60

Drilling at 5,177'. Drilled 170', sand and shale. Tripping for Bit No. 22. Mud 9.2 - 60. Water loss 8.2%.

5/2/60

Drilling at 5440'. Drilled 263', sand and shale. Tripping for Bit No. 23. Mud 9.1 - 58. Water loss 9%.

5/3/60

Drilling at 5583'. Drilled 143', sand and shale, using Bit No. 23. Mud 9.3 - 60. Water loss 9. Deviation 1/2 degree at 5520'.

5/4/60

Drilling at 5785'. Drilled 202', sand and shale. Presently tripping for Bit No. 24. Mud 9.3 - 82. Water loss 8.8.

5/5/60

Drilling at 5977'. Drilled 192', sand and shale. Presently tripping for Bit No. 26. Mud 9.4 - 62. Water loss 8.8.

Bit No. 25 came off bottom at 5977'. Made 1921' in 14 hours.

5/6/60

Drilling at 6194'. Drilled 217', sand and shale. Tripping for Bit No. 27. Mud 9.3 - 62. Water loss 7.2. Deviation 3/4 degree at 6150'.

5/9/60

Total Depth 6726. Drilled 145 feet. Sand and Shale. Present operation-tripping for Bit No. 30. Mud weight 9.4, viscosity 93, water loss 6.6.

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5/10/60

Drilling at 6767'. Drilled 41', sand and shale, using Bit No. 31. Mud 9.3 - 110. Water loss 6.

5/11/60

Drilling at 6808'. Drilled 41', sand, using Bit No. 31. Mud 9.4 - 99. Water loss 6. pH = 9. Mud cake 2/32nds. Slit. loss of circulation throughout past 24 hours with some hole trouble.

5/12/60

Drilling at 6847'. Drilled 39', sand. Tripping for Bit No. 33. Mud 9.3 - 118. Water loss 9.8.

5/13/60

Total depth 6860'. Laying down drillpipe. Ran radioactivity logs. Will run 5 1/2" casing. Dakota Sand excellent by logging indications. Mud 9.4 - 120. Water loss 9.

5/14/60

TD 6660'. PBTD 6843'. WOC. Picking up 2 1/2" EUE tubing in anticipation of drilling out cement - clearing to PBTD and releasing rotary rig. Ran 200 joints 5 1/2" - 17 1/2 - J-55 new casing. Set at 6859' KB. Cemented with 225 sacks with 6% gel with full returns throughout. Bumped plugs with 3,000 psig, tested floats - OK. Preceded cement job with 10 barrels water treated with caustic and quebracho.

Cemented Mesa Verde through DV tool at 4868'. Cemented with 175 sacks (50-50 pozmix) with 12 1/2 lbs. Gilsontite per sack and 4% gel. Full returns throughout job. Bumped plugs OK - checked sleeve - holding OK. Released pressure.

Centralizers at 6850, 6809, 6709, 6710, 4902, 4840, 4703, 4535'. Umbrellas at 4900', 4534', 4503'.

5/15/60

Laying down drilling tubing. Picked up 2-7/8" tubing, drilled out stage collar, cleaned out to 6840' TD. Spotted 750 gallons 15% HCl on bottom.

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5/16/60

Rig released 10:00 a.m. 5/15/60. Moving off. Will move on completion rig next week.

5/18/60

Shut in. Preparing to frac tomorrow. Ran Gamma Ray collar log and cement log yesterday. Checked PBTD 6840'. Cement confirmed in following intervals:

5475' - TD
3795' - 4900'

Perforated with 2 bullets and 2 jets per foot as follows:

6740' - 6763'
6768' - 6776'
6782' - 6787'
6804' - 6820'
6828' - 6836'

5/19/60

Preparing to frac today.

5/20/60

Moving on completion rig to clean out frac sand filled up to 5400' and preparing to refrac. Sand-water fraced yesterday as follows:

Pumped away 750 gallons 15% MCA - initial injection pressure 1400 psig, gradually decreasing throughout three-hour period during which acid was staged.

Began injecting at 46 bpm at 1900 psig with 3/4 lbs. sand per gallon, gradually increasing to 1 lb. per gallon. After 10,000 lbs. sand injected, lost one pump truck because of mechanical failure. Continued pumping at 30 bpm at 1650 psig. Injected 50 balls after 20,000 lbs. sand with no pressure increase - dropped 25 additional balls with 100 psig pressure increase. Now pumping at 31 bpm at 2,000 psig with 40,000 lbs. sand in. Dropped 25 balls with pressure increase to 2200 psig, increasing rapidly to 2900 psig and dropping back to 2500 psig, at 24 bpm at 3,000 psig with rapid increase to 3500 psig. Ceased pumping. Opened well, which backflowed about 30 minutes - measured sand fillup at 5400'.

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5/24/60

Swabbing well. Continued cleaning out frac sand to PBTD of 6840'. Pulled and laid down workover tubing. Picked up and ran 1 1/2" EUE completion tubing set at 6720' KB. Jet collars at 6192', 5685', 5177'. Have now swabbed only 45 minutes.

5/25/60

Swabbing. Have swabbed continually for about 24 hours from 5,000'. Found fluid level at 2000' to 2500' after each swab run. Response is slow because of small tubing. Well now appears quite lively and is threatening to come in.

5/26/60

Blowing Dakota. Well blew in about 1:00 p.m. yesterday after swabbing 30 hours thru 1 1/2" tubing. Casing pressure now 690 psig. Well looks strong but unloading lots of frac water.

5/27/60

Shut in for pressure build up and intermittent flowing for cleanup. Gauged 1200 MCFD yesterday p.m. after 30 hours continuous blowing to atmosphere. Making heavy water fog.

5/29/60

Shut in for 7-day pressure buildup and official potential test. Tested yesterday. Well had been shut in approximately 30 hours with pressure buildup to 1650 psig tubing - 1725 psig casing. Flow rate 1500 MCFD after 3 hours through 3/4" choke - well blowing fairly dry.

6/6/60

Running Official Potential Test and Back Pressure Test with subsurface pressure bomb.

6/9/60

Shut in after running standard potential test yesterday. Attempted to run test on 6/6/60, but unable to get sub-surface pressure bomb below

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5/20/60 (Continued)

JOB SUMMARY:

55,000 gal. water
50,000 lbs. (20-40 mesh) sand
750 gal. 15% MCA
100 balls
24 to 46 bpm
1600 to 3500 psig

Because of mechanical problems with HOMO frac equipment, we conclude that a sub-standard frac was obtained.

5/21/60

Cleaned out frac sand at 5950'. Cleaned solid sand from 5388' to 5410' - had 120' break and solid sand since. Water appears gassy.

5/22/60

Putting tubing in preparation for refrac. Cleaned sand to 6840' PBTD. Picked first frac balls 400' off bottom. Circulating water continually gas cut. Moderate lost circulation opposite perforations.

5/23/60

Cleaning out sand at 6600'.

Re-Frac Summary:

24,000 lbs. (20-40 mesh) sand
25,000 gal. water
38 bpm
1900-3500 psig

Began injecting at 1900 psig at 43 bpm. Injected 10,000 lbs. sand at these conditions. Pressure then gradually increased to 2700 psig with rate decreasing to 33 bpm for the next 10,000 lbs. Pressure increased rapidly during remainder of job with indicated sand-out after 24,000 lbs. sand at 3500-4000 psig. Opened well after 30 minutes and backflowed for 10 minutes - well died. Measured top of sand at 5933'.

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6/9/60 (Continued)

6,000'. The sub-surface pressure data gathered were as follows:

Static tubing pressure - (9 days shut in) 1829 psig
- at 2,000' 1979 psig
at 4,000' 2130 psig

These data indicate a dry static column gradient of 0.075 psig per foot. Therefore, we can project a sand face pressure at 6750' of 2334 psig. However, experience throughout the area with wells at this early stage of post-frac cleanup indicates we may add at least 150 psig for bottom hole liquid accumulation. We, therefore, estimate static reservoir pressure at about 2500 psig.

Surface data gathered during yesterday's potential test were as follows:

| Time | Casing Pressure | Tubing Pressure | Temperature |
|--------------------|-----------------|-----------------|-------------|
| <u>3/4" Choke:</u> | | | |
| 0 | 1899 psig | 1897 psig | - |
| 60 | 1480 | 179 | 62 |
| 120 | 1349 | 146 | 69 |
| 180 | 1239 | 124 * | 70 |
| * 1795 MCFD | | | |
| <u>1/2" Choke:</u> | | | |
| 75 | 1177 psig | 278 | 74 |
| 105 | 1171 | 276 ** | 76 |
| ** 1430 MCFD | | | |
| <u>3/8" Choke:</u> | | | |
| 75 | 1047 psig | 375 | 80 |
| 105 | 1039 | 375 *** | 80 |
| *** 1060 MCFD | | | |

Flow stream contained heavy frac water fog.

OPEN FLOW TEST DATA

DATE June 8, 1960

| | | | |
|--|--------------------------|-----------------------------------|--------------------------|
| Operator Consolidated Oil & Gas, Inc. | | Lease Government Gross No. 1-7 | |
| Location SW of Sec. 7 - T31N-R12W | | County San Juan | State New Mexico |
| Formation Dakota | | Pool Undesignated Dakota | |
| Casing: Diameter 5-1/2" | Set At: Feet 6859' KB | Tubing: Diameter 1-1/4" | Set At: Feet 6720' KB |
| Pay Zone: From 6740' | To 6836' KB | Total Depth: 6860' KB | |
| 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 1899 | + 12 = PSIA 1911 | Days Shut-In 10 | Shut-In Pressure, Tubing PSIG 1897 | + 12 = PSIA 1909 | |
| Flowing Pressure: P PSIG 124 | + 12 = PSIA 136 | | Working Pressure: P _w PSIG 1239 | + 12 = PSIA 1251 | |
| Temperature: T °F 70 | n = 0.75 | | Fpv (From Tables) 1.015 | Gravity 0.7 | |

CHOKE VOLUME : $Q = C \times P_r \times F_r \times F_g \times F_{pv}$

$$Q = 14,1605 \times 136 \times 0.9905 \times 0.9258 \times 1.015 = 1795 \text{ MCF/D}$$

$$\text{OPEN FLOW} - A_{of} = Q \left(\frac{P_c^2}{P_c^2 - P_w^2} \right)^n = 1795 \times \frac{3,655,000}{3,655,000 - 1,565,000}^{0.75}$$

$$A_{of} = 1795 \left(\frac{3,655}{2,090} \right)^{0.75} = (1.75)^{0.75} \times 1795 = 1.52 \times 1795$$

$$A_{of} = 2730 \text{ MCF/D}$$

TESTED BY Clyde Phillips

WITNESSED BY