

# DRILLING AND COMPLETION HISTORY

## CONSOLIDATED OIL & GAS, INC.

KLINE NO. 1-10

San Juan County, New Mexico  
June 20, 1961

Location: 1850' F/NL & 1550' F/EL, Section 10  
T31N-R13W, N. M. P. M.

Elevation: 5715' Ground  
5727' K. B. - all measurements from K. B.

Spud: April 17, 1961

Drilling Completed: May 11, 1961  
Well Completed: May 24, 1961

Total Depth: 6690' Drilled  
6686' Plug Back

Casing:  
Surface: 9 5/8", 32.30# H-40 cemented at 193' x/132 sx  
2% CaCl<sub>2</sub> cement.

Production: 5 1/2", 15.5# J-55 cemented at 6686' w/100 sx  
4% gel plus 125 sx neat thru shoe, and 200 sx  
50% Pozmix w/12% Gilsonite and 4% gel cement  
thru stage collar at 4739'.

Tubing: MV - 1" CW hung at 4215'.  
DK - 1 1/2" IJ J-55 hung at 6487'.

Logs: Schlumberger Gamma Ray-Neutron.

Cores and Drillstem Tests: None

Formation Tops: (Log)

|                 |       |           |
|-----------------|-------|-----------|
| Pictured Cliffs | 1950' | (+ 3777') |
| Mesa Verde      | 3528' | (+ 2199') |
| Cliffhouse      | 3660' | (+ 2067') |
| Menefee         | 3810' | (+ 1917') |
| Pt. Lookout     | 4280' | (+ 1447') |
| Mancos          | 4600' | (+ 1127') |
| Greenhorn       | 6394' | (- 667')  |
| Dakota          | 6514' | (- 787')  |

Producing Perforations:

|  | MV            | DK            |
|--|---------------|---------------|
|  | 4285' - 4287' | 6525' - 6549' |
|  | 4315' - 4325' | 6555' - 6576' |
|  | 4367' - 4375' | 6593' - 6601' |
|  | 4384' - 4394' | 6613' - 6615' |
|  | 4433' - 4438' | 6631' - 6639' |
|  | 4454' - 4458' |               |

Treatment: Sand-water Frac:  
Mesaverde: 95,000# (20-40 mesh) sand, 80,000  
gal. water.  
Dakota: 114,000# (40-60 and 20-40 mesh)  
sand, 112,000 gal. water, 1500 gal.  
acid in three stages.

Initial Potential: MV Flow volume thru 3/4" choke: 736 MCFD  
Calculated Absolute Open Flow Potential:  
887 MCFD

DK Flow volume thru 3/4" choke: 1858 MCFD

WELL: KLINE NO. 1-10  
(1850' F/NL & 1550' F/EL of Sec. 10-31N-13W)

FIELD: Basin Dakota & Blanco Mesaverde

COUNTY: San Juan STATE: New Mexico

ELEVATIONS: 5715' GD  
5727' KB

4/17/61

MIRT (moving in rotary tools).

4/18/61

Drilled 200'. 13 3/4" hole. Ran 181' of 9 5/8" surface casing. Set at 193' KB. Cemented with 132 sx cement with 2% CaCl<sub>2</sub>. Plug down at 4:00 a. m.

4/19/61

Depth 1050'. Drilled 850'. Shale. Trip for Bit No. 2. Mud 8.8. Vis. 31. Dev. 1/2° at 600'.

4/20/61

Depth 2673'. Drilled 1024'. Trip for Bit No. 4. Mud 9.1. Vis. 34. Dev. 1 1/2° at 1970'.

4/21/61

Depth 2874'. Drilling with Bit No. 5. Mud 9.2. Vis. 36. 4% oil. Dev. 1 1/4° at 2500'.

4/22/61

Depth 3290'. Drilled 416'. Sand and shale. Drilling with Bit No. 7. Mud 9.3. Vis. 43. Water loss 10%. Dev. 1/4° at 3200'.

4/23/61

Depth 3521'. Drilled 231'

4/24/61

Depth 3702'. Drilled 181'. Sand. Drilling with Bit No. 11. Mud 9.2. Vis. 39. Water loss 6. 4% oil.

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4/25/61

Depth 3914'. Drilled 212'. Sand. Drilling with Bit No. 14. Mud 9.2. Vis. 37. Water loss 7. 5% oil.

4/26/61

Depth 4289'. Drilled 375'. Sand and shale. Making trip for Bit No. 16. Mud 9.2. Vis. 38. Water loss 6.8. Dev. 3/4° at 4200'.

4/27/61

Depth 4589'. Drilled 300'. Sand and shale. Drilling with Bit No. 17. Mud 9.1. Vis. 38. Water loss 6.2. 5% oil.

4/28/61

Depth 4845'. Drilled 260'. Sand and shale. Drilling with Bit No. 18. Mud 9.2. Water loss 7. Vis. 39. Dev. 1° at 4800'.

4/29/61

Depth 5118'. Drilled 273'. Sand and shale. Drilling with Bit 21. Mud 9.4. Vis. 42. Water loss 8.

4/30/61

Depth 5410'. Drilled 290'. Sand and shale. Drilling with Bit 22. Mud 9.4. Vis. 46. Water loss 8. Dev. 3/4° at 5300'.

5/1/61

Depth 5635'. Drilled 224'. Sand and shale. Trip for Bit 24. Mud 9.4. Vis. 44. Water loss 9.

5/2/61

Depth 5904'. Drilled 270'. Sand and shale. Trip for Bit No. 25. Mud 9.4. Vis. 47. Water loss 8.2. Dev. 1° at 5660'.

5/3/61

Depth 6140'. Drilled 236'. Sand and shale. Drilling with Bit 26. Mud 9.4. Vis. 47. Water loss 8. 9% oil.

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5/4/61

Depth 6322'. Drilled 182'. Sand and shale. Mud 9.4. Vis. 49. Water loss 8.4. Waiting on orders.

5/5/61

TD 6322'. Shut down. Waiting on orders.

5/6/61

TD 6322'. Resuming operations (because of a temporary problem which arose with the landowner, we deemed it advisable to cease operations pending resolution).

5/8/61

Depth 6610'. Drilled 70'. Sand. Trip for Bit No. 31. Mud 9.5. Vis. 57. Water loss 8.

5/9/61

6686'. Drilled 75'. Logging. Mud 9.6. Vis. 65. Water loss 8%. 5% oil.

5/10/61

TD 6690'. Laying down drill pipe in preparation for running 5 1/2" production casing.

Unable to get to bottom with log yesterday. Went back in hole with drill pipe and conditioned hole. Pulled drill pipe. Ran Schlumberger Radioactivity Log. Field reports Dakota top at 6523'. Indicating 167' of Dakota penetration.

5/11/61

WOC. Moving off rotary rig. Ran 206 joints - 6688' - 5 1/2" J-35 15.5# STC casing and set at 6686' KB. Float collar at 6658' PBTD. Seven centralizers spaced throughout Dakota along with Weatherford reciprocating scratchers. Seven centralizers spaced throughout Mesaverde. Baker stage collar at 4739'.

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5/11/61(Cont'd)

Cemented Dakota with 100 sx 50/50 Pozmix with 4% gel followed by 125 sx neat cement with HAL Additive No. 9. This circulation maintained throughout job. Bumped plugs at 1250 PSIG - indication of pumping by top plug.

Cemented Mesaverde after four hours WOC on Dakota with 200 sx 50/50 Pozmix with 4% gel with 12.5# Gilsomite per sack. Good returns maintained throughout job. Bumped plugs at 3000 PSIG - shut in for WOC.

Pressure tested casing above Mesaverde cement plug found at 4580' - test OK to 1650 PSIG with rig pump.

5/19/61

Moving on completion rig and pumping frac water.

5/20/61

Coming out of hole with drill tubing and bit in order to perf and frac Dakota and Mesaverde zones. Drilled Mesaverde Stage Collars and tested to 2000 PSIG - OK. Drilled cement plug and float collars and drilled out to 6686' PBTD. Tested whole casing string to 3000 PSIG - OK. Spotted 750 gallons 15% mud acid on bottom.

5/21/61

Cleaning out frac sand after second Dakota frac stage in order to proceed with third Dakota frac stage and Mesaverde frac.

Lower (1st) Stage Dakota Frac

Perforated with three bullets and three jets per foot - 6631' to 6639'. Soaked away acid with continuous reduction in pressure throughout four stages as follows: 1900 to 1800 to 1600 to 700 PSIG. Injected 8000 pounds 40-60 mesh sand at 1/2 pound per gallon at 22 1/2 BPM. Had initial injection pressure of 2700 PSIG increasing to 3400 PSIG and decreasing to 3200 PSIG during flush. Used 21,000 gallons water treated with Dowell J-101. Had 1400 PSIG standing surface pressure for several hours while perforating for next frac stage.

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5/21/61 (Cont'd)

Middle (2nd) Stage Dakota Frac

Perforated with three bullets and three jets per foot - 6613' to 6615' and 6593' to 6601' (note no bridge plug inserted). Displaced 750 gallons 15% mud acid to bottom and soaked away slowly from initial pressure of 2000 PSIG to ending pressure of 500 PSIG. Injected 31,000 pounds sand (20,000 pounds 40-60 mesh and 11,000 pounds 20-40 mesh) at concentrations ranging from 1/2 pound to 1 pound sand per gallon. Started injecting at 3400 PSIG. Had minimum pressure of 3300 PSIG and maximum pressure of 3500 PSIG throughout job. Was able to flush with only 50 barrels water before sanding out - utilized 41,000 gallons water treated with Dowell J-101. Estimate 27,000 pounds sand injected into formation.

5/22/61

Drilling on magnesium bridge plug at 5987'.

Cleaned out several sand bridges and 150' of sand after middle stage Dakota frac. Well continued to flow back with lots of gas pockets throughout cleaning out procedure.

Upper (3rd) Stage Dakota Frac

Perforated with two bullets and two jets per foot - 6555' to 6576', 6525' to 6549'. Injected total of 75,000 pounds 20-40 mesh sand in 60,000 gallons water with J-101 at average rate of 40 BPM with injection pressures ranging from 2500 PSIG to 3100 PSIG while dropping 60 balls. Dropped 20 balls after 20,000 pounds sand at 2500 PSIG - increased sand to 1 1/4 pounds per gallon - dropped 20 balls after 35,000 pounds sand injected with pressure increase from 2600 to 2700 PSIG - increased sand to 1 1/2 pounds per gallon and dropped 10 balls after 47,000 pounds sand injected - dropped 10 balls after 60,000 pounds sand injected and increased concentration to two pounds per gallon. Pressure rose to 3100 PSIG - started flush and sanding out with under-flush of 20 barrels. Standing pressure went to 2200 PSIG immediately and 1300 PSIG in 30 minutes. Set Giberson magnesium bridge plug at 5987' on wire line. Perforated Mesaverde with two jets per foot as follows: 4454' to 4458', 4433' to 4438', 4403' to 4412', 4384' to 4394', 4367' to 4375', 4315' to 4325', 4285' to 4287'.

Mesaverde Frac Summary: 95,000 pounds 20-40 mesh sand, 80,000 gallons water, 60 balls, 47 BPM, 2200 PSIG.

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5/22/61 (Cont'd)

Details:

Started injecting at 52 BPM at 1900 PSIG with 1 pound sand per gallon, increasing throughout job to 2 pounds per gallon. Started dropping balls at 5-ball stages after 25,000 pounds sand injected. Generally noted pressure increase of 25 to 100 PSIG after each ball drop. Had one significant pressure break from 3200 PSIG to 2800 PSIG. Sanding out to 3500 PSIG.

Picked up drill tubing and bit and cleaned out 431' of frac sand on top of bridge plug. Well continued to flow back slightly for several hours following a standing pressure of 1700 PSIG immediately and 700 PSIG in 30 minutes. Lost very little water to Mesaverde while cleaning out sand.

5/23/61

Stripping out drill tubing and bit after drilling bridge plug and cleaning to 6686' PBTD. Well has been very lively since drilling bridge plug on top of Dakota. It was necessary to insert a bottom hole tubing plug in order to strip out the drill tubing safely.

5/24/61

Allowing Dakota to blow and clean up.

Completed stripping drill tubing out of hole. Set Baker Model "D" permanent completion production packer on wire line at 6480' KB. Ran Dakota completion tubing (1 1/2" integral joint) as follows:

|   |                 |
|---|-----------------|
| Locator sub, seals, and production tube | 7.35'           |
| 2" EUE pup joint above locator sub      | 6.10'           |
| 206 joints tubing                       | 6459.23'        |
| Top 1 1/2" IJ pup                       | 4.00'           |
| <b>Total</b>                            | <b>6476.68'</b> |

Set Baker Model "D" with 6500# tubing weight.

Mesaverde completion tubing set as follows (1" regular CW): 132 joints (4239') landed at 4251' KB. Jet collars at 3030' and 3491' KB.

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5/25/61

Blowing and cleaning up Dakota - making 1600 MCFD - bringing lots of frac water. Eight hour shut-in period yesterday indicated 2000 PSIG plus subsurface pressure.

5/26/61

Unloading Mesaverde frac water with Dakota gas. Have 1080 PSIG on casing after 15 hours cycling through Mesaverde.

5/27/61

Preparing to run preliminary potential test of Dakota zone today. Dakota has been flowed intermittently during the past few days in order to effect initial clean up of frac water. It appears to be fairly well cleaned up. Surface pressure built to 1900 PSIG in 8 to 12 hours following flow period.

The Mesaverde zone has been flowing and cleaning up frac water continuously since 5-26-61 p.m., at which time it kicked off and began flowing on its own after being helped with Dakota gas pressure. Flowing Mesaverde casing head pressure remains at 550 PSIG.

5/30/61

Shut in for initial pressure build up and subsequent potential testing of Dakota zone. A three hour test yesterday following only 18 hours shut in, during which surface pressure built to only 1753 PSIG, indicated 1100 MCFD - still real wet from Dakota.

Mesaverde has continued to blow and unload on its own, making about 225 MCFD along with a steady stream of frac water. Will shut in today for initial pressure build up and further testing.

5/31/61

Both Mesaverde and Dakota zones shut in yesterday. Mesaverde shut in at 3:00 p.m. for initial pressure build up preliminary to initial testing. The Dakota remains shut in preliminary to additional testing at 1875 PSIG surface pressure after 24 hours shut in.

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6/2/61

Contrary to the report of 5/31/61 to the effect that both zones would be shut in for initial seven day pressure build up periods, we performed additional testing yesterday after only 48 hours of pressure buildup. The test data for the Dakota through a 3/4" choke was as follows:

| Time After Opening | Tubinghead Pressure | Temperature |
|--------------------|---------------------|-------------|
| 0 minutes          | 2015 PSIG           | -           |
| 60 "               | 139 "               | 49°         |
| 120 "              | 113 "               | 49°         |
| 180 "              | 99 "                | 50°         |

\*1600 MCFD and blowing fairly dry.

The surface pressure on the Mesaverde was 935 PSIG. The well was blown directly to the atmosphere through the 1" tubing string with the following results: 625 PSIG casing pressure after 60 minutes, 450 PSIG casing pressure after 120 minutes, 375 PSIG casing pressure after 180 minutes. The actual flow rate at the end of three hours was 900 MCFD with the flow stream being fairly dry.

6/7/61

Shut in both zones. Tested Dakota yesterday to obtain initial routine three hour potential flow test through 3/4" choke following a shut-in period. Also, this satisfied first phase of packer leakage test. Results of Dakota test were as follows:

| Time After Opened | Tubing Pressure | Temperature |
|-------------------|-----------------|-------------|
| 0 minutes         | 2140 PSIG       | -           |
| 15 "              | 347 "           | 42°         |
| 30 "              | 278 "           | 43°         |
| 45 "              | 206 "           | 45°         |
| 60 "              | 192 "           | 45°         |
| 120 "             | 144 "           | 45°         |
| 180 "             | 125 "           | 45°         |

\*Approximately 1900 MCFD - flow stream fairly dry.

A similar test of the Mesaverde yesterday produced the following results:

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5/7/61 (Cont'd)

| Time After Opened | Tubing Press. | Casing Press. | Temp. |
|-------------------|---------------|---------------|-------|
| 0 minutes         | 1055 PSIG     | 1055 PSIG     | -     |
| 15 "              | 94 "          | 910 "         | 34°   |
| 30 "              | 80 "          | 843 "         | 36°   |
| 45 "              | 72 "          | 780 "         | 36°   |
| 60 "              | 64 "          | 715 "         | 38°   |
| 120 "             | 45 "          | 519 "         | 40°   |
| 180 "             | 34 "          | 412 "         | 43°   |

\*80 MCFD - flow stream quite dry

# OPEN FLOW TEST DATA

DATE June 14, 1961

|   |                             |                                       |                                 |
|---|-----------------------------|---------------------------------------|---------------------------------|
| Operator<br><b>Consolidated Oil &amp; Gas, Inc.</b>   |                             | Lease<br><b>Kline No. 1-10</b>        |                                 |
| Location<br><b>1850' FNL, 1550' FEL Sec. 10-31-13</b> |                             | County<br><b>San Juan</b>             | State<br><b>New Mexico</b>      |
| Formation<br><b>Mesa Verde</b>                        |                             | Pool<br><b>Blanco Mesa Verde</b>      |                                 |
| Casing: Diameter<br><b>5 1/2</b>                      | Set At: Feet<br><b>6686</b> | Tubing: Diameter<br><b>1" Regular</b> | Set At: Feet<br><b>4251</b>     |
| Pay Zone: From<br><b>4285</b>                         | To<br><b>4458</b>           | Total Depth:<br><b>6480 P.B.</b>      |                                 |
| Stimulation Method<br><b>Sand-water frac</b>          |                             | Flow Through Casing                   | Flow Through Tubing<br><b>x</b> |

|   |                            |                                     |   |                            |  |
|---|----------------------------|-------------------------------------|---|----------------------------|--|
| Choke Size, Inches<br><b>0.750</b>            |                            | Choke Constant: C<br><b>14,1605</b> |   |                            |  |
| Shut-In Pressure, Casing, PSIG<br><b>1092</b> | + 12 = PSIA<br><b>1104</b> | Days Shut-In<br><b>7</b>            | Shut-In Pressure, Tubing PSIG<br><b>1092</b>        | + 12 = PSIA<br><b>1104</b> |  |
| Flowing Pressure: P PSIG<br><b>43</b>         | + 12 = PSIA<br><b>55</b>   |                                     | Working Pressure: P <sub>w</sub> PSIG<br><b>499</b> | + 12 = PSIA<br><b>511</b>  |  |
| Temperature: T °F<br><b>37</b>                | n =<br><b>0.75</b>         |                                     | F <sub>pv</sub> (From Tables)<br><b>1.000</b>       | Gravity<br><b>0.70</b>     |  |

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

$$Q = 14.1605 \times 55 \times 1.0229 \times .9258 \times 1.000 = \underline{\quad 736 \quad} \text{MCF/D}$$

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

$$A_{of} = \left( \frac{1192464}{931343} \right)^n =$$

$$A_{of} = \underline{\quad 887 \quad} \text{MCF/D}$$

| Time   | Tubing Pres. | Casing Pres. | Temp. |
|--------|--------------|--------------|-------|
| 0      | 1092         | 1092         | - -   |
| 1 hr.  | 71           | 750          | 36    |
| 2 hrs. | 52           | 615          | 36    |
| 3 hrs. | 43           | 499          | 37    |

TESTED BY C. Phillips

WITNESSED BY \_\_\_\_\_

*George E. Farnan*

# OPEN FLOW TEST DATA

DATE June 6, 1961

|   |                             |   |                                 |
|---|-----------------------------|---|---------------------------------|
| Operator<br><b>Consolidated Oil &amp; Gas, Inc.</b>           |                             | Lease<br><b>Kline No. 1-10</b>          |                                 |
| Location<br><b>1850' F/NL &amp; 1550' F/EL, Sec. 10-31-13</b> |                             | County<br><b>San Juan</b>               | State<br><b>New Mexico</b>      |
| Formation<br><b>Dakota</b>                                    |                             | Pool<br><b>Basin</b>                    |                                 |
| Casing: Diameter<br><b>5 1/2</b>                              | Set At: Feet<br><b>6686</b> | Tubing: Diameter<br><b>1 1/2" I. J.</b> | Set At: Feet<br><b>6484</b>     |
| Pay Zone: From<br><b>6525</b>                                 | To<br><b>6639</b>           | Total Depth:<br><b>6686' P. B.</b>      |                                 |
| Stimulation Method<br><b>Sand-water frac</b>                  |                             | Flow Through Casing                     | Flow Through Tubing<br><b>x</b> |

|  |      |                                     |                          |                                  |      |             |
|--|------|-------------------------------------|--------------------------|----------------------------------|------|-------------|
| Choke Size, Inches<br><b>0.750</b>       |      | Choke Constant: C<br><b>14.1605</b> |                          |                                  |      |             |
| Shut-In Pressure, Casing,<br>(Mesaverde) | PSIG | + 12 = PSIA                         | Days Shut-In<br><b>5</b> | Shut-In Pressure, Tubing         | PSIG | + 12 = PSIA |
|  |      |                                     |                          | <b>2140</b>                      |      | <b>2152</b> |
| Flowing Pressure: P                      | PSIG | + 12 = PSIA                         |                          | Working Pressure: P <sub>w</sub> | PSIG | + 12 = PSIA |
| <b>125</b>                               |      | <b>137</b>                          |                          |                                  |      |             |
| Temperature: T                           | °F   | n =                                 |                          | F <sub>pv</sub> (From Tables)    |      | Gravity     |
| <b>45</b>                                |      | <b>0.75</b>                         |                          | <b>1.018</b>                     |      | <b>0.70</b> |

CHOKE VOLUME = Q = C x P<sub>i</sub> x F<sub>i</sub> x F<sub>g</sub> x F<sub>pv</sub>

Q = 14.1605 x 137 x 1.0147 x .9258 x 1.018 = 1858 MCF/D

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

Aof =  $\left( \frac{\quad}{\quad} \right)^n =$

Aof =                      MCF/D

TESTED BY Clyde Phillips

WITNESSED BY                     

*Rene E. Farnan*