

# DRILLING AND COMPLETION HISTORY

CONSOLIDATED OIL & GAS, INC.

CANDADO NO. 1-15

Rio Arriba County, New Mexico

August 9, 1961

**Location:** 920' F/SL & 1150' F/WL, Section 15  
T26N-R7W, N.M.P.M.

**Elevation:** 6157' Ground  
6169' K.B. - all measurements from K.B.

**Spud:** March 7, 1961

**Drilling Completed:** May 4, 1961  
**Well Completed:** May 22, 1961

**Total Depth:** 6790' Drilled  
6725' Plug Back

**Casing:**  
**Surface:** 10 3/4" 32.75# H-40 cemented at 196' w/140 sx  
2% CaCl<sub>2</sub> cement.

**Production:** 7 5/8" 26 & 29# J-55 cemented at 2502' w/96  
sx 50/50 Pozmix

5 1/2" 15.5 & 17# J-55 liner 2425' - 6788'  
cemented through shoe w/45 sx. 50/50 Pozmix  
and 52 sx. neat cement. Cemented through  
perforations at 4646' w/100 sx. 50/50 Pozmix.  
Squeezed at top w/40 sx. 50/50 Pozmix cement.

**Tubing:** MV - 1" Regular CW hung at 4410'  
DK - 1 1/2" IJ J-55 hung at 6501'

**Logs:** Welex Induction Electric Log  
Lane Wells Gamma-Ray Neutron

**Cores and Drillstem Tests:** None

**Formation Tops: (Log)**

Pictured Cliffs	2205'	(+3964)
Pt. Lookout	4418'	(+1751)
Mancos	4618'	(+1551)
Gallup	5585'	(+ 584)
Greenhorn	6448'	(- 279)
Dakota	6566'	(- 397)

**Producing Perforations:**

	MV	DK
4428' - 4433'	6569' - 6586'	
4491' - 4500'	6623' - 6638'	
4518' - 4526'	6654' - 6662'	
4544' - 4548'	6696' - 6704'	

**Treatment:** Sand-water frac:  
Mesaverde: 80,000# (20-40 mesh) sand, 85,000  
gal. water.  
Dakota: 93,000# (40-60, 20-40 and 10-20 mesh)  
sand, 120,000 gal. gelled water,  
1000 gal. acid in two stages.

**Initial Potential:** MV Flow volume thru 3/4" choke: 970 MCFD  
Calculated Absolute Open Flow Potential:  
1230 MCFD

DK Flow volume thru 3/4" choke: 1212 MCFD

WELL: CANDADO NO. 1-15  
(920' F/SL & 1150' F/WL of Sec. 15-26N-7W, NMPM)

FIELD: Basin Dakota

COUNTY: Rio Arriba STATE: New Mexico

ELEVATIONS: 6157' GD  
6169' KB

3/6/61

Moving on rotary tools.

3/7/61

Rigging up.

3/8/61

Spud - 8:30 p.m., 3-7-61. Drilled 15" hole to 197'. Ver. 1/2° at 60'. Ran 6 joints 10 3/4" casing 186'. Set at 196' KB. Cmt'd. w/140 sx. 2% CaCl<sub>2</sub>. Plug down 6:00 a.m.

3/9/61

Depth - 1373'. Drilled 1176' shale sand. Presently making trip for Bit No. 2. Mud weight - 9. Vis. - 35. Dev. - 1/2° at 650', 3° at 1100', and 3 1/2° at 1350'. Pressured up on surface pipe 600 pounds for 30 minutes.

3/10/61

Depth - 2073'. Drilled 700'. Formation - shale and sand. Present operation - drilling with Bit No. 3. Mud weight - 9.6. Vis. - 46. Dev. 2 1/2° at 1600', 3° at 1960'.

3/11/61

TD - 2503'. Laying down drill pipe and preparing to run 7 5/8" intermediate casing.

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# CANDADO NO. 1-15

3/12/61

WOC. Moving off rotary rig - released yesterday p.m.

Ran 68 joints (26 and 29 pound) 2492' of 7 5/8" casing - set at 2502 KB. Cemented with 96 sx of 50/50 Pozmix with 4% gel. Bumped plugs at 1:45 p.m. at 2850 PSIG - checked floats - OK. Good returns throughout job.

Will move off Huron rig and move on Cunningham rig for gas drilling to Dakota.

3/17/61

Moving on and rigging up Cunningham rotary rig.

3/19/61

Blowing hole dry. Completed rigging up Cunningham rig - picked up 2 7/8" drillpipe and drilled 3' of hard cement and float shoe from 7 5/8" casing. Pulled up hole and began blowing hole dry for gas drilling.

3/20/61

Drilling with gas at 2835' with gas bit No. 1 (CP-EH3). Using four 5 1/2" drill collars - 60 RPM - 8,000 pounds set on bit - 150 PSIG - 2 MMCFD.

3/21/61

Drilling at 3120' with Bit No. 2 (CP-EH3). 6 1/2 hours trip - 2 hours repair tongs - 1 hour blowing hole dry after trip - 14 1/2 hours drilling.

3/22/61

Drilling at 3460'. Preparing to trip Bit No. 2. Now drilling 2 min/ft. 23 hrs drilling - 1 hr blowing hole dry because of separator failure.

3/23/61

Drilling at 3680' with Bit No. 3 (CP EH-4). Now drilling at 160 PSIG gas pressure at 4 to 6 minutes per foot. 5 1/2 hrs. tripping, 3/4 hr. welding, 1/2 hr. blowing, 17 1/4 hrs. drilling.

WELL: CANDADO NO. 1-15

3/25/61

Drilling at 4275' with Bit No. 4 (CP-EH3 in at 4120'). Now have six drill collars in hole. Running with 12,000 pounds - 70 RPM - 190 FSIG - 2100 MCFD. 13 1/2 hours drilling, 7 hours trip, 2 1/2 hours repairing gas line, and 1 hour blowing hole.

3/26/61

Drilling at 4885'. Used 1850 MCFD at 205 PSIG last 24 hours.

3/27/61

TD 5160'. Blowing hole in an attempt to regain dust. Drilled 275' in 9 1/2 hours. Tripped for Bit No. 5 (CP-EH3). 9 1/2 hours drilling, 13 hours trip and repairing air jammer, 1 1/2 hours blowing.

3/28/61

Drilling at 5620'. Have drilled 460' with Bit No. 5 in 19 hours. Derrick floor gas measure now 200 PSIG, using 1850 MCFD. Have experienced considerable difficulty with moisture, believed to be entering hole with supply gas. However, there were indications of hole moisture at 5585' to 5605'. No natural gas shows to date noted. Anticipate Dakota pay section about 6600' to 6800'.

3/29/61

Drilling at 5930' with Bit No. 6. (Tungsten Carbide Button Bit) Have drilled 153' in 7 1/4 hours. Tripped, repaired rig and installed new drilling line. Took about 2 hours blowing to resume dusting after trip and downtime. Drilling at 2 to 3 minutes per foot.

3/30/61

Drilling at 6165' with Bit No. 6. Now drilling at 1 1/2 to 2 minutes per foot. Down most of night due to gas line freeze up. Picked up sustained natural gas flow of 25 MCFD at 6120'.

3/31/61

TD 6625'. Blowing - getting spray of very high gravity oil picked up at 6505' - this believed top of Greenhorn. No dusting since 6505'. Dakota top indicated at 6610'. Will try to resume dusting and drill to projected TD of 6800'. Drilling gas pressure 200 PSIG/1600 MCFD.

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WELL: CANDADO NO. 1-15

4/1/61

TD 6650'. Going in hole after tripping.

Because of inability to resume dusting operations due to Greenhorn oil accumulation and since no return drilling cuttings have been encountered since 6505', the drillstem was tripped. Had considerable difficulty getting out of hole - took about 750 PSIG gas pressure to get loose - drillstem free from 5800' for remainder of trip. Drillstem had minor accumulations of plastered cuttings and completely coated with free oil.

4/2/61

Preparing to mud up and complete well with mud as circulating medium.

When going in hole yesterday, had no difficulty and full circulation to 6100'. Unable to circulate with gas below 6300'. Pulled drill pipe - had plugged bit and recovered 150' of free-life green 45° API crude oil in drill pipe. This indicated at least 200' of free oil accumulation in bottom of hole. Impossible to drill with gas under these conditions so decision made to mud up.

The free oil accumulation is believed to be from the Greenhorn limestone occurring at the approximate interval of 6505' to 6550'. The 25 to 40 MCFD of natural gas show picked up at 6120' has been sustained - possibly a slight increase in natural was incurred from the Greenhorn along with the free oil. Projected total depth remains at 6800' - have 150' of Dakota section yet to be penetrated.

4/3/61

TD - 6650'. Mudding up.

4/4/61

TD - 6650'. Continuing to mud up. Circulating hole in good shape at 6100'. Expect to commence drilling by 4/5/61.

4/5/61

TD - 6650'. Coming out of hole to pick up drill collars and bit to drill ahead.

WELL: CANDADO NO. 1-154/6/61

Circulating and conditioning mud in hole at TD 6650'.

4/7/61

TD 6650'. Circulating and conditioning mud in hole at 6620'.

4/8/61

TD 6685'. Pulling out of hole to pick up overshot to recover fish. Drilled ahead from 6650' to 6685'. Drillpipe stuck while drilling. Able to move pipe to approximately 47' off bottom with 80,000# pull when pipe parted at 4,000'.

4/9/61

TD 6685'. Pulling out of hole with fish. Caught top of fish at approximately 4000' with overshot. Moved approximately 5' up the hole when pipe parted at 1500' with 100,000# pull. Went in with second overshot - caught fish approximately 10' down hole. Pulled to 75,000#. Drill string had heavy drag for 45' but came free and pulled on out of hole.

4/10/61

Conditioning mud and preparing to drill ahead. Recovered all of fish, changed bits. Old bit in gauge but dull - went in hole with new C.P. - EH3 (W7R equivalent). Hit bridge at 6100'. Circulating and conditioning mud and preparing to wash down to total depth and drill ahead. Mud 8.9. Water loss 6. Vis. 82. 3% oil. Considerable amount of green oil was seen during fishing operations which continually cut mud properties while recovering stuck drill string.

4/11/61

Depth 6703'. Pulled out of hole to pick up new bit. Drilled 17' in 12 hours. Drilling sand. Mud 8.9. Vis. 70. Water loss 6. Green oil cut mud back from 72 to 52 after drilling out bridge in hole at 6100'. Had to circulate conditioning mud for 2 hours after reaching bottom before drilling ahead.

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WELL: CANDADO NO. 1-154/12/61

TD 6703'. Conditioning mud and hole at 6600'. Mud 9. Vis. 70. Water loss 6. 3 1/2% oil.

4/13/61

TD 6711'. Attempting to free stuck drill pipe. After working way to bottom yesterday and drilling ahead at 15 to 35 minutes per foot, the mud pump plugged. While shut down for cleaning up pump, the hole apparently heaved and stuck the drill pipe. Have been unable to move further than 5' off bottom. The drill pipe has parted twice - now have two overshots in hole. Will attempt to free pipe by displacing oil; however, it has not been possible to secure mud returns up to this time.

4/14/61

TD 6711'. Pulling drill pipe after cutting with McCullough Jet Cutter at 6202'. Displaced 20 barrels crude oil to bottom - took 2400 PSIG to begin displacement - this gradually increasing to 3 BPM at 1800 PSIG. Circulation was not obtained. It is believed that either the Greenhorn or upper Dakota was broken down.

Unsuccessful in attempts to free stuck drill pipe. Decision was made to cut and retrieve 2 7/8" drill pipe and rerun 3 1/2" drill pipe with jars and overshot to attempt to retrieve fish, which now consists of the following:

170' including 6 3/4" bit, bit-sub and six 5 1/2" drill collars which are worn to about 5 3/16" O.D., 92' of 4 1/2" drill pipe and 208' of 2 7/8" drill pipe, for a total of 470' of fish. The drill pipe was cut in approximately the middle of a joint.

The projected total depth at this time remains at approximately 6790'. Difficulty continues to be associated with the unusually treacherous hole condition as a result of the necessity to mud up the gas drilled hole as explained in our recent memorandum dated April 7, 1961.

4/15/61

TD 6711'. Preparing to pick up string of 3 1/2" drill pipe and go in hole with overshot drill collars and hydraulic jars.

WELL: CANDADO NO. 1-154/16/61

TD 6711'. Going in hole with fishing string as per 4/15/61 report.

4/17/61

TD 6711'. Jarring on fish. Have been unable to move fish after several hours jarring and pulling. Have pulled as much as 75,000 pounds plus the weight of string. If additional effort at jarring fish out of hole unsuccessful, will retrieve fishing string and rig up washover string after backing off at stuck point.

4/18/61

TD 6711'. Preparing to cut 2 7/8" drill tubing at a point one joint above 4 1/2" drill pipe fish.

Unable to move fish by jarring.

4/19/61

TD 6711'. Attempting to recover 170' of drill tubing fish. Cut drill tubing as reported yesterday but did not bring it out of hole with washover pipe. Now fishing with overshot.

4/20/61

TD 6711'. Coming out of hole after unsuccessful attempt to retrieve 170' of drill tubing fish. This is the second unsuccessful trip. It is now apparent that the fish was not cut as reported 4/19/61. Will now go back with overshot without jars and attempt to locate free point and back off with Dialog.

4/21/61

TD 6711'. Attempting to clean out fish with Dialog jetting equipment. Came out of hole with fishing string - removed jars - reran overshot and latched on to fish. Intention is to locate free point - use Dialog indicators and back off with string shot at lowest point possible. Will then go in with wash pipe and wash over and retrieve fish.

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WELL: CANDADO NO. 1-154/22/61

TD 6711'. Preparing to rerun fishing string with two overshots. Cleaned out with Dialog and located free point essentially at the top of the five drill collars. Attempted to back off 4 1/2" and 2 7/8" drill pipe fish at this point but unsuccessful because of overshot in hole.

4/23/61

TD 6711'. Preparing to rerun fishing string as reported yesterday. Went in with double overshot but unable to back off fish because of 3 1/2" drill pipe fishing string tendency to back off first. Now running fishing string with unusually tight make-up by removing all thread dope and lubricant.

4/24/61

TD 6711'. Pulling fishing string and approximately 300' of 4 1/2" and 2 7/8" drill pipe fish - believe that back off above the five drill collars was successfully obtained. If this proves to be so, will then re-enter hole with wash pipe and wash over drill collars.

4/25/61

TD 6711'. Conditioning mud and hole. Preparing to wash over remaining fish, consisting of five drill collars and one joint of 4 1/2" drill pipe - approximately 231' of fish remain in hole.

Pulled fishing string and recovered all of fish indicated in yesterday's report.

4/26/61

TD 6711'. Washing. Have now successfully washed over 140' of 231' of total fish.

4/27/61

TD 6711'. Washing. Have now successfully washed over 200' of fish - 30' of washing remains to be done. Having considerable difficulty with heaving shale and high pump pressures.

WELL: CANDADO NO. 1-154/28/61

TD 6711'. Preparing to go in hole with overshot and jars to retrieve remainder of fish. Believe that we successfully washed over the whole 231' of fish and that it was left free in the hole.

4/29/61

TD 6711'. Preparing to go back in hole with bit to condition hole and drill ahead.

4/30/61

TD 6715'. Preparing to increase mud weight in order to resolve gas cutting problem. After cleaning out lower portion of hole, the drilling mud became heavily cut with gas from the upper exposed Dakota formation. Impossible to circulate with the mud so gassy.

5/1/61

TD 6722'. Tripped for Tungsten Carbide Bit. Pulled bit after making 7' because of extreme torque conditions - found one cone completely worn with loose bearings. Increased mud weight to 9.2 pounds per gallon and lowered viscosity to 75 to resolve gas cutting problems.

5/2/61

Drilling at 6743'. Made 21' in 18 hours. Spent 3 1/2 hours washing and conditioning hole. Mud 130-9.2-7WL.

5/3/61

TD 6749'. Tripping. Made 6' in 12 hours. Drilling with Tungsten Carbide Bit. Now going in hole with CP-EH4. Had considerable difficulty getting out of hole because of tight spot about 250' off bottom.

5/4/61

TD 6750'. Logging. Drilled 41'. Conditioned hole and came out for log.

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WELL: CANDADO NO. 1-155/5/61

TD 6790'. Laying down drill pipe in preparation for running production casing (Welex Induction Log indicated productive Dakota zones throughout the top 180' of a total of some 230' of Dakota penetration, also a Mesaverde zone is indicated).

5/6/61

TD 6790'. WOC. Completed laying down drill pipe. Ran 6804' of 5 1/2" production casing and set at 6788' KB. Had Texas pattern shoe on bottom and two float collars spaced one and two joints above the shoe respectively. Cemented with 45 sx of 50/50 Pozmix with 4% gel followed by 52 sx neat cement with Hal additive No. 9. (Theoretical cement fillup 1500'.) Had good returns throughout job with little difficulty in running casing. Necessary to put on pump at one point 200' off bottom. Bumped plugs at 3000 psig with water - checked floats - OK. 5 1/2" J-55 casing details as follows: 9 jts 17# - 328'; 63 jts 15.5# - 1986'; 124 jts 14# - 3828'; 21 jts 15.5# - 642'; 5' of float equipment = 6789'.

5/7/61

WOC. Will run correlation logs today.

5/8/61

Going in hole with completion tubing with 4 3/4" bit. Ran Gamma Ray-Neutron Radioactivity Log to 6646'. Ran Cementron Log and found cement top at 6070' with indications of good cement from 6120' to TD.

5/9/61

Pulled tubing with packer after swab testing lower Dakota perms prior to fracing.

Cleaned out cement stringers to PBTD 6725'. Displaced 1000 gallons 15% HCl. Pulled tubing. Perforated with 4 jets and 2 bullets per foot - 6696' to 6704' and 6654' to 6662'. Soaked away acid at 1600 PSIG - gradually decreased to 1400 PSIG - held steady for 1 1/2 hours before bleeding off.

Ran tubing with hook wall packer to 5800' - set packer and swabbed down. Recovered only load water, acid water and a slight amount, perhaps two barrels, of muddy water. Continued swabbing dry for 1 1/2 hours. Gas flow TSTM.

WELL: CANDADO NO. 1-155/10/61

WOC after cementing casing opposite Mesaverde.

Pulled tubing after swab testing lower Dakota perms (see 5-9-61 report). Sand-water fraced lower Dakota perms as follows: 50,000 pounds of sand (20,000 pounds 40-60 mesh and 30,000 pounds 20-40 mesh), 70,000 gallons water (gelled with HOWCO WAC-8), 2600 to 2700 PSIG, 27 1/2 BPM. Standing pressure 2200 PSIG after 30 minutes. Lubricated in Baker magnesium bridge plug and set at 6648'.

Perforated with three jets per foot - 6569' to 6586'. Immediately noted communication - believed to be via vertical fractures - wellhead pressure jumped to 1800 PSIG. Perforated 6623' to 6638' with three jets per foot and 6625' to 6635' with two additional bullets per foot. Performed upper stage Dakota frac as follows: Started injecting at 2600 PSIG and ended up at 2900 PSIG with sand concentrations ranging from 1/2 pound per gallon initially to 1 1/4 pound per gallon finally. Injected 30,000 pounds of 20-40 mesh sand followed by 13,000 pounds of 10-20 mesh sand at an average rate of 25 BPM. A sand-out occurred at the time that 2/3 of the casing volume was flushed. Used 50,000 gallons water treated with HOWCO WAC-8. Standing pressure was 2500 PSIG immediately and 2350 PSIG after 30 minutes.

Set Baker magnesium bridge plug at 6200', perforated with four bullets per foot at 4646' and cemented opposite Mesaverde as follows: 100 sx 50/50 Pozmix with 4% gel. Displaced top plug to 4603'. Good returns throughout job.

5/11/61

WOC.

5/12/61

Going in hole with tubing and packer to swab test Mesaverde perms - 4494' to 4498'. Ran Cementron Log yesterday and found indicated cement top at 3850'.

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WELL: CANDADO NO. 1-155/13/61

Preparing to frac Mesaverde. Perforated with two bullets per foot - 4428' to 4433' - ran tubing and test packer and swab tested - secured dry swab test with gas TSTM (too small to measure). Completed perforating with two bullets per foot in the following intervals: 4491' to 4500'; 4518' to 4526'; 4544' to 4548'.

5/14/61

Shut in after fracing Mesaverde as follows: Started pumping in at 3100 PSIG - held pressure several minutes before breaking down to 1500 PSIG. Started 1/2# sand per gallon, increasing to 1# per gallon after 25,000# sand in formation. Injecting at 50 BPM at 2300 PSIG at this time. Dropped 5 balls every 10,000# sand with 25 to 75 PSIG increase noted with each set of balls. After 65,000# sand in, started dropping 5 balls for each 5,000# sand. Pumping at 50 BPM @ 2500 PSIG at this time. Pressure increased gradually to 2850 PSIG after a total of 40 balls had been injected. Pressure then rapidly rose to 3500 PSIG and a flush was obtained at 3000 PSIG @ 12 BPM.

Job summary:  
80,000# 20-40 mesh sand.  
85,000 gallons water  
40 balls  
48 BPM  
2200 to 2860 PSIG average

5/15/61

WOC after squeezing top of 5 1/2" liner.

After Mesaverde frac yesterday, allowed well to stand 4 hours, at which time surface pressure had declined to 1100 PSIG. Opened the well, which generally died down but continued to flow a small stream after 4 hours flow-back.

Set McCullough magnesium bridge plug at 4350' - did not hold - set second plug at 4320' - held OK. Cut 5 1/2" casing with McCullough jet cutter at 2425' (note that 7 5/8" casing shoe is at 2502') and pulled casing.

Cemented top of 5 1/2" liner by displacing 40 sx 50/50 Pozmix with 4% gel at 1400 PSIG after 3000 PSIG breakdown - surface pressure 1000 PSIG after 10 minutes shut in. Displaced top cement plug to 2385'.

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5/16/61

Drilling cement at 2380'.

5/17/61

Drilling on second magnesium plug at 4350' (see report of 5/15/61). After drilling cement above 5 1/2" liner top, tested to 1500 PSIG - OK. A small drillstem collar leak was indicated because of a 100 PSIG bleed-off in ten to fifteen minutes.

5/18/61

Drilling on last bridge plug and cleaning out frac sand at 6665'. Have lost approximately 100 barrels water to formation while cleaning out.

5/19/61

Preparing to run Baker Model "D" permanent completion packer and proceed with final stages of dual completion. Cleaned out bridge plug junk and frac sand to 6720'. Well has been quite active - blowing water as much as 100' in the air since drilling last bridge plug.

5/20/61

Running completion tubing. Set Baker Model "D" permanent dual completion packer at 6500'.

5/21/61

Allowing Dakota zone to blow and clean up. Landed 1 1/2" integral joint Dakota completion tubing in Baker Model "D" Packer and landed 1" regular CW Mesaverde annulus string. Flanged up wellhead and noted 700 PSIG tubinghead pressure on Dakota zone with water column standing on it. Opened Dakota for initial clean up.

Tubing details:

1 1/2" LJ Dakota	
Seal units and production tube	5.75'
Locator sub	0.87'
2" EUE pup	6.05'
Swedges	0.70'
207 joints	6465.03'
Top 1 1/2" LJ Subs	26.00'
Total	6491.03'

Set @ 6501' KB with 6,000# weight left on packer.

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WELL: CANDADO NO. 1-15

5/21/61 (Cont'd)

1" Regular CW Mesaverde  
137 Joints 4400' Set at 4410' KB  
Jet Collars @ 3607' and 3896' KB.

5/22/61

Allowing Dakota zone to flow into Mesaverde annulus in order to kick off Mesaverde zone.

5/23/61

Blowing Dakota zone to atmosphere - making 200 MCFD - real wet with frac water but showing considerable free oil.

Opened Dakota to atmosphere yesterday p.m. Mesaverde zone now has 900 PSIG on casing but has not kicked off by itself through tubing as yet because of full column of water in tubing. It will be necessary to allow Dakota to flow and clean up several days, after which time we can use Dakota pressure to kick off Mesaverde zone.

5/25/61

Attempting to unload Mesaverde and instigate natural flow with Dakota. Have wellhead pressure of 1160 PSIG but unsuccessful in kicking off Mesaverde. Will go ahead and clean up Dakota before bringing in Mesaverde. Dakota productivity has improved somewhat as a result of the additional blowing.

5/29/61

Continuing to allow Dakota zone to clean up by intermittent blowing. Have installed automatic intermitter which allows well to blow to atmosphere one hour out of every three hours. The wellhead pressure builds to approximately 800 PSIG following each two-hour shut in period. During the one hour of flow the Dakota shows 200 to 600 MCFD of gas while bringing an almost continual stream of frac water with heavy slugs of green oil.

The Mesaverde zone finally kicked off on its own during the p.m. of 5/27/61. It initially appears to be quite strong but it will take considerable blowing and cleaning up because of over 2500 barrels of water lost in the formation during the frac job.

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CANDADO NO. 1-15

5/30/61

Mesaverde flowing and cleaning up showing a fairly steady 1 1/2" stream of water with a considerable amount of oil. Had 875 PSIG on casing after approximately three hours flowing on its own after turning off Dakota supply gas.

Dakota flowing and cleaning up intermittently with automatically controlled flow periods of one hour out of every three hours. Still dumping considerable frac water and green oil. Appears to be making about 300 to 500 MCFD of gas after blowing down.

5/31/61

Cycling Dakota gas down casing annulus in an effort to stimulate continued natural Mesaverde flow. Dakota continuing to intermittently flow one out of every three hours. Gas volume appears to be about 400 MCFD. The flow stream contains less frac water and still shows considerable green oil.

Found Mesaverde logged off with 960 PSIG casing pressure. Turned Dakota into Mesaverde annulus.

6/2/61

Dakota shut in for seven-day pressure build up and subsequent potential testing. The past two days have indicated considerable drying up in the Dakota formation of frac water production. After a seven day shut in period for reservoir pressure stabilization and buildup, we will install special testing equipment in order to ascertain not only gas production but exact volumes of oil productivity. While brief periods of natural flow have been instigated from the Mesaverde formation, it continues to log off because of heavy volumes of returning frac water. The surface pressure will build rapidly to 900 PSIG when shut in. We will conduct additional formation clean up operations before shutting in the Mesaverde for quantitative testing and further evaluation.

6/5/61

Dakota remains shut in - had 2080 PSIG tubinghead pressure yesterday.

Mesaverde had 1025 PSIG on casing and 925 PSIG on tubing. Opened Mesaverde through tubing - had heavy slug of frac water and oil for first 20 min. - dying off to the point of being essentially dead after 45 min. The zone is still very loggy with frac water.

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6/8/61

Dakota has remained shut in but will be tested today. Had 2300 PSIG tubinghead pressure yesterday.

Tubinghead and casinghead pressures for the Mesaverde yesterday were 975 and 1075 PSIG, respectively. The Mesaverde was opened through the tubing and flowed a 1/2" stream of water with some oil for about 20 minutes, after which time it died off. Will install automatic intermitter today to more effectively control the cleanup operation.

6/9/61

Dakota shut in after testing yesterday. Mesaverde is continuing to blow and clean up through automatic intermitter.

Dakota test results as follows:

Time After Opened	Tubing Pressure
0 minutes	2340 PSIG
15 "	257 "
30 "	100 "
45 "	95 "
60 "	92 "
120 "	57 "
180 "	*43 "

\*723 MCFD. Flow stream quite wet with frac water and live green oil.

6/9/61 to 6/15/61

Cleaning up Mesa Verde frac water with aid from Dakota zone. Ran 21 hr. continuous test with special well tester on Dakota formation against 400# back pressure.

Gas flow dropped from one million to approximately 120 MCF per day with fairly stable flow rate during latter part of test. Produced 29.3 BBLS of oil and 6/4 BBLS of frac water in 21 hours. Tested 3 additional hours against 200# back pressure at steady 188 MCFD, and made 5 BBLS of oil and 2 BBLS of frac water in 3 hrs. Mesa Verde flowed while testing and continued to unload considerable frac water and scum of oil while flowing on its own with casing pressure beginning at 1100# and dropping to 800# overnight. Shut Mesa Verde in for build-up to unload additional water later in week. Will run continuous 24 hr. test on MCRA #1 to get accurate liquid measurement as well as

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WELL: CANDADO NO. 1-15

6/21/61

Continuing to clean up Mesaverde zone by instigating natural flow through the aid of intermittent injection of Dakota gas.

6/23/61

Dakota remains shut in except for automatically intermitting it into the Mesaverde 20 minutes out of every 8 hours. The Mesaverde has now flowed continuously for 4 days making some free gas, which seems to be increasing and approximately 150 barrels total liquid daily. The oil has increased from 5 to 20 BPD with some water, believed to be frac water.

6/26/61

Continued operations as reported in entry for 6/23/61. Tank gauge yesterday indicated well had made 45 barrels oil and 262 barrels water in four days. Mesaverde continues to flow with 650 PSIG on casing, making some gas and steady stream of oil and water. Dakota pressure builds to 2300 PSIG at tubinghead following each 8 hour shut-in period between intermitting periods.

6/27/61

Continuing to allow Mesaverde to blow on cleanup on its own with aid of Dakota for 20 min. out of every 8 hours. Made 62 barrels frac water and 5 barrels oil last 24 hours. 2230 PSIG Dakota and 650 PSIG Mesaverde casing.

6/28/61

Shut in this a. m. after continuing to flow as reported 6/28/61. Made 40 barrels water and 4 barrels oil last 24 hours. Gas volume varies from estimated 50 MCFD to 150 MCFD. 2330 PSIG on Dakota and 670 PSIG Mesaverde casing.

6/29/61

The Mesaverde is now being allowed to clean up on its own without the aid of Dakota supply gas. We have installed an intermitter which allows the Mesaverde to flow one hour out of every eight. After five hours shut in yesterday, the Mesaverde tubing pressure was 640 PSIG and the Dakota pressures was 835 PSIG.

WELL: CANDADO NO. 1-15

6/30/61

Mesaverde now flowing 1 out of every 4 hours via automatic intermitter. On a 1 out of every 8 hour schedule during the preceding 24 hours. Mesaverde made 8 barrels water and 1 1/2 barrels oil. After three hours shut in, the Mesaverde casing pressure was 680 PSIG and Dakota 2330 PSIG.

7/1/61

Mesaverde now flowing as reported in 6/30/61 report. Made 31 barrels water and 5 barrels oil last 24 hours. Casing pressure 525 PSIG after one hour flow period.

7/5/61

Mesaverde now flowing on the following automatic intermitting schedule: 1 1/4 hours on - 4 hours off. Well made 41 barrels water and 11 barrels oil during previous 72 hours. After 2 1/2 hours shut in, the casing pressure was noted to be 760 PSIG and tubing pressure was 720 PSIG.

7/6/61

Shut in Mesaverde yesterday a. m. for pressure build up and subsequent potential testing. Dakota has now been shut in several days. Dakota tubing head pressure 2340 PSIG. Mesaverde made 47 barrels water and 13 barrels oil throughout 60 hour period prior to yesterday a. m.

7/11/61

Both Dakota and Mesaverde remain shut in. Ran a routine three-hour potential test of the Mesaverde zone yesterday following four-day shut in period. Results were as follow:

Time after opening	Pressure		Temp.
	Casing	Tubing	
0 min.	1091	1080	30°
15 min.	1081	130	30°
30 min.	1069	99	30°
45 min.	1040	92	30°
60 min.	1004	81	31°
120 min.	739	57	33°

WELL: CANDADO NO. 1-15

7/12/61

Shut-in. Dakota - 2465 PSIG. Mesaverde 1000 PSIG tubing, 1010 PSIG casing.

7/21/61

Shut-in after 1st half Packer Leakage Test. Flowed DK (3/4" Pos. choke)

Time Min.	DK Tbg. PSIG	Temp. ° F.	MV Tbg. PSIG	MV Csg. PSIG
0	2478		1089	1109
15	409	43	1089	1109
30	240	43	1089	1109
45	187	43	1089	1109
60	169	43	1089	1109
120	123	43	1090	1109
180	*79	43	1090	1109

\* 1212 MCFD, moderately wet with oil and frac water.

7/28/61

Shut-in after 2nd half Packer Leakage Test. Flowed MV (3/4" Pos. choke)

Time Min.	MV Csg. PSIG	MV Tbg. PSIG	Temp. ° F.	DK Tbg. PSIG
0	1287	1232		2433
15	1187	124	29	
30	1122	113	29	
45	1068	112	28	
60	1008	106	28	2428
120	819	72	29	2428
180	679	*60	32	2428

\* 970 MCFD. Flow - quite wet, oil and water.

# OPEN FLOW TEST DATA

DATE July 27, 1961

Operator		Consolidated Oil & Gas, Inc.		Lease		Candido 1-15	
Location		920' FSL & 1150' FNL, Sec. 15-26N-7N		County		Rio Arriba	
Formation		Mesaverde		State		New Mexico	
Casing: Diameter		7 5/8		Tubing: Diameter		1"	
Pay Zone: From		4428		Set At: Feet		6788	
Simulation Method		Sand water frac		To		4348	
Flow Through Casing		6500 Pkt.		Total Depth:		6500	
Flow Through Tubing		X		Set At: Feet		4410	

Choke Size, inches		0.750		Choke Constant: C		14,1605	
Shut-In Pressure, Casing		PSIG		Shut-In Pressure, Tubing		PSIG	
1287		+ 12 = PSIA		1232		+ 12 = PSIA	
Flowing Pressure: P		60		Flowing Pressure: P <sub>w</sub>		679	
Temperature: T		32		Days Shut-In		7	
n =		0.750		Working Pressure: P <sub>w</sub>		PSIG	
Gravity		0.700		F <sub>pv</sub> (From Tables)		1.000	

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

$$Q = 14,1605 \times 72 \times 1.0281 \times .9258 = \underline{\quad 970 \quad} \text{MCF/D}$$

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

$$Aof = \left( \frac{1687401}{1226360} \right)^n =$$

$$Aof = \underline{\quad 1230 \quad} \text{MCF/D}$$

TESTED BY Case

WITNESSED BY

*[Signature]*

# OPEN FLOW TEST DATA

DATE July 27, 1961

Operator		Consolidated Oil & Gas, Inc.		Lease		Candido 1-15	
Location		920' FSL & 1150' FNL, Sec. 15-26N-7N		County		Rio Arriba	
Formation		Dakota		State		New Mexico	
Casing: Diameter		5 1/2 - 7 5/8		Tubing: Diameter		1 1/2 LF	
Pay Zone: From		6559		Set At: Feet		6788	
Simulation Method		Sand water frac		To		6704	
Flow Through Casing		X		Total Depth:		6725 PB	
Flow Through Tubing		X		Set At: Feet		6511	

Choke Size, inches		0.750		Choke Constant: C		14,1605	
Shut-In Pressure, Casing		PSIG		Shut-In Pressure, Tubing		PSIG	
Mesaverde		+ 12 = PSIA		2478		+ 12 = PSIA	
Flowing Pressure: P		79		Flowing Pressure: P <sub>w</sub>		PSIG	
Temperature: T		43		Days Shut-In		7	
n =		0.75		Working Pressure: P <sub>w</sub>		PSIG	
Gravity		0.710		F <sub>pv</sub> (From Tables)		1.000	

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

$$Q = 14,1605 \times 91 \times 1.0168 \times .9258 = \underline{\quad 1212 \quad} \text{MCF/D}$$

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

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

$$Aof = \underline{\quad \quad} \text{MCF/D}$$

TESTED BY Case

WITNESSED BY

*[Signature]*