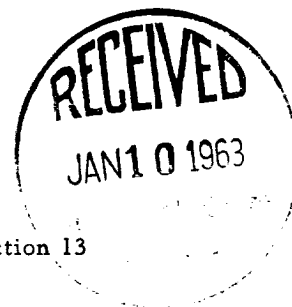


DRILLING & COMPLETION HISTORY

CONSOLIDATED OIL & GAS, INC.

DUKE NO. 1-13

San Juan County, New Mexico
December 20, 1962



Location: 1850' F/NL, 1180' F/EL, Section 13
T31N-R13W, N. M. P. M.

Elevations: 5815' GL
5827' KB - all measurements from KB

Spud: November 2, 1962

Drilling Completed: November 22, 1962
Well Completed: December 1, 1962

Total Depth: 6810' Drilled
6774' PBTD

Casing - Surface: 9 5/8" set at 205' with 150 sx. regular
2% CaCl₂

- Production: 5 1/2" set at 6807' with 222 sx. through shoe
and 292 sx. through stage collar at 4780'.

- Tubing: 1 1/2" set in Model "D" packer at 6585'.
1" landed at 4440'.

Logs: Gamma Ray/Neutron

Cores & Drillstem Tests: None

Formation Tops (log):

Cliffhouse	3785'	(+2042)
Menefee	3934'	(+1893)
Pt. Lookout	4494'	(+1333)
Greenhorn	6534'	(- 709)
Dakota	6647'	(- 822)

Producing Perforations:

	MV	DK
	4514' - 4560'	6650' - 6658'
	4578' - 4596'	6670' - 6680'
	4704' - 4708'	6690' - 6698'
		6720' - 6728'
		6742' - 6746'
		6752' - 6764'

Treatment: DK Sand water frac with 140,000 gal. water and
84,000 lbs. sand in two stages.

MV Sand water frac with 78,500 gal. water and
100,000 lbs. sand.

Initial Potential: DK Flow volume thru 3/4" choke: 3546 MCFD.

MV Flow volume thru 3/4" choke: 1077 MCFD.
Calculated Absolute Open Flow Potential:
2741 MCFD.

WELL: Duke No. 1-13
1850' F/NL, 1180' F/EL, Sec. 13-T31N-R13W
 FIELD: Basin Dakota, Blanco Mesaverde
 COUNTY: San Juan STATE New Mexico
 ELEVATIONS: 5815' GL
5827' KB

11/1/62

Moving in rotary rig.

11/2/62

Finished rigging up, will break tower this a.m.

11/3/62

Spud at 8:30 a.m. 11/2/62. Drilled 243' of sand and shale. Ran 7 joints 9 5/8" 36# J-55, total 223' set at 205' KB. Cemented with 150 sx. regular 2% CaCl₂, plug down at 3 p.m. Let cement set 12 hours, nipples up, pressured up to 750# for 30 minutes. Drilled out at 3 a.m. 11/3/62. Present operation, drilling at 439' drilled 224'.

11/4/62

Depth 1955'. Drilled 516' of sand and shale. Drilling with water. Bit No. 3 in hole. Dev. 1° at 1424'.

11/5/62

Depth 2788'. Drilled 833' of sand and shale. Bit No. 4 in hole. Drilling with water.

11/6/62

Depth 3384'. Drilled 596' of sand and shale. Dev. 1/2° at 2812', 1/4° at 3342'. Present operation, making trip for Bit 6, drilling with water.

11/7/62

Depth 3696'. Drilled 312' of sand and shale. Dev. 3/4° at 3616'. Bit No. 7 in hole, had trouble making last trip, started mudding up. Vis. 40. Mud. 9.3. Water loss 11.6.

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WELL: DUKE NO. 1-13

11/8/62

Drilling at 4001'. Drilled 305' of sand and shale. Mud 9.4. Vis. 39. Water loss 7.6. Dev. 1° at 3712', 1° at 3905'.

11/9/62

Depth 4284'. Drilled 283' of sand and shale. Dev. 1° at 4020', 1 1/4° at 4153'. Mud 9.3. Water loss 10.2. Vis. 43.

11/10/62

Depth 4488'. Drilled 204' of sand and shale. Present operation, making trip for Bit 13. Dev. 3/4° at 4381', 1° at 4488'. 14 1/4 hours tripping, 9 3/4 hours drilling. Vis. 60. Mud 9.5.

11/11/62

Depth 4602'. Drilled 114' of sand and shale. Started losing fluid at 4505', lost complete circulation at 4539'. Mixed one pit of mud and pumped in. Regained circulation, total mud lost approximately 500 bbls. Present operation, drilling ahead. Mud 9. Vis. 62. Bit 13 in hole.

11/12/62

Depth 4750'. Drilled 148' of sand and shale. No loss of mud. Dev. 1° at 4693'. Vis. 78. Mud 9.2. Drilling with Bit 15.

11/13/62

Depth 3180'. Drilled 295' of sand and shale. Present operation, tripping for Bit 8. Mud 9.8. Vis. 48. Dev. 1/2° at 2850'.

11/14/62

Depth 4973'. Drilled 97' of sand and shale. Present operation, making trip for Bit 17. Vis. 56. Mud 9.2. Water loss 7. PH 9. Mud cake 2/32. At 4909' lost circulation, lost approximately 250 bbls. mud, regained and everything OK.

11/15/62

Depth 5308'. Drilled 235' of sand and shale. Vis. 65. Mud 9. Water loss 8.2. Bit No. 18 in hole. Dev. 1 1/4° at 4931'.

WELL: DUKE NO. 1-13

11/16/62

Depth 5648'. Drilled 340' of sand and shale. Dev. 1° at 5390'. Vis. 74. Mud 9.1. Water loss 8.2. Out of hole for Bit 20.

11/17/62

Depth 5973'. Drilled 325' of sand and shale. Present operation, drilling with Bit 21. Mud 9.2. Vis. 64. PH 9. Mud cake 1/32.

11/18/62

Depth 6320'. Drilled 347' of sand and shale. Dev. 1 1/4° at 6084'. Vis. 62. Mud 8.8. Water loss 9. PH 9. Present operation, making trip for Bit 23.

11/19/62

Depth 6564'. Drilled 244' of sand and shale. Dev. 1° at 6487'. Vis. 73. Mud 9. Water loss 9. Bit 24 in hole.

11/20/62

Drilling at 6681'. Drilled 117' of sand and shale. Los approximately 150 bbls. of mud at 6669'. Bit 25 in hole. Mud 9. Vis. 80. Water loss 10.2. Hit hard drilling 12 min./ft. at 6644'.

11/21/62

Drilling 6735'. Dev. 1 1/4° at 6667'. Vis. 92. Mud 9.1. Water loss 10.2. Drilled total of 54'. Make trip for a plug bit.

11/22/62

TD 6810'. Drilled 75' sand and shale. Dev. 1 1/4° at 6765'. Bit No. 28 in hole. Present operation, conditioning hole to log. Vis. 85. Mud 9.2.

11/23/62

Came out of hole, ran log to 6808'. Started logging up. Log above GH. Dropped back down for a repeat. Tool hung up at 6790'. Could not get loose. Pulled out of rope socket. Went in hole with overshot on drill pipe, washed down to top of fish, caught fish, recovered same. Present operation, going in hole with drillpipe to condition hole. Will commence with laying drillpipe down.

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WELL: DUKE NO. 1-13

11/24/62

Circulated and cleaned hole to run pipe, layed down drillpipe and drill collars. Rigged up to run casing. Ran 209 joints 5 1/2" 15.5# J-55 8 round casing. Total pipe ran 209 joints, 6813.00', less above KB 6.00', pipe set at 6807.00' KB. One centralizer on shoe joint, float collar at 6774' KB, one centralizer at 6477' KB, one centralizer at 4877' KB, one cement basket at 4813' KB. Stage collar at 4780' KB, one centralizer at 4387.57' KB, cement first stage with 111 sx. regular, 111 sx. Diamix A, preflushed with 50 sx. GP. Plug down at 2:20 a.m. 11/24/62, bumped plug with 2000#, held OK. Second stage, cemented with 218 cu. ft. 40% Diacel D, 4% ca cl₂, followed by 37 sx. cement, 37 sx. Diamix A, plug down at 6 a.m. 11/25/62. Bumped plug with 2000#. Held OK. Good circulation on both jobs. Rig released at 6:30 a.m. 11/24/62.

11/25/62

Moving out rotary rig.

11/26/62

Finished moving out rotary rig, moved in completion rig. Shut down, waiting on completion string.

11/27/62

Picked up 2 7/8" tubing, cleaned out to 6774', pressured up to 3000#, held OK. Spotted 1000 gal. breakdown acid, pulled out of hole with tubing, present operation, running correlation log.

11/28/62

Ran correlation log. Perforated 4 per foot 6728'-6720', 6746'-6742', 6164'-6152', total 88 holes. Rig up Halliburton, 2 1/2 H + 400 acid. 7 BPM, breakdown with acid, 1500# one pump, 5 bbls. 5 min. 400#. 7 BPM, pump in at 1500#, 2-5 bbls., 5 min., 300#. 7 BPM, pump in at 1200#, 3-5 bbls., 5 min., 300#. 25 BPM pumped in at 2600# broke to 2200#, 5 min., 600#.

First Stage Frac (DK)

Breakdown, one pump	2000#	Average treat. press.	2800#
Breakdown, all pumps	2500#	Final treat. press.	3000#
Maximum treat. press.	3000#	Instant shut in	2150#
Minimum treat. Press.	2600#	Five min. shut in	1800#

WELL:

DUKE NO. 1-13

OPEN FLOW TEST DATA

DATE December 13, 1962

11/28/62 Cont'd.

First stage frac (DK) cont'd.

Breakdown & fill	3500 gal.	Avg. inj. rate	39.2 BPM
Treating fluid	66,000 gal.	sand	34,000 lbs.
Overflush	60 bbls.	Overall inj. rate	38.2 BPM
Rubber balls	None	Job complete	10:44 a.m. 11/27/62

Rig up Lane Wells, set Baker bridge plug at 6110' KB. Perforated 4 per foot, 6698'-6690', 6680'-6670', 6658'-6650'. Total 104 holes. No communication.

Second stage frac

Breakdown, one pump	1500#	Breakdown & fill	1500 gals.
Breakdown, all pumps	2000#	Treating fluid	74,000 gals.
Maximum treat. press	3000#	Overflush	7 1/2 bbls.
Minimum treat. press	2000#	Rubber balls	20
Average treat. press	2500#	Average injection rate	51.9 BPM
Final treating press	3000#	Sand	50,000 lbs.
Instant shut in	1700#	Over all injection rate	42.5 BPM
5 minute shut in	1300#	Final pressure	3000#
		Job complete	4 p.m. 11/27/62.

Ran 1% CC and 2 1/2# per 1000 gal. FR 2. Started sand at 3/4# 40-60 for 5000# total and 1#, 40-60 for 15,000#. 10,000# 20-40 at #1 per 10,000# Decrease sand to 3/4#, 20-40 pumped 20,000#. Total sand 50,000#. Rig up Lane Wells, set bridge plug at 4760' KB.

Third Stage (MV)

Perforated 2 per foot 4708'-4704', 4596'-4578', 4560'-4514', total 136 holes.

Breakdown, one pump	800#	Breakdown & fill	2210 gals.
Breakdown, all pumps	1600#	Treating fluid	78,500 gals.
Maximum treat. press	2800#	Overflush	300 gals.
Minimum treat. press	1500#	Rubber balls	80
Average treat. press	1800#	Injection rate	53.6 BPM
Final treat. press	2800#	Overall injection rate	41.7 BPM
Instant shut in	200#	Sand	100,000 lbs.
5 minute shut in	0#	Job complete	at 8:24 p.m. 11/27/62

11/29/62

Blew and cleaned well to bridge plug (4760'). Gauged well, well making 2800 MCFD. Drilled plug at 4760', water came in from DK, plug drilled at 5 p.m. 11/28. Blew and cleaned well to next bridge plug at 6710', well still making

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WELL:

DUKE NO. 1-13

OPEN FLOW TEST DATA

DATE December 13, 1962

11/29/62 Cont'd.

1 3/4" stream of water, clean of sand. Gauged well, well making 1635 MCFD. Logging with water. Drilled top off of bridge plug at 6710' at 6 a.m. 11/29. Present operation, blowing hole at 6500', well making 3" stream of frac water.

11/30/62

Blew and cleaned well to 6774' PBTD. Well making some sand and 1" stream of frac water. Well gauged 4500 MCFD. Well still logging some. Laid down 2 7/8" completion string. Rigged up Lane Wells, set Model D at 6585' KB. Present operation, running 1 1/2" tubing.

12/1/62

Ran 202 joints 1 1/2" 2.90#, 10-round, EUE, V50 total 6544.24' plus subs at 10.09', 8.09, 6.13', 4.06', 2.13', total 6574.74' landed at 6585.74' KB. MV ran 139 joints 1" V50 1.80# EUE tubing, total 4429', landed at 4440' KB. One 1" jet collar at 4213.43' KB and one 1" jet collar at 3954.41' KB.

12/2/62

Shut in for test.

12/3/62

Shut in for test.

12/4/62

Shut in for test.

12/11/62

DK 3586 MCFD through 1 1/2" tubing, light spray of water and oil throughout 3 hour test. Final casing pressure 1017#, test will be mailed today.

Operator Consolidated Oil & Gas, Inc.		Lease Duke 1-13	
Location 1850' FNL, 1180' FEL, Sec. 13, T31N, R13W		County San Juan	State New Mexico
Formation Mesaverde		Pool Blanco	
Casing Diameter 5-1/2"	Set At: Feet 6807	Tubing Diameter 1"	Set At: Feet 4440'
Per Zone: From 4514	To 4708	Total Depth 6810	
Simulation 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 1033	-12 = PSIA 1045	Days Shut-in 8	Shut-in Pressure, Tubing, PSIG 1033
Flowing Pressure: P 68	-12 = PSIA 80	Working Pressure: P _w 845	-12 = PSIA 857
Temperature: T 46	°F	n = 0.75	F _{av} (From Tables) 1.013
		Gravity 0.7 (est.)	

CHOKE VOLUME: $Q = C \times P_1 \times F_1 \times F_2 \times F_3$

$$Q = 14,1605 \times 80 \times 1.0137 \times .9258 \times 1.013 = 1,077 \text{ MCF/D}$$

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

$$Aof = \left(\frac{1,092,025}{357,576} \right)^n$$

$$Aof = 2,741 \text{ MCF/D}$$

TESTED BY: Clyde Phillips

WITNESSED BY: _____

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

Operator Consolidated Oil & Gas, Inc.		Lease Duke 1-13	
Location 1850' FNL, 1180' FEL, Sec. 13, T31N, R13W		County San Juan	State New Mexico
Formation Dakota		Pool Basin	
Casing Diameter 5-1/2"	Set At: Feet 6807	Tubing Diameter 1-1/2"	Set At: Feet 6856'
Per Zone: From 6152	To 6728	Total Depth 6810	
Simulation 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 Mesaverde	-12 = PSIA 1920	Days Shut-in 7	Shut-in Pressure, Tubing, PSIG 1920
Flowing Pressure: P 245	-12 = PSIA 257	Working Pressure: P _w 1920	-12 = PSIA 1932
Temperature: T 42	°F	n = 0.75	F _{av} (From Tables) 1.034
		Gravity	

CHOKE VOLUME: $Q = C \times P_1 \times F_1 \times F_2 \times F_3$

$$Q = 14,1605 \times 257 \times 1.0178 \times .9258 \times 1.034 = 3,546 \text{ MCF/D}$$

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

$$Aof = \left(\frac{1,092,025}{357,576} \right)^n$$

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

TESTED BY: W. L. Jackson

WITNESSED BY: _____

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