OPEN FLOW TEST DATA

DATE February 27, 1961

Operator: Consolidated Oil & Gas, Inc.		Lease: Hale-Adobe No. 1	
Location: 1450 FNL, 1450 FEL-28-31N-13W		County: San Juan	State: New Mexico
Formation: Dakota		Pool: Basin	
Casing: Diameter: 5 1/2"	Set At: Feet: 6493	Tubing: Diameter: 1 1/4" & 1 1/2" EUE	Set At: Feet: 6357
Pay Zone: From: 6376	To: 6453	Total Depth: 6453	
Stimulation Method: Sand-water frac		Flow Through Casing:	Flow Through Tubing: x

Choke Size, Inches: 0.750		Choke Constant: C: 14.1605			
Shut-in Pressure, Casing, PSIG: 1959	+ 12 = PSIA: 1971	Days Shut-in: 7	Shut-in Pressure, Tubing PSIG: 1972	+ 12 = PSIA: 1984	
Flowing Pressure: P PSIG: 141	+ 12 = PSIA: 153		Working Pressure: P_w PSIG: 992	+ 12 = PSIA	
Temperature: T °F: 52	n = 0.75		Fpv (From Tables): 1.020	Gravity: 0.70	

CHOKE VOLUME = $Q = C \times P_t \times F_t \times F_g \times F_{pv}$

$Q = 14.1605 \times 153 \times 1.0078 \times 0.9258 \times 1.020 =$ 2060 MCF/D

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

$Aof = Q \left(\frac{3888784}{2904720} \right)^n = 1.33878^n$

Aof = 2560 MCF/D

TESTED BY Phillips

WITNESSED BY _____

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Q = 14.1605 x 153 x 1.0078 x 0.9258 x 1.020 = 2060 MCF/D

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WITNESSED BY

WELL: HALE-ADOBE NO. 1-28

2/17/61

Shut in for initial pressure buildup and subsequent cleaning. Well continued to flow for 24 hours unloading lots of frac water. Casing pressure 510 PSIG this a. m. before shut in.

2/18/61

Well has been shut in for 24 hours. Tubing and casing pressure now 1800 PSIG. Preparing to blow for additional clean up.

2/19/61

Blowing and cleaning up frac water. Measured flow rates varying from 3/4 to 1 1/4 MCFD yesterday p. m. while still bringing lots of frac water.

2/20/61

Shut in. Will make preliminary three hour flow test today following 18 hour shut in period.

Well continued to flow and clean up frac water until 5 p. m., at which time it was shut in. The flow stream seemed to be drying up considerably.

2/21/61

Shut in for initial seven-day buildup and subsequent potential testing.

Performed initial three-hour flow test yesterday with following results:

Casing pressure 1635 PSIG - tubing pressure 1630 PSIG. After three hour flow through a 3/4" positive choke well was making 1100 MCFD and blowing a heavy water fog.

2/28/61

Results of official seven-day potential test ran 2/27/61:

Time	Tubing	Casing	Temp.
0	1972	1959	
15	670	1632	
30	397	1487	
45	302	1277	48°
1	294	1199	50°
2	162	1072	50°
3	141	*992	52°

*Actual Volume 2060 MCFD

Calculated Absolute Open Flow 2560 MCFD

WELL: HALE-ADOBE NO. 1-28

1/7/61

Total Depth 6370'. Drilled 120', sand and shale. Mud 9.7 - 61. Presently tripping for Bit No. 31.

1/8/61

Drilling at 6443' with Bit No. 32. Drilled73', sand. Mud 9.8 - 70. Deviation 1 degree at 6350'.

1/9/61

Total Depth 6510'. Drilled 67', sand. Presently circulating for log.

1/10/61

Fishing at total depth 6510'. When pulling out to log and when working drill pipe thru tight place 90' off bottom, drill pipe parted 325' down. Went in with overshot and caught fish. Moved fish uphole 18' and it stuck again. Were not able to get down with dialog string shot or free-point indicator. Made up string shot by using 7/16" chain. Ran in hole, went to bottom OK. While attempting to get torque in pipe to back off, pipe broke manually. Backed off single above the overshot, then found fish had moved back down-hole 18'. Screwed into it, broke circulation and pipe moved up 4'. Broke drill pipe. Had 110,000 lbs., which is believed to be all drill pipe with collars left in hole. Presently coming out of hole laying down crooked drill pipe - 36 joints so far.

1/11/61

Fishing. Total Depth 6510'.

Completed laying down cork screw drillpipe. Found that drillpipe had pulled in two, leaving a 5'4½" drillpipe fishing neck above drill collars. Went in hole with overshot, but could only get to 150' above fish. Now on top of fish with bit, circulating and conditioning hole. Mud 9.7 - 66 - 9.2 - 9.5 - 2/32nds - 2½% oil.

1/12/61

Presently in hole with overshot. Mud 9.8 - 84 - 8.2 - mixed 2 sx Driscose, 59 sx gel and 150 lbs. Tannathin.

10 hrs.	Cleaning out top of hole with bit and conditioning mud
6 hrs.	Trips
8 hrs.	Fishing with overshot.

WELL: HALE-ADOBE NO. 1-28

1/13/61

Total depth 6510'. Fishing. Recovered 2' of drillpipe with overshot yesterday. Presently pulling out of hole. If everything OK, will run joint of wash pipe and shoe and wash out around fish. Mud 9.8 - 120.

1/14/61

Fishing. Made two trips with overshot. Caught fish twice, but slips failed to hold. Presently going in hole with 6-7/8" slips to catch drill collars.

1/15/61

Fishing. Went in hole, ran dialog. Could not get below 6020'. Spotted 50 bbls. oil and waited for it to soak 3 hrs. Started working fish - worked 33' and overshot came loose. Dressed shoe with Clusterite to 6-5/8" I.D.

Milled over fish for 10' from 5983' to 5993'.

1/16/61

Presently going in hole with bit to clean to bottom. Caught fish with 6-5/8" overshot. Worked loose and pulled all fish (17 drill collars) out of hole. Mud 9.2 - 125 - 8.

1/17/61

In hole with Clusterite washover shoe cleaning junk to bottom. Presently 11 joints off bottom, or depth 6180'. Ran bit in and cleaned out to 6410'. Started trying to stick pipe, so pulled out. Mud 9 - 135 - 8.5.

1/18/61

Milling on junk.

1/19/61

Presently 10 joints off bottom milling junk. Drilled 30'. Mud 9-120-8.

12-1/2 hrs. drilling and milling on junk.
11-1/2 hrs. tripping - picked up two more drill collars.

1/20/61

Making trip at 6450'. Still milling on junk.

WELL: HALE-ADOBE NO. 1-28

1/21/61

TD - 6510'. Cleaning out at 6460'. Cleaned 10'. Mud 9.4 - 80 - 7.6.

1/22/61

TD - 6510'. Cleaned out to 6493'. Stuck pipe. Left bit in hole while trying to back off drill collars. Presently preparing to log. Mud 9.4 - 162 - 8.

1/23/61

TD - 6510'. Running 5 1/2" casing - 70 joints in hole. Logged to 6485'. Top of Dakota at 6373'. Concluded that 112' of Dakota penetration sufficient. Junk below 6493' consists of bit, cones, overshot slips and part of skirt.

1/24/61

TD 6510', PBTD 6456'. Moving off rotary rig.

5 1/2" - 15.5 lb - J - 55 casing set at 6493' KB (205 joints). A differential float collar and shoe with Texas pattern guide shoe extension was run. Four centralizers were spaced 90' apart from the shoe joint up.

Following a spearhead of 20 bbls of chemically treated water, casing was cemented with 180 sx regular cement with 6% gel. Bumped plugs at 3000 PSIG - checked floats - OK - repressured to 1250 PSIG and held for three hours. Released pressure and set slips.

Released rig at 5 p.m.

2/13/61

Moving on completion rig.

2/14/61

Perforating.

Ran correlation log and found PBTD at 6453'. Perforated with two bullets and two jets per foot - 6447' to 6453'. Broke down through these perforations at 2500 PSIG with decline to 1600 PSIG. Gradually increased to 2000 PSIG at three BPM. Displaced 1000 gallons 15% HCl to bottom under these conditions. Additional perforating will be done in this acid such that all perfs will have an acid soak prior to fracing.

WELL: HALE-ADOBE NO. 1-28

2/15/61

Preparing to run completion tubing and wash out wellbore frac sand accumulation if necessary.

Perforated with two bullets and two jets per foot 6376' to 6393' and 6398' to 6420'. Allowed acid to soak all perfs about three hours (see report of 2/14/61) and proceeded with sand-water frac as follows:

Soaked away acid at slow rate at 700 PSIG. Began injecting at 2000 PSIG remained relatively steady at this pressure with 35 BPM while injecting the first 40,000 pounds of sand - dropped 20 balls with pressure increase to 2200 PSIG - dropped 10 balls after 63,000 pounds sand injected at pressure of 2250 PSIG. Pressure gradually increased to 2700 PSIG after 90,000 pounds sand injected. Started flush with pressure increase to 2950 PSIG and brokeback to 2600 PSIG with flush one-third completed. Completed flush at 2600 PSIG. Rate had declined to about 30 BPM during the latter portion of job.

Job summary:
90,000 pounds sand (25,000 pounds 40-60 mesh - 65,000 pounds 20-40 mesh)
95,000 gallons water with J - 101 Fluid Loss Additive
1,000 gallons 15% HCl
32 BPM
2,000 to 2,600 PSIG average injection pressure

Standing pressure was 1000 PSIG after fifteen minutes. Shut well in overnight. Will rig up completion rig.

2/16/61

Blowing well for initial clean up.

Blew well in with supply gas with tubing hanging at 2400' - stripped tubing to bottom and landed as follows:

77 joints - 1 1/4" - CW - EUE	2403'	
122 joints - 1 1/2" - Smls - EUE	3941'	
	6344'	Set at 6357' KB.

Tubing jet collars located at 5567', 5062' and 4555'.

The well has been unloading naturally after landing tubing. Casing pressure now 350 PSIG.

WELL: HALE-ADOBE NO. 1-28 (1450' F/NL & 1450' F/EL of Section 28 - T31N - R13W, N.M.P.M.)

FIELD: Basin-Dakota

COUNTY: San Juan STATE New Mexico

ELEVATIONS: 5662' GD

5674' KB

12/7/60

Rigging up.

12/8/60

Rigging up.

12/10/60

Total Depth 195'. WOC. Drilled 195' of 13-3/4" hole. Ran 183' 9-5/8" surface casing set at 193' K.B. Cemented with 200 sx regular cement with 2% HA-5. Plug down 5:00 a.m. Good returns.

12/11/60

Drilling at 610' with Bit No. 1 using water. Drilled 415', sand and shale. Deviation 1 degree at 480'.

12/12/60

Total Depth 1541'. Drilled 931', shale and sand. Presently tripping for Bit No. 3, using water. Deviation 3/4 degree at 885'; 1 degree at 1300'.

12/13/60

Drilling at 1576' with Bit No. 3. Drilled 35'.

WELL: HALE-ADOBE NO. 1-28

12/14/60

Drilling at 1935' with Bit No. 4. Drilled 358', sand and shale. Mud 9.8 - 45.

12/15/60

Drilling at 2140' with Bit No. 5. Drilled 205', sand and shale. Mud 9 - 44.

12/16/60

Drilling at 2470' with Bit No. 6. Drilled 330'. Mud 9.1 - 37.

12/17/60

Drilling at 2672' with Bit No. 7. Drilled 202', sand and shale. Mud 9.2 - 65. Down 8 hrs. changing valves and seats in pump, putting guard on it.

12/18/60

Drilling at 2900' with Bit No. 7. Drilled 230', sand and shale. Mud 9.1 - 68.

12/19/60

Drilling at 3000' with Bit No. 8. Drilled 100', sand and shale. Mud 9 - 75.

9-1/2 hrs. drilling
4 hrs. Tripping and washing to bottom
10-1/2 hrs. installing No. 1 motor

12/20/60

Total Depth 3164'. Drilled 164', sand and shale. Mud 9.1 - 72 - 8. Presently tripping for Bit No. 10.

WELL: HALE-ADOBE NO. 1-28

12/21/60

Drilling at 3310' with Bit No. 11. Drilled 146', shale and sand. Mud 9.1 - 63.

12/22/60

Drilling at 3430' with Bit No. 13. Drilled 120', sand. Mud 9.5 - 68.

12/23/60

Drilling at 3600' with Bit No. 14. Drilled 170', sand. Mud 9.5 - 52 - deviation 3/4 degree at 3410'.

12/24/60

Depth 3774'. Drilled 174', sand and shale. Presently tripping for Bit No. 16. Mud 9.5 - 48.

12/25/60

Total Depth 3981'. Drilled 207', shale and sand. Presently tripping for Bit No. 17. Mud 9.3 - 48 - deviation 3/4 degree at 3774'.

12/26/60

Total Depth 4212'. Drilled 231', shale and sand. Presently tripping for Bit No. 18. Mud 9.5 - 47.

12/27/60

Drilling at 4358' with Bit No. 19. Drilled 144', sand and shale. Mud 9.6 - 44 - deviation 1 degree at 4250'.

12/28/60

Total Depth 4540'. Drilled 182', sand and shale. Mud 9.5 - 47. Presently drilling with Bit No. 20.

WELL: HALE - ADOBE NO. 1-28

12/29/60

Drilling at 4733' with Bit No. 21. Drilled 193', sand and shale. Mud 9.6 - 46.

12/30/60

Drilling at 4915' with Bit No. 23. Drilled 182', shale and sand. Mud 9.6 - 48.

12/31/60

Drilling at 5091' with Bit No. 24. Drilled 176', sand and shale. Mud 9.6 - 45.

1/1/61

Drilling at 5316' with Bit No. 25. Drilled 225', shale and sand. Mud 9.5 - 46 - deviation 1 degree at 5050'.

1/2/61

Total Depth 5572'. Drilled 256', shale and sand. Presently tripping for Bit No. 27. Mud 9.5 - 47.

1/3/61

Drilling at 5797' with Bit No. 28. Drilled225', shale and sand. Mud 9.6 - 49.

1/4/61

Total Depth 5985'. Drilled 185', shale and sand. Mud 9.7 - 52. Presently changing bearing on clutch shaft.

1/5/61

Total Depth 5985'. Presently installing clutch shaft.

1/6/61

Total Depth 6250'. Drilled 265', shale and sand. Presently tripping for Bit No. 30. Mud 9.8 - 50.

DRILLING AND COMPLETION HISTORY

CONSOLIDATED OIL & GAS, INC.

HALE-ADOBE NO. 1-28

San Juan County, New Mexico

February 27, 1961

Location: 1450' F/NL, 1450' F/EL
Section 28, T31N, R13W.

Elevation: 5662' Ground
5674' K.B.

Spud: 12-9-60

Drilling Completed 1-24-61

Well Completed: 2-16-61

Total Depth: 6510' Drilled
6453' Plug Back

Casing:

Surface: 9 5/8" 32# H-40 set at 193' cemented with 200 sx 2% HA-5 cement.

Production: 5 1/2" 15.5# J-55 at 6493' cemented with 180 sx 6% gel. cement.

Tubing: 1 1/2" J-55 EUE and 1 1/4" CW EUE at 6357'.

Logs: Lane Wells - Gamma Ray - Neutron

Cores: None

Drillstem Tests: None

Formation Tops:

Pictured Cliffs	1604'	(+ 4070')
Mesa Verde	3297'	(+ 2377')
Cliff House	3357'	(+ 2317')
Menefee	3507'	(+ 2167')
Point Lookout	4163'	(+ 1511')
Mancos	4508'	(+ 1166')
Greenhorn	6239'	(– 565')
Graneros	6312'	(– 638')
Dakota	6367'	(– 693')

Producing Perforations: 6376' - 6393' 6398' - 6420' 6447' - 6453'

Treatment: Sand-water Frac - 90,000 # Sand, 95,000 gal. water, 1,000 gal. 15% acid.

Initial Potential: Flow volume 2060 MCFD through 3/4" choke. Calculated Absolute Open Flow Potential 2560 MCFD.