DRILLING AND COMPLETION HISTORY

HURON DRILLING COMPANY, INC.

HURON NO. 1-2

Rio Arriba County, New Mexico
January 10, 1964

LOCATION:		940' FSL, 1132' FWL, Section 2 T26N-R4W, NMPM
ELEVATIONS:		7159' GL 7171' KB - all measurements from KB
SPUD:		November 14, 1963
DRILLING COMPLETED: WELL COMPLETED:		December 7, 1963 December 21, 1963
TOTAL DEPTH:		6219' (Logger) 6214' (Driller) 6178' (Plug Back)
CASING -		
Surface:		12 3/4" 33# casing set at 309' cemented with 250 sx. regular 2% $CaCl_2$ cement.
Production:		7" 23# J-55 casing set at 4155' cemented with 117 sx. 50/50 Pozmix followed by 50 sx. regular 2% $CaCl_2$ cement. 4 1/2" 9.5# J-55 casing set as liner from 4054' to 6212'. Cemented with 225 sx. 50/50 Pozmix, 4% gel cement.
TUBING:		1" regular landed at 3785' 1 1/2" EUE landed in Baker Model "D" packer at 6000'.
LOGS:		Lane Wells Gamma Ray/Neutron
CORES & DRILLSTEM TESTS:		None
FORMATION TOPS: (Log)		Pictured Cliffs 3882' (+3289') Cliffhouse 5642' (+1529') Point Lookout 6006' (+1165')
PRODUCING PERFORATIONS:		PC: 3890' - 3930', 3946' - 3956' MV: 6048' - 6056', 6061' - 6066', 6074' - 6088', 6103' - 6112', 6121' - 6131', 6143' - 6153'
TREATMENT:	PC	Sand water frac with 100,000 lbs. sand and 52,630 gal. water.
	MV	Sand water frac with 100,000 lbs. sand and 52,630 gal. water.
INITIAL POTENTIAL:	PC	Flow volume thru 3/4" choke: 1074 MCFD Calculated Absolute Open Flow Potential: 2808 MCFD
	MV	Flow volume thru 3/4" choke: 2848 MCFD

WELL: HURON NO. 1-2

940' F/SL, 1132' F/WL, Sec. 2, 26N-4W

FIELD: Blanco Mesaverde, Tapicito Pictured Cliffs

COUNTY: Rio Arriba STATE: New Mexico

ELEVATIONS: 7171' KB

7159' GL

11-13-63

Moving in rotary rig.

11-14-63

Finished rigging up. Presently drilling rat hole.

11-15-63

Spudded at 11:30 a.m. Drilled 309' of 15" hole. 1/2° dev. at 280'. Ran 7 joints (317') of 12 3/4" OD pipe, set at 309' from KB. Cemented with 250 sx. regular 2% $CaCl_2$. Plug down at 4:30 a.m.

11-16-63

Depth 801'. Drilling in shale. Drilled 492' with Bit #1.

11-17-63

Depth 1649'. Drilled 847' of sand and shale. Presently tripping for Bit #2. Mud 8.8. Vis. 36. Water loss 10. Dev. 3/4° at 1036', 1° dev. at 1600'. Lost 185 bbls. mud at 1411'. Added 30 sx. of lost circulation material. Complete returns.

11-18-63

Depth 2495'. Drilled 847' of sand and shale. Drilling with Bit 2. Mud 8.8. Vis. 36. Water loss 6.8. Dev. 1/2° at 2040'.

11-19-63

Depth 3060'. Drilled 660' of sand and shale. Presently drilling with Bit #3. Mud 9. Vis. 38. Water loss 6.8. Dev. 1/2° at 2900'.

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11-20-63

Depth, 3490'. Drilled 430', sand and shale. Drilling with Bit #13. Mud weight, 9.3; viscosity, 37; water loss, 6.8; phosphate, 9. Lost 50 bbls. of mud at 3241'.

11-21-63

Depth, 3935'. Drilling ahead. Drilled 445', sand and shale. 1° dev. at 3870'. Drilling with Bit #5. Viscosity, 40; mud weight, 9.2; water loss, 5.6. Lost 60 bbls. of mud at 3900-35'. Full returns at 3935'.

11-22-63

Depth, 4150'. Drilled 215', sand and shale. Mud weight, 9; viscosity, 80; water loss, 6.8. Coming out of hole to run 7" casing.

11-23-63

Finished coming out of hole with drill pipe. Rigged up and ran 7" casing. Ran 140 jts. 7" 23# casing (total 4159'), set at 4155' KB. F.C. at 4124'. Cemented with 117 sx 50-50 Pozmix 4% gel. Tailed in with 50 sx reg. 2% CaCl. Plug down at 3:00 a.m. (Note: when pipe was on bottom, lost complete circulation. Had to pump in approximately 375 bbls. of mud with 30% lost circulation material to regain full circulation. Had full returns on Hydrozone and cement job.

11-24-63

Nippled up and went in hole blowing down. Top of cement, 3950'. Presently drilling cement at 4144'.

11-25-63

Drilled firm cement to 4154', bottom of casing. Dusted good. Went out of casing, making 1/4" stream of water. Blew for 1 hr. No decrease in water. Drilled and blew for 6 hrs. Drilled to total depth, 4192'. This is 38' of new hole, no dust. No decrease in water. Came out of hole, picked up Baker full-bore packer. Went in and set packer at 4022'. Pressured up down drill pipe to 2000#. Couldn't pump into formation. Pressured up back side to 2000#, held. Came out of hole, put on bit, went in to 4180', hit bridge. Worked through bridge. Went on to TD, 4192'. Circulated and cleaned with water. Pulled up in casing. Pressured up down drill pipe. Taking fluid at 6 bbls./min. at 1500#. Presently coming out of hole to pick up full bore packer.

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11-26-63

Ran Baker full-bore packer, and set at 4052'. Pressured up on annulus to 1000#, pumped in at 4 BPM at 1000#. Mixed 75 sx of reg. cement with 2% CaCl. Cleared packer by 1-1/2 bbls. pumped in at 1400# pressure. Shut-in pressure, 650#; five stages of 1/4 bbl. each; final pressure, 2000#, held. Job completed at 2:00 p.m., 11/25/63. Presently blowing down at 4000'.

11-27-63

Blowing. Drilled firm cement from 4090-4155'. Went out of pipe to 4155-92'. No cement. Blew. Dried up. No visible moisture. Drilled 5' of new hole. Began making a small stream of water. Blew at 4197'. Dried up. Made 9'. At 4206', began making a little moisture. Pulled 2 stands of pipe up into casing. Blew. Dried up. Well began dusting. Going to bottom.

11-28-63

Pulling out, picking up Baker full-bore packer. Drilled 4206-65'; no dust; some water. Loaded with water, circulated and cleaned to squeeze.

11-29-63

Loaded and circulated for 30 min. Plugged bit. Came out, ran Baker full-bore packer and set at 4052'. Pressured up to 1000# on back side. Pumped 6 bbls./min. at 1700#. Mixed 100 sx. reg. with 2% $CaCl_2$. Cleared packer by 1/2 bbl. Squeezed in 4 stages - 15 min. each. Squeeze pressure, 2000#. Completed at 12:00 Noon. Came out laying down 4" drill pipe. Picked up 3-1/2" drill pipe. Blowing down at 3351'.

11-30-63

Went in hole blowing down. Top of cement at 4069'. 10-ft. stringer. Firm cement from 4070-4260'. Made 2" stream of water, then dried up. No visible moisture since 1:00 a.m. Not dusting good. Presently blowing down to 4260'.

WELL: HURON NO. 1-2

12-1-63

Depth, 4262'. Blew at this depth for 14 hrs. Still making some water. Pulled out, picked up and going in with Baker full-bore packer and set at 3997' KB. Loaded back side with water, pressured up to 1500#, held. Pumped 150 sx. reg. cement with 8/10 of 1% Hal-Ad 9" down drill pipe. Staging cement 2-1/2 hrs. Max. squeeze pressure, 2500#; max. standing pressure to this point, 700#.

12-2-63

Squeezed with 150 sx. reg. cement, with 8/10 of 1% Hal-Ad #9, and 2% $CaCl_2$. 2 - 30-min. stages, 1 - 1-hr. and 1 - 30-min. stage. Maximum squeeze pressure, 2500#. Released, held. Pressured up to 2500# for 2 hrs. Completed at 8:00 a.m., 12-30-63. Unseated full-bore packer and pulled with string, packer clean, cement in last joint. Went in blowing down. Top of cement at 3988'. Presently drilling firm cement at 4079'.

12-3-63

Depth, 4832'. Drilled 570', sand and shale. Presently tripping for Bit #9. 1-1/4° dev. at 4650'.

12-4-63

Depth, 5380'. Drilled 500'. Formation: Sand and shale. Drilling with Bit #9. Drilling with gas. Pressure, 150#. 1-1/2° dev. at 5050'.

12-5-63

Depth, 5700'. Drilled 320', firm sand and shale. Drilling with Bit #10. 6 hrs. for installing valve in "blooey" line. 4 hrs. blowing down with some visible moisture.

12-6-63

Total Depth, 6214'. Drilled 514', sand and shale. Some natural flow at 6180'. Came out of hole, rigging up Lane-Wells. Logging to TD of 6219'. Presently logging.

12-7-63

Finished logging. Ran 67 jts. of 4-1/2" 9.5# casing. Cemented with 225 sx. 50-50 pozmix with 4% gel. Plug down at 1:20 p.m. Laid down drill pipe. Total 4-1/2" (2155.43'); liner hanger, 2.10'. Set at 6212' KB; float collar, 6178' KB; liner top, 4054' KB.

WELL: HURON NO. 1-2

12-11-63

Waiting on completion rig.

12-14-63

Rigging up on completion rig.

12-15-63

Went in hole with 6-1/4" bit. Top of cement at 3152'. Cleaning out to liner top.

12-16-63

Top of cement at 3152'. Drilled 160'. Fell thru at top of liner. Pressured up with rig pump to 1600#, held. Going in to clean out to top of float collar. Had 48' of cement on top of float collar. Pressured up to 2700#. Pressure dropped. Re-pressured to 2000#. Taking fluid at 2 BPM, 1700#. Going in hole to set full bore packer at 4210'. Pressured down tubing to 3000#, held. Pressured up on back side. Taking fluid at 2 BPM, 2700#. Squeezing top of liner.

12-17-63

Set full bore packer at 240'. Pressured up on back side, held. Set full bore packer at 3929'. Squeezed with 50 sx. reg., 2% $CaCl_2$. Squeeze pressure, 2400#. Job completed at 12:45 p.m. Waiting on cement 12 hrs. Top of cement, 3979'. Drilled 75' of cement. Pressured to 2750'. Coming out of hole to blow down.

12-18-63

Blew well down to 6178'. Ran gamma-ray collar log. Perforated 6048'-6056', 6061'-6066', 6074'-6088', 6103'-6112', 6121'-6131', 6143'-6153' with Lane Well two per foot. Had 700' of fluid in hole on first perforating run. Fluid level dropped to 6150' after run (6121-6131' & 6143-6153'). Slight blow of gas increasing to estimated 30 MCF. Rigged up Dowell - four Allisons.

Loaded hole	Initial I.R.	50 BPM
All pumps - 1400 psi	Final I.R.	48 BPM
Max. T.P. - 2700 psi	Avg. I.R.	58 BPM
Min. T.P. - 1400 psi	Sand	100,000# 20-40
Final T.P. - 2200 psi	Additives	None
Avg. T.P. - 1600 psi	Ball Sealers	95 in 112 holes
Ins. SIP - 200 psi	Sand Slurry	1.9 lb./gal.
5 Min. SIP - Vacume	Flush	46 bbls.
Job complete - 3:15		

OPEN FLOW TEST DATA

DATE January 2, 1964

Operator: Huron Drilling Company, Inc.		Lease: Huron No. 1-2	
Location: 940'FSL, 1132'FWL, Sec. 2, T26N, R4W		County: Rio Arriba	State: New Mexico
Formation: Mesaverde		Pool: Blanco	
Casing: Diameter: 4-1/2"	Set At: Feet: 6212	Tubing: Diameter: 1-1/2"	Set At: Feet: 6000
Pay Zone: From: 6048	To: 6153	Total Depth: 6219	
Stimulation 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: ---	+ 12 = PSIA: ---	Days Shut-in: 14	Shut-in Pressure, Tubing PSIG: 1192	+ 12 = PSIA: 1204
Flowing Pressure: P PSIG: 198	+ 12 = PSIA: 210		Working Pressure: P_w PSIG: ---	+ 12 = PSIA: ---
Temperature: T °F: 51	n = 0.75		Fpv (From Tables): 1.027	Gravity: 0.70 (est.)

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

$Q = 14.1605 \times 210 \times 1.0088 \times .9258 \times 1.027 =$ 2848 MCF/D

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

$Aof = \left(\quad \right)^n =$

Aof = _____ MCF/D

TESTED BY Clyde Phillips

WITNESSED BY _____

H. D. Hale, President

WELL: HURON NO. 1-2

12-18-63 Cont'd.

Set Baker top drillable magnesium bridge plug at 4100'. Perforated 3890'-3930', 3946'-3956' at two per foot. Dowell - four Allisons

Pump In 1 truck	950 psi	Initial I.R.	44 BPM
All trucks	1100 psi	Final I.R.	64 BPM
Max. T.P.	1100 psi	Avg. I.R.	66 BPM
Min. T.P.	900 psi	Sand	100,000# 20-40
Final T.P.	1100 psi	Additives	None
Avg. T.P.	1000 psi	Ball Sealers	65 in 100 holes
Inst. SIP	400 psi	Sand Slurry	1.9 lb/gal.
5 min. SIP	400 psi	Flush	None
Job Complete	6:15 A.M.		

12-19-63

Blew down to 1900'. Well began unloading. Went to 4063'. Well cleaning up. Gauged 1,250 MCFD. Drilled top off plug at 4100'. Logged off. Blew down to 3880'. Making sand and water. Gas increasing in volune and trying to unload.

12-20-63

Drilled plug loose. Blew and cleaned well. Pushed plug to bottom. Gauged well before laying down completion string. Well making 4260 MCFD. Set Model "D" packer at 6000' KB. Landed MV tubing. Running 1" tubing for PC zone.

12-21-63

Ran 184 joint 1 1/2" V.S. tubing. Total 5976.11' plus 11' subs plus K.B. 12'. Tubing landed at 5999.11'KB. with 8000# wt. on packer. Ran 120 joints 1" regular tubing. 3773.20' plus K.B. 12' set at 3785.20' KB. Finished job at 11:00 A.M. 12/20/63. One jet collar on 1" tubing at 3565.40' KB, one jet collar at 3094.40' KB.

12-22-63

After flowing MV for 24 hours well making 1450 MCF with small spray of water. PC pressure 1030/1030 SI for 7 day test.

12-23-63

Shut in for test.

OPEN FLOW TEST DATA

DATE December 26, 1963

Operator: Huron Drilling Company, Inc.		Lease: Huron No. 1-2	
Location: 940'FSL, 1132'FWL, Sec. 2, T26N, R4W		County: Rio Arriba	State: New Mexico
Formation: Pictured Cliffs		Pool: Tapacito	
Casing: Diameter: 7"	Set At: Feet: 4155	Tubing: Diameter: 1"	Set At: Feet: 3565
Pay Zone: From: 3890	To: 3956	Total Depth: 6219	
Stimulation 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: 1100	+ 12 = PSIA: 1112	Days Shut-in: 7	Shut-in Pressure, Tubing PSIG: 1096	+ 12 = PSIA: 1108
Flowing Pressure: P PSIG: 68	+ 12 = PSIA: 80		Working Pressure: P_w PSIG: 903	+ 12 = PSIA: 915
Temperature: T °F: 49	n = 0.85		Fpv (From Tables): 1.013	Gravity: 0.70 (est.)

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

$Q = 14.1605 \times 80 \times 1.0108 \times .9258 \times 1.013 =$ 1074 MCF/D

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

$Aof = \left(\frac{1112^2}{1112^2 - 915^2} \right)^n = 3.097^n = 2.615$

Aof = 2808 MCF/D

TESTED BY Clyde Phillips

WITNESSED BY _____

H. D. Hale, President