

El Paso Natural Gas Company

El Paso, Texas

October 4, 1957

DIRECT REPLY TO:
P. O. BOX 997
FARMINGTON, NEW MEXICO

Mr. A. L. Porter
Secretary and Director
Oil Conservation Commission
Box 871
Santa Fe, New Mexico

Dear Sir:

This is a request for administrative approval for a well dually completed in the Blanco Mesa Verde Pool and the South Blanco Pictured Cliffs Pool. The El Paso Natural Gas Company Storey No. 4 (PM) is located 900 feet from the North line and 1650 feet from the East line, Section 34, Township 28 North, Range 8 West, N.M.P.M., San Juan County, New Mexico.

This well has been completed in the Point Lookout and Cliff House sections of the Mesa Verde formation and in the Pictured Cliffs formation. Completion has been accomplished in the following manner:

1. 10 3/4" surface casing set at 173 feet with 125 sacks of cement circulated to the surface.
2. 7 5/8" intermediate casing set at 2804 feet with 250 sacks of cement. Top of the cement at 1335 feet, which is above the top of the Pictured Cliffs at 2640 feet.
3. 5 1/2" liner set from 2743 feet to 5060 feet with 300 sacks of cement.
4. The casing and liner were tested for leaks before perforating.
5. The Point Lookout section was perforated in four intervals and fractured with water and sand.
6. The Cliff House section was perforated in one interval and fractured with water and sand.
7. The Pictured Cliffs formation was perforated in one interval and fractured with water and sand.
8. All perforations were cleaned after treatment and completion was accomplished by setting a Baker Model EGJ production packer on 2" EUE tubing at 2848 feet with the tubing perforations set opposite the Point Lookout perforations. 1 1/4" EUE tubing was run, with the tubing perforations set opposite the Pictured Cliffs perforations, as a siphon string. The Point Lookout gas will be produced through the 2" tubing and the Pictured Cliffs gas through the casing.



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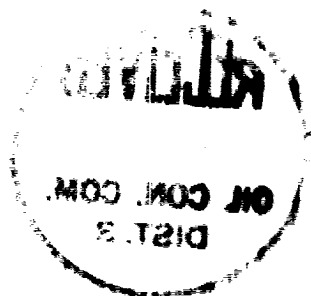
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9. A Garrett circulating sleeve was installed in the 2" EUE tubing string just below the Pictured Cliffs perforations. This will enable the bottom hole pressure tests to be taken at a future date if so required.
10. Initial potential tests have been run and commercial production has been found in both zones. A packer leakage test has been run and witnessed by a member of the Aztec office of the Oil Conservation Commission. This test shows no communication in the well bore between the two producing formations.

Administrative approval is requested for the dual completion to allow production from both known producing formations, eliminating the high initial cost of drilling two separate wells.

Since El Paso Natural Gas Company holds all leases immediately adjacent to the drilling block, the approval of any other operator has not been sought. Enclosed are:

- (a) Two copies of the schematic diagram of the mechanical installations.
- (b) Two copies of the affidavit from the packer setting company stating that the packer used was set at the depth shown.
- (c) Two copies of the packer leakage test as observed by a member of the Oil Conservation Commission.
- (d) Two copies of the initial potential test showing commercial production from the two formations.

It is intended to dedicate the N/2 of Section 34, Township 28 North, Range 8 West to the Mesa Verde formation and the NE/4 of Section 34, Township 28 North, Range 8 West to the Pictured Cliffs formation.

Any further information required will be furnished upon your request. Thank you for your consideration in this matter.

Yours very truly,

ORIGINAL SIGNED E. S. OBERLY

E. S. Oberly
Division Petroleum Engineer

ESO/dgb

Encl.

cc: Emery Arnold
Sam Smith
Phil McGrath



1. The first part of the report is a general description of the project and its objectives. It includes a brief history of the project and a statement of the problem to be solved.

2. The second part of the report is a detailed description of the methodology used in the study. It includes a description of the data sources, the statistical methods used, and the results of the analysis.

3. The third part of the report is a discussion of the results of the study. It includes a comparison of the results with the objectives of the project and a discussion of the implications of the findings.

4. The fourth part of the report is a conclusion and a list of references. The conclusion summarizes the main findings of the study and the references list the sources of information used in the report.

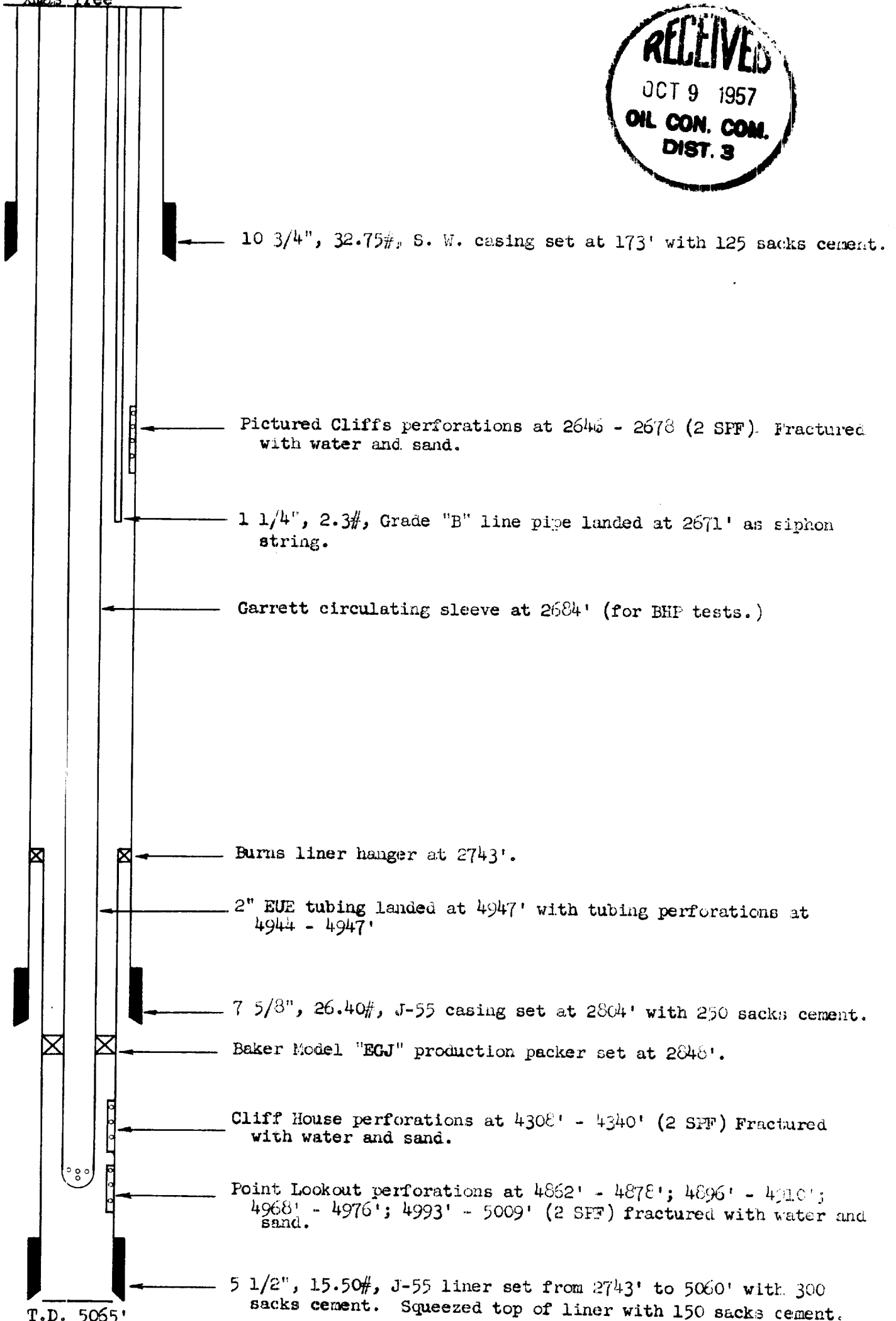
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SCHEMATIC DIAGRAM OF DUAL COMPLETION
El Paso Natural Gas Co. Storey No. 4 (PM)
(NE/4 Section 34, T28N, R6W)

Dual String
Xmas Tree

Zero reference point 10.0' above tubing head.



STATE OF NEW MEXICO
COUNTY OF SAN JUAN }



I, Mack M. Mahaffey, being first duly sworn upon my oath depose and say as follows:

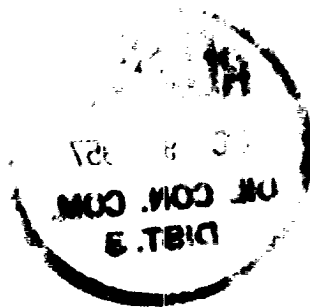
I am an employee of Baker Oil Tools, Inc., and that on September 4, 1957, I was called to the location of the El Paso Natural Gas Company Storey No. 4 (FM) Well located in the NW/4 NE/4 of Section 34, Township 28 North, Range 8 West, N.M.P.M., for advisory service in connection with installation of a production packer. In my presence, a Baker Model "EGJ" Production Packer was set in this well at 2848 feet in accordance with the usual practices and customs of the industry.

Mack M. Mahaffey

Subscribed and sworn to before me, a Notary Public in and for San Juan County, New Mexico, the 7 day of OCT., 1957.

Paul D. MacLachlan
Notary Public in and for San Juan County,
New Mexico

My commission expires February 24, 1960



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EL PASO NATURAL GAS COMPANY

P. O. Box 997
Farmington, N.M.

September 19, 1957

Mr. E. C. Arnold
Oil Conservation Commission
120 East Chaco
Aztec, New Mexico

Re: Packer Leakage Test on the El Paso Natural
Gas Company Well, Storey No. 4 (PM), NE
34-28-8, San Juan County, New Mexico.

Dear Mr. Arnold:

The subject well was dually completed in the Pictured Cliffs and Mesa Verde zones and a packer was set at 2848 feet. The Pictured Cliffs zone was tested through a 3/4" choke for three hours September 12, 1957 with the following data obtained:

Pictured Cliffs SIPC - 884 psig; shut-in 8 days
Pictured Cliffs SIPT - 884 psig

Mesa Verde SIPT - 980 psig; shut-in 8 days.



<u>Time</u> <u>Minutes</u>	<u>PC Flowing Pressure</u> <u>Casing Psig</u>	<u>MV SIPT Psig</u>	<u>PC Working</u> <u>Pressure, Psig</u>	<u>Temp °F</u>
0	On through casing			
15	512	980		64
30	367	981		65
45	288	981		66
60	210	982		67
180	145	983	149	68

The choke volume for the Pictured Cliffs was 2141 MCF/D with an A.O.F. of 2201 MCF/D.

The Mesa Verde zone was tested September 19, 1957 with a 3/4" choke for 3 hours with the following data obtained:

Pictured Cliffs SIPC - 921 psig; shut-in 7 days
Pictured Cliffs SIPT - 921 psig

Mesa Verde SIPT - 1026 psig; shut-in 15 days

<u>Time</u> <u>Minutes</u>	<u>MV Flowing Pressure</u> <u>Tubing Psig</u>	<u>PC SIPC Psig</u>	<u>MV Working</u> <u>Pressure, Psig</u>	<u>Temp °F</u>
15	395	921	Calculated	65
30	335	921		66
45	313	921		68
60	299	921		68
180	240	920	470	69

The choke volume for the Mesa Verde test was 3011 MCF/D with an A.O.F. of 3613 MCF/D.

The results of the above tests indicate there is no packer leakage.

Very truly yours,

R. A. Ullrich
R. A. Ullrich
Gas Engineer

RAU/jla

cc: E. J. Coel, Jr.
W. M. Rodgers
E. S. Oberly (6)
File



EL PASO NATURAL GAS COMPANY
GAS WELL TESTTo: Mr. E. E. Alsup
From: Gas Engineering DepartmentDate: September 19, 1957
Place: Farmington, New MexicoDUAL COMPLETIONCORRECTED COPYSubject: Test data on the El Paso Natural Gas Company Well,
STOREY NO. 4, San Juan County, New Mexico.

Tested By: R. A. Ullrich

Location Sec. 34 T. 23 R. 8 900'N, 1650'E

Shut-in Pressure P.C. SIPC 921 psig ; (Shut-in 15 days)
M.V. SIPT 1026 psig0.750" Choke Volume 3011 MCF/D @ 14.7 psia and 60° F. for 0.6
gravity gas. Flow through tubing for 3 hours.

Calculated 3 Hour Absolute Open Flow 3613 MCF/D

Working Pressure On casing = 470 Psig

Producing Formation Mesa Verde

Stimulation Method Sand Water Frac.

Total Depth 5065 - c/o 5020

Field Blanco

H₂S Sweet to lead acetate.

Final SIPC (PC) - 920 psig; packer at 2848; sleeve at 2684

cc: D. H. Tucker E. S. Oberly (6)
~~W. M. Rodgers~~ Bill Parrish
~~W. M. Rodgers~~ Dean Rittmann
~~W. M. Rodgers~~ Samuel Smith
W. M. Rodgers
Wayne Cheek
Drilling Department
B. D. Adams
~~W. M. Rodgers~~
Jack Purvis
~~W. M. Rodgers~~
D. C. Kennedy
E. J. Coel, Jr.
A. J. Dudenhoefter
File*Lewis D. Galloway*
L. D. Galloway

EL PASO NATURAL GAS COMPANY
OPEN FLOW TEST DATA

CORRECTED COPY

DUAL COMPLETION

DATE September 19, 1957

Operator El Paso Natural Gas Company		Lease Storey No. 4	
Location 900'N, 1650'E, Sec. 34-28-8		County San Juan	State New Mexico
Formation Mesa Verde		Pool Blanco	
Casing: Diameter 7-5/8	Set At: Feet 2793	Tubing: Diameter 2	Set At: Feet 4937
Perf Zone: From 4862	To 5009	Total Depth: 5065 - c/o 5020	
Stimulation Method Sand Water Frac.		Flow Through Casing	Flow Through Tubing X

Choke Size, Inches 0.75	Choke Constant: C 12.365		5-1/2" liner. 2743 to 5060	
Shut-In Pressure, Casing, PSIG PC 921	- 12 = PSIA 933	Days Shut-In 15	Shut-In Pressure, Tubing PSIG 1026	- 12 = PSIA 1038
Flowing Pressure: P PSIG MY 240	- 12 = PSIA 252		Working Pressure: Pw PSIG Calculated	- 12 = PSIA 482
Temperature: T °F 69	n = .75		Fpv (From Tables) 1.026	Gravity .665

Final SIFPC (PC) - 920 psig. Packer at 2848. Sleeve at 2684

CHOCKE VOLUME = Q = C x P_i x F_i x F_g x F_{pv}

$$Q = 12.365 \times 252 \times .9915 \times .9498 \times 1.026 = 3011 \text{ MCF/D}$$

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

$$Aof = \left(\frac{1,077,444}{845,120} \right)^n = 1.2749^{.75} \times 3011 = 1.20 \times 3011$$

$$Aof = 3613 \text{ MCF/D}$$

TESTED BY R. A. Ullrich

WITNESSED BY _____

cc: E. S. Oberly (6)

L. D. Galloway
L. D. Galloway



EL PASO NATURAL GAS COMPANY
GAS WELL TEST

To: Mr. E. E. Alsup

Date: September 12, 1957

From: Gas Engineering Department

Place: Farmington, New Mexico

DUAL COMPLETIONSubject: Test data on the El Paso Natural Gas Company Well,
STOREY NO. 4, San Juan County, New Mexico.

Tested By: R. A. Ullrich

Location Sec. 34 T. 28 R. 8 .900'N, 1650'E

Shut-In Pressure P.C. SIPC 884 psig ; (Shut-in 8 days)
P.C. SIPT 884 psig
M.V. SIPT 980 psig0.750" Choke Volume 2141 MCF/D @ 14.7 psia and 60° F. for 0.6
gravity gas. Flow through casing for 3 hours.

Calculated 3 Hour Absolute Open Flow 2201 MCF/D

Working Pressure On tubing = 149 Psig

Producing Formation Pictured Cliffs

Stimulation Method Sand Water Frac.

Total Depth 5065 - c/o 5020

Field Undesignated

H₂S Sweet to lead acetate.

Final SIPT (Mesa Verde) - 983 psig. Packer at 2848



cc: D. H. Tucker

Bill Parrish

~~W. T. Hollis~~

Dean Rittmann

W. T. Hollis

~~G. D. Weller~~

W. M. Rodgers

Wayne Cheek

Drilling Department

B. D. Adams

Roland Hamblin

Jack Purvis

~~W. T. Hollis~~

C. C. Kennedy

E. J. Coel, Jr. (6)

A. J. Dudenhoeffer

File

L. D. Galloway

EL PASO NATURAL GAS COMPANY
OPEN FLOW TEST DATA

DUAL COMPLETION

DATE September 12, 1957

Operator El Paso Natural Gas		Lease Storey No. 4	
Location 990'N, 1650'E, Sec. 34-28-8		County San Juan	State New Mexico
Formation Pictured Cliffs		Pool Undesignated	
Casing: Diameter 7-5/8	Set At: Feet 2793	Tubing: Diameter 1-1/4	Set At: Feet 2661
Perforation Zone: From 2646	To 2678	Total Depth: 5065 - c/o 5020	
Stimulation Method Sand Water Frac.		Flow Through Casing X	Flow Through Tubing

Choke Size, Inches 0.75		Choke Constant: C 14.1605		5-1/2" liner. 2743 - 5060	
Shut-In Pressure, Casing, PSIG 884	- 12 = PSIA 896	Days Shut-In 8	Shut-In Pressure, Tubing, PSIG 884	- 12 = PSIA 896	
Flowing Pressure: P, PSIG 145	- 12 = PSIA 157		Working Pressure: Pw, PSIG 149	- 12 = PSIA 161	
Temperature: T, °F 68	n = .85		Fpv (From Tables) 1.014	Gravity .655	

Start SIPT (MV) - 980 psig - Final - 983 psig. Packer at 2848. Sleeve at 2684

CHOKE VOLUME = Q = C x P_i x F_i x F_g x F_{pv}

Q = 14.1605 x 157 x .9924 x .9571 x 1.014 = 2141 MCF/D

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

Aof = $\left(\frac{802,816}{776,895} \right)^n = 1.0333^{.75} \times 2141 = 1.0282 \times 2141$

Aof = 2201 MCF/D

TESTED BY R. A. Ullrich

WITNESSED BY _____

cc: E. J. Cosl, Jr. (6)

L. D. Galloway
L. D. Galloway

