

El Paso Natural Gas Company

El Paso, Texas

December 13, 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 qually completed in the Aztec Pictured Cliffs Extension Pool and in the Blanco Mesa Verde Pool. The El Paso Natural Gas Company Warren No. 2-A (PM) is located 917 feet from the North line and 1125 feet from the East line of Section 23, Township 28 North, Range 9 West, N.M.P.M., San Juan County, New Mexico.

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

1. 10 3/4" surface casing set at 174 feet with 150 sacks of cement circulated to the surface.
2. 7 5/8" intermediate casing set at 2576 feet with 250 sacks of cement. Top of the cement is at 1300 feet, which is above the top of the Pictured Cliffs at 2401 feet.
3. 5 1/2" liner set from 2521 feet to 4919 feet with 300 sacks of cement.
4. The casing and liner were tested for leaks before perforating.
5. The Point Lookout and Menefee sections were perforated in eight intervals and fractured with water and sand.
6. The Pictured Cliffs formation was perforated in two intervals and fractured with water and sand.
7. All perforations were cleaned after treatment and completion was accomplished by setting a Baker Model "EGJ" production packer on 2" EUE tubing at 2606 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.



COPY

Page 2 of 2

2. *Neotoma* 50

1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100. 101. 102. 103. 104. 105. 106. 107. 108. 109. 110. 111. 112. 113. 114. 115. 116. 117. 118. 119. 120. 121. 122. 123. 124. 125. 126. 127. 128. 129. 130. 131. 132. 133. 134. 135. 136. 137. 138. 139. 140. 141. 142. 143. 144. 145. 146. 147. 148. 149. 150. 151. 152. 153. 154. 155. 156. 157. 158. 159. 160. 161. 162. 163. 164. 165. 166. 167. 168. 169. 170. 171. 172. 173. 174. 175. 176. 177. 178. 179. 180. 181. 182. 183. 184. 185. 186. 187. 188. 189. 190. 191. 192. 193. 194. 195. 196. 197. 198. 199. 200. 201. 202. 203. 204. 205. 206. 207. 208. 209. 210. 211. 212. 213. 214. 215. 216. 217. 218. 219. 220. 221. 222. 223. 224. 225. 226. 227. 228. 229. 230. 231. 232. 233. 234. 235. 236. 237. 238. 239. 240. 241. 242. 243. 244. 245. 246. 247. 248. 249. 250. 251. 252. 253. 254. 255. 256. 257. 258. 259. 260. 261. 262. 263. 264. 265. 266. 267. 268. 269. 270. 271. 272. 273. 274. 275. 276. 277. 278. 279. 280. 281. 282. 283. 284. 285. 286. 287. 288. 289. 290. 291. 292. 293. 294. 295. 296. 297. 298. 299. 300. 301. 302. 303. 304. 305. 306. 307. 308. 309. 310. 311. 312. 313. 314. 315. 316. 317. 318. 319. 320. 321. 322. 323. 324. 325. 326. 327. 328. 329. 330. 331. 332. 333. 334. 335. 336. 337. 338. 339. 340. 341. 342. 343. 344. 345. 346. 347. 348. 349. 350. 351. 352. 353. 354. 355. 356. 357. 358. 359. 360. 361. 362. 363. 364. 365. 366. 367. 368. 369. 370. 371. 372. 373. 374. 375. 376. 377. 378. 379. 380. 381. 382. 383. 384. 385. 386. 387. 388. 389. 390. 391. 392. 393. 394. 395. 396. 397. 398. 399. 400. 401. 402. 403. 404. 405. 406. 407. 408. 409. 410. 411. 412. 413. 414. 415. 416. 417. 418. 419. 420. 421. 422. 423. 424. 425. 426. 427. 428. 429. 430. 431. 432. 433. 434. 435. 436. 437. 438. 439. 440. 441. 442. 443. 444. 445. 446. 447. 448. 449. 450. 451. 452. 453. 454. 455. 456. 457. 458. 459. 460. 461. 462. 463. 464. 465. 466. 467. 468. 469. 470. 471. 472. 473. 474. 475. 476. 477. 478. 479. 480. 481. 482. 483. 484. 485. 486. 487. 488. 489. 490. 491. 492. 493. 494. 495. 496. 497. 498. 499. 500. 501. 502. 503. 504. 505. 506. 507. 508. 509. 510. 511. 512. 513. 514. 515. 516. 517. 518. 519. 520. 521. 522. 523. 524. 525. 526. 527. 528. 529. 530. 531. 532. 533. 534. 535. 536. 537. 538. 539. 540. 541. 542. 543. 544. 545. 546. 547. 548. 549. 550. 551. 552. 553. 554. 555. 556. 557. 558. 559. 560. 561. 562. 563. 564. 565. 566. 567. 568. 569. 570. 571. 572. 573. 574. 575. 576. 577. 578. 579. 580. 581. 582. 583. 584. 585. 586. 587. 588. 589. 590. 591. 592. 593. 594. 595. 596. 597. 598. 599. 600. 601. 602. 603. 604. 605. 606. 607. 608. 609. 610. 611. 612. 613. 614. 615. 616. 617. 618. 619. 620. 621. 622. 623. 624. 625. 626. 627. 628. 629. 630. 631. 632. 633. 634. 635. 636. 637. 638. 639. 640. 641. 642. 643. 644. 645. 646. 647. 648. 649. 650. 651. 652. 653. 654. 655. 656. 657. 658. 659. 660. 661. 662. 663. 664. 665. 666. 667. 668. 669. 670. 671. 672. 673. 674. 675. 676. 677. 678. 679. 680. 681. 682. 683. 684. 685. 686. 687. 688. 689. 690. 691. 692. 693. 694. 695. 696. 697. 698. 699. 700. 701. 702. 703. 704. 705. 706. 707. 708. 709. 710. 711. 712. 713. 714. 715. 716. 717. 718. 719. 720. 721. 722. 723. 724. 725. 726. 727. 728. 729. 730. 731. 732. 733. 734. 735. 736. 737. 738. 739. 740. 741. 742. 743. 744. 745. 746. 747. 748. 749. 750. 751. 752. 753. 754. 755. 756. 757. 758. 759. 760. 761. 762. 763. 764. 765. 766. 767. 768. 769. 770. 771. 772. 773. 774. 775. 776. 777. 778. 779. 780. 781. 782. 783. 784. 785. 786. 787. 788. 789. 790. 791. 792. 793. 794. 795. 796. 797. 798. 799. 800. 801. 802. 803. 804. 805. 806. 807. 808. 809. 810. 811. 812. 813. 814. 815. 816. 817. 818. 819. 820. 821. 822. 823. 824. 825. 826. 827. 828. 829. 830. 831. 832. 833. 834. 835. 836. 837. 838. 839. 840. 84



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8. 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.
9. 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 dedicated acreage, approval has not been sought from any other operator to dually complete this well. 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 E/2 of Section 23, Township 28 North, Range 9 West to the Mesa Verde formation and the NE/4 of Section 23, Township 28 North, Range 9 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





STATE OF NEW MEXICO)
)
COUNTY OF SAN JUAN)

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

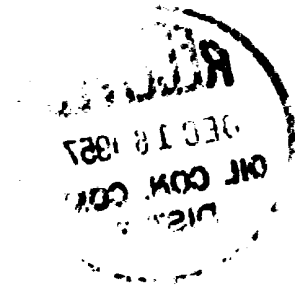
I am an employee of Baker Oil Tools, Inc., and that on November 2,
1957, I was called to the location of the El Paso Natural Gas Company
Warren No. 2-A (FM) Well located in the NE1/4 of Section 23, Township
28 North, Range 9 West, N.M.P.M., for advisory service in connection with
installation of a production packer. In my presence, a Baker Model "EGJ"
Production Packer was set in this well at 2635 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 10 day of DEC, 1957.

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

My commission expires February 24, 1960.



1. The first of these is the fact that the...

2. The second of these is the fact that the...

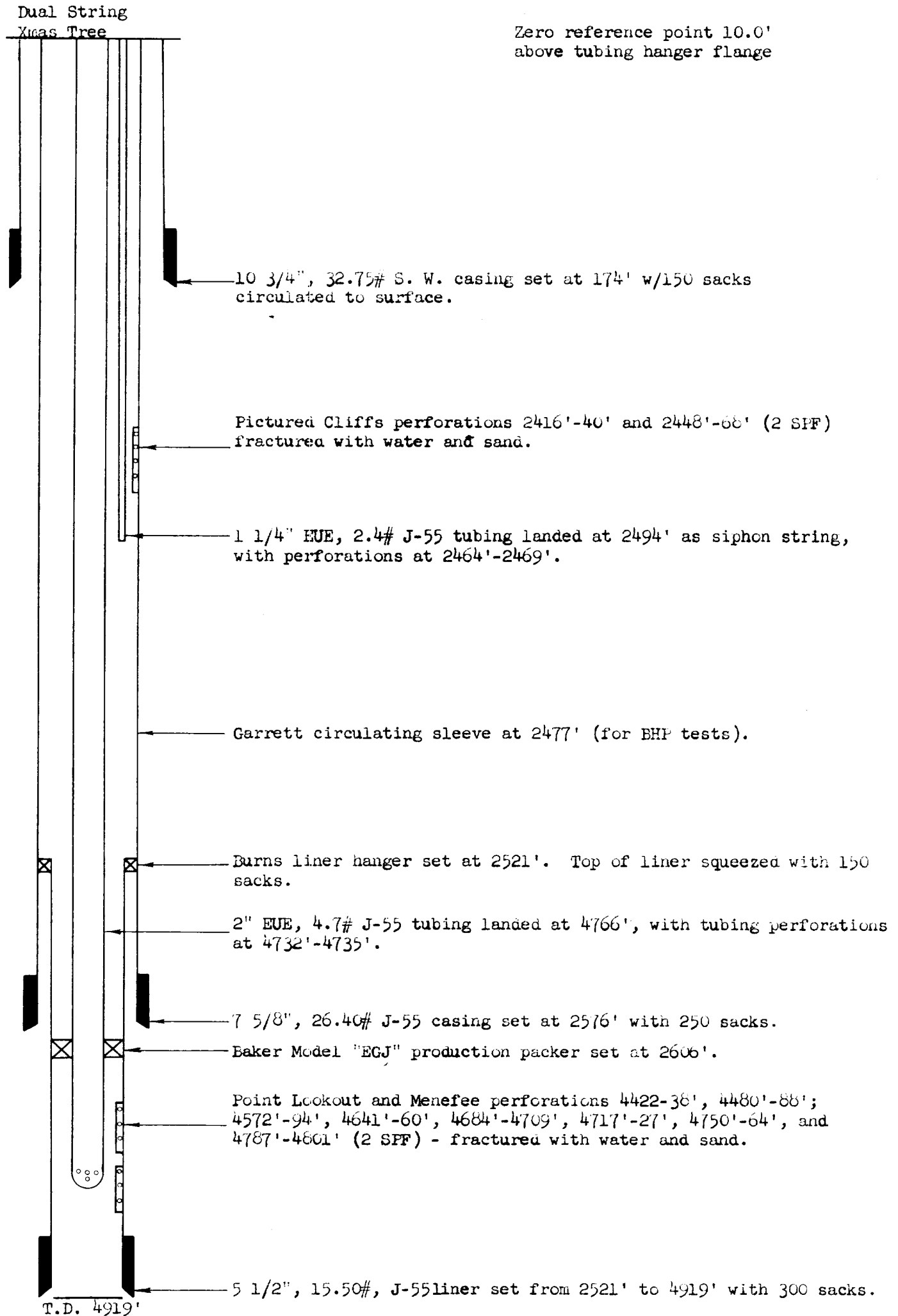
3. The third of these is the fact that the...

4. The fourth of these is the fact that the...

5. The fifth of these is the fact that the...

6. The sixth of these is the fact that the...

SCHEMATIC DIAGRAM OF DUAL COMPLETION
EL PASO NATURAL GAS COMPANY WARREN NO. 2-A (PM)
NE/4 Section 23, T-28-N, R-9-W



EL PASO NATURAL GAS COMPANY

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

November 20, 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, Warren No. 2-A (PM),
917'N, 1125'E, Sec. 23-28-9, 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 2635 feet. The Pictured Cliffs zone was tested through a 3/4" choke for three hours November 12, 1957, with the following data obtained:

Pictured Cliffs SIPC 804 psig; shut-in 10 days
Pictured Cliffs SIPT 804 psig

Mesa Verde SIPT 1015 psig; shut-in 10 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 | | | | |
| 15 | 345 | 1015 | | 49 |
| 30 | 307 | 1016 | 307 | 52 |
| 45 | 262 | 1017 | | 53 |
| 60 | 245 | 1017 | 249 | 54 |
| 120 | 215 | 1017 | 219 | 58 |
| 180 | 202 | 1019 | 205 | 58 |

The choke volume for the Pictured Cliffs was 2629 MCF/D with an A.O.F. of 2798 MCF/D.

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

Pictured Cliffs SIPC 824 psig; shut-in 7 days
Pictured Cliffs SIPT 824 psig

Mesa Verde SIPT 1032 psig; shut-in 17 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> |
|-------------------------------|--|---------------------|--|-----------------|
| 0 | | | | |
| 15 | 484 | 827 | | 64 |
| 30 | 427 | 827 | | 64 |
| 45 | 387 | 827 | | 65 |
| 60 | 370 | 827 | | 65 |
| 120 | 340 | 828 | | 67 |
| 180 | 320 | 828 | Calculated 621 | 67 |

The choke volume for the Mesa Verde test was 3885 MCF/D with an A.O.F. of 5482 MCF/D.

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

Very truly yours,

S. V. Roberts

S. V. Roberts
Gas Engineer

SVR/jla

cc: W. M. Rodgers
E. S. Oberly (6)
File



EL PASO NATURAL GAS COMPANY
GAS WELL TEST

To: Mr. Ed E. Alsup

Date: November 19, 1957

From: Gas Engineering Department

Place: Farmington, New Mexico

DUAL COMPLETIONSubject: Test data on the El Paso Natural Gas Company Well,
WARREN NO. 2-A (M), San Juan County, New Mexico.

Tested By: R. R. Davis

Location Sec. 23 T. 28 R. 9 917'N, 1125'E

Shut-In Pressure P.C. SIPC 824 psig ; (Shut-in 7 days)
P.C. SIPT 824 psig
M.V. SIPT 1032 psig0.750" Choke Volume 3885 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 5482 MCF/D

Working Pressure On Calculated = 621 Psig

Producing Formation Mesa Verde

Stimulation Method Sand Water Frac.

Total Depth 4917 - c/o 4875

Field Blanco

H2S Sweet to lead acetate.

Final SIPC (PC) - 828 psig. Packer at 2635. Sleeve at 2477.

cc: D. H. Tucker

~~W. M. Rodgers~~~~W. H. Hanks~~~~J. D. Hanks~~

W. M. Rodgers

Wayne Cheek

Drilling Department

B. D. Adams

~~Robert Hanks~~

Jack Purvis

~~W. H. Hanks~~

C. C. Kennedy

E. J. Coel, Jr.

A. J. Dudenhoeffer

File

Bill Parrish

Dean Rittmann

Samuel Smith

E. S. Oberly (6)

Lewis D. Galloway
L. D. GallowayMedium fog first 2-1/2 hours of test period. Heavy fog last 1/2 hour of
test period.

EL PASO NATURAL GAS COMPANY
OPEN FLOW TEST DATADUAL COMPLETIONDATE November 19, 1957

| | | | |
|---|---|--|---------------------------------|
| Operator
El Paso Natural Gas | | Lease
Warren No. 2-A (M) | |
| Location
917'N, 1125'E, Sec. 23-28-9 | | County
San Juan | State
New Mexico |
| Formation
Mesa Verde | | Pool
Blanco | |
| Casing: Diameter
7-5/8
5-1/2" liner | Set At: Feet
4875
2521 - 4919 | Tubing: Diameter
2" | Set At: Feet
4756 |
| Pay Zone: From
4422 | To
4801 | Total Depth:
4917 - c/o 4875 | |
| Stimulation Method
Sand Water Frac. | | Flow Through Casing | Flow Through Tubing
X |

| | | | | | |
|---|---------------------------|------------------------------------|---|----------------------------|--|
| Choke Size, inches
.750 | | Choke Constant: C
12.365 | | | |
| Shut-In Pressure, Casing, PSIG
PC 824 | - 12 PSIA
836 | Days Shut-In
7 | Shut-In Pressure, Tubing PSIG
MV 1032 | - 12 = PSIA
1044 | |
| Flowing Pressure: P PSIG
320 | - 12 = PSIA
332 | | Working Pressure: Pw PSIG
Calculated | - 12 = PSIA
633 | |
| Temperature: T °F
67 | n =
.750 | | Fpv (From Tables)
1.040 | Gravity
.715 | |

Final SIPC (PC) - 828 psig. Packer at 2635. Sleeve at 2477

CHOKE VOLUME = $Q = C \times P_r \times F_r \times F_g \times F_{pv}$

$$Q = 12.365 \times 332 \times .9933 \times .9161 \times 1.040 = 3885 \text{ MCF/D}$$

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


$$Aof = \left(\frac{1,089,936}{689,247} \right)^n \cdot 1.5813^{.75} \times 3885 = 1.4110 \times 3885$$

$$Aof = 5482 \text{ MCF/D}$$

TESTED BY R. R. Davis

WITNESSED BY _____

cc: E. S. Oberly (6)

Medium fog first 2-1/2 hours of test period.
Heavy fog last 1/2 hour of test period.

 L. D. Galloway

EL PASO NATURAL GAS COMPANY
GAS WELL TEST

To: Mr. Ed E. Alsup

Date: November 12, 1957

From: Gas Engineering Department

Place: Farmington, New Mexico

DUAL COMPLETIONSubject: Test data on the El Paso Natural Gas Company Well,
WARREN NO. 2A (P), San Juan County, New Mexico.

Tested By: Robert R. Davis

Location Sec. 23 T. 28 R. 9 917'N, 1125'E

Shut-In Pressure P.C. SIPC 804 psig ; (Shut-in 10 days)
P.C. SIPT 804 psig

M.V. SIPT 1015

0.750" Choke Volume 2629 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 2798 MCF/D

Working Pressure On tubing = 205 Psig

Producing Formation Pictured Cliffs

Stimulation Method Sand Water Frac.

Total Depth 4917 - c/o 4875

Field Undesignated

H2S Sweet to lead acetate.

Initial SIPT (MV) - 1015 psig. Final SIPT (MV) - 1019 psig

cc: D. H. Tucker

Bill Parrish

~~R. W. H. H. H. H.~~

Dean Rittmann

~~R. W. H. H. H. H.~~

Samuel Smith

~~R. W. H. H. H. H.~~

E. S. Oberly (6)

W. M. Rodgers

Wayne Cheek

Drilling Department

B. D. Adams

~~R. W. H. H. H. H.~~

Jack Purvis

~~R. W. H. H. H. H.~~

C. C. Kennedy

E. J. Coel, Jr.

A. J. Dudenhoeffer

File

Lewis D. Galloway
L. D. Galloway

EL PASO NATURAL GAS COMPANY
OPEN FLOW TEST DATA

DUAL COMPLETION

DATE November 12, 1957

| | | | |
|--|---|--|-----------------------------|
| Operator
El Paso Natural Gas | | Lease
Warren No. 2A (P) | |
| Location
917'N, 1125'E, Sec. 23-28-9 | | County
San Juan " | State
New Mexico |
| Formation
Pictured Cliffs | | Pool
Undesignated | |
| Well Diameter
7-5/8
5-1/2 | Set At: Feet
4875
2521 - 4919 | Tubing: Diameter
1-1/4 | Set At: Feet
2484 |
| Pay Zone: From
2416 | To
2468 | Total Depth:
4917 - c/o 4875 | |
| Stimulation Method
Sand Water Frac. | | Flow Through Casing
X | Flow Through Tubing |

| | | | | |
|---|------------------------------------|---------------------------|--|---------------------------|
| Choke Size, inches
.750 | Choke Constant: C
12.365 | | | |
| Shut-In Pressure, Casing, PSIG
PC 804 | - 12 = PSIA
816 | Days Shut-In
10 | Shut-In Pressure, Tubing PSIG
PC 804 | - 12 = PSIA
816 |
| Flowing Pressure: P PSIG
202 | - 12 = PSIA
214 | | Working Pressure: Pw PSIG
205 | - 12 = PSIA
217 |
| Temperature: T
58 | | | Fpv (From Tables)
1.020 | Gravity
.635 |

Initial SIPT (MV) - 1015 psig. Final SIPC (MV) - 1019 psig

CHOKE VOLUME = $Q = C \times P_c \times F_p \times F_g \times F_{pv}$

$$Q \quad 12.365 \times 214 \times 1.0019 \times .9721 \times 1.020 \quad \underline{2629} \quad \text{MCF/D}$$

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

$$Aof \left(\frac{665,856}{618,767} \right)^n = 1.0761^{.35} \times 2629 = 1.0643 \times 2629$$

$$Aof \quad \underline{2798} \quad \text{MCF/D}$$

TESTED BY Robert R. Davis

WITNESSED BY _____

cc: E. S. Oberly (6)



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